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REDUCTION OF OSCILLATOR ORBITAL SYMMETRY PARTITIONS INTO IR OF SU(3)

By

KOTA V. KRISHNA BRAHMAM

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ABSTRACT

We have developed a computer code to reduce the partitions of oscillator orbital symmetry groups, viz. $U((n+1)(n+2/2)$ into irreducible representations of SU(3) group. The method of obtaining the reductions is given in detail. The group theoretical notions required to understand the present report are also included. A complete reduction of the chain $U(10) \supset SU(3)$ (for $U(10)$ partitions having not more than four columns) is appended.

C O N T E N T S

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Introduction

With the pioneer works of Wigner, Racah[1] and Elliott[2] group theoretical methods or in other words the symmetry principles came into full usage in many branches of physics. Most profound applications of the group theoretical methods are being made in nuclear physics. The group SU(4) introduced by Wigner takes care of the spin-isospin independence of the nuclear forces[3]. The sympletic group introduced by Racah takes care of the pairing aspects of nuclear forces[4]. The group SU(3) introduced by Elliott brings in the rotational features of the nuclear spectra. Perhaps, the SU(3) group is the best example where an intermediate group is used to study nuclear structure. Besides these three symmetries there are many other symmetry groups which are used to explain a wide variety of nuclear phenomena. For example, in the two-level model of Krumlinde and Zymanski[5] various subgroup chains of the R(8) group are used to study the 'Backbending Effect'. The chains $U(6) \supset SU(3)$ and $U(6) \supset U(5) \supset R(5) \supset R(3)$ are used by Arima and Iachello[6] to explain the collective behaviour of nuclei(both vibrations and rotations) in a 'Boson interacting model'. The near degeneracy of the pseudo spin-orbit doublets of the type $[(\ell + \frac{1}{2}), (\ell + 4) - \frac{1}{2}]$ lead to the introduction of the pseudo L-S and pseudo SU(3) coupling schemes by Arima et al[7] and Hecht and Adler[8]. These symmetries

are being used in the studies of heavy deformed nuclei where the group chains U((n+1)(n+2)/2) ⊃ SU(3) ⊃ R(3) are used, $\hat{\eta}$ being the pseudo major oscillator shell-number. Recently some non-compact groups like SL(3,R)[9] and Sp(3,R)[10] are being used to understand nuclear structure.

An excellent review of various group symmetries that are being used in nuclear physics is given by Hecht[11]. Similar review articles by various experts can also be found in the proceedings of the XVth Solvay Conference which was devoted to the contributions of group theory and how it aided the tremendous progress towards understanding the atomic nucleus[12].

To make use of a group chain G ⊃ G', the first question one asks is: what irreducible representations (IR) of G' are contained in a given IR of G. For compact Lie groups a complete answer to this question is given by Littlewood by introducing the concept of Plethysm[13]. Although the theory of S-functions and the plethysm theory provides a complete answer, it is often very difficult to use them directly. This we will see in detail at a later stage.

When we assume the nucleons to be moving in an average central field approximated by an isotropic three dimensional oscillator field, one obtains the shell model of the nucleus. The orbital angular momentum quantum numbers (ℓ) that are possible for a single particle in a given major oscillator shell (η) are given by

$$\ell = \eta, \eta-2, \cdots, 0 \text{ or } 1$$

(I.1)

From the above series one notices that the highest orbital symmetry group for a given number of nucleons in a given shell η, is $U((n+1)(n+2)/2)$ (hereafter denoted by U(S); the unitary group in S dimensions). This is a good symmetry group for spin-isospin independent fields. Elliott exploited the potential usefulness of the group SU(3) in the chain $U(S) \supset SU(3) \supset R(3)$. To make use of this chain, one should essentially know how to reduce this chain. The problem of reducing the chain $SU(3) \supset R(3)$ is given completely by Elliott[4]. An alternative derivation can be seen in the paper of Racah[14]. The solution is as follows:

$$L = K, K+1, \cdots\cdots, K+\bar{\lambda}, \quad K \neq 0$$

$$= \bar{\lambda}, \bar{\lambda}-2, \cdots\cdots, 0 \text{ or } 1, \quad K = 0$$

where $\quad K = \bar{\mu}, \bar{\mu}-2, \cdots\cdots, 0 \text{ or } 1$

where $\bar{\mu}$ is smaller of λ and μ, $\bar{\lambda}$ is larger of λ and μ. $(\lambda\mu)$ is IR of SU(3) and L are IR of R(3).

Now we are left with the problem of reducing the chain $U(S) \supset SU(3)$. For $\eta = 1$ the answer is trivial. For $\eta = 2$ a complete answer is given by Flores and Perez[15]. Note that they make use of the general expression for $\{2\} \otimes \{f\}$, $\{f\}$ being the S-function corresponding to a totally symmetric partition $[f]$, derived by Chacon[15]. For $\eta = 3$ and $\eta = 4$ shells only partial listings are available in literature[16,17]. These are all hand made calculations, which make use of the Littlewood's techniques. The aim of the present report

is to provide a complete answer to this problem. A general computer programme to find IR of SU(3) in a given U(S) partition is appended (see Appendix-A). The routines developed are based on the technique developed by the author recently[18]. This we will discuss in detail in section B. In section A we give a brief review of various group theoretical concepts needed to understand the general philosophy adopted in the development of the routines. A complete discription of the routines is given in section C. Some applications and concluding remarks are given in section D. In appendix-B the reduction of the chain $U(10) \supset SU(3)$ (for partitions having not more than four columns) is given. In appendix C tensor decomposition of one and two-body operators in $\eta = 4$ shell is given.

SECTION-A

A Survey of some group theoretical concepts:

To understand the routines a formal knowledge of various concepts of the permutations group is needed. To make this report self contained, they will be reviewed in this section. We will introduce a new concept, called the 'order of a partition'. We replace proofs throughout by some simple examples. An extensive introduction to the permutation groups and S-function theory is given by Wybourne[19]. One can also look into the works of Hamermesh[20] and Littlewood[21] for further details.

A.1 Permutation Group:

The set of all permutations of n objects from a group, called the permutation group denoted by S_n. A permutation $(\alpha_1, \alpha_2, \cdots, \alpha_n)$ is a mapping of the n objects onto the n-objects. For example, for three particles we can write a permutation as

$$\begin{pmatrix} 1 & 2 & 3 \\ 2 & 1 & 3 \end{pmatrix}$$

which means the first object is mapped to the second, the second to the first and the third to the third.

For $\alpha_1, \alpha_2, \alpha_3, \cdots, \alpha_n$ objects

$$\begin{pmatrix} \alpha_1 & \alpha_2 & \alpha_3 & - & - & - & \alpha_n \\ \alpha_1 & \alpha_2 & \alpha_3 & - & - & - & \alpha_n \end{pmatrix}$$

is the identity element of S_n. The inverse is defined by

$$\begin{pmatrix} \alpha_1 & \alpha_2 & \cdots & \alpha_n \\ \alpha_1' & \alpha_2' & \cdots & \alpha_n' \end{pmatrix}^{-1} = \begin{pmatrix} \alpha_1' & \alpha_2' & \cdots & \alpha_n' \\ \alpha_1 & \alpha_2 & \cdots & \alpha_n \end{pmatrix}$$

and the group multiplication is given by

$$\begin{pmatrix} \alpha_1 & \alpha_2 & \cdots & \alpha_n \\ \alpha_1' & \alpha_2' & \cdots & \alpha_n' \end{pmatrix} \begin{pmatrix} \alpha_1' & \alpha_2' & \cdots & \alpha_n' \\ \alpha_1'' & \alpha_2'' & \cdots & \alpha_n'' \end{pmatrix} = \begin{pmatrix} \alpha_1 & \alpha_2 & \cdots & \alpha_n \\ \alpha_1'' & \alpha_2'' & \cdots & \alpha_n'' \end{pmatrix}$$

It can be seen easily that the group multiplication is closed.

A.2   Cycle:

If, in a permutation

$$\alpha_1 \rightarrow \alpha_2, \quad \alpha_2 \rightarrow \alpha_3, \quad \cdots, \quad \alpha_r \rightarrow \alpha_1$$

then we call it a cycle denoted by

$$\begin{pmatrix} \alpha_1 & \alpha_2 & \cdots & \alpha_r \end{pmatrix}$$

Moreover it is called a cycle of length r (for $r \neq 0$). So any permutation can be devided into cycles. For example,

$$\begin{pmatrix} 1 & 2 & 3 \\ 2 & 1 & 3 \end{pmatrix} = (12)(3)$$

$$\begin{pmatrix} 1 & 2 & 3 & 4 \\ 2 & 3 & 4 & 1 \end{pmatrix} = (12\,34)$$

A.3. <u>Cyclic Structure:</u>

If in a permutation there are ν_1 cycles of length one, ν_2 cycles of length two,...., ν_n cycles of length n, then we define the cyclic structure (f) corresponding to the given permutation by

$$f = \left(1^{\nu_1} 2^{\nu_2} \cdots n^{\nu_n} \right)$$

Example: For three objects, the possible cyclic structures are

$$\left(1^0 2^0 3^1 \right) , \quad \left(1^1 2^1 3^0 \right) , \quad \left(1^3 2^0 3^0 \right)$$

It is easy to note that

$$\nu_1 + 2 \nu_2 + 3 \nu_3 + \cdots + n \nu_n = n$$

A.4. <u>Partition:</u>

Given an integer N, we can find N numbers

$$\lambda_1, \lambda_2, \cdots, \lambda_N \quad \text{such that}$$

$$\lambda_1 \geqslant \lambda_2 \geqslant \cdots \geqslant \lambda_N \geqslant 0 \tag{1.A}$$

$$\lambda_1 + \lambda_2 + \cdots + \lambda_N = N \tag{2.A}$$

We call $\left[\lambda_1, \lambda_2 \cdots \lambda_N \right]$ a partition of the integer N. (We often denote a partition by the symbol $\{f\}$).

Example: For three particles, the possible partitions are:

$$[300] \quad , \quad [210] \quad , \quad [111]$$

For brevity we will write $[111]$ as $[1^3]$, similarly $[300]$ as $[3]$. A totally symmetric partition is denoted by $[N]$ and a totally antisymmetric partition by $[1^N]$. Diagrametric representation of a partition is known as young tableau. For three particles the possible young tableau are

$$[3] \quad = \quad \boxed{||}$$

$$[2,1] \quad = \quad$$

$$[1^3] \quad = \quad$$

An young tableauxis called an irregular tableaux if eq.(1.A) is invalid.

A.5. <u>Equivalence between partition and cyclic structure:</u>

Given a partition $[\lambda_1 \; \lambda_2 \; --- \; \lambda_N]$ of the integer N, the corresponding cyclic structure $(1^{\nu_1} \; 2^{\nu_2} \; ---- \; N^{\nu_N})$ is found by

$$\nu_1 = \lambda_1 - \lambda_2$$

$$\nu_2 = \lambda_2 - \lambda_3$$

$$\vdots \qquad \vdots$$

$$\nu_{N-1} = \lambda_{N-1} - \lambda_N$$

$$\nu_N = \lambda_N$$

$$(3.A)$$

A.6. Irreducible representations of the symmetric group:

All the permutations having the same cyclic structure belong to the same class. Hence the distinct classes (a set of elements of S_n which transform onto themselves through a similarity transformation by the elements of S_n, form a class) can be labelled by the cyclic structures.

Example: The distinct classes of four objects can be labelled as

$$4^1, \; 3^1 1^1, \; 2^2, \; 2^1 1^2, \; 1^4$$

ii) As the number of irreducible representations of S_n is identical to the number of classes, and corresponding to a class, there will be one and only one cyclic structure and a cyclic structure in turn have a unique partition, we use the partitions to label the IR of the permutation group.

Note: Because of the well known duality between S_N and $U(N)$[22], we can use the label $[f]$ of the symmetric group as the label for the IR of $U(N)$.

A.7. Dimensionality:

The dimensionality of a partition $[f_1 \; f_2 \; \ldots \; f_N]$ of $U(N)$ is given by

$$DIM \left([f] \right) = \prod_{i < j} \frac{f_i - f_j + j - i}{j - i} \tag{4.A}$$

In the above product i runs from one to N and for a given i, j runs from i + 1 to N. For example:

$$\text{DIM}\left(\left[1^{n}\right]\right)_{U(N)} = {}^{N}C_{n}$$

$$\text{(5.a)}$$

$$\text{DIM}\left(\left[n\right]\right)_{U(N)} = {}^{N+n-1}C_{n}$$

$$\text{(6.a)}$$

$$\text{DIM}\left(\left[2^{s} 1^{N-c}\right]\right)_{U(N)} = \frac{N-2s+1}{N+1}\left({}^{N+1}C_{s}\right)^{2}$$

$$\text{(7.a)}$$

$$\text{DIM}\left(\left[\lambda_{1}\,\lambda_{2}\,\lambda_{3}\right]\right)_{U(3)} = \frac{(\lambda_{1}-\lambda_{2}+1)(\lambda_{2}-\lambda_{3}+1)(\lambda_{1}-\lambda_{3}+2)}{2}$$

$$\text{(8.A)}$$

A.8. Order of a cycle:

Order of a cycle is defined as number of different permutations having the same cyclic structure. The order h_{β} of a cyclic structure β (of n objects), where

$$\beta = 1^{\nu_{1}} 2^{\nu_{2}} \cdots n^{\nu_{n}}$$

is given by [21]

$$h_{\beta} = \frac{n!}{1^{\nu_{1}}.2^{\nu_{2}} \cdots n^{\nu_{n}} \; \nu_{1}!\, \nu_{2}! \cdots \nu_{n}!}$$

$$\text{(9.A)}$$

A.9. Order of a partition:

This is a new notation we are introducing for easy reading of the programmes. The order of a partition is defined as the number of columns in the representative young tableaux. For example:

$$[4^3 2^2 1.]$$ partition of order four

$$[3^3]$$ partition of order three

$$[2^2 1^2]$$ partition of order two

$$[1^5]$$ partition of order one

In nuclear physics problems we restrict the spatial partitions to partitions of order four (maximum) as we include only spin and isospin. Similarly the partitions we encounter in atomic physics problems are of order two.

A.10. <u>Conjugate partition:</u>

Given a partition $[f]$ of r particles, having α_1 rows with A_1 columns, α_2 rows with A_2 columns,...., α_r rows with A_r columns, then we will write $[f]$ as

$$[f] = [A_1^{\alpha_1} A_2^{\alpha_2} ---- A_r^{\alpha_r}]$$

where $A_1 \geq A_2 \geq ---- \geq A_r \geq 0$
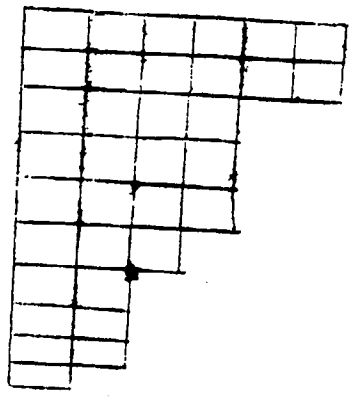
For example:

$$= [6^2 5^0 4^3 3^1 2^2 1^1]$$

Now we define a conjugate partition $[\tilde{f}]$ corresponding to the given partition $[f]$ as,

$$[\tilde{f}] = [\alpha_1 + \alpha_2 + \cdots + \alpha_n, \; \alpha_1 + \alpha_2 + \cdots + \alpha_{n-1}, \; \cdots, \; \alpha_1 + \alpha_2, \; \alpha_1]$$

(10.A)

It is easy to note that $[\tilde{f}]$ is obtained by interchaning the rows and columns of $[f]$. For example:

$$[\widetilde{5\,3\,2\,1}] = [4\,3\,2\,1\,1]$$

$$[\widetilde{2^a\,1^b}] = [a+b, \, a]$$

A.11. Hole partition:

The concept of hole partition is very useful because of the particle hole relationship in physics.

If $[f] = [f_1, f_2, \ldots, f_n]$, $[f]$ being a partition of U_N, then we define the corresponding hole partition $[\tilde{f}]$ as

$$[\tilde{f}] = [\, f_1^{N-n}, \; f_1 - f_n, \; f_1 - f_{n-1}, \; \cdots, \; f_1 - f_2]$$

(11.A)

(if $f_1 = N$, f_1^{N-n} is to be dropped out in the above equation).
For example:

$$[\widetilde{1^3}]_{U(10)} = [1^7]_{U(10)}$$

$$\widetilde{[2^6]}_{U(15)} = [2^9]_{U(15)}$$

$$\widetilde{[4^2 2 1]}_{U(6)} = [4^2 3 2]_{U(6)}$$

A.12.   Character : $c_\rho^{[f]}$

Character of a partition is the spur of the representative matrix. There are well defined methods to compute the character of a partition $[f]$ with respect to a cyclic structure ρ, denoted by $c_\rho^{[f]}$. There are two trivial characters and these will suffice our purpose.

$$c_\rho^{[N]} = +1 \qquad (12.A)$$

$$c_\rho^{[1^N]} = (-1)^{N + \sum_{i=1}^{N} \upsilon_i} \qquad (13.A)$$

where
$$\rho = 1^{\upsilon_1} 2^{\upsilon_2} \cdots N^{\upsilon_N}$$

A.13. Symmetric Functions:

Given n variables $x_1, x_2, ---, x_n$ we define elementary symmetric functions h_i as,

$$h_1 = \sum x_1$$

$$h_2 = \sum x_1 x_2$$

$$\vdots$$

$$h_n = x_1 x_2 \cdots x_n$$

(14.A)

We define the symmetric functions a_n (homogeneous product sums) as

$$a_1 = \sum x_1$$

$$a_2 = \sum x_1 x_2 + \sum x_1^2$$

(15.A)

$$a_3 = \sum x_1 x_2 x_3 + \sum x_1^2 x_2 + \sum x_1^3$$

$$\vdots$$

$$a_n = \sum x_1^n + \sum x_1^{n-1} x_2 + \cdots + x_1 x_2 \cdots x_n$$

We define symmetric functions S_r (power sums) as

$$S_1 = \sum x_i$$

$$S_2 = \sum x_i^2$$

$$S_n = \sum x_i^n$$

(16.A)

A.14. S-functions:

From the theory of symmetric groups, we get for a given partition $[\lambda]$ of an integer r, a corresponding S-function (Schur function), denoted by $\{\lambda\}$ as [23]

$$\{\lambda\} = \frac{1}{n!} \sum_\rho h_\rho C_\rho^{[\lambda]} S_\rho$$

(17.A)

where $\quad S_\rho = S_1^{\nu_1} S_2^{\nu_2} \cdots S_r^{\nu_r}$

and $C_\rho^{[\lambda]}$ is the character corresponding to the class defined by $\quad j = 1^{\nu_1} 2^{\nu_2} \cdots r^{\nu_r}$

There are two important qualities

$$\{N\} = h_n$$

$$\{1^N\} = a_n$$

where h_N and a_N are symmetric functions defined by eqns.14.A and 15.A respectively.

A.15. Expansion of S-functions:

Given partition $[f]$ $\left([f] = [f_1 f_2 \cdots f_n]\right)$ then the corresponding S-function $\{f\}$ can be expanded into S-functions of the type h_r as [21]

$$\{f\} = |A_{ij}|$$

(18.A)

where

$$A_{ij} = \{f_i + j - i\}$$

Similarly any S-function can be expanded into S-functions of the type a_r as

if

$$[\widetilde{f}] = [P_1 P_2 \cdots P_n]$$

(19.A)

then

$$\{f\} = |B_{ij}|$$

where

$$B_{ij} = \{1^{P_i + j - i}\}$$

For example:

$$\{21\} = \{2\}\{1\} - \{3\}$$

using (18.A)

$$\{21\} = \{1^2\}\{1\} - \{1^3\}$$

using (19.A)

$$\{3^2 2^3 1\} \quad \begin{vmatrix} \{3\} & \{4\} & \{5\} & \{6\} & \{7\} & \{8\} \\ \{2\} & \{3\} & \{4\} & \{5\} & \{6\} & \{2\} \\ \{0\} & \{1\} & \{2\} & \{3\} & \{4\} & \{5\} \\ \{-1\} & \{0\} & \{1\} & \{2\} & \{3\} & \{4\} \\ \{-2\} & \{-1\} & \{0\} & \{1\} & \{2\} & \{3\} \\ \{-4\} & \{-3\} & \{-2\} & \{-1\} & \{0\} & \{1\} \end{vmatrix} \quad \text{by using (18.A)}$$

Alternatively $\quad \{3^2 2^2 1\} = \{6\,5\,2\}$

Hence

$$\{3^2 2^3 1\} \quad = \quad \begin{vmatrix} \{1^6\} & \{1^7\} & \{1^8\} \\ \{1^4\} & \{1^5\} & \{1^6\} \\ \{0\} & \{1\} & \{1^2\} \end{vmatrix} \quad \text{by using (19.A)}$$

From the above example we see that in some cases, expansion to S-function of the type a_r is simple than expansion to S-functions of the type h_r (vice versa is also true).

Note:

$$\{0\} = 1$$
$$\{n\} = 0 \qquad \text{if } n < 0 \qquad\qquad \text{(20.A)}$$
$$\{1^n\} = 0 \qquad \text{if } n < 0, \; n > s \; \text{for } U(s)$$

A.6. Outer multiplications

We define the outer multiplication of two S-functions $\{f_1\}$ of S_n and $\{f_2\}$ of S_m as reduction of $\{f_1\}\{f_2\}$ to S-functions of S_{m+n}. We denote the outer product as[19]

$$\{f_1\}\{f_2\} = \sum_{\{f_3\}} T_{f_1 f_2 f_3} \{f_3\}$$

where $\{f_3\}$ in an S-function of S_{m+n}, $T_{f_1 f_2 f_3}$ is the number of times the S.function $\{f_3\}$ is occuring in the reduction of the outerproduct $\{f_1\} \times \{f_2\}$

Rule 1]
$$\{f_1\}\{f_2\} = \{f_2\}\{f_1\}$$
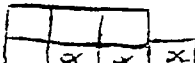
Rule 2] Say $[f_2]$ is a totally symmetric partition, then we can write

$$\{f_2\} = \boxed{\alpha\,|\,\alpha\,|\,\alpha\,|\,\alpha\,|\,\alpha\,|\,\alpha\,|\,\alpha\,} \cdots$$

To obtain the outer product of $\{f_1\}\{f_2\}$, we add the boxes α to the boxes of the young tableaux corresponding to the S-function $\{f_1\}$, such that no two αs appear in the same column of the resultant young tableaux.

Rule 3] The resultant young tableaux should be regular.

Example:

$$\text{(tableau)} \quad \times \quad \boxed{\alpha \mid \alpha \mid \alpha} \quad = \quad \boxed{\;\;\alpha+\alpha \mid \alpha\;}$$

$$+ \quad \boxed{\;\mid \alpha \mid \alpha \;;\; \alpha\;}$$

$$+ \quad \boxed{\;\mid x \mid \alpha \;;\; \alpha\;} \quad + \quad \boxed{\;\mid x \mid x \mid \alpha\;}$$

$$+ \quad \boxed{\;\mid \alpha \;;\; \alpha \;;\; \alpha\;} \quad + \quad \boxed{\;\mid \alpha \mid \alpha \;;\; \alpha\;}$$

The tableaux of the type $\boxed{\;\mid \alpha \mid x \mid x\;}$ are irregular. For arbitrary $\{f_2\}$ there are rules, but are quite cumbersome to carry out for a general case. As we can expand any general S-function to S-function of the type h_n (using 18.A), we can use the Rules (2) and (3) to find the outer multiplication of any two arbitrary S-functions.

Example:

$$\{6,2\}\{8,8\} = \{2\}\big[\{6\}\{8\} - \{9\}\{7\}\big]$$

$$= \{14,10\} + \{14,9,1\} + \{14,8,2\}$$

$$+ \{13,9,2\} + \{13,8,3\} + \{12,10,2\}$$

$$+ \{12,9,3\} + \{12,8,4\} + \{11,10,3\}$$

$$+ \{11,9,4\} + \{11,8,5\} + \{10,10,4\}$$

$$+ \{10,9,5\} + \{10,8,6\}$$

$$\{21\}\{21\} = \{21\}\left[\{21\} \cdot \{1\} - \{3\}\right]$$

$$= \{42\} + \{411\} + \{33\} + \{321\} + \{222\}$$

$$\{42\}\{10\} = \{102\} + \{93\} + \{921\} + \{84\}$$

$$+ \{831\} + \{822\} + \{741\} + \{732\}$$

$$+ \{642\}$$

A.17. Plethysm of S-functions:

(i)   'Plethysm of S-functions' is a kind of S-function multiplication which is extremely useful in the reduction of various groups. If $\{K\}$ is an IR of a group G(n), of dimension d, then it can be used to form a basis for the representation $[1]$ of U(d) (unitary group in d-dimensions). Now, if $\{L\}$ is a representation of U(d), corresponding to the partition $[L]$ of r particles, then $\{K\} \otimes \{L\}$ (read as K plethysm L) gives the S-functions in the outer product $\{K\}^r$ having symmetry $\{L\}$. We write,

$$\{K\} \otimes \{L\} = \sum_{P} T_{KLP} \{P\}$$

(21.A)

where $\{P\}$ are all possible S-functions that can occur in the outer product of $\{K\}^r$ and T_{KLP} gives the number of times each of them is occuring.

Example:

The dimensionality of the (200) representation of U(3) is six. Hence it can be used to span the IR $[1]$ of U(6). Now to reduce the partitions $\{2\}$ and $\{1^2\}$ of U(6) to IR of SU(3), we have to find

$$\{2\} \otimes \{2\} \quad \text{and} \quad \{2\} \otimes \{1^\nu\}$$

we know that

$$\{2\}^2 = \{4\} + \{31\} + \{22\}$$

Also DIM $(\{2\})$ U(6) = 21

DIM $(\{1\})$ U(6) = 15

DIM $(\{4\})$ U(3) = 15

DIM $(\{31\})$ U(3) = 15

and DIM $(\{22\})$ U(3) = 6

As we know $[400]$ is totally symmetric, from the dimensionality relations, we will get

$$\{2\} \otimes \{2\} = \{400\} + \{220\}$$

and

$$\{2\} \otimes \{1^\nu\} = \{310\}$$

(ii)   Some properties of plethysm:

$$\{P\} \otimes [\{Q\} + \{S\}] = \{P\} \otimes \{Q\} + \{P\} \otimes \{R\} \tag{22.A}$$

$$\{P\} \otimes [\{Q\} \{R\}] = [\{P\} \otimes \{Q\}][\{P\} \otimes \{R\}] \tag{23.A}$$

In (23.A) the R.H.S. is the outer product of $\{P\} \otimes \{Q\}$ with

$$\{P\} \otimes \{R\}$$

Note: The operation "plethysm" is not distributive w.r.t. addition, substraction or multiplication on the left.

A.18. <u>Dimensionality Checks</u>:

(i) When we reduce a partition $[P]$ of $U(N)$ to partitions $[Q]$ of $U(R)$ $(R < N)$, that is

$$\{P\}_{U(N)} \longrightarrow \sum_{Q} T_{PQ} \{Q\}_{U(R)}$$

Then

$$DIM\left[\{P\}\right]_{U(N)} = \sum_{Q} T_{PQ} \, DIM\left[\{Q\}\right]_{U(R)}$$

(24.A)

(ii) If we multiply two s-function $\{P\}$ and $\{Q\}$ corresponding to the partitions $[P]$ and $[Q]$ of S_n and S_m respectively, to get

$$\{P\}_{S_n} \{Q\}_{S_m} = \sum_{R} T_{PQR} \{R\}_{S_{m+n}}$$

Then

$$DIM\left[\{P\}\right]_{S_n} * DIM\left[\{Q\}\right]_{S_m} =$$

$$\sum_{R} T_{PQR} \frac{m+n\,!}{m\,!\,m\,!} \, DIM\left[\{R\}\right]_{S_{m+n}}$$

where

$$DIM [\{f\}]_{S_m} = \frac{m! \prod\limits_{i > j}^{k} (\ell_i - \ell_j)}{\ell_1! \, \ell_2! \, ---- \, \ell_k!}$$

with $\quad [f] = [f_1, f_2, ----, f_k] \quad f_k \neq 0,$ $\qquad (25.A)$

and $\quad \ell_i = f_i + k - i \qquad\qquad f_{k+1} = 0$

(iii) If

$$\{A\}_{U(N)} * \{B\}_{U(N)} \Rightarrow \sum_{C} T_{ABC} \{C\}_{U(N)}$$

then

$$DIM [\{A\}]_{U(N)} * DIM [\{B\}]_{U(N)}$$

$$= \sum_{C} T_{ABC} \, DIM [\{C\}]_{U(N)}$$

Dimension checks are quite useful in checking the s-function multi-
plications and also the reductions of U(S) partitions.

where
$$DIM \, \{ \{f\} \}_{S_m} = \frac{m! \prod_{i > j}^{k} (\ell_i - \ell_j)}{\ell_1! \, \ell_2! \, ---- \, \ell_k!}$$

With $[f] = [f_1, f_2, ----, f_k] \quad f_k \neq 0,$ (25.A)

$$f_{k+1} = 0$$

and $\ell_i = f_i + k - i$

(iii) If

$$\{A\}_{U(N)} * \{B\}_{U(N)} \rightarrow \sum_{C} T_{ABC} \{C\}_{U(N)}$$

then
$$DIM \, [\{A\}]_{U(N)} * DIM \, [\{B\}]_{U(N)}$$

$$= \sum_{C} T_{ABC} \, DIM \, [\{C\}]_{U(N)}$$

Dimension checks are quite useful in checking the s-function multi-plications and also the reductions of U(S) partitions.

SECTION-B

REDUCTION OF U(S) PARTITION TO IR OF SU(3)

B.1   INTRODUCTION

In this section we will see in detail how we will go about reducing U(S) partitions to IR of SU(3) using the plethysm concept introduced by Littlewood. We can see from eq.(6.A) that the dimensionality of the U(3) partition $[\eta\ 0\ 0]$ is $(\eta+1)(\eta+2)/2$. Hence it can be used to span the IR [1] of U(S). Suppose $[f]$ is a partition of U(S). Then we will get from the concept of plethysm that $\{\eta\}\otimes\{f\}$ gives the reduction of $\{f\}$ to IR of U(3) (we have to restrict the partitions in the reduction to the partitions having not more than three rows as we want U(3) content only). Now using eq.(17.A), we will get

$$\{\eta\}\otimes\{f\} = \frac{1}{r!}\sum_{\rho} h_{\rho}\, C_{\rho}^{[f]}\left(\{\eta\}\otimes S_{\rho}\right)$$

$$(1.B)$$

where $[f]$ is a partition of r particles. For the definition of the remaining quantities see the previous section.
Using

$$S_{\rho} = S_1^{\upsilon_1}\, S_2^{\upsilon_2} ---- S_{\lambda}^{\upsilon_{\lambda}}$$

we can rewrite (1.B) as

$$\{\eta\} \otimes \{f\} = \frac{1}{n!} \sum_{\rho} h_{\rho} \, C_{\rho}^{[f]} \, \left[\{\eta\} \otimes S_1\right]^{\nu_1} \left[\{\eta\} \otimes S_2\right]^{\nu_2} \cdots$$

<div align="right">(2.B)</div>

$\{\eta\} \times S_r$ is called [23] the 'new multiplication' of S-functions. J.A. Todd discussed their method of evaluation extensively[23]. It is clear from eqn.(2.B) that the problem of reducing a partition $[f]$ of U(S) reduces to the evaluation of $\{\eta\} \times S_r$, as we can read off the value of h_{ρ} and $C_{\rho}^{[f]}$ from the character tables.

$\left[\{\eta\} \otimes S_{\lambda}\right]^{\nu_{\lambda}}$ is the outer product of $\{\eta\} \otimes S_{\lambda}$ taken ν_{λ} times with itself.

$\left[\{\eta\} \otimes S_{\lambda'}\right]^{\nu_{\lambda'}} \left[\{\eta\} \otimes S_{\lambda''}\right]^{\nu_{\lambda''}}$ is the outer product of $\left[\{\eta\} \otimes S_{\lambda'}\right]^{\nu_{\lambda'}}$ with $\left[\{\eta\} \otimes S_{\lambda''}\right]^{\nu_{\lambda''}}$

B.2. <u>New Multiplication</u>:

To evaluate $\{\eta\} \otimes S_r$, we expand $\{\eta\} \otimes S_r$ as

$$\{\eta\} \otimes S_n = x_1 \{\eta n\} + x_2 \{\eta n-1, 1\}$$
$$+ x_3 \{\eta n-2, 2\} + x_4 \{\eta n-2, 1, 1\}$$

$$+ - - - - - -$$

<div align="right">(3.B)</div>

In the above sum all partitions of the integer n are taken with the restriction that they should not have more than three rows as we want only U(3) content. Now to fix the coefficients we use the third reciprocity theorem of Weyl[24] which states that 'If the IR g of G contains, on restricting G to the subgroup $G'=G_1 \times G_2$, the representation $g_1 \times g_2$ of G' exactly b times ($\bar{c}$ are IR of G) then conversely the representation $(g_1 \times g_2)$ of (the full linear group) contains the representation g exactly b times. We illustrate the above theorm with one example:

Example:

Using eqn.(3.B) we will write

$$\{4\} \otimes S_3 = x_1 \{12\} + x_2 \{11,1\} + x_3 \{10,2\}$$
$$+ x_4 \{10,1,1\} + x_5 \{9,3\} + x_6 \{7,2,1\}$$
$$+ x_7 \{8,4\} + x_8 \{5,3,1\} + x_9 \{8,2,2\}$$
$$+ x_{10} \{7,5\} + x_{11} \{7,4,1\} + x_{12} \{7,3,2\}$$
$$+ x_{13} \{6,6\} + x_{14} \{6,5,1\} + x_{15} \{6,4,2\}$$
$$+ x_{16} \{6,3,3\} + x_{17} \{5,5,2\}$$
$$+ x_{18} \{5,4,3\} + x_{19} \{4,4,4\}$$

We will find the x_i's as follows:

It is trivial to note that $x_1 = 1$

To find x_2:

$$\{11\ 2\} = \begin{vmatrix} \{11\} & \{12\} \\ \{1\} & \{2\} \end{vmatrix}$$

$$= \begin{vmatrix} 0 & \{4\} \otimes S_3 \\ 1 & 0 \end{vmatrix} \qquad \text{using eq.(18.A)}$$

Hence $\{11\ 1\}$ contains $\{4\} \otimes S_3$ 1 times. So, using reciprocity theorm we will get $x_2 = -1$.

To find x_3:

$$\{10\ 2\} = \begin{vmatrix} \{10\} & \{11\} \\ \{1\} & \{2\} \end{vmatrix}$$

In the determinant, there is no term of the type $\{3\}$, so it can not contain $\{4\} \otimes S_3$. Hence $x_3 = 0$.

To find x_4:

$$\{10\ 1\ 1\} = \begin{vmatrix} \{10\} & \{11\} & \{12\} \\ \{0\} & \{1\} & \{2\} \\ 0 & \{0\} & \{1\} \end{vmatrix}$$

$$= \begin{vmatrix} 0 & 0 & \{4\} \otimes S_3 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \end{vmatrix}$$

$$x_4 = -1$$

To find x_7:

$$\{8\,4\} = \begin{vmatrix} \{8\} & \{9\} \\ \{3\} & \{4\} \end{vmatrix}$$

$$= \begin{vmatrix} 0 & \{3\} \otimes S_3 \\ \{1\} \otimes S_3 & 0 \end{vmatrix}$$

$$x_7 = -1$$

Continuing this process, we get

$$\{4\} \otimes S_3 = \{12\} - \{11\,1\} + \{10\,1\,1\} + \{9\,3\} - \{9\,2\,1\}$$
$$- \{8\,4\} + \{8\,2\,2\} + \{7\,4\,1\} - \{7\,3\,2\}$$
$$+ \{6\,6\} - \{6\,5\,1\} + \{6\,3\,3\} + \{5\,5\,2\} - \{5\,4\,3\}$$
$$+ \{4\,4\,4\}$$

For instance, reducing $\{2\} \otimes S_4$, $\{3\} \otimes S$, $\{4\} \otimes S_3$ we can write a general expression for $\{3\} \times S_r$ as[25]

$$\{3\} \otimes S_n = \{3n\} - \{3n-1,1\} + \{3n-2,1,1\}$$
$$+ \{2n, n\} - \{2n, 2n-1,1\} - \{2n-1, n+1\}$$
$$+ \{2n-1, n-1, 2\} + \{2n-2, n+1, 1\}$$
$$- \{2n-2, n, 2\} + \{n, n, n\}$$

Following the general procedure outlined above, deducing general expressions for $\{2\} \otimes S_n$, $\{3\} \otimes S_n$, $\{4\} \otimes S_n$, ... we can derive a general expression for $\{n\} \otimes S_n$, n being an integer as[18]

$$\{n^2\} \otimes S_n = \sum_{a,b} \Big[\{nn - an, \, an - bn, \, bn\}$$

$$- \{nn - an, \, an - bn - 1, \, bn + 1\}$$

$$+ \{nn - an - 1, \, an - bn - 1, \, bn + 2\}$$

$$- \{nn - an - 1, \, an - bn + 1, \, bn\}$$

$$+ \{nn - an - 2, \, an - bn + 1, \, bn + 1\}$$

$$- \{nn - an - 2, \, an - bn, \, bn + 2\} \Big]$$

(4.B)

In the above expression, the summation is over all positive integers a and b with the constraint that all the non-standard S-functions are to be completely ignored. Eqn.(4.B) gives only the U(3) content of $\{n\} \otimes S_n$ as needed for the applications to SU(3) group.

Note: For $n = 2$, only two rowed partitions are to be included on the R.H.S. of eqn.(4.B). Similarly for $n = 1$ only one rowed partitions are to be included. Then we get two trivial results

$$\{n\} \otimes S_2 = \{2n\} - \{2n-1, 1\} + \{2n-2, 2\}$$
$$- \{2n-3, 3\} + \cdots + (-1)^n \{n, n\}$$

and

$$\{n\} \otimes S_1 = \{n\}$$

(5.B)

These are identical with Littlewoods results[23].

B.3] IR of SU(3) using $\{\eta\} \otimes S_h$

3.b. Knowing how to reduce $\{\eta\} \otimes S_r$ we will see how one can make use of eqn.(2.B) to reduce U(S) partitions to IR of SU(3). Let us consider the partitions $[3]$, $[21]$ and $[1^3]$ of U(10),($\eta = 3$). The character table for the integer three is given in table-I[21]. Using eqn.(2.B) we obtain

$$\{3\} \otimes \{3\} = \frac{1}{3!} \left[[\{3\} \otimes S_1]^3 + 3[\{3\} \otimes S_1][\{3\} \otimes S_2] \right.$$
$$\left. + 2\{3\} \otimes S_3 \right]$$

$$(6.B.1)$$

$$\{3\} \otimes \{21\} = \frac{1}{3!} \left[2[\{3\} \otimes S_1]^3 - 2\{3\} \otimes S_3 \right]$$

$$(6.B.2)$$

$$\{3\} \otimes \{1^3\} = \frac{1}{3!} \left[[\{3\} \otimes S_1]^3 - 3[\{3\} \otimes S_1][\{3\} \otimes S_2] \right.$$
$$\left. + 2\{3\} \otimes S_3 \right]$$

$$(6.B.3)$$

Using eqn.(5.B) we obtain

$$\{2\} \otimes S_3 = \{9\} - \{81\} + \{711\} + \{63\}$$
$$- \{621\} - \{54\} + \{522\}$$
$$+ \{444\} - \{432\} + \{333\}$$

$$(6.B.4)$$

TABLE-I

Character table for the integer three.[*]

ρ	(1^3)	(12)	(3)
h_ρ	1	3	2
$\{3\}$	1	1	1
$\{21\}$	2	0	-1
$[1^3]$	1	-1	1

* (table adopted from ref.19).

$$\left[\{3\}\otimes S_1\right]\left[\{3\}\otimes S_2\right] = \{3\}\left[\{6\}-\{51\}+\{42\}-\{33\}\right]$$

$$= \{9\} + \{72\} - \{711\}$$
$$- \{531\} + \{522\}$$
$$+ \{44\} - \{333\}\right]$$

<div align="right">(6.B.5)</div>

$$\left[\{3\}\otimes S_1\right]^3 = \{3\}^3$$

$$= \{9\} + 2\{81\} + 3\{72\}$$
$$+ \{711\} + 4\{63\} + 2\{621\}$$
$$+ 2\{54\} + 3\{531\} + \{522\}$$
$$+ \{441\} + 2\{432\} + \{333\}$$

<div align="right">(6.B.6)</div>

Sustituting eqns. (6.B.4), (6.B.5) and (6.B.) in eqn.(6.B.1), eqn. (6.B.2) and eqn. (6.B.3) we finally obtain

$$\{3\}\otimes\{3\} = \{9\} + \{72\} + \{63\}$$
$$+ \{522\} + \{441\}$$

$$\{3\}\otimes\{21\} = \{81\} + \{72\} + \{63\} + \{621\}$$
$$+ \{54\} + \{531\} + \{432\}$$

$$\{3\} \otimes \{1^2\} = \{711\} + \{63\} + \{531\} + \{333\}$$

We can check whether the above results are correct or not by computing the dimensionalities.

For example: Using eqn.(5.A) and (8.A), we get for the $[1^3]$ partition

$$120 = 28 + 64 + 27 + 1 = 120$$

The method outlined above becomes tremendously laborious as the number of particles and as the integer (shell number) are increasing. For example, to reduce a typical partition of U(15), one has to perform something as 10^8 s-function multiplications when we adopt the procedure discussed in 16.a). Also, to make use of eqn.(2.B), only characters upto sixteen particles are available in literature. Another disadvantage of using eqn.(2.B) is to reduce even a single partition; we have to reduce all the $\{\eta\} \otimes S_{\rho}$ as can be seen from the example given. Although we can avoid this by expanding the s-functions corresponding to a given partition to s-functions of the type a_n or h_n and using this we can reduce the partitions of higher integers in terms of the lower ones, the laborious s-functions multiplication puts a bar on the human capability. So the only alternative we can think of is: to computerise the problem. To achieve this, we adopt a slightly different approach which we will discuss below.

B.4. <u>New Method to reduce partitions of U(S) to IR of SU(3).</u>

B.4.1 <u>The possible IR of SU(3)</u>:

For a given number of particles r of U(S), we can find all possible U(3) partitions $[\lambda_1, \lambda_2, \lambda_3]$ with the restriction

$$\lambda_1 \geqslant \lambda_2 \geqslant \lambda_3 \geqslant 0$$

(7.B.1)

and

$$\lambda_1 + \lambda_2 + \lambda_3 = \eta * r$$

(7.B.2)

where η is related to S by the relation

$$S = (\eta+1)(\eta+2)/2$$

(7.B.3)

The corresponding SU(3) representations ($\lambda\mu$) are given by

$$(\lambda\mu) = (\lambda_1 - \lambda_2, \lambda_2 - \lambda_3)$$

(7.B.4)

For $r < 3$, we will have further restrictions that

$$\lambda_3 = 0 \quad for \quad \eta = 2$$

(7.B.5)

and

$$\lambda_2 = \lambda_3 = 0 \quad for \quad \eta = 1$$

(7.B.6)

Example: For r = 4 of U(10), the possible IR of SU(3) are

$$(\lambda\mu) = (12\ 0)\ (10\ 1)\ (8\ 2)\ (90)\ (63)\ (71)$$
$$(44)\quad (52)\quad (6?)\ (25)\ (33)\ (41)\ (06)$$
$$(14)\ (22)\ (30)\ (03)\ (11)\ (00)$$

B.4.2 The $\in$ restriction:

When we restrict to partitions having not more than four columns, for larger r; the maximum $\in\ =\ 2\lambda + \mu$ possible will be much less than the maximum $\in$ possible in principle.

Example: For r = 10 of U(15)

$$\text{max } \in \text{ (in principle)} = 80$$

$$\text{max } \in \text{ (for partitions of order four)} = 62$$

So, when we reduce partitions of o ~r less or equal to four, we can cutt oof all $(\lambda\mu)$ having . $\in\ >\ 62$;

This $\in$ restriction is very important, as it saves lot of computer time.

B.4.3   Reduction of the outer product:

The problem of finding IR of SU(3) in a partition $[x]$ of x particles of U(S) is nothing but finding the number of times each $(\lambda\mu)$ (which satisfy eqn.(7.B.1) - eqn. (7.B.6)) is occuring in that partition. This we will write in a mathematical notation as

$$\{\eta\} \otimes \{x\} = \sum_{\eta'} A_{x\eta'} \left(\lambda_{x\eta'}\ \mu_{x\eta'}\right)$$

$$(8.B)$$

In the above expression $\{\eta\}$ and $\{x\}$ are s-functions corresponding to the partitions $[\eta]$ and $[x]$. A_{xr}' gives the number of times the SU(3) representations $(\lambda_{xr'} \mu_{xr'})$ of x particles in the shell η, occurs in the reduction of the partition $[x]$. A similar expression for a partition $[y]$ of y particles in the shell η, is written as

$$\{\eta\} \otimes \{Y\} = \sum_{r''} A_{yr''} (\lambda_{yr''} \mu_{yr''})$$

(9.B)

Now, we will see how we can find IR of SU(3) in the Kronecker product of the S-functions $\{x\}$ and $\{y\}$. This we can write as

$$\{\eta\} \otimes [\{x\}\{Y\}] = \sum_{r'''} A_{zr'''} (\lambda_{zr'''} \mu_{zr'''})$$

(10.B)

where

$$Z = X + Y$$

To find $A_{zr'''}$ We first find the number of times the representations $(\lambda_{zr'''} \mu_{zr'''})$ occur in the Kronecker product of the SU(3) representations $(\lambda_{xr'} \mu_{xr'}) \times (\lambda_{yr''} \mu_{yr''})$ and multiply it, with $A_{xr} \times A_{yr}$. Repeat the same for all r' and then for all r''. If we add them all we get $A_{zr'''}$. Repeating the same for all r''', we get all $A_{zr'''}$.

B.4.4 To find the IR of SU(3) in a partition of U(S).

To achieve this we expand the given partition to partitions of type $[1^r]$ using eqn.(19.A). Now knowing the reductions of the

partitions of the type $[1^r]$ we can find the determinant products using the method given in (B.4.3).

We reduce the partitions $[1^r]$ using eqn.(2.B), knowing the $c_\rho^{[1^r]}$ form (13.A) and h_ρ form (9.A). As the number of rows in a partition of U(S) cannot be greater than S, for a given S we have to reduce all $[1^r]$, r < s. Now, because of particle-hole equivalence we need reduce only half of them, as the other half can be reduced using the relation

$$\{n\} \otimes \{1^n\} = \sum_{\mathcal{R}} A_\mathcal{R} (\lambda_\mathcal{R} \mu_\mathcal{R})$$

then

$$\{n\} \otimes \{1^{S-n}\} = \sum_\mathcal{R} A_\mathcal{R} (\mu_\mathcal{R} \lambda_\mathcal{R})$$

Two trivial cases are:

$$\{n\} \otimes \{1^s\} = (00)$$

$$\{n\} \otimes \{0\} = (00)$$

B.4.5. <u>SU(3) outer product</u>:

Now to evaluate the outer products, using the method outlined in (B.4.3), we should know how to find the SU(3) outer product. That is, we should know how to reduce the outer product $(\lambda_1 \mu_1) \times (\lambda_2 \mu_2)$ to IR of SU(3). This problem is solved by Chew and Sharp[26]. This problem is equivalent to reducing the chain,

$$SU(3) \times SU(3) \supset SU(3)$$

The number of times a given SU(3) representation $(\lambda_3 \mu_3)$ occur in the Kronecker product of the SU(3) representations $(\lambda_1 \mu_1) \times (\lambda_2 \mu_2)$ is calculated as

If $S = $
$$\left[(\lambda_1 + \lambda_2 - \lambda_3) - (\mu_1 + \mu_2 - \mu_3) \right] / 3$$

$$\mathcal{U} = \left[(\lambda_1 + \lambda_2 - \lambda_3) + 2(\mu_1 + \mu_2 - \mu_3) \right] / 3$$

Let μ be lesser of $\lambda_1 - S$ and μ_2,

ν be lesser of $\lambda_2 - S$ and μ_1

Say $\nu \not> \mu$ (otherwise interchange the roles of ν and μ.)
Then the multiplicity can be found from fig. i.

B.5. The general procedure:

We will summarise the general procedure as follows:

1. Evaluate all $\{\eta\} \otimes S_\lambda$ for a given shell η, $r \leqslant NR2$, where $NR2 = (m+1)(n+2)/4$

2. Reduce all $[1^r]$ partitions, $r \leqslant NR2$

3. Expand the given partition to partitions of the type $[1^r]$

4. Evaluate the determinantal products.
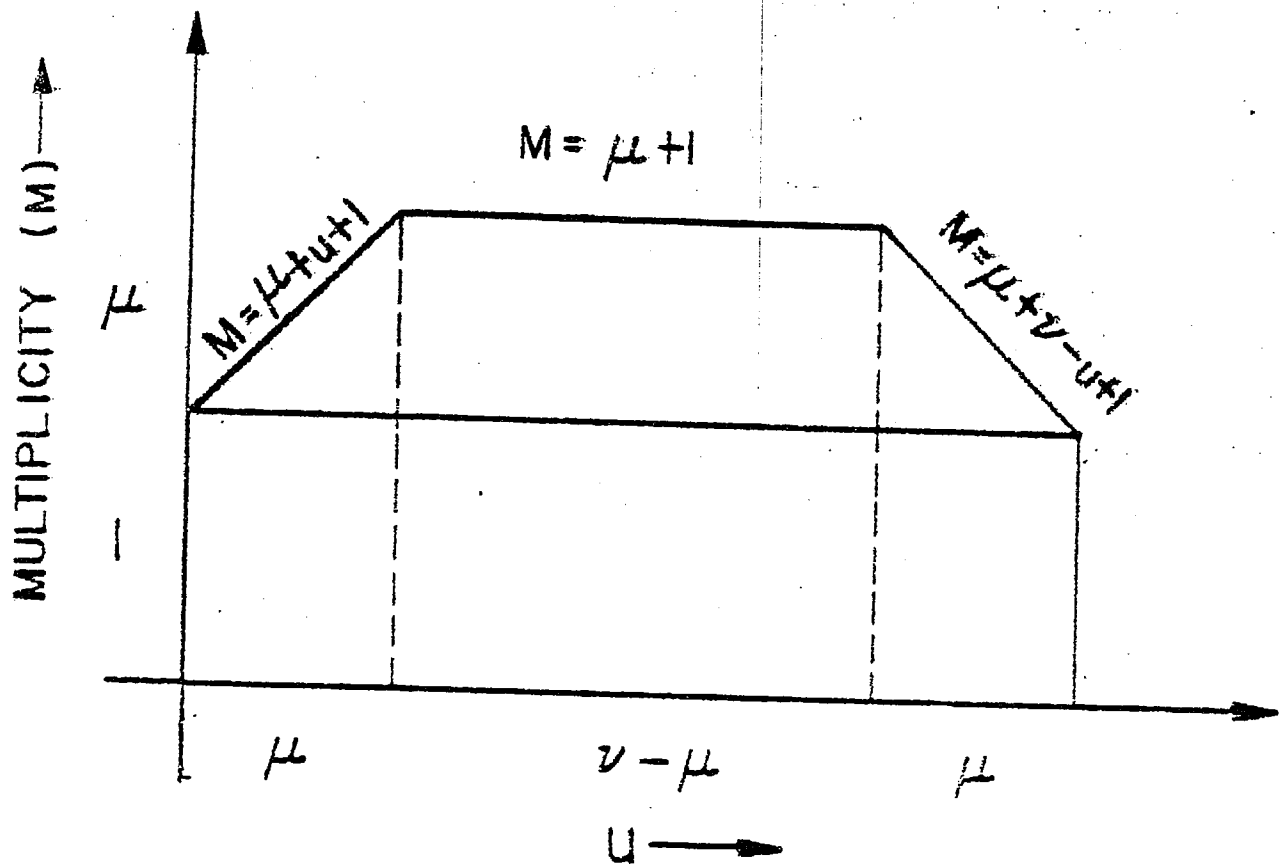
FIG. I. REDUCTION OF $(\lambda_1 \mu_1) \times (\lambda_2 \mu_2) \longrightarrow (\lambda_3 \mu_3)$

It is interesting to note that the above procedure is very much laborious when we do with hand (because to find outerproducts we have to use fig.i all the time), compared to the procedure we to adopt if we use eqn.(2.B). But it is very much straightforward to translate the above procedure to a machine code. Now we will go over the description of the programme which computes IR of SU(3) in a partition of U(S).

SECTION-C

DESCRIPTION OF THE PROGRAMME

C.1   Introduction:

The fortran IV deck which computes the IR of SU(3) in a given partition of U(S), consists of thirteen subroutines and a main programme. The main programme calls the subroutines in a particular order and it consists of the input and output statements. The general layout of the programme is given in the flow-diagrams. The fortran IV programme given in Appendix-A can reduce only partitions having not more than four columns. However, it can be extended for any number of columns, in a straightforward way. Four column partitions are sufficient for applications to atomic and nuclear physics problems.

C.2.   Notation:

The routines are written in a notation in so far as practical parallels that used in the sections A and B. The equivalence is as follows:

λ $\sim$ LAM, LAMK, LAM3, LAMR

μ $\sim$ MU, MUK, MU3, MUR

Multiplicity (M)   MFAT, MFATR, MFAT3, MFATRR, MFATKK, MFAT4

$$C_\rho^{[1^n]} \qquad \sim \qquad \text{ICH}$$

$$\kappa \rho \qquad \sim \qquad \text{IH}$$

$$1^{\nu_1} \, 2^{\nu_2} \, 3^{\nu_3} \qquad \sim \qquad \text{NU}$$

$$[\overline{I=}] \qquad \sim \qquad \text{IFR, IFP}$$

Factorials	$\sim$	IFACT
Shell number	$\sim$	N
Number of particles	$\sim$	NP
$[4^a \, 3^b \, 2^c \, 1^d]$	$\sim$	IA, IB, IC, ID
$(N+1)(N+2)/2$	$\sim$	NR
$NR/2$	$\sim$	NR2

C.3   Structure

The main structure of the programme is illustrated in the block diagrams (fig.(ii) and fig.(iii)). The details are given in the comment cards which are incorporated into the programme deck.

C.4   Subprogramme description:

For identification, in the fortran IV deck, we label our thirteen subroutines as $A, B, C, \ldots, L.M.$

A.   **YNGTBL**: This subroutine calculate all the young tableaux for particles upto NR2. Then they are changed to corresponding cyclic structures. It makes use of eqns. $(1.A - 3.A)$. In fact, we make use of a method, which we call "Back substitution method", to find the young tableaux.

START

READ N, IA,IB,IC,ID
COMPUTE NR, NRZ, NP

IS THE PARTITION VALID? — NO → STOP

YES

COMPUTE ALL $\{\eta\} \otimes S_r$ $r \leqslant NR\,2$

REDUCE ALL $[1^r]$ PARTITIONS, $r \leqslant NR\,2$

FIND THE ORDER OF THE
PARTITION (NK)

IS NP > NR $*$ NK/2 — YES → FIND HOLE PARTITION

NO

EXPAND THE GIVEN PARTITION
TO $[1^r]$ PARTITIONS

REDUCE THE KRONECKER PRODUCTS

①

IS NP > $\dfrac{NR * NK}{2}$ — YES → INTER CHANGE λ and μ of $(\lambda\mu)$

NO

WRITE THE REDUCTIONS

DINENSION CHECK

STOP
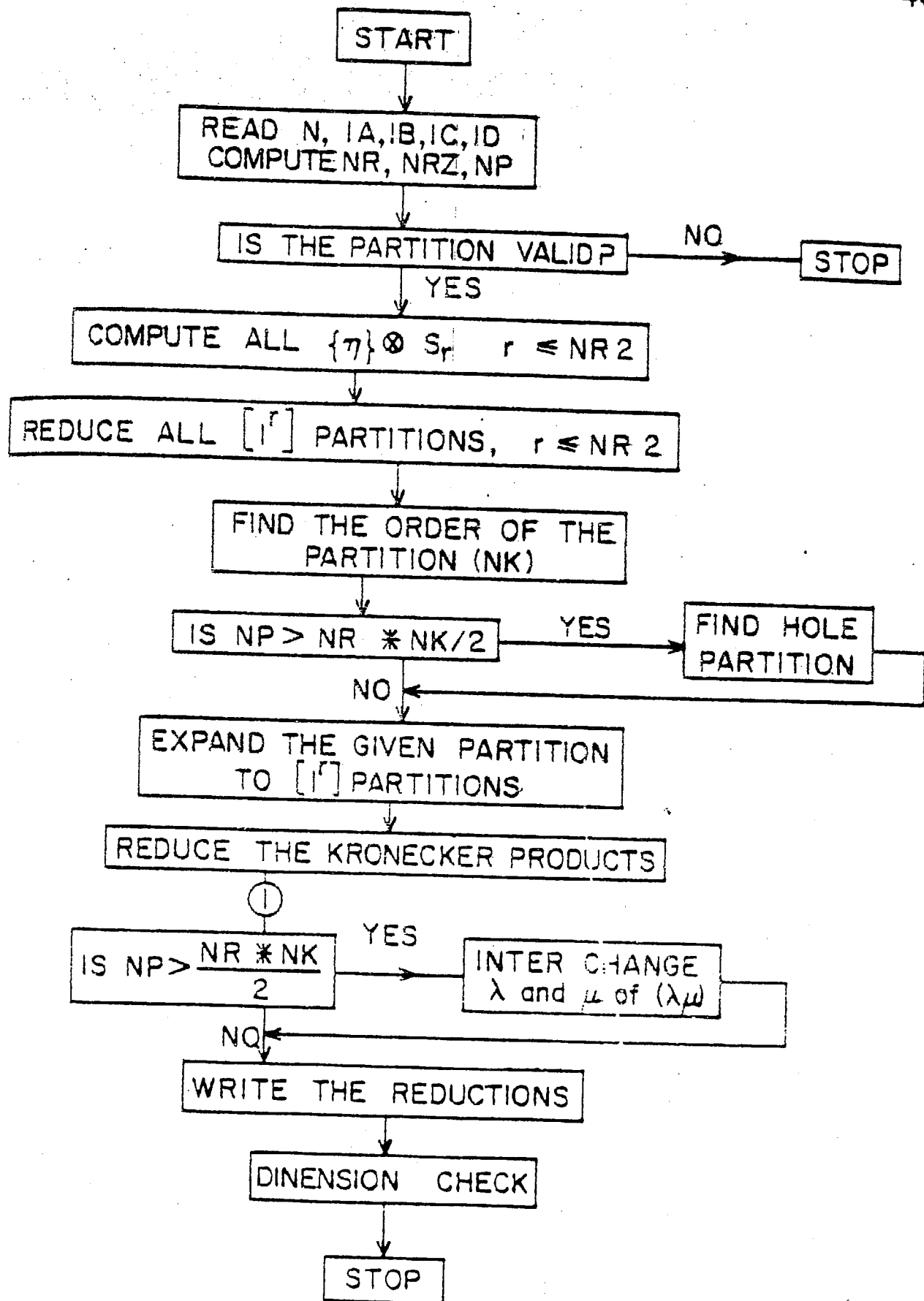
FIG. 2. FLOW CHART TO REDUCE U(S) PARTITIONS INTO IR OF SU(3)
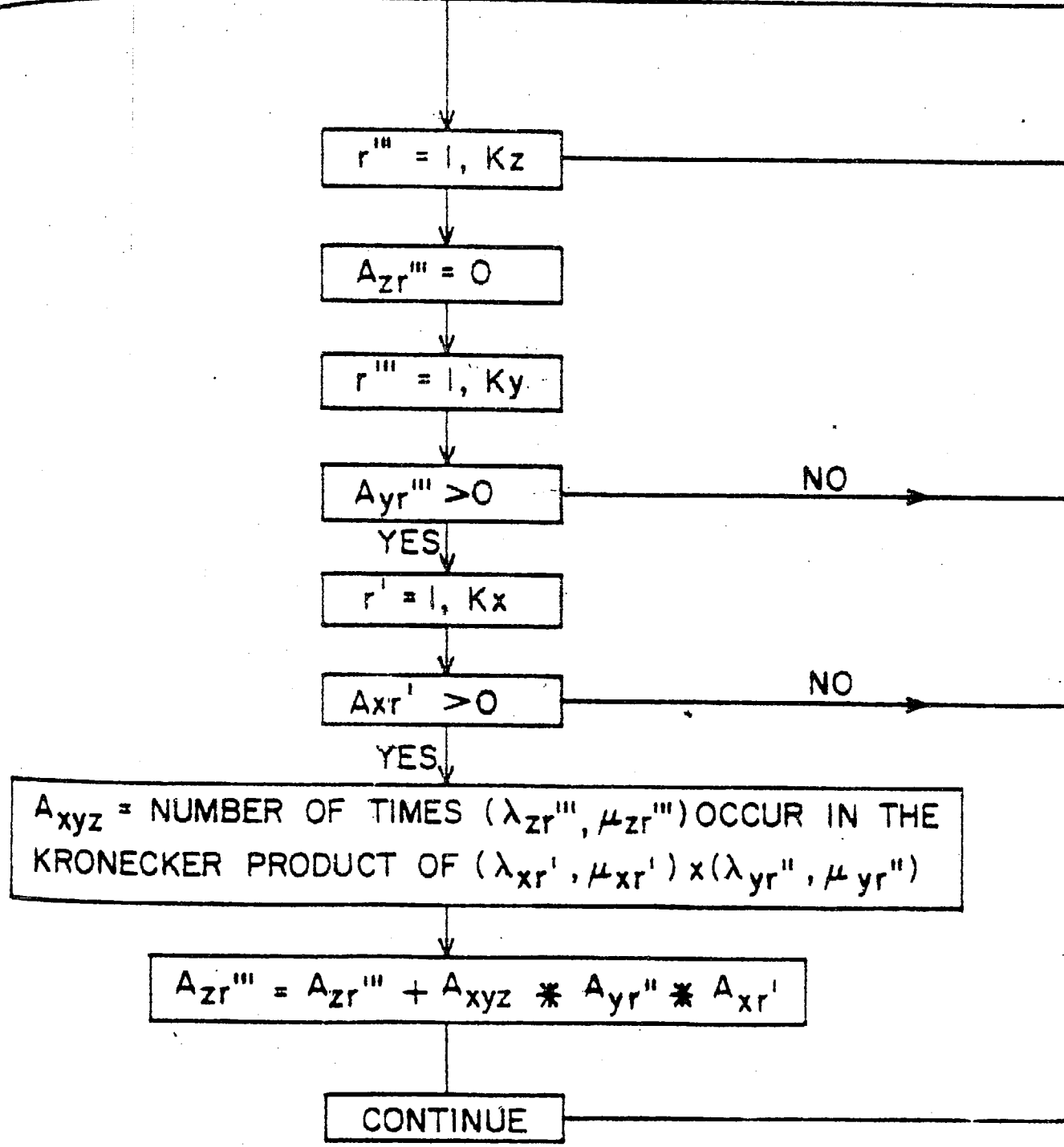
FIG 3 FLOW DIAGRAM TO FIND IR OF SU(3) IN $\{\eta\} \otimes [\{x\}\{Y\}]$

A partition f of N particles consists of maximum of N rows denoted by

$$[F] = [f_1, f_2, \ldots, f_N].$$

To find all possible $[f]$ for the integer N, we first put

1st step : $[f] = [N, 0, 0, \ldots, 0]$

2nd step : Decrease N by one unit and write the one particle partitions in the next place, to get

$$[f^1] = [N-1, 1, 0, 0, \ldots 0]$$

3rd step : Decrease N by one unit and write the two particle partitions in the next places, to get

$$[f''] = [N-2, 2, 0, 0, \ldots, 0]$$
$$[f''] = [N-2, 1, 1, 0, 0, \ldots 0]$$

At each step we have to check whether the partition obtained is a valid partition or not using eqn.(1.A). Proceeding in the same way as above until $f_1 = 0$, we get all N-particle partitions. So, knowing the partitions for the integers $1, 2, \ldots, N-1$, we can find the partitions for the integers N using the above procedure. We start s with N=1 and using the above back substitution method we find partitions for any integer N.

This routine is called by PLTHSM.

B. PARTIS: We denote a U(S) partition by
$$[f] = [f_1, f_2, \ldots, f_s]$$

This routine computes f_i if we give the partition in the form $[4^a 3^b 2^c 1^d]$. The method is as follows:

$$f_1 = f_2 = \cdots = f_a = 4, \quad \text{for } a \neq 0$$

$$f_{a+1} = f_{a+2} = \cdots = f_{a+b} = 3; \quad \text{for } b \neq 0$$

$$f_{a+b+1} = f_{a+b+2} = \cdots = f_{a+b+c} = 2 \quad \text{for } C \neq 0$$

$$f_{a+b+c+1} = f_{a+b+c+2} = \cdots = f_{a+b+c+d} = 1$$
$$\text{for } d \neq 0$$

$$f_{a+b+c+d+1} = f_{a+b+c+d+2} = \cdots = f_{b} = 0$$

Called from IEPSLN and MAIN.

C. IEPSLN: This routine calculates the maximum $\in (2\lambda + \mu)$ possible for a partition of a given order. The purpose of this routine is discussed in B.4.2.

If $\{f\} = [f_1\ f_2\ \ldots\ f_N]$

and $[p] = [p_1\ p_2\ \ldots\ p_N]$

we call $[f]$ having weight greater than that of $[p]$, if $f_1 > p_1$

or $f_1 = p_1$ and $f_2 > p_2$

or $f_1 = p_1,\ f_2 = p_2,\ f_3 > p_3$

$- - - - - - - -$

For a partition $[f]$ of given order, if we know the leading SU(3) representation $(\lambda \mu)$ then any other representation $(\lambda' \mu')$ having $\epsilon' = 2\lambda' + \mu'$ can not occur in the reduction of any partition of that order, if

$$\epsilon^{k} > \epsilon \quad ; \quad \epsilon = 2\lambda + k$$

so we can omit all $(\lambda' k')$ having $\epsilon' > \epsilon$ to save computer time.

(i) To find highest symmetry partition, for a given number of of particles (NP1), of given order (N1)

Step (i)   Find K1 = $[NP1/N1]$ where $[x]$ is the integral part of x

Step (ii)   Compute NP2 = NP1 - N1 $\times$ K1

Step (iii)   Find K2 = $[NP2/(N1-1)]$

Step (iv)   Compute NP3 = NP2 - (N-1) $\times$ K2

$$- - - - - - - - - - - - - -$$

By doing the above procedure to N1 steps, we will get the highest symmetry partition

$$[F]_{heighest} = \left[NI^{KI}, (NI-1)^{k2}, (NI-2)^{K3}, \cdots, I^{KNI} \right]$$

Example: The highest symmetry partition, for six particles, of order four is computed as follows:

$$
\begin{aligned}
K1 &= 6/4 = 1 \\
N1 &= 2 \\
K2 &= 2/3 = 0 \\
N2 &= 2 \\
K3 &= 2/2 = 1 \\
N4 &= 0 \\
K4 &= 0
\end{aligned}
$$

Therefore $[f] = [4^1 \; 3^0 \; 2^1 \; 1^0]$

Knowing the highest symmetry partition, the leading SU(3) representation in the reduction of that partition can be found as follows:

For a given shell η, the possible single particle orbits $(n_z \ n_x \ n_y)$ can be found with the following constraints:

$$n_z = \eta \cdot k \ , \quad n_x = k - r, \quad n_y = r$$

where

$$0 \leq k \leq \eta \ , \quad 0 \leq r \leq k$$

and

$$n_z \geqslant n_x \geqslant n_y \geqslant 0$$

Example: For $\eta = 3$ shell the possible single particle orbits $(n_z \ n_x \ n_y)$ are given by

$$(300)(210)(201)(120)(111)(102)(030)(021)(012)(003)$$

(note that these are in decreasing weight).

Given a partition $[f] = \left[N1^{K_1} \ N2^{K_2} \ - - - - \right]$ filling the first K1 single particle orbits with N1 quanta, then next K2 orbits with N_2 quanta $----$, we can find the total N_z, N_x and N_y as

$$N_i = \sum_{\substack{j=\text{single} \\ \text{particle orbits}}} n_i(j)$$

Then the corresponding leading SU(3) representation is given by

$$(\lambda \mu) = (N_Z - N_X, N_X - N_Y)$$

So maximum $\in = 2\lambda + \mu$

Example: For the partition $[4\,2]$ of U(10) we get

$$N_Z = 14$$

$$N_X = 2$$

$$N_Y = 0$$

Therefore $(\lambda \mu)$ (leading) = (12, 2)

Hence maximum $\in = 26$.

This routine is called from SUREP

It calls PARTIS

D.   SUREP: This routine computes all the possible SU(3) representations $(\lambda \mu)$ that can occur in the reduction of a given partition of a given order, making use of eqns. (7.B.1) - (7.B.6) (see sec. B.4.2).

Called from PLTHSM, KRONP, REDTN

Calls EPSLN

Note: While reducing $[1^r]$ partitions using eqn.(2.B) this routine will not call EPSLN, here all the SU(3) representations are to be used.

E. <u>NUMULT</u>: This routine evaluate $\{n\} \otimes S_n$ for $n \leq NR2$
Makes use of the expression (4.B)

called from MAIN

It converts U(3) representations to SU(3) representations using
eqn.(7.B.4).

F. <u>MULTU</u>: Calculates the multiplicity of the SU(3) coupling

$$(\lambda_1 \mu_1) \times (\lambda_2 \mu_2) \rightarrow (\lambda_3 \mu_3).$$ This routine is adopted from
ref.(28). See sec. B.4.5. for details.

Called from KRONP, REDTN

G. <u>KRONP</u>: This routine performs SU(3) outer multiplication to
reduce the Kronecker product of any two partitions [P] and [Q]
See sec. B.4.3. for details

Called from   PLTHSM, REDTN

Calls   SUREP, MULTU

Note: When called from PLTHSM [Q] stands for $\{n\} \otimes S_n$.
       When called from REDTN [Q] stands for $\{n\} \otimes \{1^n\}$
       This routine destroy the $(\lambda \mu)$ of [P] and stores the
$(\lambda \mu)$ of the product in that place while returning (this saves
storage).

When $[Q] = [1^{NR}]$ it takes $[Q] \rightarrow (00)$
When $[Q] = [1^R]$, R > NR2 it makes use of the particle-hole
relationship.

H. <u>PLTHSM</u>: This routine reduces all $[1^n]$ partitions using
eqn.(2.B).

    Called from MAIN

    Calls YNGTBL.

I. <u>PATHOL</u>: This routine will find the hole partition correspond-to a given partition $[f]$. For example:

$$\text{if } [f] = [4^a \, 3^b \, 2^c \, 1^d]$$

$$[\tilde{f}] = [4^{NR-a-b-c-d} \, 3^d \, 2^c \, 1^b]$$

$$\text{if } [f] = [3^a \, 2^b \, 1^c]$$

$$[\tilde{f}] = [3^{NR-a-b-c} \, 2^c \, 1^b]$$

$$\text{if } [f] = [2^a \, 1^b]$$

$$[\tilde{f}] = [2^{NR-a-b}, \, 1^b]$$

$$\text{if } [f] = [1^r]$$

$$[\tilde{f}] = [1^{NR-r}]$$

where $NR = (n+1)(n+2)/2$, n being the shell number. This routine converts $[f]$ to $[\tilde{f}]$ only when

$$NP > \frac{NI * NR}{2}, \quad and \quad NI > 1$$

(N1 = order of the partition, NP = number of particles).
Called from REDTN.

J. <u>ORDER</u>: This routine computes the order of a given partition.
The procedure is as follows:

Say $[f] = [4^a \, 3^b \, 2^c \, 1^d]$

then

if $a \neq 0$ $[f]$ is of fourth order

if $a = 0$, $b \neq 0$ $[f]$ is of third order

if $a=0$, $b=0$, $c \neq 0$ $[f]$ is of second order

     $a=0$ $b=0$ $c=0$ $d \neq 0$ $[f]$ is of first order

called from MAIN

K.   <u>DESEND</u>: Given four numbers, K1, K2, K3 and K4, this routine puts them in descending order. Say, in the descending the numbers are $\bar{K}_1$, $\bar{K}_2$, $\bar{K}_3$ and $\bar{K}_4$. We can find them, as

$$\text{Max} \quad (K_1 \ K_2 \ K_3 \ K_4) = \bar{K}_1$$

$$\text{Min} \quad (K_1 \ K_2 \ K_3 \ K_4) = \bar{K}_4$$

maximum of the three numbers, **except** $(\bar{K}_1) = \bar{K}_2$

$$\bar{K}_3 = K_1 + K_2 + K_3 + K_4 - \bar{K}_1 - \bar{K}_2 - \bar{K}_4$$

called from REDTN.

L.   <u>REDTN</u>: Given a partition $[f] = [4^a \ 3^b \ 2^c \ 1^d]$, this routine reduces it to IR of SU(3). It computes the conjugate partition $[\tilde{f}]$ as

$$[\tilde{f}] = [a+b+c+d, \ a+b+c, \ a+b, \ a]$$

$$= [X_1, \ X_2, \ X_3, \ X_4]$$

Then expand $[f]$ to a 4 x 4 matrix as

$$[f] = \begin{vmatrix} [1^{x_1}] & [1^{x_1+1}] & [1^{x_1+2}] & [1^{x_1+3}] \\ [1^{x_2-1}] & [1^{x_2}] & [1^{x_2+1}] & [1^{x_2+2}] \\ [1^{x_3-2}] & [1^{x_3-1}] & [1^{x_3}] & [1^{x_3+1}] \\ [1^{x_4-3}] & [1^{x_4-2}] & [1^{x_4-1}] & [1^{x_4}] \end{vmatrix}$$

(3.c)

Now the determinent is computed as follows:

Given a 4 x 4 matrix

$$[A] = \begin{vmatrix} KA(1) & KB(1) & KC(1) & KD(1) \\ KA(2) & KB(2) & KC(2) & KD(2) \\ KA(3) & KB(3) & KC(3) & KD(3) \\ KA(4) & KB(4) & KC(4) & KD(4) \end{vmatrix}$$

then the determinant (IAI) corresponding to the matrix (A) is given by:

$$|A| = \sum_{\substack{i \neq j \\ \neq k \neq l}} KA(i) KB(j) KC(k) KD(l) \quad * \quad (-1)^{\phi}$$

(4.c)

where $(-1)^{\phi} = +1$ if (ijkl) is an even permutation, and
$(-1)^{\phi} = -1$ if (ijkl) is an odd permutation. This can be achieved through the method illustrated by the flow chart in fig.(iv).
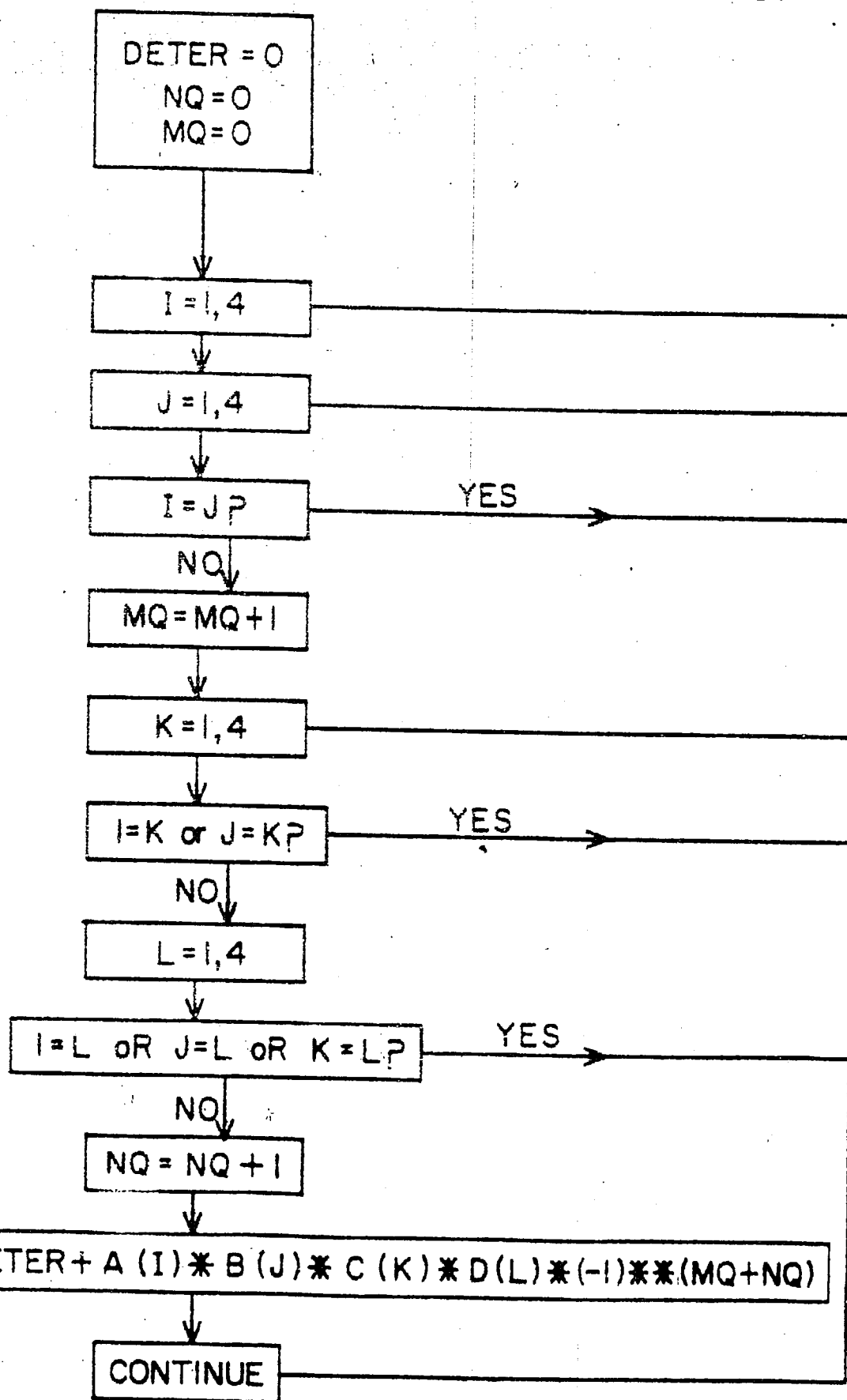
FIG.4. FLOW DIAGRAM TO FIND DETERMINANT

$$\sum \setminus (\cdots)(\cdots)(\cdots) = (\cdots)$$

The above determinant gives typical terms of the type
$$\begin{bmatrix} 1^{S_1} \end{bmatrix} \begin{bmatrix} 1^{S_2} \end{bmatrix} \begin{bmatrix} 1^{S_3} \end{bmatrix} \begin{bmatrix} 1^{S_4} \end{bmatrix}$$ which will be reduced to IR of SU(3) using the techniques outlined in B.4.3 and B.4.4. We have used eq.(20.A) while replacing the partitions in eqn.(3.C).

To reduce the partitions of particles (NP), $NP \geqslant \dfrac{NI \times NR}{2}$, first the corresponding hole partition will be reduced to IR of SU(3) and then the particle-hole transformation is done; which states that

$$\text{if } [f] = \sum_{n} A_{n}(\lambda_{n} \mu_{n})$$

$$\widetilde{[f]} = \sum_{n} A_{n}(\mu_{n} \lambda_{n})$$

$$(5.C)$$

calls SUREP, KRONP, DESEND
called by MAIN.

M. <u>DIMCHK</u>: This routine performs dimensionality checks. This makes use of A.18.i). The dimensionality of a given partition is computed by expanding it to a determinant as given in eqn. 3.C) and the determinant is evaluated using eqn.4.C). In this evaluation the partitions are replaced by their respective dimensionalities (see eqn.5.A). This we will call 'Theoretical Dimensionality'. The dimensionality corresponding to the reductions is computed, using

the fact that $\dim(\lambda \mu) = (\lambda+1)(\mu+1)(\lambda+\mu+2)/2$

(This we will call 'calculated dimensionality'). In the first step, this routine checks the dimensionalities of all the $[1^r]$ partitions ($r \leqslant NR2$) (se. eqn. 5.A). Secondly, it will check the dimensionality of the reduction of the given partition. To perform these two steps, we use a dummy variable IE in the programme. If IE=0 the programme checks the dimensionalities of (I^r) partitions only. If IE = 1 it checks the dimensionality of the given partition Called by MAIN.

Z.   **MAIN:**   The main programme serves as a control routine, as it gives the sequence in which the subroutines are to be called. It contains the input, output statements. The calling sequence is as follows:

CALLS, NUMULT, PLTHSM, DIMCHK, PATHOL, REDTN, PARTIS and DIMCHK It reads the shell number (N) and the numbers IA, IB, IC and ID which define the given partition $[f]$ where

$$[f] = \left[4^{IA} \; 3^{IB} \; 2^{IC} \; 1^{ID}\right]$$

C.5   Input, output formats:

C.5.1 Input Format: (K=number of cards)

  Ist card   - SHELL NUMBER (N)

   FORMAT 20I4

(2-K) cards -   IA, IB, IC, ID (on each card)

   FORMAT 20I4

   (END FILE = -1)

C.5.2 Output Format:

I. Write the input partition $[f_1, f_2, f_3, \ldots, f_{NR}]$ of U(S).
FORMAT – 20I4

II. List the reductions, where the first number in the brackets give the value of λ and the second number μ. A space is inserted to separate them. ($\lambda \mu$) is an IR of SU(3). The number before the parenthesis gives the number of times that particular IR of SU(3) is occuring in the reduction of the given partition.

III. If the given partition is invalid, it will write

IA, IB, IC, ID -- check the data.

C.6. Common Block Description: We used nine labelled common blocks in the routines. They are:

1. /VKB1/ N, NR, NR2

   N is shell number, NR is the orbital degeneracy and NR2 = NR/2

   used in YNGTBL, PARTIS, IEPSLN, SUREP, REDTN, NUMULT, KRONP, DIMCHK and MAIN

2. /VKB2/ NU(6,8,6), KP(6)

   NU gives the cyclic structures for particles upto NR2. The first dimension is for the number of particles, second dimension for the different cycles and the third dimension is for the different rows in the partition. KP gives the number of different partitions (or cycles structures) for a given number of particles.

Used in YNGTBL, PLTHSM.

3. /VKB3/ $\quad$ LAMR $(11,6)$, MUR $(11, 6)$ MFATR$(11,6)$, LKR (6)

MFATR gives the number of times the SU(3) representation (LAMR, MUR) occuring in the reduction of $\{\eta\} \otimes S_r$ or $\{\eta\} \otimes \{1^{n_r}\}$ as the case may be. LKR give the number of SU(3) representations.

The first dimension in LAMR, MUR and MFATR is for different SU(3) representations and the second dimension for different number of particles (r).

Used in NUMULT, PLTHSM, REDTN, KRONP, DIMCHK and MAIN

NOTE: In NUMULT it stores $\{\eta\} \otimes S_r$ and then they will be destroyed and in PLTHSM it stores $\{\eta\} \otimes \{1^n\}$.

4. /VKB4/LAM(200), MU(200)

LAM, MU are different SU(3) representations.

Used in PLTHSM, REDTN, SUREP, KRONP.

5. /VKB5/MFAT(200)

MFAT stores the multiplicities of the SU(3) representations.

Used in PLTHSM, KRONP, REDTN.

6. /VKB6/NP, N1

NP=number of particles, N=1order of the partition

Used in PATHOL, REDTN, MAIN

7. /VKB7/ KR8

KR8 = number of SU(3) representations (whose multiplicities are non-zero) in the reduction of the given partition.

8. /VKB8/ LAMK(200), MUK(200), MFATK(200)

This block stores the final reductions, that is the SU(3) representations (LAMK, MUK) and their multiplicities MFATK.

Used in REDTN, DIMCHK and MAIN.

9. /VKB9/ DBIN(12)

This block stores Binomial coefficients

Used in DIMCHK and MAIN

C.7.   Checks in the Programme:

The following checks are made during the reduction of U(S) partitions to ensure that our results are correct.

i)   Valid Partition: A partition $[4^a \, 3^b \, 2^c \, 1^d]$ of U(S) is a valid partition only if

$$S \geqslant a, b, c, d \geqslant 0$$

$$a + b + c + d \leqslant S$$

These checks are incorporated in the main routine.

ii)   Symmetry Checks: If we know the reduction of a partition $[\lambda]$, that is

$$[\lambda] = \sum_r A_r (\lambda_r \mu_r)$$

then, if we know the reduction of $[\tilde{\lambda}]$

$$[\tilde{\lambda}] = \sum_r A_r (\mu_r \lambda_r)$$

Secondly, if $[\tilde{\lambda}] = [\lambda]$

then the number of times $(\lambda_r \mu_r)$ occuring in the reduction of

$[\lambda]$ should be same as the number of times ($\mu_n \lambda_n$) is occuring. This test is displayed in the output.

iii)   <u>Dimension Check</u>: Dimensionality check is a very stringent check on the reductions obtained. This is taken care by the DIMCHK subroutine. However, there is one practical difficulty with this routine. The maximum accuracy one can attain, using the double precision arithmatic is sixteen digits on IBM 360/44 machine. If the dimensionality of a partition exceeds 10^{16}, then accuracy will be lost in its computation. Hence the routine can not make proper dimension check. For example, the maximum dimensionality one encounters in $\eta = 2, 3, 4$ and 5 shells respectively are 10^5, 10^8, 10^{15} and 10^{20}. If the dimensionalities are not matching, then the theoretical and calculated dimensions will be printed. It is advisable to make a manual dimension check before discarding the reductions to see whether the error is due to fixed point floating or not.

Note: The primary aim of the programmes is to compute A_n 's (see 5.C). As A_n never go beyond 10^{15}, these will be computed with absolute accuracy.

C.8.   Modification of the Subroutines:

The Fortran IV deck associated with the listing given in Appendix-A can be used to reduce any partition (not more than four columns) of $\eta = 3$ shell (U(10) partition). The dimensionalities of various variables occuring in different subroutines are spelled out in terms of some parameters in the comment cards of each subroutine. The values of the parameters for $\eta = 2, 3, 4$ and 5 shells,

(these cover all most all the nuclear physics) are given in Table-II. The prescription for fixing the sizes of the arrays are also spelled out in the comment cards. Within a shell, smaller limits, than given in Table-II are possible if one deals with less number of particles and if the order of the partition is less.

C.9 Restrictions on the complexicity of the problem.

The partition should be of maximum fourth order. In fact, by suitably modifying the REDTN subroutine the programme can be used to reduce a partition of any order. The shell number (η) should be $\eta \leqslant 9$. If $\eta > 9$, $nR2 ! = \frac{(m+2)(n+1)}{4}!$, exceeds 32 ! in which case the IBM 360/40 machine floats. For our purpose all the factorials (see NUMULT routine) should be invariably in integer format. In fact this is not a serious limitation as we will never go to such a higher shell in SU(3) model calculation. (If a need arises one can use some alternative techniques). If the dimensionalities are greater than 10^{16} the routines can not make proper dimension check on IBM 360/44 machine.

C.10. Typical Running Time:

The running time is a complex function of the shell number, order of the partition and the number of particles. For the test run the compilation time $\simeq 2$ minutes. It took roughly 15 sec. to reduce a given partition.

In Appendix-A a test run output is displayed so that it serves as an example for the type of output we get.

<u>TABLE-II</u>

<u>ARRAY SIZE PARAMETERS</u>

Shell number Parameters		$\eta = 2$	$\eta = 3$	$\eta = 4$	$\eta = 5$
External	N	2	3	4	5
	NR	6	10	15	21
	NR2	3	5	7	10
Internal	NA	4	6	8	11
	NB	4	8	16	43
	NC	8	12	17	23
	ND	42 (7)	200 (27)	620 (80)	1810 (234)
	NE	7	11	31	79

* The numbers in the parenthesis are needed if we want to reduce a first order partition only.

D.   CONCLUSIONS

The routines presented in Appendix-A are developed, keeping in mind their usefulness for nuclear physics problems. The routines developed are a vital first step in a more complete analysis of complex nuclear phenomena. Here we will list a few applications of the present codes. In fact the codes and the general philosophy adopted in their development, can be used in numerious ways in reducing a wide variety of group chains of physical interest.

D.i.   Applications:

1.   They are of primary use in the study of heavy deformed nuclei[29].

2.   They find usages in atomic physics problems when we deal with electronic configurations such as s-d, s-d-g[30] etc.

3.   The reductions are of maximum use when we want to study the goodness of the chain $U(S) \supset SU(3)$ for any quantum mechanical system, using French distribution techniques. Here the only thing we need to know is, what IR of SU(3) are contained in a given partition of U(S) besides knowing the input net[31].

4.   By knowing the reductions of U(S) partitions to IR of SU(3), the SU(3) tensor character of any general K-body operator can be known directly. As an example   the SU(3) tensor character of 1-body and 2-body operators of $\eta = 4$ shell is given in Appendix-C.

5. To evaluate the $U(S) \supset SU(3)$ isoscalar factors, the reductions are needed. (Note that the leading or first few $SU(3)$ representations give a satisfactory description of the spectral properties of a nucleus, in which case one can find them using other techniques. In calculating r-particle CFPs corresponding to these few representations (of N-particles) the N-r particle $SU(3)$ representation are to be known fully.

6. The routines IEPSLN, SUREP, MULTU and KRONP can be used to reduce the Keonecker product $(\lambda_1 \mu_1) \times (\lambda_2 \mu_2) \to (\lambda_3 \mu_3)$. The general procedure is as follows: The $U(3)$ partitions corresponding to $(\lambda_1 \mu_1)$ and $(\lambda_2 \mu_2)$ are $(\lambda_1 + \mu_1, \mu_1)$ and $(\lambda_2 + \mu_2, \mu_2)$ respectively. So they correspond to the partitions of $\lambda_1 + 2\mu_1$ and $\lambda_2 + 2\mu_2$ particles, respectively. Now $(\lambda_3 \mu_3)$ are the partitions of $\lambda_1 + \lambda_2 + 2(\mu_1 + \mu_2)$ particles and all the possible $(\lambda_3 \mu_3)$ can be generated with SUREP subroutine and we can use IEPSLN routine to cutdown the unnecessary $(\lambda \mu)$'s. Now the multiplicities of $(\lambda_3 \mu_3)$ can be found using the MULTU routine and KRONP routine.

This application is of great help to both nuclear and particle physics.

7. The general philosophy adopted in the development of the routines can be used to reduce other groups of physical interest. Example: To reduce the chain $SU(4) \supset SU(2) \otimes SU(2)$, one can adopt the following procedure:

i. For the SU(4) group, $[1]$ $[1^2]$ $[1^3]$ and $[1^4]$ are the only $[1^r]$ type partitions that can occur. Their reduction to (ST) multiplets is quite straight-forward. We get

$$[1] = (\tfrac{1}{2}\,\tfrac{1}{2})$$
$$[1^2] = (10),\ (01)$$
$$[1^3] = (\tfrac{1}{2}\,\tfrac{1}{2})$$
$$[1^4] = (00)$$

We know how to evaluate the Keonecker products of two (ST) x S'T') multiplets, as we know R(3) algebra. Hence we can adopt the procedure developed in sec. B.4.3 and B.4.4. to reduce any partition of SU(4) to SU(2) x SU(2) multiplets.

1.2 One can also adopt the following techniques. For a totally symmetric partition $[\gamma\, c\, c]$ of SU(4) the possible ST multiplets are S=T with [14]

$$S = \frac{\gamma}{2},\ \frac{\gamma}{2} - 1,\ ----,\ 0\ \text{or}\ \frac{1}{2}$$

Now we can use eqn.(18.a) and expand the U(4) partition to a 4x4 determinant and methodology developed in the present note can be used straightaway to decompose any partion of SU(4) to (ST) multiplets.

Example 2. <u>To reduce the chain U(N) ⊃ O(3).</u>

As the representation $\{N-1\}$ of GL(2) is of dimension N, we can use it to span the IR $\{1\}$ of U(N). We can reduce the partitions $\{1^K\}$ of U(N) to IR of GL(2) using the result[19]

$$\{P\} \otimes \{1^K\} = \{P+1-K\} \otimes \{K\}$$

$$(1.D)$$

The R.H.S. of the above equation can be evaluated quite easily using Littlewood's result for reducing totally symmetric partitions of U(N) to IR of GL(2). Because of the equivalence between GL(2) and O(3), we can reduce any totally antisymmetric partitions of U(N) to IR of O(3) using eqn. (1.D). Now any arbitrary partition of U(N) can be reduced to IR of O(3) using the methodology given in Sec. C as the evaluation of O(3) outer product is straightforward.

Example. 3. We can reduce U(N) ⊃ Sp(N) chain, as the reduction of $\{1^r\}$ partitions of U(N) to Sp(N) partitions is given as

$$\{1^n\}_{U(N)} \rightarrow \langle 1^n \rangle \quad \langle 1^{n-2} \rangle \ - - - \ \langle 0 \rangle \ or \ \langle 1 \rangle$$

$$n \leq N/2$$

$$\}_{U(N)} \rightarrow \langle 1^K \rangle \ \langle 1^{K-2} \rangle \ \langle 1^{K-4} \rangle \ - - - -$$

$$\langle 0 \rangle \ or \ \langle 1 \rangle$$

$$n > N/2 \ , \ K = N - n \qquad (2.D)$$

As we know how to teach the evaluation of Sp(N) to machines (Bulter 1970), we can reduce any partition of U(N) to Sp(N) partitions.

8. The method adopted in the development of the routines is highly useful in reducing group chains which are prototype of $U((n+1)(n+2)/2) \supset SU(3)$. Example: To reduce $U((n+1)(n+2)(n+3)/3) \supset SU(4)$ the $[P00]$ partition of SU(4) can be used to span the IR (11) of $U((p+1)(p+2)(p+3)/3)$. The usefulness of this chain is discussed in ref.33).

9. The routine PLTHSM can be used to reduce a totally symmetric partition of U(S) just by changing the value of ICH (we have to use eqn.12.A) instead of 13.A). This is useful in the 'Boson Interacting Model' calculations[6] where we allow a single Boson to have angular momentum 0 or 2, 0 or 2 or 4 etc. where $U(6) \supset SU(3)$, $U(15) \supset SU(3)$ etc. chains are of use.

10. The explicit reductions of $U(S) \supset SU(3)$ may be useful in developing a statistical expression for the SU(3) degeneracy in a given U(S) partition as is done for R(3) case by Cleary and Wybourne[34].

Just as an example, we give in Appendix-B the reductions of all U(10) partitions (not more than four columns) to IR of SU(3). To generate these reductions it took 3.30 hours on IBM 360/44 system, compared to the six minutes time it took to reduce all $\eta = 2$ shell partitions. With the problem of reducing the U(S) partitions is solved, the problem remains to be tackled is to develop a general routine to evaluate U(3)/SU(3) isoscalar factors. Recently

a code is developed to calculate many particle CFP which covers
the whole s-d shell and part of f-p shell [35]. This together
with the codes of Draayer and Akiyama , will make the development
of SU(3) techniques to solve the complex nuclear phenomena
solved. We close this report with the quotation by Fanklin

" The study of elementary problems of physics such as the
harmonic oscillator form an advanced standpoint is an interesting
and fruitful subject of research ".

APPENDIX-A

PROGRAMME LISTING

The Fortran IV programme that reduces U(S) partitions (not more than four columns) to IR of SU(3) is listed out. Sample input and output are also included.

```
C    PART1: ROUTINE IDENTIFICATION LABEL = A , NAME = YNGTBL
     SUBROUTINE YNGTBL
C    ***************************************************************
C    SUBROUTINE TO CALCULATE THE YOUNG-TABLEUX AND THE CORRESPONDING
C                        CYCLIC STRUCTURES
C    REFERENCES ----
C                1. V.K.B.KOTA (SEE THE TEXT OF THIS REPORT)
C                2. B.G.WYBOURNE,SYMMETRY PRINCIPLES IN ATOMIC
C                   SPECTROSCOPY (WILY INTER-SCIENCE) 1970
C    PARAMETERS ----
C                IFP - CORRESPOND TO PARTITIONS
C                MU -  CORRESPOND TO CYCLIC STRUCTURES
C                EXTERNAL: N = SHELL NUMBER
C                INTERNAL: NR = ORBITAL DEGENERACY (NR=(N+1)*(N+2)/2)
C                          NR2 = NR/2
C                          NX = NUMBER OF YOUNG-TABLEUX POSSIBLE
C                               FOR NR2 PARTICLES
C                          NA = NR2+1
C                          NB = NX+1
C    EXTENSIONS ----
C                ADJUST THE INTERNAL PARAMETERS IN THE VKB2 BLOCK
C    DIMENSIONS ----
C                IFP(NA,NB,NA),MU(NA,NB,NA),KP(NA)
C    ***************************************************************
     INTEGER R
     EQUIVALENCE (IFP,MU)
     COMMON/VKB2/N,NR,NR2
     COMMON/VKB2/MU(6,5,6),KP(6)
     DIMENSION IFP(6,5,6)
     KP(1)=1
     DO 55 R=1,NR2
     J=1
C    INITIALISATION (PUT F(1)=R)
     IFP(R,J,1)=R
     IZX=R-1
     IF(IZX.EQ.0)GOTO 55
     DO 10 IJ=1,IZX
     IJJ=IJ+1
C    EQUATE THE NO.OF BOXES IN ALL ROWS(EXCEPT THE FIST ROW)TO ZERO
  10 IFP(R,J,IJJ)=0
     I=R
C    DECRESE THE NO.OF BOXES IN THE FIRST ROW BY ONE UNIT
  15 I=I-1
     IF(I.EQ.0) GOTO 50
     NRK=R-I
     L=KP(NRK)
     DO 45 K=1,L
     J=J+1
     IFP(R,J,1)=I
     DO 20 M=1,NRK
     KL=M+1
     IFP(R,J,KL)=IFP(NRK,K,M)
  20 CONTINUE
     IF( NRK+1.EQ.R) GOTO 30
     NZZ=R-NRK-1
     DO 25 NZ=1,NZZ
```

```
  25 IFP(R,J,NZZZ)=0
  30 DO 35 NM=2,R
C    CHECK THE IN-EQUALITY
     IF(IFP(R,J,NM-1).LT.IFP (R,J,NM)) GOTO 40
  35 CONTINUE
     GOTO 45
  40 J=J-1
  45 CONTINUE
     GO TO 15
  50 KP(R)=J
  55 CONTINUE
C    TRASFORM TO CYCLIC STRUCTURE
     DO 65 I=1,NR2
     II=KP(I)
     DO 65 J=1,II
     DO 65 JJ=1,I
     IF(JJ.EQ.I)GOTO 60
     NU(I,J,JJ)=IFP(I,J,JJ)-IFP(I,J,JJ+1)
     GOTO 65
  60 NU(I,J,JJ)=IFP(I,J,JJ)
  65 CONTINUE
     RETURN
     END
C    PARTIS ROUTINE IDENTIFICATION LABEL = B , NAME = PARTIS
     SUBROUTINE PARTIS(L1,L2,L3,L4,L)
C    ***********************************************************************
C    ROUTINE TO FIND THE U(S) PARTITIONS
C    REFERENCES ----
C
C                  - V.K.B.KOTA (SEE THE TEXT OF THIS REPORT)
C    PARAMETERS ----
C                  L1 = NUMBER OF FOUR COLUMNED ROWS
C                  L2 = NUMBER OF THREE COLUMNED ROWS
C                  L3 = NUMBER OF TWO COLUMNED ROWS
C                  L4 = NUMBER OF ONE COLUMNED ROWS
C                  L(I) GIVES THE NUMBER OF BOXES IN THE I-TH ROW OF
C                  THE REPRESENTATIVE YOUNG TABLEUX
C                  EXTERNAL: N = SHELL NUMBER
C                  INTERNAL: NR,NR2 (SEE THE ROUTINE-A)
C    EXTENSIONS ----
C                  ADJUST THE INTERNAL PARAMETERS IN THE DIMENSION
C                  STATEMENT
C    DIMENSIONS ----
C                  L(NR)
C    ***********************************************************************
     COMMON/VKB1/N,NR,NR2
     DIMENSION L(40)
     KI=1
     IF(L1.EQ.0)GOTO 20
     DO 10 I=KI,L1
     L(I)=4
  10 CONTINUE
  20 L12=L1+L2
     KI=KI+L1
     IF(L2.EQ.0)GOTO 40
     DO 30 I=KI,L12
     L(I)=3
  30 CONTINUE
  40 L13=L12+L3
     KI=KI+L2
     IF(L3.EQ.0)GOTO 60
     DO 50 I=KI,L13
     L(I)=2
  50 CONTINUE
```

```fortran
      KI=KI+L3
      IF(L4.EQ.0)GOTO 80
      DO 70 I=KI,L14
      L(I)=1
70    CONTINUE
80    KI=KI+L4
      IF(KI.GT.NR)GOTO 100
      DO 90 I=KI,NR
      L(I)=0
90    CONTINUE
100   RETURN
      END
C     PART1: ROUTINE IDENTIFICATION LABEL = C , NAME = IEPSLN
      FUNCTION IEPSLN(NP,N1)
C     ***************************************************************
C     TO FIND THE MAXIMUM EPSILON
C     REFERENCES
C                  1. V.K.B.KOTA (SEE THE TEXT OF THIS REPORT)
C                  2. J.FLORES,E.CHACON,P.A.MELLO AND M DE LLANO
C                     (NUCL.PHYCS.A72 (1965) 352-78)
C     PARAMETERS
C                  NP = NUMBER OF PARTICLES
C                  N1 = ORDER OF THE GIVEN PARTITION
C                  EXTERNAL: N = SHELL NUMBER
C                  INTERNAL: NR,NR2 (SEE THE ROUTINE A)
C                            NC = NR+2
C     EXTENSIONS
C                  ADJUST THE INTERNAL PARAMETERS IN THE DIMENSION
C                  STATEMENT
C     DIMENSIONS
C                  NX(NC),NY(NC),NZ(NC),IFR(NC)
C     ***************************************************************
      COMMON/VKB1/N,NR,NR2
      DIMENSION NX(12),NY(12),NZ(12),IFR(12)
      NRK=N+1
      L=1
      DO 10 I=1,NRK
C     FIND ALL THE SINGLE PARTICLE ORBITALS (NX,NY,NZ)
      DO 10 J=1,NRK
      DO 10 K=1,NRK
      NZ(L)= N-I+1
      NX(L)= N-J+1
      NY(L)= N-K+1
      IF((NX(L)+NY(L)+NZ(L)).NE.N)GOTO 10
      L=L+1
10    CONTINUE
      L=L-1
      IF(L.NE.NR)WRITE(6,20)
20    FORMAT(1X,'PROGRAMME WRONG')
C     FIND THE HIGHEST ORBITAL SYMMETRY PARTITION CORRESPONDING TO N1
      K1=NP/4
      IF(N1.LT.4)K1=0
      K11=NP-4*K1
      K2=K11/3
      IF(N1.LT.3)K2=0
      K22=K11-3*K2
      K3=K22/2
      IF(N1.LT.2)K3=0
      K4=K22-2*K3
      CALL PARTIS(K1,K2,K3,K4,IFR)
      NXR=0
      NYR=0
      NZR=0
```

```
            DO 30 I=1,NR
            NXR=NX(I)*IFR(I)+NXR
            NYR=NY(I)*IFR(I)+NYR
            NZR=NZ(I)*IFR(I)+NZR
         30 CONTINUE
C           CALCULATE THE MAXIMUM EPSILON
            IEPSLN =2*(NZR-NXR)+(NXR-NYR)
            RETURN
            END
C           PART1: ROUTINE IDENTIFICATION LABEL = D , NAME = SUREP
            SUBROUTINE SUREP(INR,NOP,LAM,MU,L)
C           **********************************************************
C           ROUTINE TO FIND SU(3) REPRESENTATIONS
C           REFERENCES ----
C                          1. V.K.B.KOTA (SEE THE TEXT OF THIS REPORT)
C           PARAMETERS ----
C                           INR = NUMBER OF PARTICLES
C                           NOP = ORDER OF THE PARTITION
C                           (LAM MU) = SU(3) REPRESENTATIONS
C                           L = NUMBER OF SU(3) REPRESENTATIONS
C                           EXTERNAL: N = SHELL NUMBER
C                           INTERNAL: NR,NR2 (SEE THE ROUTINE-A)
C                                     ND = MAXIMUM NUMBER OF SU(3)
C                                     REPRESENTATIONS THAT CAN OCCUR IN THE
C                                     REDUCTION OF A GIVEN PARTITION OF
C                                     A GIVEN SHELL
C           EXTENSIONS ----
C                           ADJUST THE INTERNAL PARAMETERS IN THE DIMENSION
C                           STATEMENT
C           DIMENSIONS----
C                           LAM(ND),MU(ND)
C           **********************************************************
            COMMON/VKB1/N,NR,NR2
            DIMENSION LAM(200),MU(200)
            IF(INR.EQ.1)GOTO 40
            IF(INR.EQ.2)GOTO 50
C           THE FOLLOWING STATEMENT WILL OPERATE WHEN THE ROUTINE IS CALLED
C           FROM THE ROUTINE-PLTHSV
            IF(NOP.EQ.NR)IAP=2*N*INR
            IF(NOP.LT.NR)IAP=IEPSLN(INR,NOP)
C           NOR = TOTAL NUMBER OF QUANTA
            NOR=INR*N
            NZK=NOR+1
            I1=NOR/2+1
            I2=NOR/3+1
            I=0
            DO 30 L1=1,NZK
            LAM1=NZK-L1
            DO 20 L2=1,I1
            LAM2=I1-L2
C           CHECK THE INEQUALITY
            IF(LAM1.LT.LAM2)GOTO 20
            DO 10 L3=1,I2
            LAM3=I2-L3
C           CHECK THE INEQUALITY
            IF(LAM2.LT.LAM3)GOTO 10
C           (LAM1 LAM2 LAM3) IS THE U(3) PARTITION
            IF((LAM1+LAM2+LAM3).NE.NOR)GOTO 10
C           CHECK THE VALE OF EPSILON
            IF((2*(LAM1-LAM2)+(LAM2-LAM3)).GT.IAP)GOTO 10
            I=I+1
            LAM(I)=LAM1-LAM2
            MU(I)=LAM2-LAM3
```

```
   20 CONTINUE
   30 CONTINUE
      L=I
      RETURN
C     (LM MU) FOR ONE PARTICLE
   40 L=1
      LAM(1)=N
      MU(1)=0
      RETURN
C     (LM MU) FOR TWO PARTICLES
   50 L=N+1
      DO 60 K1=1,L
      LAM(K1)=N*2-2*(K1-1)
   60 MU(K1)=K1-1
      RETURN
      END
C     PART1: ROUTINE IDENTIFICATION LABEL = E , NAME = NUMULT
      SUBROUTINE NUMULT
C     ***************************************************************
C     ROUTINE TO PERFORM THE NEW-MULTIPLICATION
C     REFERENCES ----
C              1. V.K.B.KOTA (SEE THE TEXT CF THIS REPORT)
C              2. H.WEYL THE THEORY OF GROUPS AND QUANTUM-MECHANICS
C                 (DOVER PUBLICATION;N.Y,1930)
C     PARAMETERS ----
C                EXTERNAL: N = SHELL NUMBER
C                INTERNAL: NR,NR2 (SEE THE ROUTINE-A)
C                          NY = NUMER OF IR OF SU(3) IN A TOTALLY
C                          ANTI-SYMMETRIC PARTITION CF NR2 PARTICLES
C                          NZ = MAX(NR,NY)
C                          NE = NZ+1
C                          NA -- (SEE THE ROUTINE-A)
C     EXTENSIONS ----
C                ADJUST THE INTERNAL PARAMETERS IN THE VKB3 BLOCK
C     DIMENSIONS----
C                LAMR(NE,NA),MUR(NE,NA),MFATR(NE,NA),LKR(NA)
C     ***************************************************************
      COMMON/VKB1/N,NR,NR2
      COMMON/VKB3/LAMR(11,6),MUR(11,6),MFATR(11,6),LKR(6)
      DO 60 IR=1,NR2
      IF(IR.EQ.1)GOTO 30
      IF(IR.EQ.2)GOTO 40
      IRJ=IR+1
      IJ=0
      DO 20 IIA=1,IRJ
      IA=IIA-1
      DO 20 IIB=1,IRJ
      IB=IIB-1
      DO 10 IK=1,3
      IY=IK-1
      IKJ=2-IY
      K=1
      DO 10 IL=1,3
      ILJ=IL-1
      IF(ILJ.EQ.IKJ)GOTO 10
      K=K+1
      IJ=IJ+1
      LAM1=N*IR-IA*IR-IY
      LAM3=IB*IR+ILJ
      MFATR(IJ,IR)=(-1)**(IY+K)
      LAMR(IJ,IR)=2*LAM1-N*IR+LAM3
      MUR(IJ,IR)=N*IR-LAM1-2*LAM3
C     CHECK THE IN-EQUALITY
```

```
      IJ=IJ-1
 10   CONTINUE
 20   CONTINUE
      LKR(IR)=IJ
      GOTO 60
C     NEW MULTIPLICATION FOR ONE PARTICLE
 30   LAMR(1,1)=N
      MUR(1,1)=0
      MFATR(1,1)=1
      LKR(1)=1
      GOTO 60
C     NEW MULTIPLICATION FOR TWO PARTICLES
 40   LKR(2)=N+1
      NNN=N+1
      DO 50 NN=1,NNN
      LAMR(NN,2) =2*N-2*(NN-1)
      MFATR(NN,2)=(-1)**(NN+1)
      MUR(NN,2)=NN-1
 50   CONTINUE
 60   CONTINUE
      RETURN
      END
C     PART1: ROUTINE IDENTIFICATION LABEL = F , NAME = MULTU
      FUNCTION MULTU(XL1,XM1,XL2,XM2,XL3,XM3)
C     ***********************************************************************
C     MULTIPLICITY IN SU(3) COUPLING
C     REFERENCES
C                       1. Y.AKIYAMA AND J.P.DRAAYER (COM.PHYS.COMM 5
C                          (1973) 405-415)
C                       2. C.K.CHEW AND R.T.SHARP-CAN.J.PHYS 44(1976)2789
C     ***********************************************************************
      IMPLICIT INTEGER(X)
      MULTU=0
      NX=XL1+XL2-XL3-XM1-XM2+XM3
      MX=NX/3
      IF(3*MX.NE.NX)RETURN
      IF(MX)20,10,10
 10   L1=XL1
      L2=XL2
      L3=XL3
      M1=XM1
      M2=XM2
      M3=XM3
      GOTO 30
 20   L1=XM1
      L2=XM2
      L3=XM3
      M1=XL1
      M2=XL2
      M3=XL3
      MX=-MX
 30   NX=MX+M1+M2-M3
      MU=L1-MX
      IF(MU.LT.0)RETURN
      NU=L2-MX
      IF(NU.LT.0)RETURN
      IF(MU.GT.M2)MU=M2
      IF(NU.GT.M1)NU=M1
      MU=MU+1
      NU=NU-1
      DO 40 MY=1,MU
      NY=NX-MY
```

```
      MULTU=MULTU+1
   40 CONTINUE
      RETURN
      END
C     PART1: ROUTINE IDENTIFICATION LABEL = G , NAME = KRONP
      SUBROUTINE KRONP(K1,K2,KW,KWW)
C     ************************************************************************
C     ROUTINE TO PERFORM THE KRONECKER PRODUCT
C     REFERENCES ----
C                  1. V.K.B.KOTA (SEE THE TEXT OF THIS REPORT)
C     PARAMETERS ----
C                  K1,K2: NUMBER OF PARTICLES
C                  KW: NUMBER OF IR OF SU(3) IN THE PARTITION CORRES-
C                  PONDING TO K1 PARTICLES
C                  KWW: A CONTROLLING VARIABLE
C                  EXTERNAL: N = SHELL NUMBER
C                  INTERNAL: NR,NR2 (SEE THE ROUTINE-A)
C                            VKB3 BLOCK -- SEE THE RUOTINE-E
C                            ND -- SEE THE ROUTINE-D
C     EXTENSIONS ----
C                  ADJUST THE INTERNAL PARAMETERS IN THE VKB3,VKB4,VKB5
C                  BLOCKS AND IN THE DIMENSION STATEMENT
C     DIMENSIONS----
C                  LAM(ND),MU(ND),MFAT(ND),LAM3(ND),MU3(ND),MFAT3(ND)
C     ************************************************************************
      COMMON/VKB1/N,NR,NR2
      COMMON/VKB3/LAMR(11,6),MUR(11,6),MFATR(11,6),LKR(6)
      COMMON/VKB4/LAM(200),MU(200)
      COMMON/VKB5/MFAT(200)
      DIMENSION LAM3(200),MU3(200),MFAT3(200)
C     PARTICLE-HOLE-TRANSFER
      IF(K2.GT.NR2)K21=NR-K2
      IF(K2.LE.NR2)K21=K2
      IF(K2.EQ.NR )KW2=1
      IF(K2.NE.NR )KW2=LKR(K21)
      K3=K1+K2
C     WHEN CALLED FROM THE ROUTINE--H THE FOLLOWING WILL OPERATE
      IF(KWW.EQ.0)CALL SUREP(K3,NR,LAM3,MU3,KW3)
C     WHEN CALLED FROM THE ROUTINE--L THE FOLLOWING WILL OPERATE
      IF(KWW.EQ.1)CALL SUREP(K3,4,LAM3,MU3,KW3)
      IF(K1.EQ.0)GOTO 40
      IF(K2.EQ.NR)GOTO 20
      DO 10 KR3=1,KW3
      MFAT3(KR3)=0
      DO 10 KR2=1,KW2
      DO 10 KR1=1,KW
      IF(MFAT(KR1).EQ.0)GOTO 10
      IF(K2.GT.NR2)MFATRP=MULTU(LAM(KR1),MU(KR1),MUR(KR2,K21),
     1 LAMR(KR2,K21),LAM3(KR3),MU3(KR3))
      IF(K2.LE.NR2)MFATRP=MULTU(LAM(KR1),MU(KR1),LAMR(KR2,K21),
     2 MUR(KR2,K21),LAM3(KR3),MU3(KR3))
      MFAT3(KR3)=MFAT3(KR3)+MFATRP*MFAT(KR1)*MFATR(KR2,K21)
   10 CONTINUE
      GOTO 90
C     PRODUCT WITH (0 0) REPRESENTATION
   20 DO 30 KR3=1,KW3
      MFAT3(KR3)=0
      DO 30 KR1=1,KW
      IF(LAM3(KR3).EQ.LAM(KR1).AND.MU3(KR3).EQ.MU(KR1))
     1 MFAT3(KR3)=MFAT(KR1)
   30 CONTINUE
      GOTO 90
   40 IF(K2.EQ.NR)GOTO 70
```

```
                 MFAT3(KR3)=0
                 DO 60 KR2=1,KW2
                 IF(K2.GT.NR2)GOTO 50
                 IF(LAM3(KR3).EQ.LAMR(KR2,K21).AND.MU3(KR3).EQ.MUR(KR2,K21))
               1 MFAT3(KR3)=MFATR(KR2,K21)
                 GOTO 60
C                PARTICLE HOLE TRANSFER
        50 IF(LAM3(KR3).EQ.MUR(KR2,K21).AND.MU3(KR3).EQ.LAMR(KR2,K21))
               1 MFAT3(KR3)=MFATR(KR2,K21)
        60 CONTINUE
                 GOTO 90
        70 DO 80 KR3=1,KW3
                 MFAT3(KR3)=0
                 IF(LAM3(KR3).EQ.0.AND.MU3(KR3).EQ.0)MFAT3(KR3)=1
        80 CONTINUE
        90 KW=KW3
                 DO 100 KR3=1,KW3
                 LAM(KR3)=LAM3(KR3)
                 MU(KR3)=MU3(KR3)
                 MFAT(KR3)=MFAT3(KR3)
       100 CONTINUE
                 RETURN
                 END
C       PART1: ROUTINE IDENTIFICATION LABEL = H , NAME = PLTHSM
                 SUBROUTINE PLTHSM
C       ****************************************************************
C       ROUTINE TO REDUCE TOTALLY ANTISYMMETRIC PARTITIONS
C       REFERENCES ---
C                        1. V.K.B.KOTA (SEE THE TEXT OF THIS REPORT)
C                        2. J.A.TODD PROC.OF.CAM.PHIL.SOC,49(1949)328
C       PARAMETERS ---
C                        EXTERNAL: N = SHELL NUMBER
C                        INTERNAL: NR,NR2 (SEE THE ROUTINE-A)
C                                  VKB2 BLOCK -- SEE THE ROUTINE-A
C                                  VKB3 BLOCK -- SEE THE RUCTINE-E
C                                  VKB4,VKB5 BLOCKS -- SEE THE ROUTINE-G
C                                  ND -- SEE THE ROUTINE-O
C                                  NE,NA -- SEE THE ROUTINE-E
C       EXTENSIONS---
C                        ADJUST THE INTERNAL PARAMETERS IN THE VKB2,VKB3,
C                        VKB4,VKB5 BLOCKS AND IN THE DIMENSION STATEMENT
C       DIMENSIONS---
C                        LAMK(NE,NA),MUK(NE,NA),MFATK(NE,NA),L(NA)
C                        IFACT(NA),MFATKK(ND)
C       ****************************************************************
                 COMMON/VKB1/N,NR,NR2
                 COMMON/VKB2/MU(6,8,6),KP(6)
                 COMMON/VKB3/LAMR(11,6),MUR(11,6),MFATR(11,6),LKR(6)
                 COMMON/VKB4/LAM(200),MU(200)
                 COMMON/VKB5/MFAT(200)
                 DIMENSION LAMK(11,6),MUK(11,6),MFATK(11,6),L(6),IFACT(6),
               1            MFATKK(200)
                 CALL YNGTBL
                 NR3=NR2+1
                 IFACT(1)=1
C       CALCULATE FACTORIALS
                 DO 10 I=2,NR3
        10 IFACT(I)=IFACT(I-1)*(I-1)
                 DO 80 I=1,NR2
                 CALL SUREP(I,NR,LAM,MU,KW)
                 LK=KW
                 DO 20 IR=1,LK
        20 MFATKK(IR)=0
```

```
      DO 60 J=1,II
      I3=0
      IH=1
      ICH=0
      DO 40 K=1,I
      I5=NU(I,J,K)
      IF(I5.EQ.0)GOTO 40
C     CALCULATE THE CHARACTER
      ICH=ICH+I5
C     CALCULATE THE ORDER
      IH=IH*IFACT(I5+1)*(K**I5)
      DO 30 IKH=1,I5
      I2=I3
      I3=I2+K
C     PERFORM THE OUTER PRODUCT
      CALL KRONP(I2,K,KW,0)
   30 CONTINUE
   40 CONTINUE
      MGGG=IFACT(I+1)/IH
      MNUU=(-1)**(I+ICH)
      MFAA=MNUU*MGGG
      DO 50 IR=1,LK
   50 MFATKK(IR)=MFATKK(IR)+MFAA*MFAT(IR)
   60 CONTINUE
      KW8=0
      DO 70 IR=1,LK
      IF(MFATKK(IR).EQ.0)GOTO 70
      KW8=KW8+1
      LAMK(KW8,I)=LAM(IR)
      MUK(KW8,I)=MU(IR)
      MFATK(KW8,I)=MFATKK(IR)/IFACT(I+1)
   70 CONTINUE
      L(I)=KW8
   80 CONTINUE
      DO 90 I=1,NR2
      KW8=L(I)
      LKR(I)=KW8
      DO 90 KR8=1,KW8
      LAMR(KR8,I)=LAMK(KR8,I)
      MUR(KR8,I)=MUK(KR8,I)
      MFATR(KR8,I)=MFATK(KR8,I)
   90 CONTINUE
      RETURN
      END
C     PART1: ROUTINE IDENTIFICATION LABEL = I , NAME = PATHOL
      SUBROUTINE PATHOL(I1,I2,I3,I4,K1,K2,K3,K4)
C     ***************************************************************
C     ROUTINE TO PERFORM PARTICLE HOLE TRANSFORMATION
C     REFERENCES ----
C                 1. V.K.B.KOTA (SEE THE TEXT OF THIS REPORT)
C     PARAMETERS ----
C                 (I1,I2,I3,I4) CORRESPOND TO THE GIVEN PARTITION,THEN
C                 (K1,K2,K3,K4) IS THE CORRESPONDING HOLE PARTITION
C                 EXTERNAL: N = SHELL NUMBER
C                 INTERNAL: NR,NR2 (SEE THE ROUTINE-A)
C                           NP: NUMBER OF PARTICLES
C                           N1: ORDER OF THE PARTITION
C     ***************************************************************
      COMMON/VKB1/N,NR,NR2
      COMMON/VKB6/NP,N1
      IF(NP.LE.(NR*N1)/2.OR.N1.LE.1)GOTO 30
      IF(N1-3)15,20,25
```

```fortran
      K2=0
      K3=NR-I3-I4
      K4=I4
      RETURN
C     THREE ROWED PARTITIONS
   20 K2=NR-I3-I2-I4
      K1=0
      K3=I4
      K4=I3
      RETURN
C     FOUR ROWED PARTITIONS
   25 K1=NR-I1-I2-I3-I4
      K2=I4
      K3=I3
      K4=I2
      RETURN
C     ONE ROWED PARTITIONS (NO PARTICLE HOLE TRANSFER)
   30 K1=I1
      K2=I2
      K3=I3
      K4=I4
      RETURN
      END
C     PART1: ROUTINE IDENTIFICATION LABEL = J , NAME = ORDER
      SUBROUTINE ORDER(I1,I2,I3,I4,N1)
C     ************************************************************
C     ROUTINE TO FIND THE ORDER OF A GIVEN PARTITION
C     REFERENCES ----
C                 1. V.K.B.KOTA (SEE THE TEXT OF THIS REPORT)
C     PARAMETERS----
C                 N1 = ORDER OF THE PARTITION
C                 (I1,I2,I3,I4) CORRESPOND TO THE GIVEN PARTITION
C     ************************************************************
      N1=4
      IF(I1.EQ.0)N1=3
      IF(N1.EQ.3.AND.I2.EQ.0)N1=2
      IF(N1.EQ.2.AND.I3.EQ.0)N1=1
      RETURN
      END
C     PART1: ROUTINE IDENTIFICATION LABEL = K , NAME = DESEND
      SUBROUTINE DESEND(K1,K2,K3,K4,L1,L2,L3,L4)
C     ************************************************************
C     ROUTINE TO ARRANGE THE GIVEN NUMBERS IN DESENDING ORDER
C     REFERENCES ----
C                 1. V.K.B.KOTA (SEE THE TEXT OF THIS REPORT)
C     PARAMETERS----
C                 K1,K2,K3,K4 -- GIVEN NUMBERS
C                 L1,L2,L3,L4 -- ARE THE NUMBERS IN DESENDING ORDER
C     ************************************************************
      L1=MAX0(K1,K2,K3,K4)
      L4=MIN0(K1,K2,K3,K4)
      IF(K1.EQ.L1)L2=MAX0(K2,K3,K4)
      IF(K2.EQ.L1)L2=MAX0(K1,K3,K4)
      IF(K3.EQ.L1)L2=MAX0(K1,K2,K4)
      IF(K4.EQ.L1)L2=MAX0(K1,K2,K3)
      L3=K1+K2+K3+K4-L1-L2-L4
      RETURN
      END
C     PART1: ROUTINE IDENTIFICATION LABEL = L , NAME = REDTN
      SUBROUTINE REDTN(K1,K2,K3,K4)
C     ************************************************************
C     REDUCTION OF A GIVEN PARTITION TO IR OF SU(3)
C     REFERENCES ----
C                 1. V.K.B.KOTA (SEE THE TEXT OF THIS REPORT)
```

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C     PARAMETERS ----
C                    (K1,K2,K3,K4) -- CORRESPOND TO THE GIVEN PARTITION
C                    KR8 = NUMBER OF IR OF SU(3) IN THE RESULTANT
C                    REDUCTION
C                    EXTERNAL: N = SHELL NUMBER
C                    INTERNAL: NR,NR2 (SEE THE ROUTINE-A)
C                              NP,N1 -- SEE THE ROUTINE-I
C                              ND -- SEE THE ROUTINE-D
C                              VKB3 BLOCK -- SEE THE ROUTINE-E
C                              VKB4,VKB5 BLOCKS -- SEE THE ROUTINE-G
C     EXTENSIONS----
C                    ADJUST THE INTERNAL PARAMETERS IN THE VKB3,VKB4,
C                    VKB5,VKB8 BLOCKS AND IN THE DIMENSION STATEMENT
C     DIMENSIONS----
C                    IAD(4),KA(4),KB(4),KC(4),KD(4),IAK(4,4),MFAT4(ND)
C     ****************************************************************
      COMMON/VKB1/N,NR,NR2
      COMMON/VKB3/LAMR(11,6),MUR(11,6),MFATR(11,6),LKR(6)
      COMMON/VKB4/LAM(200),MU(200)
      COMMON/VKB5/MFAT(200)
      COMMON/VKB6/NP,N1
      COMMON/VKB7/KR8
      COMMON/VKB8/LAMK(200),MUK(200),MFATK(200)
      DIMENSION IAD(4),KA(4),KB(4),KC(4),KD(4),IAK(4,4),MFAT4(200)
C     FIND THE TRNSPOSE OF THE GIVEN PARTITION
      IF(K1+K2+K3+K4.EQ.0)GOTO 160
      IAD(1)=K1+K2+K3+K4
      IAD(2)=K1+K2+K3
      IAD(3)=K1+K2
      IAD(4)=K1
C     EXPANSION TO THE MATRIX OF TOTALLY ANTISYMMETRIC PARTITIONS
      DO 10 I=1,4
      DO 10 J=1,4
  10  IAK(I,J)=IAD(I)+J-I
      DO 20 I=1,4
      KA(I)=IAK(1,I)
      KB(I)=IAK(2,I)
      KC(I)=IAK(3,I)
  20  KD(I)=IAK(4,I)
      KN4=4*K1+3*K2+2*K3+K4
      CALL SUREP(KN4,4,LAM,MU,KW4)
      DO 30 KP4=1,KW4
  30  MFAT4(KP4)=0
C     PERFORM THE DETERMINANTAL PRODUCT
      NQ=0
      MQ=0
      DO 110 I1=1,4
      DO 100 I2=1,4
      IF(I1.EQ.I2)GOTO 100
      MQ=MQ+1
      DO 90 I3=1,4
      IF(I1.EQ.I3.OR.I2.EQ.I3)GOTO 90
      DO 80 I4=1,4
      IF(((I1.EQ.I4).OR.(I2.EQ.I4)).OR.(I3.EQ.I4))GOTO 80
      NQ=NQ+1
      MNQ=(-1)**(MQ+NQ)
C     CHECK THE IN-EQUALITY
      IF(KD(I4).LT.0.OR.KD(I4).GT.NR)GOTO 80
      IF(KC(I3).LT.0.OR.KC(I3).GT.NR)GOTO 80
      IF(KB(I2).LT.0.OR.KB(I2).GT.NR)GOTO 80
      IF(KA(I1).LT.0.OR.KA(I1).GT.NR)GOTO 80
      CALL DESEND(KD(I4),KC(I3),KB(I2),KA(I1),L1,L2,L3,L4)
      L5=L4+L3
```

```fortran
      IF(L4.EQ.0)GOTO 40
      CALL KRONP(0,L4,KW,1)
   40 CALL KRONP(L4,L3,KW,1)
   50 L6=L5+L2
      IF(L2.EQ.0)GOTO 60
      CALL KRONP(L5,L2,KW,1)
   60 CALL KRONP(L6,L1,KW,1)
      DO 70 KR4=1,KW4
   70 MFAT4(KR4)=MFAT4(KR4)+MFAT(KR4)*MNQ
   80 CONTINUE
   90 CONTINUE
  100 CONTINUE
  110 CONTINUE
      IF(NP.LE.(N1*NR)/2.OR.N1.LE.1)GOTO 140
      CALL SUREP(NP,4,LAMK,MUK,KWK)
      DO 120 KR3=1,KWK
      MFAT(KR3)=0
C     PARTICLE-HOLE-TRANSFER
      DO 120 KR4=1,KW4
      IF(LAMK(KR3).EQ.MU(KR4).AND.MUK(KR3).EQ.LAM(KR4))MFAT(KR3)=
     1 MFAT4(KR4)
  120 CONTINUE
      DO 130 KR4=1,KWK
      LAM(KR4)=LAMK(KR4)
      MU(KR4)=MUK(KR4)
  130 MFAT4(KR4)=MFAT(KR4)
      KW4=KWK
  140 KR8=0
      DO 150 KR4=1,KW4
      IF(MFAT4(KR4).EQ.0)GOTO 150
      KR8=KR8+1
      LAMK(KR8)=LAM(KR4)
      MUK(KR8)=MU(KR4)
      MFATK(KR8)=MFAT4(KR4)
  150 CONTINUE
      RETURN
  160 KR8=1
      MFATK(1)=1
      LAMK(1)=0
      MUK(1)=0
      RETURN
      END
C     PART1: ROUTINE IDENTIFICATION LABEL = M , NAME = DIMCHK
      SUBROUTINE DIMCHK(IA,IB,IC,ID,IF)
C     *****************************************************************
C     ROUTINE TO PERFORM DIMENSIONALITY CHECK
C     REFERENCES ----
C
C     PARAMETERS ----  1. V.K.3.KOTA (SEE THE TEXT CF THIS REPORT)
C
C                      (IA,IB,IC,ID) -- CORRESPOND TO THE GIVEN PARTITION
C                      IE = IT IS A DUMMY VARIABLE (SEE REF.1 )
C                      EXTERNAL: N = SHELL NUMBER
C                      INTERNAL: NR,NR2 (SEE THE ROUTINE-A)
C                              NC -- SEE THE ROUTINE-C
C                              VKB3 BLOCK -- SEE THE ROUTINE-E
C                              VKB8 BLOCK -- SEE THE ROUTINE-L
C     EXTENSIONS----
C
C                      ADJUST THE INTERNAL PARAMETERS IN THE VKB3,VKB8,
C                      AND VKB9 BLOCKS
C     DIMENSIONS----
C
C                      IAD(4),KA(4),KB(4),KC(4),KD(4),IAK(4,4),DBIN(NC)
C     *****************************************************************
      IMPLICIT REAL*8(D)
      COMMON/VKB1/N,NR,NR2
```

```fortran
      DCALC=0.D0
      DO 120 I=1,KR8
120   DCALC=DCALC+MFATK(I)*DIME(LAMK(I),MUK(I))
      IF(OTHER.NE.DCALC)WRITE(6,140)OTHER,DCALC
130   FORMAT(/1X,'CHECK ------ PLTHSM AND NUMULT')
140   FORMAT(/10X,'DIMENSION(THEORY)=',D22.16,5X,'DIMENSION(CALCULATE
     1=',D22.16)
      RETURN
      END
C     PART2: ROUTINE IDENTIFICATION LABEL = X , NAME = MAIN
C     *******************************************************************
C     MAIN PROGRAMME TO GENERATE THE IR OF SU(3) IN A GIVEN PARTITION
C     OF A GIVEN SHELL
C     PARAMETERS
C                 EXTERNAL: N = SHELL NUMBER
C                           NP,N1 --- SEE THE ROUTINE-I
C                 INTERNAL: NR,NR2 (SEE THE ROUTINE-A)
C                           VKB3 BLOCK --- SEE THE ROUTINE-E
C                           VKB6 BLOCK --- SEE THE ROUTINE-I
C                           VKB7,VKB8 BLOCKS --- SEE THE ROUTINE-L
C                           VKB9 BLOCK --- SEE THE ROUTINE-M
C     EXTENSIONS
C                 ADJUST THE INTERNAL PARAMETERS IN THE VKB3,VKB8,VKB
C                 BLOCKS AND IN THE DIMENSION STATEMENT
C     DIMENSIONS
C                 IFR(NR)
C     *******************************************************************
      IMPLICIT REAL*8(D)
      COMMON/VKB1/N,NR,NR2
      COMMON/VKB3/LAMR(11,6),MUR(11,6),MFATR(11,6),LKR(6)
      COMMON/VKB6/NP,N1
      COMMON/VKB7/KR8
      COMMON/VKB8/LAMK(200),MUK(200),MFATK(200)
      COMMON/VKB9/DBIN(12)
      DIMENSION IFR(10)
      READ(5,100)N
      NR=((N+1)*(N+2))/2
      NR2=NR/2
      WRITE(6,200)
      CALL NUMULT
      CALL PLTHSM
      CALL DIMCHK(1,1,1,1,0)
10    READ(5,100)IA,IB,IC,ID
      NP=4*IA+2*IB+2*IC+ID
      IF(IA.LT.0)GOTO 45
      IF((IA+IB+IC+ID).GT.NR)GOTO 40
      IF((((IA.GT.NR).OR.(IB.GT.NR)).OR.(IC.GT.NR)).OR.ID.GT.NR) GOTO 40
      IF((((IA.LT.0).OR.(IB.LT.0)).OR.(IC.LT.0)).OR.ID.LT.0) GOTO 40
      CALL ORDER(IA,IB,IC,ID,N1)
      CALL PATHOL(IA,IB,IC,ID,K1,K2,K3,K4)
      CALL PEDIN(K1,K2,K3,K4)
      CALL PARTIS(IA,IB,IC,ID,IFR)
      WRITE(6,700)
      WRITE(6,300)NR,(IFR(I),I=1,NR)
      WRITE(6,400)
      IKQ1=KR8/6
      IKQ2=6*IKQ1+1
      IKQ3=IKQ1-1
      IF(IKQ1.LE.0)IKZQ=KR8
      IF(IKQ1.GT.0)IKZQ=6
      WRITE(6,500)(MFATK(I),LAMK(I),MUK(I),I=1,IKZQ)
      IF(IKQ3)35,25,15
15    DO 20 IKQ4=1,IKQ3
```

```fortran
      COMMON/VKB3/LAMR(11,6),MUR(11,6),MFATR(11,6),LKR(6)
      COMMON/VKB7/KR8
      COMMON/VKB8/LAMK(200),MUK(200),MFATK(200)
      COMMON/VKB9/DBIN(12)
      DIMENSION IAK(4,4),KA(4),KB(4),KC(4),KD(4),IAD(4)
      DIME(I,J)=DFLOAT(((I+1)*(J+1)*(I+J+2))/2)
      IF(IE.EQ.1)GOTO 50
C     CHECK THE DIMENSIONALITIES OF THE TOTALLY ANTISYMMETRIC PARTITIONS
      DBIN(1)=1.D0
      DBIN(NR+1)=1.D0
      NK=NR2+1
      DO 20 I=2,NK
      DBIN(I)=1
      KK=I-1
      DO 10 J=1,KK
   10 DBIN(I)=(DBIN(I)*(NR-J+1))/J
   20 DBIN(NR-I+2)=DBIN(I)
      DO 40 I=1,NR2
      KK=LKR(I)
      DDM=0.D0
      DO 30 J=1,KK
   30 DDM=DDM+MFATR(J,I)*DIME(LAMR(J,I),MUR(J,I))
      IF(DDM.NE.DBIN(I+1))WRITE(6,130)
      IF(DDM.NE.DBIN(NR-I+1))WRITE(6,130)
   40 CONTINUE
      RETURN
C     CHEK THE DIMENSIONALITY OF THE GIVEN PARTITION
   50 IAD(1)=IA+IB+IC+ID
      IAD(2)=IA+IB+IC
      IAD(3)=IA+IB
      IAD(4)=IA
      DO 60 I=1,4
      DO 60 J=1,4
   60 IAK(I,J)=IAD(I)+J-I
      DO 70 I=1,4
      KA(I)=IAK(1,I)
      KB(I)=IAK(2,I)
      KC(I)=IAK(3,I)
      KD(I)=IAK(4,I)
   70 CONTINUE
      NQ=0
      MQ=0
      OTHER=0.D0
      DO 110 I1=1,4
      DO 100 I2=1,4
      IF(I1.EQ.I2)GOTO 100
      MQ=MQ+1
      DO 90 I3=1,4
      IF(I1.EQ.I3.OR.I2.EQ.I3)GOTO 90
      DO 80 I4=1,4
      IF(((I1.EQ.I4).OR.(I2.EQ.I4)).OR.(I3.EQ.I4))GOTO 80
      NQ=NQ+1
      IF(KD(I4).LT.0.OR.KD(I4).GT.NR)GOTO 80
      IF(KC(I3).LT.0.OR.KC(I3).GT.NR)GOTO 80
      IF(KB(I2).LT.0.OR.KB(I2).GT.NR)GOTO 80
      IF(KA(I1).LT.0.OR.KA(I1).GT.NR)GOTO 80
      IPQ=MQ+NQ+0.2
      IMNQ=IPQ-IPQ/2*2
      MNQ=1-2*IMNQ
      OTHER=OTHER+DBIN(KA(I1)+1)*DBIN(KB(I2)+1)*DBIN(KC(I3)+1)*
     1 DBIN(KD(I4)+1)*MNQ
   80 CONTINUE
   90 CONTINUE
```

```
        IKQ5= 6*IKQ4+1
        IKQ6=IKQ5+5
   20 WRITE(6,500)(MFATK(I),LAMK(I),MUK(I),I=IKQ5,IKQ6)
   25 IF(KR8-IKQ2+1)35,35,30
   30 WRITE(6,500)(MFATK(I),LAMK(I),MUK(I),I=IKQ2,KR8)
   35 CALL DIMCHK(IA,IB,IC,ID,1)
        GOTO 10
   40 WRITE(6,700)
        WRITE(6,600)IA,IB,IC,ID
        GOTO 10
   45 WRITE(6,200)
        STOP
  100 FORMAT(2014)
  200 FORMAT(1H2)
  300 FORMAT(15X,'U(',I2,') PARTITION',5X,10I3,15X)
  400 FORMAT(22X,'IRREDUCIBLE REPRESENTATIONS OF SU(3)',22X)
  500 FORMAT( 6(1X, I5,'(',I2,1X,I2,')'))
  600 FORMAT(    5X,4I3,'  ====  CHECK THE DATA',41X)
  700 FORMAT(/)
        END
```

        INPUT DATA

```
    3
    1    0    0    0
    9    0    0    0
    1    0    8    0
    0    0    6    2
    0    0   -2    2
    0   -6   -2    2
    6   -2   -2    0
    0    0    0   10
    0    0    0   -5
    0    0    0    4
    0    0    0   -6
    0    1    0    0
    0    9    0    0
    2    2    2    2
    0    0    5    0
    0    0   -2   -8
    0    1    1    0
    0    0   10    0
   -1    2    2    1
    5    5    1    1
    9   -2    4    0
   -1
```

U(10) PARTITION   4 0 0 0 0 0 0 0 0 0
            IRREDUCIBLE REPRESENTATIONS OF SU(3)

```
1(12  0)     1( 8  2)     1( 6  3)     1( 4  4)     1( 6  0)     1( 3  3)
1( 4  1)     1( 0  6)     1( 2  2)     1( 0  0)
```

U(10) PARTITION   4 4 4 4 4 4 4 4 4 0
            IRREDUCIBLE REPRESENTATIONS OF SU(3)

```
1( 0 12)     1( 2  8)     1( 3  6)     1( 4  4)     1( 6  0)     1( 3  3)
1( 0  6)     1(-1  4)     1( 2  2)     1( 0  0)
```

U(10) PARTITION   4 2 2 2 2 2 2 2 2 0
            IRREDUCIBLE REPRESENTATIONS OF SU(3)

```
1( 6  6)     1( 8  2)     1( 5  5)     1( 6  3)     1( 7  1)     1( 2  8)
1( 3  6)     4( 4  4)     2( 5  2)     2( 6  0)     1( 1  7)     2( 2  5)
4( 3  3)     3( 4  1)     2( 0  6)     3( 1  4)     5( 2  2)     1( 3  0)
1( 0  3)     2( 1  1)     1( 0  0)
```

U(10) PARTITION   2 2 2 2 2 2 1 1 0 0
            IRREDUCIBLE REPRESENTATIONS OF SU(3)

```
1( 7  4)     1( 9  0)     1( 3  9)     2( 4  7)     3( 5  5)     3( 6  3)
2( 7  1)     1(-1 10)     2( 2  8)     5( 3  6)     5( 4  4)     6( 5  2)
1( 6  0)     1( 0  9)     4( 1  7)     7( 2  5)     8( 3  3)     5( 4  1)
3( 0  6)     6( 1  4)     6( 2  2)     3( 3  0)     3( 0  3)     3( 1  1)
```

U(10) PARTITION   2 2 1 1 0 0 0 0 0 0
            IRREDUCIBLE REPRESENTATIONS OF SU(3)

```
1( 9  3)     1(10  1)     2( 7  4)     2( 8  2)     1( 9  0)     1( 4  7)
3( 5  5)     5( 6  3)     4( 7  1)     3( 3  6)     5( 4  4)     7( 5  2)
3( 6  0)     1( 0  9)     2( 1  7)     6( 2  5)     8( 3  3)     6( 4  1)
1( 0  6)     5( 1  4)     6( 2  2)     3( 3  0)     3( 0  3)     3( 1  1)
```

U(10) PARTITION   3 3 3 3 3 3 2 2 1 1
            IRREDUCIBLE REPRESENTATIONS OF SU(3)

```
1( 7  4)     1( 9  0)     1( 3  9)     2( 4  7)     3( 5  5)     3( 6  3)
2( 7  1)     1( 1 10)     2( 2  8)     5( 3  6)     5( 4  4)     6( 5  2)
1( 6  0)     1( 0  9)     4( 1  7)     7( 2  5)     8( 3  3)     5( 4  1)
3( 0  6)     6( 1  4)     6( 2  2)     3( 3  0)     3( 0  3)     3( 1  1)
```

U(10) PARTITION   4 4 4 4 4 4 3 3 2 2
            IRREDUCIBLE REPRESENTATIONS OF SU(3)

```
1( 7  4)     1( 9  0)     1( 3  9)     2( 4  7)     3( 5  5)     3( 6  3)
2( 7  1)     1( 1 10)     2( 2  8)     5( 3  6)     5( 4  4)     6( 5  2)
1( 6  0)     1( 0  9)     +( 1  7)     7( 2  5)     8( 3  3)     5( 4  1)
3( 0  6)     6( 1  4)     6( 2  2)     3( 3  0)     3( 0  3)     3( 1  1)
```

U(10) PARTITION   1 1 1 1 1 1 1 1 1 1
            IRREDUCIBLE REPRESENTATIONS OF SU(3)

```
1( 0  0)
```

U(10) PARTITION   1 1 1 1 1 0 0 0 0 0
            IRREDUCIBLE REPRESENTATIONS OF SU(3)

```
1( 5  2)     1( 2  5)     1( 4  1)     1(-1  4)     1( 3  0)     1( 0  3)
```

U(10) PARTITION   1 1 1 1 0 0 0 0 0 0
            IRREDUCIBLE REPRESENTATIONS OF SU(3)

```
1( 5  2)     1( 3  3)     1( 0  6)     1( 2  2)     1( 3  0)
```

U(10) PARTITION   1 1 1 1 1 1 0 0 0 0

```
        1( 6  0)        1( 2  5)        1( 3  3)        1( 2  2)        1( 0  3)

            U(10) PARTITION      3  0  0  0  0  0  0  0  0  0
                IRREDUCIBLE REPRESENTATIONS OF SU(3)
        1( 9  0)        1( 5  2)        1( 3  3)        1( 3  0)        1( 0  3)

            U(10) PARTITION      3  3  3  3  3  3  3  3  3  0
                IRREDUCIBLE REPRESENTATIONS OF SU(3)
       1( 0  9)        1( 2  5)        1( 3  3)        1( 3  0)        1( 0  3)

            U(10) PARTITION      4  4  3  3  2  2  1  1  0  0
                IRREDUCIBLE REPRESENTATIONS OF SU(3)
     1(16  7)      2(17  5)      3(18  3)      2(19  1)      1(12 12)      4(13
    11(14  8)     19(15  6)     25(16  4)     21(17  2)      9(18  0)      4(10
    16(11 11)     42(12  9)     75(13  7)    103(14  5)    103(15  3)     66(16
     1( 7 16)     11( 8 14)     42( 9 12)    109(10 10)    205(11  8)    301(12
   336(13  4)    272(14  2)    103(15  0)      2( 5 17)     19( 6 15)     75( 7
   205( 8 11)    412( 9  9)    651(10  7)    806(11  5)    762(12  3)    467(13
     3( 3 18)     25( 4 16)    103( 5 14)    301( 6 12)    651( 7 10)   1116( 8
  1515( 9  6)   1627(10  4)   1267(11  2)    484(12  0)      2( 1 19)     21( 2
   103( 3 15)    336( 4 13)    806( 5 11)   1515( 6  9)   2273( 7  7)   2730( 8
  2520( 9  3)   1527(10  1)      9( 0 18)     66( 1 16)    272( 2 14)    762( 3
  1627( 4 10)   2730( 5  8)   3679( 6  6)   3903( 7  4)   3035( 8  2)   1146( 9
   103( 0 15)    467( 1 13)   1267( 2 11)   2520( 3  9)   3903( 4  7)   4765( 5
  4447( 6  3)   2707( 7  1)    484( 0 12)   1527( 1 10)   3035( 2  8)   4447( 3
  4960( 4  4)   3952( 5  2)   1516( 6  0)   1146( 0  9)   2707( 1  7)   3952( 2
  4035( 3  3)   2569( 4  1)   1516( 0  6)   2569( 1  4)   2421( 2  2)    990( 3
   990( 0  3)    918( 1  1)    133( 0  0)

            U(10) PARTITION      2  2  2  2  2  0  0  0  0  0
                IRREDUCIBLE REPRESENTATIONS OF SU(3)
    1(10  4)      1(12  0)      1( 7  7)      1( 8  5)      2( 9  3)      2(10
    1( 4 10)      1( 5  8)      4( 6  6)      4( 7  4)      5( 8  2)      2( 3
    4( 4  7)      8( 5  5)      7( 6  3)      6( 7  1)      2( 0 12)      2( 1
    6( 2  8)      7( 3  6)     14( 4  4)      9( 5  2)      5( 6  0)      6( 1
    9( 2  5)     11( 3  3)      7( 4  1)      6( 0  6)      7( 1  4)     11( 2
    1( 3  0)      7( 0  3)      4( 1  1)      1( 0  0)

            U(10) PARTITION      2  2  1  1  1  1  1  1  1  1
                IRREDUCIBLE REPRESENTATIONS OF SU(3)
    1( 4  1)      1( 0  3)

            U(10) PARTITION      3  2  0  0  0  0  0  0  0  0
                IRREDUCIBLE REPRESENTATIONS OF SU(3)
   1(11  2)      1( 9  3)      1(10  1)      2( 7  4)      2( 8  2)      2( 9
   2( 5  5)      3( 6  3)      3( 7  1)      2( 3  6)      3( 4  4)      5( 5
   1( 6  0)      1( 1  7)      3( 2  5)      5( 3  3)      4( 4  1)      1( 0
   3( 1  4)      3( 2  2)      2( 3  0)      2( 0  3)      2( 1  1)

            U(10) PARTITION      2  2  2  2  2  2  2  2  2  2
                IRREDUCIBLE REPRESENTATIONS OF SU(3)
   1( 0  0)

    11   2   2   1   ----  CHECK THE DATA

     5   5   1   1   ----  CHECK THE DATA

     8  -2   4   0   ----  CHECK THE DATA
```

1(3 0)   1 0 0 0 0 0 0 0 0 0

1(6 0)   1(2 2)   2 0 0 0 0 0 0 0 0 0

1(4 1)   1(0 3)   1 1 0 0 0 0 0 0 0 0

1(9 0)   1(5 2)   3 0 0 0 0 0 0 0 0 0
                  1(3 3)   1(3 0)   1(0 3)

1(7 1)   1(5 2)   2 1 0 0 0 0 0 0 0 0
1(1 1)   1(3 3)   1(4 1)   1(1 4)   1(2 2)

1(6 0)   1(3 3)   1 1 1 0 0 0 0 0 0 0
                  1(2 2)   1(0 0)

1(12 0)   1(8 2)   4 0 0 0 0 0 0 0 0 0
1(4 1)   1(0 6)   1(6 3)   1(4 4)   1(6 0)   1(3 3)
                       1(2 2)   1(0 0)

1(10 1)   1(8 2)   3 1 0 0 0 0 0 0 0 0
1(6 0)   2(2 5)   2(6 3)   1(7 1)   1(4 4)   2(5 2)
1(3 0)   1(0 3)   2(3 3)   2(4 1)   1(1 4)   2(2 2)
                       1(1 1)

-(8 2)   -(7 1)   2 2 0 0 0 0 0 0 0 0
1(4 1)   1(0 6)   2(4 4)   1(5 2)   1(6 0)   -(3 3)
                       1(1 4)   2(2 2)   1(1 1)

1(9 0)   1(6 3)   2 1 1 0 0 0 0 0 0 0
2(3 3)   2(4 1)   1(7 1)   1(4 4)   2(5 2)   -(2 5)
1(1 1)   2(1 4)   1(2 2)   2(3 0)   -(3 3)

1(5 2)   1(3 3)   1 1 1 1 0 0 0 0 0 0
                  1(0 6)   1(2 2)   1(3 0)

1(13 1)   1(11 2)   4 1 0 0 0 0 0 0 0 0
-(9 0)   2(5 5)   2(9 3)   1(10 1)   2(7 4)   -(8 2)
4(5 2)   2(6 0)   3(6 3)   3(7 1)   2(3 6)   3(4 4)
-(C 6)   3(1 4)   1(1 7)   2(2 5)   4(3 3)   3(4 1)
                       3(2 2)   2(3 0)   1(0 3)   -(   )

```
                        3  2  0  0  0  0  0  0  0  0
  1(11  2)      1( 9  3)       1(10  1)       2( 7  4)       2( 8  2)       2( 9  0)
  2( 5  5)      3( 6  3)       3( 7  1)       2( 3  6)       3( 4  4)       5( 5  2)
  1( 6  0)      1( 1  7)       3( 2  5)       5( 3  3)       4( 4  1)       1( 0  6)
  3( 1  4)      3( 2  2)       2( 3  0)       2( 0  3)       2( 1  1)


                        3  1  1  0  0  0  0  0  0  0
  1(12  0)      1( 9  3)       1(10  1)       1( 7  4)       3( 8  2)       2( 5  5)
  3( 6  3)      3( 7  1)       1( 3  6)       5( 4  4)       4( 5  2)       4( 6  0)
  1( 1  7)      3( 2  5)       5( 3  3)       4( 4  1)       2( 0  6)       3( 1  4)
  6( 2  2)      1( 3  0)       1( 0  3)       2( 1  1)       1( 0  0)


                        2  2  1  0  0  0  0  0  0  0
  1(10  1)      1( 7  4)       1( 8  2)       1( 9  0)       1( 5  5)       3( 6  3)
  2( 7  1)      1( 3  6)       3( 4  4)       4( 5  2)       1( 6  0)       1( 2  7)
  3( 2  5)      4( 3  3)       4( 4  1)       3( 1  4)       3( 2  2)       2( 3  0)
  2( 0  3)      2( 1  1)


                        2  1  1  1  0  0  0  0  0  0
  1( 8  2)      2( 6  3)       1( 7  1)       1( 3  6)       2( 4  4)       2( 5  2)
  2( 6  0)      2( 2  5)       3( 3  3)       3( 4  1)       1( 0  6)       2(    4)
  3( 2  2)      1( 3  0)       2( 0  3)       1( 1  1)


                        1  1  1  1  1  0  0  0  0  0
  1( 5  2)      1( 2  5)       1( 4  1)       1( 1  4)       1( 3  0)       1( 0  3)


                        4  2  0  0  0  0  0  0  0  0
  1(14  2)      1(12  3)       1(13  1)       3(10  4)       2(11  2)       2(12  0)
  2( 8  5)      4( 9  3)       4(10  1)       4( 6  6)       5( 7  4)       8( 8  2)
  2( 9  0)      2( 4  7)       6( 5  5)       9( 6  3)       7( 7  1)       5( 5  8)
  5( 3  6)     11( 4  4)       9( 5  2)       6( 6  0)       3( 1  7)       7( 7  5)
 10( 3  3)      7( 4  1)       4( 0  6)       6( 1  4)       9( 2  2)       4( 3  0)
  2( 0  3)      3( 1  1)       1( 0  0)


                        4  1  1  0  0  0  0  0  0  0
  1(15  0)      1(12  3)       1(13  1)       1(10  4)       3(11  2)       2( 8  5)
  4( 9  3)      3(10  1)       2( 6  6)       6( 7  4)       5( 8  2)       2( 8  5)
  2( 4  7)      6( 5  5)       9( 6  3)       7( 7  1)       1( 2  8)       5( 9  0)
  8( 4  4)     12( 5  2)       3( 6  0)       1( 0  9)       3( 1  7)       6( 3  6)
 11( 3  3)      8( 4  1)       2( 0  6)       7( 1  4)       6( 2  2)       8( 1  5)
  5( 0  3)      3( 1  1)                                                    5( 3  0)


                        3  3  0  0  0  0  0  0  0  0
  1(12  3)      1(11  2)       1(12  0)       2( 8  5)       2( 9  3)       2(10  1)
  1( 6  6)      2( 7  4)       3( 8  2)       2( 9  0)       2( 4  7)       3( 5  5)
  6( 6  3)      3( 7  1)       3( 3  6)       4( 4  4)       5( 5  2)       2( 5  0)
  2( 0  9)      1( 1  7)       5( 2  5)       6( 3  3)       4( 4  1)       4(    6)
  3( 1  4)      3( 2  2)       3( 3  0)       3( 0  3)       1( 1  1)       1(    0)


                        3  2  1  0  0  0  0  0  0  0
  1(13  1)      1(10  4)       2(11  2)       1(12  0)       2( 8  5)       4( 9  3)
  4(10  1)      2( 6  6)       7( 7  4)       8( 8  2)       3( 9  0)       3( 4  7)
```

```
   8( 5  5)      12( 6  3)      10( 7  1)              2( 2  8)      7( 3  6)      14( 4  4)
  15( 5  2)       6( 6  0)       5( 1  7)             11( 2  5)     15( 3  3)      13( 4  1)
   4( 0  6)      11( 1  4)      12( 2  2)              5( 3  0)      4( 0  3)       6( 1  1)
```

```
                                     3  1  1  1  0  0  0  0  0  0
   1(11  2)       2( 9  3)      1(10  1)              1( 5  6)
   3( 9  0)       4( 5  5)      5( 6  3)              5( 7  1)      3( 7  4)       3( 8  2)
   7( 4  4)       9( 5  2)      3( 6  0)              2( 1  7)      1( 2  8)       4( 3  6)
   6( 4  1)       3( 0  6)      6( 1  4)              7( 2  2)      5( 2  5)      10( 3  3)
   3( 1  1)       1( 0  0)                                          4( 3  0)       3( 0  3)
```

```
                                  2  2  2  0  0  0  0  0  0  0
   1(12  0)       1( 9  3)      1( 6  6)              1( 7  4)
   3( 6  3)       2( 7  1)      1( 2  8)              2( 3  6)      3( 8  2)       2( 5  5)
   4( 6  0)       1( 1  7)      2( 2  5)              5( 3  3)      5( 4  4)       3( 5  2)
   2( 1  4)       5( 2  2)      1( 3  0)              1( 0  3)      3( 4  1)       3( 0  6)
                                                                   1( 1  1)       2( 0  0)
```

```
                                  2  2  1  1  0  0  0  0  0  0
   1( 9  3)       1(10  1)      2( 7  4)              2( 8  2)
   3( 5  5)       5( 6  3)      4( 7  1)              3( 3  6)      1( 9  0)       1( 4  7)
   3( 6  0)       1( 0  9)      2( 1  7)              6( 2  5)      5( 4  4)       7( 5  2)
   1( 0  6)       5( 1  4)      6( 2  2)              3( 3  0)      8( 3  3)       6( 4  1)
                                                                   3( 0  3)       3( 1  1)
```

```
                                  2  1  1  1  1  0  0  0  0  0
   1( 8  2)       1( 5  5)      1( 6  3)              2( 7  1)
   2( 5  2)       2( 6  0)      1( 1  7)              2( 2  5)      1( 3  6)       3( 4  4)
   1( 0  6)       3( 1  4)      4( 2  2)              1( 0  3)      4( 3  3)       3( 4  1)
                                                                   2( 1  1)       1( 0  0)
```

```
                                  1  1  1  1  0  0  0
   1( 6  0)       1( 2  5)      1( 3  3)              1( 2  2)
                                                                   1( 0  3)
```

```
                                  4  3  0  0  0  0  0  0  0  0
   1(15  3)       1(13  4)      1(14  2)              1(15  0)
   3(13  1)       3( 9  6)      4(10  4)              6(11  2)      2(11  5)       3(12  3)
   6( 8  5)      10( 9  3)      7(10  1)              3( 5  8)      3(12  0)       3( 7  7)
   2( 8  2)       6( 9  0)      3( 3  9)              6( 4  7)      7( 6  6)      13( 7  4)
   1( 7  1)       1( 1 10)      5( 2  8)              2( 3  6)     14( 5  5)      17( 6  3)
   7( 6  0)       2(-0  9)      7( 1  7)              3( 2  5)     17( 4  4)      17( 5  2)
   6( 3  6)      10( 1  4)     11( 2  2)              6( 3  0)     17( 3  3)      14( 4  1)
   1( 0  0)                                                        5( 0  3)       4( 1  1)
```

```
                                  4  2  1  0  0  0  0  0  0  0
   1(16  1)       1(13  4)      2(14  2)              1(15  0)
   4(13  1)       3( 9  6)      8(10  4)              2(11  2)      2(11  5)       5(12  3)
   2( 8  5)      17( 9  3)     14(10  1)              4( 5  8)      4(12  0)       4( 7  7)
   6( 8  2)      11( 9  0)      3( 3  9)             14( 4  7)     13( 6  6)      24( 7  4)
   7( 7  1)       2( 1 10)      9( 2  8)             24( 3  6)     27( 5  5)      35( 6  3)
   6( 6  0)       4( 0  9)     14( 1  7)             30( 2  5)     37( 4  4)      37( 5  2)
   6( 3  6)      24( 1  4)     25( 2  2)             11( 3  0)     37( 3  3)      27( 4  1)
   1( 0  0)                                                       11( 0  3)      11( 1  1)
```

```
                                  4  1  1  1  0  0  0  0  0  0
```

TABLE. IRREDUCIBLE REPRESENTATIONS OF SU(3) CONTAINED IN A PARTITION OF U(10)

```
 1(14  2)      2(12  3)        1(13  1)        1( 9  6)       3(10  4)       3(1   2)
 3(12  0)      5( 8  5)        6( 9  3)        6(10  1)       1( 5  8)       6( 6  6)
 9( 7  4)     12( 8  2)        4( 9  0)        1( 3  9)       5( 4  7)      11( 5  5)
18( 6  3)     11( 7  1)        4( 2  8)       10( 3  6)      18( 4  4)      17( 5  2)
 9( 6  0)      2( 0  9)        6( 1  7)       15( 2  5)      19( 3  3)      14( 4  1)
 6( 0  6)     11( 1  4)       14( 2  2)        6( 3  0)       6( 0  3)       5( 1  1)
 2( 0  0)
```

```
                            3  3  1  0  0  0  0  0  0  0
 1(14  2)      1(11  5)        1(12  3)        2(13  1)        1( 9  6)       4(10  4)
 4(11  2)      3(12  0)        2( 7  7)        5( 8  5)        9( 9  3)       6(10  1)
 2( 5  8)      8( 6  6)       12( 7  4)       15( 8  2)        4( 9  0)       2( 3  9)
 6( 4  7)     15( 5  5)       18( 6  3)       14( 7  1)        1( 1 10)       6( 2  8)
13( 3  6)     23( 4  4)       19( 5  2)       11( 6  0)        1( 0  9)       8( 1  7)
15( 2  5)     21( 3  3)       15( 4  1)        8( 0  6)       13( 1  4)      17( 2  2)
 5( 3  0)      5( 0  3)        6( 1  1)        2( 0  0)
```

```
                            3  2  2  0  0  0  0  0  0  0
 1(15  0)      1(12  3)        1(13  1)        1( 9  6)       2(10  4)       4(11  2)
 1( 7  7)      4( 8  5)        7( 9  3)        5(10  1)       2( 5  8)       5( 6  6)
12( 7  4)      9( 8  2)        7( 9  0)        1( 3  9)       6( 4  7)      13( 5  5)
17( 6  3)     13( 7  1)        1( 1 10)        4( 2  8)      13( 3  6)      17( 4  4)
21( 5  2)      6( 6  0)        2( 0  9)        7( 1  7)      16( 2  5)      20( 3  3)
15( 4  1)      4( 0  6)       14( 1  4)       12( 2  2)       8( 3  0)       7( 0  3)
 6( 1  1)
```

```
                            3  2  1  1  0  0  0  0  0  0
 1(12  3)      1(13  1)        3(10  4)        3(11  2)       2(12  0)       1( 7  7)
 5( 8  5)      8( 9  3)        7(10  1)        1( 5  8)       7( 6  6)      13( 7  4)
16( 8  2)      6( 9  0)        1( 3  9)        8( 4  7)      17( 5  5)      24( 6  3)
18( 7  1)      1( 1 10)        6( 2  8)       16( 3  6)      29( 4  4)      28( 5  2)
13( 6  0)      2( 0  9)       10( 1  7)       23( 2  5)      30( 3  3)      23( 4  1)
 9( 0  6)     20( 1  4)       23( 2  2)        9( 3  0)       9( 0  3)      10( 1  1)
 1( 0  0)
```

```
                            3  2  1  1  1  0  0  0  0  0
 1(11  2)      1( 8  5)        1( 9  3)        2(10  1)       1( 6  6)       4( 7  4)
 3( 8  2)      3( 9  0)        2( 4  7)        4( 5  5)       8( 6  3)       5( 7  1)
 1( 2  8)      5( 3  6)        8( 4  4)       11( 5  2)       2( 6  0)       1( 0  9)
 3( 1  7)      9( 2  5)       11( 3  3)        9( 4  1)       2( 0  6)       8( 1  4)
 7( 2  2)      6( 3  0)        5( 0  3)        4( 1  1)
```

```
                            2  2  2  1  0  0  0  0  0  0
 1(11  2)      1( 8  5)        2( 9  3)        1(10  1)       2( 6  6)       4( 7  4)
 4( 8  2)      3( 9  0)        1( 3  9)        2( 4  7)       6( 5  5)       8( 6  3)
 6( 7  1)      2( 2  8)        6( 3  6)        9( 4  4)      11( 5  2)       4( 6  0)
 1( 0  9)      4( 1  7)        8( 2  5)       12( 3  3)       8( 4  1)       4( 0  6)
 7( 1  4)      8( 2  2)        5( 3  0)        4( 0  3)       3( 1  1)       1( 0  0)
```

```
                            2  2  1  1  1  0  0  0  0  0
 1( 9  3)      1(10  1)        1( 6  6)        2( 7  4)       3( 8  2)       1( 9  0)
 1( 4  7)      4( 5  5)        5( 6  3)        5( 7  1)       2( 2  8)       4( 3  6)
 9( 4  4)      8( 5  2)        4( 6  0)        3( 1  7)
```

4(1 1)   1(0 0)

2 1 1 1 1 1 0 0 0 0

```
1( 9  0)     1( 5  5)     1( 6  3)      1( 7  1)     1( 3  6)      2( 4
3( 5  2)     1( 1  7)     2( 2  5)      4( 3  3)     2( 4  1)      1( 0
3( 1  4)     3( 2  2)     2( 3  0)      1( 0  3)     2( 1  1)
```

1 1 1 1 1 1 1 0 0 0

```
1( 3  3)     1( 0  6)     1( 2  2)      1( 0  0)
```

4 4 0 0 0 0 0 0 0 0

```
1(16  4)     1(15  3)     1(16  1)      2(12  6)     2(13  4)     3(14  2
1(15  0)     1(10  7)     3(11  5)      4(12  3)     4(13  1)     3( 8  8
4( 9  6)     9(10  4)     7(11  2)      5(12  0)     1( 6  9)     5( 7  7
9( 8  5)    12( 9  3)     7(10  1)      3( 4 10)     5( 5  8)    12( 6  6
15( 7  4)   16( 8  2)     4( 9  0)      4( 3  9)     9( 4  7)    16( 5  5
17( 6  3)   12( 7  1)     2( 0 12)      2( 1 10)     9( 2  8)    14( 3  6
21( 4  4)   15( 5  2)     9( 6  0)      1( 0  9)     8( 1  7)    12( 2  5
16( 3  3)   11( 4  1)     8( 0  6)     10( 1  4)    12( 2  2)     3( 3  0
3( 0  3)     4( 1  1)     2( 0  0)
```

4 3 1 0 0 0 0 0 0 0

```
1(17  2)     1(14  5)     2(15  3)      2(16  1)     2(12  6)     5(13  4
6(14  2)     4(15  0)     3(10  7)      9(11  5)    14(12  3)    11(13  1
4( 8  8)    14( 9  6)    23(10  4)     26(11  2)     9(12  0)     5( 6  9
16( 7  7)   33( 8  5)    42( 9  3)     30(10  1)     4( 4 10)    17( 5  8
38( 6  6)   58( 7  4)    52( 8  2)     24( 9  0)     3( 2 11)    14( 3  9
37( 4  7)   63( 5  5)    73( 6  3)     50( 7  1)     1( 0 12)     8(   10)
26( 2  8)   56( 3  6)    74( 4  4)     72( 5  2)    27( 6  3)    10( 0  9)
32( 1  7)   60( 2  5)    70( 3  3)     48( 4  1)    21( 0  6)    44(    4)
44( 2  2)   21( 3  0)    20( 0  3)     18( 1  1)     2( 0  0)
```

4 2 2 0 0 0 0 0 0 0

```
1(18  0)     1(15  3)     1(16  1)      1(12  6)     2(13  4)     5(14  2)
1(10  7)     5(11  5)     8(12  3)      6(13  1)     3( 8  8)     7( 9  6)
17(10  4)   13(11  2)    10(12  0)      2( 6  9)    10( 7  7)    21( 8  5)
27( 9  3)   20(10  1)     3( 4 10)     10( 5  8)    29( 6  6)    36( 7  4)
42( 8  2)   12( 9  0)     1( 2 11)      9( 3  9)    24( 4  7)    44( 5  5)
51( 6  3)   36( 7  1)     1( 0 12)      5( 1 10)    21( 2  8)    37( 3  6)
61( 4  4)   48( 5  2)    26( 6  0)      5( 0  9)    23( 1  7)    41( 2  5)
52( 3  3)   35( 4  1)    20( 0  6)     31( 1  4)    39( 2  2)    11( 3  0)
11( 0  3)   14( 1  1)     4( 0  0)
```

4 2 1 1 0 0 0 0 0 0

```
1(15  3)     1(16  1)     3(13  4)      3(14  2)     2(15  0)     1(10  7)
6(11  5)     9(12  3)     8(13  1)      1( 8  8)     9( 9  6)    16(10  4)
20(11  2)    8(12  0)     2( 6  9)     12( 7  7)    26( 8  5)    36( 9  3)
26(10  1)    1( 4 10)    13( 5  8)     30( 6  6)    52( 7  4)    49( 8  2)
23( 9  0)    2( 2 11)    11( 3  9)     32( 4  7)    60( 5  5)    72( 6  3)
51( 7  1)    6( 1 10)    22( 2  8)     54( 3  6)    77( 4  4)    75( 5  2)
29( 6  0)   10( 0  9)    32( 1  7)     62( 2  5)    76( 3  3)    54( 4  1)
22( 0  6)   49( 1  4)    49( 2  2)     23( 3  0)    22( 0  3)    21( 1  1)
3( 0  0)
```

APPENDIX-B

REDUCTION OF U(10) ⊃ SU(3) CHAIN

The reduction of all possible partitions (not more than four columns) of U(10) to IR of SU(3) are tabulated. We give complete details upto N=20 (N = $\sum_{i=1}^{10} f_i$). For N ⊅ 20, the reductions can be obtained from the present tabulations by particle-hole relationship (see eqn.5.C). In the tables the U(10) partition $[f_1, f_2 \text{---}, f_{10}]$ is printed out and below this the reductions are listed out. For example,

1. 1111000000

    U(10) partition, usually written as $[f_1, f_2, f_3 \ldots, f_{10}]$

2. 1(52) 1(33) 1(06)

    — — — —

    The number inside the prenthesis indicate the ($\lambda\mu$) of the IR of SU(3). Always a space is inserted between λ ⊔ μ. The number outside the parenthesis indicates the number of times that a given SU(3) representation occurs in a partition of U(10).

4 1 1 1 1 0 0 0 0 0

1(14 2)	1(11 5)	1(12 3)	2(13 1)	1(9 6)	4(10 4)
3(11 2)	3(12 0)	2(7 7)	5(8 5)	9(9 3)	5(10 1)
2(5 8)	7(6 6)	12(7 4)	15(8 2)	3(9 0)	2(3 9)
7(4 7)	16(5 5)	20(6 3)	15(7 1)	1(1 10)	6(2 8)
14(3 6)	24(4 4)	21(5 2)	13(6 0)	1(0 9)	9(1 7)
18(2 5)	24(3 3)	17(4 1)	9(0 6)	15(1 4)	20(2 2)
6(3 0)	6(0 3)	7(1 1)	2(0 0)		

3 3 2 0 0 0 0 0 0 0

1(16 1)	1(13 4)	1(14 2)	1(15 0)	1(10 7)	2(11 5)
5(12 3)	3(13 1)	1(8 8)	4(9 6)	8(10 4)	9(11 2)
3(12 0)	2(6 9)	6(7 7)	15(8 5)	17(9 3)	13(10 1)
1(4 10)	7(5 8)	16(6 6)	26(7 4)	23(8 2)	12(9 0)
2(2 11)	6(3 9)	19(4 7)	30(5 5)	37(6 3)	25(7 1)
3(1 10)	11(2 8)	27(3 6)	37(4 4)	37(5 2)	13(6 0)
7(0 9)	16(1 7)	32(2 5)	37(3 3)	27(4 1)	9(0 6)
24(1 4)	22(2 2)	12(3 0)	12(0 3)	10(1 1)	1(0 0)

3 3 1 1 0 0 0 0 0 0

1(13 4)	1(14 2)	1(15 0)	2(11 5)	3(12 3)	3(13 1)
1(8 8)	4(9 6)	8(10 4)	10(11 2)	3(12 0)	6(7 7)
12(8 5)	18(9 3)	13(10 1)	2(4 10)	7(5 8)	18(6 6)
29(7 4)	27(8 2)	13(9 0)	6(3 9)	16(4 7)	34(5 5)
39(6 3)	29(7 1)	1(0 12)	4(1 10)	15(2 8)	31(3 6)
46(4 4)	44(5 2)	17(6 0)	3(0 9)	19(1 7)	34(2 5)
45(3 3)	31(4 1)	15(0 6)	29(1 4)	31(2 2)	13(3 0)
11(0 3)	13(1 1)	2(0 0)			

3 2 2 1 0 0 0 0 0 0

1(14 2)	1(11 5)	3(12 3)	2(13 1)	3(9 6)	7(10 4)
7(11 2)	4(12 0)	1(6 9)	5(7 7)	13(8 5)	17(9 3)
14(10 1)	1(4 10)	6(5 8)	18(6 6)	28(7 4)	30(8 2)
11(9 0)	1(2 11)	6(3 9)	20(4 7)	36(5 5)	46(6 3)
32(7 1)	4(1 10)	15(2 8)	34(3 6)	52(4 4)	49(5 2)
22(6 0)	6(0 9)	21(1 7)	43(2 5)	52(3 3)	37(4 1)
16(0 6)	33(1 4)	37(2 2)	15(3 0)	15(0 3)	15(1 1)
2(0 0)					

3 2 1 1 1 0 0 0 0 0

1(12 3)	1(13 1)	1(9 6)	3(10 4)	4(11 2)	4(12 0)
2(7 7)	6(8 5)	10(9 3)	8(10 1)	3(5 8)	10(6 6)
8(7 4)	19(8 2)	8(9 0)	3(3 9)	11(4 7)	24(5 5)
31(6 3)	23(7 1)	2(1 10)	9(2 8)	24(3 6)	38(4 4)
37(5 2)	16(6 0)	4(0 9)	15(1 7)	32(2 5)	41(3 3)
30(4 1)	12(0 6)	27(1 4)	30(2 2)	13(3 0)	15(3 3)
13(1 1)	2(0 0)				

3 1 1 1 1 1 0 0 0 0

1(12 0)	1(8 5)	1(9 3)	1(10 1)	1(6 6)	2(7 4)
4(8 2)	2(4 7)	4(5 5)	7(6 3)	4(7 1)	1(2 8)
4(3 6)	9(4 4)	7(5 2)	5(6 0)	1(0 9)	3(1 7)
8(2 5)	10(3 3)	9(4 1)	3(0 6)	7(1 4)	9(2 2)
3(3 0)	4(0 3)	4(1 1)	1(0 0)		

```
 4  4).   136( 5  2)     53( 6  0)     22( 0  9)     69( 1  7)    117( 2  5)
 3  3)     91( 4  1)     44( 0  6)     84( 1  4)     84( 2  2)     35( 3  0)
 0  3)     34( 1  1)      4( 0  0)
```

```
                    4  3  1  1  0  0  0  0  0  0
(16  4)     1(17  2)     1(18  0)     3(14  5)     4(15  3)     4(16  1)
(11  8)     6(12  6)    11(13  4)    14(14  2)     5(15  0)     1( 9  9)
(10  7)    21(11  5)    31(12  3)    22(13  1)     2( 7 10)    14( 8  8)
( 9  6)    55(10  4)    51(11  2)    24(12  0)     2( 5 11)    16( 6  9)
( 7  7)    79( 8  5)    91( 9  3)    65(10  1)     2( 3 12)    15( 4 10)
( 5  8)    94( 6  6)   127( 7  4)   119( 8  2)    46( 9  0)     1( 1 13)
( 2 11)    38( 3  9)    92( 4  7)   144( 5  5)   163( 6  5)   108( 7  1)
( 0 12)    22( 1 10)    67( 2  8)   127( 3  6)   173( 4  4)   152( 5  2)
( 6  0)    25( 0  9)    75( 1  7)   134( 2  5)   153( 3  3)   105( 4  1)
( 0  0)    96( 1  4)    99( 2  2)    41( 3  0)    40( 0  3)    39(    1)
```

```
                    4  2  2  1  0  0  0  0  0  0
(17  2)     1(14  5)     3(15  3)     2(16  1)     3(12  6)     8(13  4)
(14  2)     5(15  0)     1( 9  9)     6(10  7)    16(11  5)    21(12  3)
(13  1)     1( 7 10)     9( 8  8)    26( 9  6)    40(10  4)    43(11  2)
(12  0)     2( 5 11)    11( 6  9)    35( 7  7)    62( 8  5)    77( 9  3)
(10  1)     1( 3 12)    11( 4 10)    38( 5  8)    77( 6  6)   112( 7  4)
( 8  2)    44( 9  0)     1( 1 13)     8( 2 11)    33( 3  9)    77( 4  7)
( 5  5)   144( 6  3)    98( 7  1)     3( 0 12)    19( 1 10)    58( 2  3)
( 3  6)   155( 4  4)   143( 5  2)    55( 6  0)    19( 1 10)    58( 2  8)
( 2  5)   143( 3  3)    98( 4  1)    46( 0  6)    21( 0  9)    69(    7)
( 3  0)    38( 0  3)    37( 1  1)     5( 0  0)    91( 1  4)    91( 2  2)
```

```
                    4  2  1  1  1  0  0  0  0  0
(15  3)     1(16  1)     1(12  6)     3(13  4)     4(14  2)     2( 5  0)
(10  7)     7(11  5)    11(12  3)     9(13  1)     4( 8  8)    12( 9  6)
(10  4)    24(11  2)    10(12  0)     4( 6  9)    17( 7  7)    35( 8  5)
( 9  3)    33(10  1)     5( 4 10)    19( 5  8)    47( 6  6)    69( 7  4)
( 8  2)    28( 9  0)     3( 2 11)    17( 3  9)    46( 4  7)    83( 5  5)
( 6  3)    68( 7  1)     2( 0 12)    10( 1 10)    37( 2  8)    76( 3  6)
( 4  4)   101( 5  2)    42( 6  0)    12( 0  9)    46( 1  7)    55( 2  5)
( 3  3)    72( 4  1)    35( 0  6)    67( 1  4)    72( 2  2)    30( 3  0)
( 0  3)    29( 1  1)     5( 0  0)
```

```
                    4  1  1  1  1  1  0  0  0  0
( 5  0)     1(11  5)     1(12  3)     1(13  1)     1( 9  6)     2(10  4)
(   2)      2( 7  7)     4( 8  5)     8( 9  3)     4(10  1)     2( 5  8)
(   6)     12( 7  4)    10( 8  2)     7( 9  0)     2( 3  9)     6( 4  7)
(   5)     17( 6  3)    14( 7  1)     1( 1  0)     5( 2  8)    15( 3  6)
(   4)     23( 5  2)     8( 6  0)     2( 0  9)     8( 1  7)    17( 2  5)
(   3)     16( 4  1)     7( 0  6)    16( 1  4)    16( 2  2)     9( 3  0)
(   3)      7( 1  1)     1( 0  0)
```

```
                    3  3  3  0  0  0  0  0  0  0
(   0)      1(15  3)     1(12  6)     1(13  4)     3(14  2)     -( 9  9) -
(   7)      4(11  5)     5(12  3)     3(13  1)     3( 8  8)     6( 9  6)
(   4)      7(11  2)     7(12  0)     1( 5 11)     3( 6  9)     9( 7  7)
(   5)     18( 9  3)    11(10  1)     1( 3 12)     3( 4 10)     9( 5  8)
(   6)     22( 7  4)    26( 8  2)     7( 9  0)     2( 2 11)     9( 3  9)
```

(4 4)	136(5 2)	53(6 0)	22(0 9)	69(1 7)	117(2 5)
(3 3)	91(4 1)	44(0 6)	84(1 4)	84(2 2)	35(3 0)
(0 3)	34(1 1)	4(0 0)			

4 3 1 1 0 0 0 0 0 0

1(16 4)	1(17 2)	1(18 0)	3(14 5)	4(15 3)	4(16 1)
1(11 8)	6(12 6)	11(13 4)	14(14 2)	5(15 0)	1(9 9)
0(10 7)	21(11 5)	31(12 3)	22(13 1)	2(7 10)	14(8 8)
3(9 6)	55(10 4)	51(11 2)	24(12 0)	2(5 11)	16(6 9)
42(7 7)	79(8 5)	91(9 3)	65(10 1)	2(3 12)	15(4 10)
45(5 8)	94(6 6)	127(7 4)	119(8 2)	46(9 0)	1(1 13)
11(2 11)	38(3 9)	92(4 7)	144(5 5)	163(6 3)	108(7 1)
4(0 12)	22(1 10)	67(2 8)	127(3 6)	173(4 4)	152(5 2)
64(6 0)	25(0 9)	75(1 7)	134(2 5)	153(3 3)	105(4 1)
90(0 6)	96(1 4)	99(2 2)	41(3 0)	40(0 3)	39(1)
6(0 0)					

4 2 2 1 0 0 0 0 0 0

1(17 2)	1(14 5)	3(15 3)	2(16 1)	3(12 6)	8(13 4)
8(14 2)	5(15 0)	1(9 9)	6(10 7)	16(11 5)	21(12 3)
17(13 1)	1(7 10)	9(8 8)	26(9 6)	40(10 4)	43(11 2)
16(12 0)	2(5 11)	11(6 9)	35(7 7)	62(8 5)	77(9 3)
53(10 1)	1(3 12)	11(4 10)	38(5 8)	77(6 6)	112(7 4)
00(8 2)	44(9 0)	1(1 13)	8(2 11)	33(3 9)	77(4 7)
29(5 5)	144(6 3)	98(7 1)	3(0 12)	19(1 10)	58(2 8)
16(3 6)	155(4 4)	143(5 2)	55(6 0)	21(0 9)	69(7)
22(2 5)	143(3 3)	98(4 1)	46(0 6)	91(1 4)	91(2 2)
81(3 0)	38(0 3)	37(1 1)	5(0 0)		

4 2 1 1 1 0 0 0 0 0

1(15 3)	1(16 1)	1(12 6)	3(13 4)	4(14 2)	2(5 0)
2(10 7)	7(11 5)	11(12 3)	9(13 1)	4(8 8)	12(9 6)
23(10 4)	24(11 2)	10(12 0)	4(6 9)	17(7 7)	35(8 5)
46(9 3)	33(10 1)	5(4 10)	19(5 8)	47(6 6)	69(7 4)
47(8 2)	28(9 0)	3(2 11)	17(3 9)	46(4 7)	83(5 5)
96(6 3)	68(7 1)	2(0 12)	10(1 10)	37(2 8)	76(3 6)
0(4 4)	101(5 2)	42(6 0)	12(0 9)	46(1 7)	65(2 5)
85(3 3)	72(4 1)	35(0 6)	67(1 4)	72(2 2)	30(3 0)
83(0 3)	29(1 1)	5(0 0)			

4 1 1 1 1 1 0 0 0 0

1(15 0)	1(11 5)	1(12 3)	1(13 1)	1(9 6)	2(10 4)
4(11 2)	2(7 7)	4(8 5)	8(9 3)	4(10 1)	2(5 8)
6(6 6)	12(7 4)	10(8 2)	7(9 0)	2(3 9)	6(4 7)
5(5 5)	17(6 3)	14(7 1)	1(7 0)	5(2 8)	15(3 6)
0(4 4)	23(5 2)	8(6 0)	2(0 9)	8(1 7)	17(2 5)
4(3 3)	16(4 1)	7(0 6)	16(1 4)	16(2 2)	9(3 0)
8(0 3)	7(1 1)	1(0 0)			

3 3 3 0 0 0 0 0 0 0

1(8 0)	1(15 3)	1(12 6)	1(13 4)	3(14 2)	1(9 9)
1(11 7)	4(11 5)	5(12 3)	3(13 1)	3(8 8)	6(9 6)
1(10 4)	7(11 2)	7(12 0)	1(5 11)	3(6 9)	9(7 7)
4(8 5)	18(9 3)	11(10 1)	1(3 12)	3(4 10)	9(5 8)
2(6 6)	22(7 4)	26(8 2)	7(9 0)	2(2 11)	9(3 9)

16(4 7)	29(5 5)	32(6 3)	20(7 1)	2(0 12)	4(1 10)
16(2 8)	25(3 6)	37(4 4)	27(5 2)	18(6 0)	4(0 9)
14(1 7)	24(2 5)	32(3 3)	18(4 1)	14(0 6)	16(1 7)
23(2 2)	7(3 0)	7(0 3)	6(1 1)	5(0 0)	

3 3 2 1 0 0 0 0 0 0

1(15 3)	1(16 1)	1(12 6)	3(13 4)	4(14 2)	1(15 0)
3(10 7)	8(11 5)	11(12 3)	9(13 1)	1(7 10)	5(8 8)
15(9 6)	25(10 4)	24(11 2)	11(12 0)	1(5 11)	7(6 9)
22(7 7)	41(8 5)	49(9 3)	35(10 1)	1(3 12)	8(4 10)
26(5 8)	53(6 6)	76(7 4)	71(8 2)	27(9 0)	1(1 13)
6(2 11)	23(3 9)	56(4 7)	90(5 5)	102(6 3)	70(7 1)
2(0 12)	14(1 10)	42(2 8)	82(3 6)	114(4 4)	102(5 2)
42(6 0)	15(0 9)	50(1 7)	89(2 5)	103(3 3)	73(4 1)
34(0 6)	67(1 4)	69(2 2)	28(3 0)	27(0 3)	28(2 1)
3(0 0)					

3 3 1 1 1 0 0 0 0 0

1(13 4)	1(14 2)	1(15 0)	1(10 7)	2(11 5)	5(12 3)
3(13 1)	1(8 8)	6(9 6)	9(10 4)	12(11 2)	4(12 0)
3(6 9)	8(7 7)	20(8 5)	23(9 3)	18(10 1)	2(4 10)
11(5 8)	24(6 6)	39(7 4)	34(8 2)	18(9 0)	3(2 11)
10(3 9)	29(4 7)	47(5 5)	59(6 3)	38(7 1)	6(1 10)
19(2 8)	46(3 6)	60(4 4)	62(5 2)	21(6 0)	11(0 9)
27(1 7)	55(2 5)	63(3 3)	45(4 1)	17(0 6)	41(1 4)
39(2 2)	22(3 0)	21(0 3)	17(1 1)	2(0 0)	

3 2 2 2 0 0 0 0 0 0

1(13 4)	1(15 0)	2(11 5)	3(12 3)	2(13 1)	1(8 8)
5(9 6)	6(10 4)	9(11 2)	2(12 0)	2(6 9)	7(7 7)
13(8 5)	18(9 3)	12(10 1)	1(3 12)	2(4 10)	10(5 8)
19(6 6)	30(7 4)	25(8 2)	15(9 0)	2(2 11)	9(3 9)
21(4 7)	37(5 5)	42(6 3)	29(7 1)	1(0 12)	6(1 10)
16(2 8)	37(3 6)	46(4 4)	47(5 2)	16(6 0)	8(0 9)
21(1 7)	40(2 5)	48(3 3)	31(4 1)	14(0 6)	30(1 4)
29(2 2)	16(3 0)	15(0 3)	12(1 1)	2(0 0)	

3 2 2 1 1 0 0 0 0 0

1(14 2)	2(11 5)	3(12 3)	3(13 1)	1(8 8)	4(9 6)
10(10 4)	9(11 2)	6(12 0)	2(6 9)	9(7 7)	18(8 5)
25(9 3)	18(10 1)	3(4 10)	11(5 8)	29(6 6)	41(7 4)
44(8 2)	15(9 0)	2(2 11)	12(3 9)	31(4 7)	57(5 5)
66(6 3)	47(7 1)	1(0 12)	7(1 10)	27(2 8)	54(3 6)
82(4 4)	71(5 2)	34(6 0)	9(0 9)	35(1 7)	64(2 5)
80(3 3)	55(4 1)	28(0 6)	51(1 4)	58(2 2)	21(3 0)
21(0 3)	23(1 1)	5(0 0)			

3 2 1 1 1 1 0 0 0 0

1(13 1)	1(9 6)	2(10 4)	3(11 2)	1(12 0)	2(7 7)
5(8 5)	8(9 3)	6(10 1)	3(5 8)	8(6 5)	17(7 4)
15(8 2)	7(9 0)	3(3 9)	11(4 7)	23(5 5)	28(6 3)
21(7 1)	2(1 10)	9(2 8)	23(3 6)	36(4 4)	36(5 2)
14(6 0)	3(0 9)	16(1 7)	31(2 5)	40(3 3)	30(4 1)
12(0 6)	28(1 4)	30(2 2)	13(3 0)	12(0 3)	14(1 1)
1(0 0)					

```
                    3  1  1  1  1  1  1  1  0  0  0
1( 9  3)      1( 6  6)      1( 7  4)      2( 8  2)      3( 5  5)      3( 6  3)
3( 7  1)      1( 2  8)      3( 3  6)      6( 4  4)      5( 5  2)      4( 6  0)
2( 1  7)      4( 2  5)      8( 3  3)      5( 4  1)      3( 0  6)      5( 1  4)
8( 2  2)      2( 3  0)      2( 0  3)      3( 1  1)      2( 0  0)


                    2  2  2  2  1  0  0  0  0  0
1(10  4)      1(11  2)      1( 7  7)      2( 8  5)      3( 9  3)      3(10  1)
2( 5  8)      4( 6  6)      7( 7  4)      7( 8  2)      3( 9  0)      1( 2 11)
2( 3  9)      7( 4  7)     11( 5  5)     13( 6  3)     10( 7  1)      2( 1 10)
5( 2  8)     12( 3  6)     17( 4  4)     16( 5  2)      6( 6  0)      3( 0  9)
8( 1  7)     16( 2  5)     18( 3  3)     13( 4  1)      4( 0  6)      3( 1  4)
2( 2  2)      5( 3  0)      6( 0  3)      6( 1  1)


                    2  2  2  1  1  1  0  0  0  0
1(12  0)      1( 8  5)      2( 9  3)      1(10  1)      1( 5  8)      3( 6  6)
4( 7  4)      6( 8  2)      1( 9  0)      1( 3  9)      4( 4  7)      8( 5  5)
11( 6  3)     7( 7  1)      1( 1 10)      4( 2  8)     10( 3  6)     15( 4  4)
13( 5  2)     8( 6  0)      2( 0  9)      6( 1  7)     14( 2  5)     17( 3  3)
12( 4  1)     6( 0  6)     11( 1  4)     14( 2  2)      5( 3  0)      6( 0  3)
5( 1  1)      2( 0  0)


                    2  2  1  1  1  1  1  0  0  0
1( 7  4)      1( 8  2)      1( 4  7)      2( 5  5)      3( 6  3)      2( 7  1)
3( 3  6)      4( 4  4)      5( 5  2)      2( 6  0)      1( 0  9)      2( 1  7)
6( 2  5)      7( 3  3)      6( 4  1)      1( 0  6)      5( 1  4)      5( 2  2)
3( 3  0)      4( 0  3)      3( 1  1)


                    2  1  1  1  1  1  1  1  0  0
1( 4  4)      1( 6  0)      1( 2  5)      1( 3  3)      1( 4  1)      1( 1  4)
3( 2  2)      1( 0  3)      1( 1  1)


                    1  1  1  1  1  1  1  1  1  0
1( 0  3)


                    4  4  2  0  0  0  0  0  0  0
1(20  2)      1(17  5)      1(18  3)      2(19  1)      1(14  8)      2(15  6)
6(16  4)      5(17  2)      4(18  0)      1(12  9)      5(13  7)     10(14  5)
15(15  3)    10(16  1)      3(10 10)      8(11  8)     22(12  6)     29(13  4)
12(14  2)     9(15  0)      2( 8 11)     12( 9  9)     29(10  7)     51(11  5)
16(12  3)    39(13  1)      4( 6 12)     14( 7 10)     42( 8  8)     71( 9  6)
19(10  4)    79(11  2)     39(12  0)      2( 4 13)     14( 5 11)     40( 6  9)
27( 7  7)   125( 8  5)    134( 9  3)     97(10  1)      3( 2 14)     11( 3 12)
8( 4  0)     87( 5  8)    152( 6  6)    174( 7  4)    158( 8  2)     53( 9  0)
8( 1 13)     24( 2 11)     72( 3  9)    132( 4  7)    192( 5  5)    194( 6  3)
8( 7  1)     13( 0 12)     40( 1 10)    104( 2  8)    162( 3  6)    213( 4  4)
8( 5  2)     75( 6  0)     30( 0  9)     95( 1  7)    147( 2  5)    165( 3  3)
8( 4  1)     64( 0  6)    100( 1  4)    107( 2  2)     37( 3  0)     35( 0  3)
8( 1  1)      9( 0  0)


                    4  4  1  1  1  0  0  0  0  0  0
```

1(17 5)	1(18 3)	1(19 1)	2(15 6)	3(16 4)	4(17 2)
2(18 0)	1(12 9)	4(13 7)	9(14 5)	13(15 3)	9(16 1)
7(11 8)	15(12 6)	26(13 4)	25(14 2)	11(15 0)	2(8 11)
10(9 9)	26(10 7)	46(11 5)	54(12 3)	37(13 1)	1(6 12)
11(7 10)	31(8 8)	66(9 6)	86(10 4)	80(11 2)	32(12 0)
2(4 13)	12(5 11)	38(6 9)	80(7 7)	123(8 5)	132(9 3)
87(10 1)	10(3 12)	31(4 10)	82(5 8)	138(6 6)	176(7 4)
149(8 2)	62(9 0)	2(0 15)	5(1 13)	26(2 11)	69(3 9)
135(4 7)	193(5 5)	203(6 3)	129(7 1)	6(0 12)	38(1 10)
93(2 8)	167(3 6)	204(4 4)	179(5 2)	69(6 0)	39(0 9)
97(1 7)	161(2 5)	175(3 3)	116(4 1)	57(0 6)	107(? 4)
104(2 2)	47(3 0)	46(0 3)	40(1 1)	6(0 0)	

4 3 3 0 0 0 0 0 0 0

1(21 0)	1(18 3)	1(19 1)	1(15 6)	2(16 4)	4(17 2)
1(12 9)	2(13 7)	6(14 5)	9(15 3)	6(16 1)	1(10 10)
5(11 8)	11(12 6)	20(13 4)	15(14 2)	10(15 0)	2(8 11)
7(9 9)	20(10 7)	33(11 5)	38(12 3)	26(13 1)	2(6 12)
9(7 10)	25(8 8)	52(9 6)	60(10 4)	61(11 2)	20(12 0)
2(4 13)	9(5 11)	30(6 9)	61(7 7)	92(8 5)	97(9 3)
63(10 1)	1(2 14)	8(3 12)	26(4 10)	65(5 8)	102(6 6)
35(7 4)	106(8 2)	50(9 0)	1(0 15)	4(1 13)	20(2 11)
53(3 9)	102(4 7)	144(5 5)	151(6 3)	95(7 1)	6(0 12)
30(1 10)	69(2 8)	127(3 6)	148(4 4)	136(5 2)	46(6 0)
30(0 9)	72(1 7)	119(2 5)	128(3 3)	86(4 1)	40(0 6)
80(1 4)	72(2 2)	38(3 0)	35(0 3)	29(1 1)	3(0 0)

4 3 2 1 0 0 0 0 0 0 0

1(18 3)	1(19 1)	1(15 6)	4(16 4)	5(17 2)	2(18 0)
4(13 7)	11(14 5)	16(15 3)	13(16 1)	1(10 10)	8(1 8)
24(12 6)	40(13 4)	40(14 2)	17(15 0)	2(8 11)	13(9 9)
41(10 7)	76(11 5)	91(12 3)	65(13 1)	2(6 12)	18(7 10)
58(8 8)	117(9 6)	165(10 4)	150(11 2)	60(12 0)	3(4 3)
19(5 11)	68(6 9)	153(7 7)	239(8 5)	263(9 3)	176(10 1)
2(2 14)	16(3 12)	65(4 10)	163(5 8)	287(6 6)	368(7 4)
22(8 2)	127(9 0)	10(1 13)	47(2 11)	137(3 9)	282(4 7)
14(5 5)	436(6 3)	288(7 1)	17(0 12)	81(1 10)	238(2 8)
65(3 6)	464(4 4)	400(5 2)	159(6 0)	75(0 9)	215(1 7)
56(2 5)	395(3 3)	266(4 1)	132(0 6)	249(1 4)	246(2 2)
91(3 0)	99(0 3)	97(1 1)	12(0 0)		

4 3 1 1 1 0 0 0 0 0

1(16 4)	1(17 2)	1(18 0)	1(13 7)	3(14 5)	6(15 3)
4(16 1)	2(11 8)	8(12 6)	14(13 4)	17(14 2)	6(15 0)
4(9 9)	14(10 7)	31(11 5)	39(12 3)	29(15 1)	5(7 0)
21(8 8)	49(9 6)	74(10 4)	68(11 2)	32(12 0)	6(5 11)
25(6 9)	66(7 7)	110(8 5)	128(9 3)	87(10 1)	5(3 2)
25(4 10)	71(5 8)	138(6 6)	131(7 4)	167(8 2)	63(9 0)
3(1 13)	18(2 11)	63(3 9)	135(4 7)	212(5 5)	231(6 3)
53(7 1)	7(0 12)	36(1 10)	103(2 8)	189(3 6)	252(4 4)
18(5 2)	93(6 0)	37(0 9)	113(1 7)	194(2 5)	223(3 3)
50(4 1)	77(0 6)	139(1 4)	146(2 2)	59(3 0)	57(0 3)
56(1 1)	10(0 0)				

4 2 2 2 0 0 0 0 0 0

1(16 4)	1(18 0)	2(14 5)	3(15 3)	2(16 1)	(1 8)

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   6(12   6)        7(13   4)       11(14   2)        2(15   0)        2( 9   9)        9(10  …
  17(11   5)       23(12   3)       16(13   1)        1( 6  12)        3( 7  10)       16( 8  …
  29( 9   6)       47(10   4)       38(11   2)       22(12   0)        4( 5  11)       17( 6  …
  40( 7   7)       68( 8   5)       76( 9   3)       52(10   1)        1( 2  14)        4( 3  12)
  20( 4  10)       45( 5   8)       91( 6   6)      109( 7   4)      106( 8   2)       35( 9  …
   2( 1  13)       12( 2  11)       41( 3   9)       85( 4   7)      131( 5   5)      142( 6  …
  92( 7   1)        7( 0  12)       23( 1  10)       70( 2   8)      117( 3   6)      160( 4  …
 130( 5   2)       61( 6   0)       22( 0   9)       71( 1   7)      118( 2   5)      136( 3  …
  90( 4   1)       52( 0   6)       83( 1   4)       92( 2   2)       33( 3   0)       32( 0  …
  33( 1   1)        8( 0   0)
```

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                          4   2   2   1   1   0   0   0   0   0
   1(17   2)        2(14   5)        3(15   3)        3(16   1)        1(11   8)        4(12   6)
  11(13   4)       10(14   2)        7(15   0)        2( 9   9)       11(10   7)       22(11   5)
  31(12   3)       22(13   1)        4( 7  10)       15( 8   8)       41( 9   6)       58(10   4)
  62(11   2)       21(12   0)        4( 5  11)       22( 6   9)       55( 7   7)       98( 8   5)
 112( 9   3)       79(10   1)        4( 3  12)       20( 4  10)       65( 5   8)      121( 6   6)
 173( 7   4)      147( 8   2)       68( 9   0)        2( 1  13)       17( 2  11)       56( 3   9)
 130( 4   7)      201( 5   5)      224( 6   3)      148( 7   1)        5( 0  12)       34( 1  10)
  94( 2   8)      187( 3   6)      239( 4   4)      224( 5   2)       81( 6   0)       39( 0   9)
 111( 1   7)      199( 2   5)      223( 3   3)      154( 4   1)       69( 0   6)      145( 1   4)
 139( 2   2)       67( 3   0)       64( 0   3)       58( 1   1)        6( 0   0)
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                          4   2   1   1   1   1   0   0   0   0
   1(16   1)        1(12   6)        2(13   4)        3(14   2)        1(15   0)        2(10   7)
   5(11   5)        9(12   3)        6(13   1)        4( 8   8)       10( 9   6)       23(10   4)
  19(11   2)        9(12   0)        4( 6   9)       15( 7   7)       33( 8   5)       39( 9   3)
  29(10   1)        5( 4  10)       18( 5   8)       44( 6   6)       63( 7   4)       62( 8   2)
  25( 9   0)        3( 2  11)       16( 3   9)       46( 4   7)       78( 5   5)       93( 6   3)
  64( 7   1)        2( 0  12)       10( 1  10)       36( 2   8)       74( 3   6)      108( 4   4)
  98( 5   2)       41( 6   0)       13( 0   9)       45( 1   7)       86( 2   5)      104( 3   3)
  74( 4   1)       34( 0   6)       68( 1   4)       72( 2   2)       30( 3   0)       30( 0   3)
  30( 1   1)        5( 0   0)
```

```
                          4   1   1   1   1   1   0   0   0
   1(12   3)        1( 9   6)        1(10   4)        2(11   2)        3( 8   5)        3( 9   3)
   3(10   1)        1( 5   8)        4( 6   6)        7( 7   4)        6( 8   2)        5( 9   0)
   1( 3   9)        4( 4   7)        8( 5   5)       13( 6   3)        8( 7   1)        3( 2   8)
   9( 3   6)       13( 4   4)       16( 5   2)        5( 6   0)        2( 0   9)        5( 1   7)
  13( 2   5)       17( 3   3)       12( 4   1)        4( 0   6)       11( 1   4)       11( 2   2)
   8( 3   0)        7( 0   3)        5( 1   1)        1( 0   0)
```

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                          3   3   3   1   0   0   0   0   0   0
   1(17   2)        1(14   5)        2(15   3)        1(16   1)        1(11   8)        3(12   6)
   6(13   4)        5(14   2)        4(15   0)        2( 9   9)        6(10   7)       13(11   5)
  15(12   3)       11(13   1)        1( 6  12)        3( 7  10)       11( 8   8)       24( 9   6)
  31(10   4)       31(11   2)       10(12   0)        4( 5  11)       13( 6   9)       32( 7   7)
  49( 8   5)       57( 9   3)       37(10   1)        1( 2  14)        4( 3  12)       15( 4  10)
  37( 5   8)       65( 6   6)       85( 7   4)       71( 8   2)       32( 9   0)        2( 1  13)
  10( 2  11)       33( 3   9)       63( 4   7)       98( 5   5)      103( 6   3)       68( 7   1)
   5( 0  12)       19( 1  10)       50( 2   8)       89( 3   6)      110( 4   4)      100( 5   2)
  38( 6   0)       17( 0   9)       52( 1   7)       86( 2   5)       99( 3   3)       64( 4   1)
  34( 0   6)       61( 1   4)       61( 2   2)       28( 3   0)       25( 0   3)       23( 1   1)
   4( 0   0)
```

3 3 2 2 0 0 0 0 0 0

1(14 5)	1(15 3)	1(16 1)	2(12 6)	4(13 4)	4(14 2)
2(15 0)	1(9 9)	6(10 7)	10(11 5)	14(12 3)	9(13 1)
2(7 10)	8(8 8)	19(9 6)	28(10 4)	27(11 2)	11(12 0)
1(4 13)	3(5 11)	14(6 9)	29(7 7)	50(8 5)	54(9 3)
38(10 1)	3(3 12)	12(4 10)	34(5 8)	62(6 6)	83(7 4)
73(8 2)	31(9 0)	1(0 15)	2(1 13)	13(2 11)	32(3 9)
70(4 7)	101(5 5)	111(6 3)	72(7 1)	2(0 12)	19(1 10)
48(2 8)	92(3 6)	117(4 4)	106(5 2)	40(6 0)	23(0 9)
56(1 7)	99(2 5)	107(3 3)	74(4 1)	32(0 6)	68(1 4)
65(2 2)	30(3 0)	31(0 3)	27(1 1)	3(0 0)	

3 3 2 1 1 0 0 0 0 0

1(15 3)	1(16 1)	2(12 6)	4(13 4)	5(14 2)	2(15 0)
1(9 9)	4(10 7)	12(11 5)	15(12 3)	12(13 1)	2(7 10)
10(8 8)	23(9 6)	37(10 4)	35(11 2)	16(12 0)	3(5 11)
13(6 9)	37(7 7)	62(8 5)	75(9 3)	50(10 1)	3(3 12)
16(4 10)	45(5 8)	88(6 6)	117(7 4)	109(8 2)	42(9 0)
2(1 13)	11(2 11)	42(3 9)	91(4 7)	146(5 5)	158(6 3)
108(7 1)	6(0 12)	25(1 10)	74(2 8)	136(3 6)	184(4 4)
159(5 2)	68(6 0)	25(0 9)	83(1 7)	142(2 5)	167(3 3)
113(4 1)	59(0 6)	107(1 4)	112(2 2)	44(3 0)	43(0 3)
44(1 1)	8(0 0)				

3 3 1 1 1 1 0 0 0 0

1(14 2)	1(10 7)	2(11 5)	3(12 3)	3(13 1)	1(8 8)
4(9 6)	9(10 4)	7(11 2)	5(12 0)	3(6 9)	8(7 7)
17(8 5)	21(9 3)	15(10 1)	2(4 10)	10(5 8)	24(6 6)
34(7 4)	35(8 2)	11(9 0)	3(2 11)	10(3 9)	28(4 7)
46(5 5)	55(6 3)	37(7 1)	6(1 10)	21(2 8)	44(3 6)
64(4 4)	57(5 2)	27(6 0)	9(0 9)	28(1 7)	54(2 5)
63(3 3)	45(4 1)	20(0 6)	41(1 4)	45(2 2)	18(3 0)
19(0 3)	18(1 1)	3(0 0)			

3 2 2 2 1 0 0 0 0 0

1(13 4)	1(14 2)	1(10 7)	3(11 5)	5(12 3)	4(13 1)
3(8 8)	8(9 6)	13(10 4)	14(11 2)	6(12 0)	1(5 11)
5(6 9)	15(7 7)	27(8 5)	32(9 3)	24(10 1)	1(3 12)
7(4 0)	20(5 8)	41(6 6)	57(7 4)	52(8 2)	22(9 0)
_(_ 3)	6(2 11)	21(3 9)	47(4 7)	75(5 5)	35(6 3)
56(7 _)	2(0 12)	13(1 10)	39(2 8)	74(3 6)	100(4 4)
89(5 2)	35(6 0)	15(0 9)	47(1 7)	82(2 5)	96(3 3)
65(4 1)	33(0 6)	62(1 4)	64(2 2)	28(3 0)	26(0 3)
26(_ 1)	4(0 0)				

3 2 2 1 1 . . 0 0 0 0

1(15 0)	1(11 5)	2(12 3)	2(13 1)	1(6 6)	4(9 6)
7(10 4)	9(11 2)	2(12 0)	2(6 9)	8(7 7)	16(8 5)
22(9 3)	15(10 1)	3(4 10)	12(5 8)	27(6 6)	42(7 4)
37(8 2)	18(9 0)	2(2 11)	12(3 9)	32(4 7)	57(5 5)
65(6 3)	46(7 1)	1(0 12)	8(1 10)	27(2 8)	59(3 6)
80(4 4)	78(5 2)	29(6 0)	10(0 9)	37(1 7)	69(2 5)
84(3 3)	58(4 1)	27(0 6)	57(1 4)	58(2 2)	27(3 0)
25(0 3)	25(1 1)	3(0 0)			

3 2 1 1 1 1 1 0 0 0

1(10 4)	1(11 2)	1(7 7)	3(8 5)	4(9 3)	3(10 1
1(5 8)	5(6 6)	9(7 4)	9(8 2)	4(9 0)	1(3 9
7(4 7)	14(5 5)	18(6 3)	14(7 1)	1(1 10)	6(2 8
15(3 6)	25(4 4)	25(5 2)	10(6 0)	2(0 9)	10(1 7
22(2 5)	29(3 3)	22(4 1)	9(0 6)	21(1 4)	23(2 2
10(3 0)	9(0 3)	11(1 1)	1(0 0)		

3 1 1 1 1 1 1 1 0 0

1(7 4)	1(9 0)	1(5 5)	1(6 3)	1(7 1)	1(3 6)
2(4 4)	4(5 2)	1(1 7)	2(2 5)	4(3 3)	3(4 1)
1(0 6)	3(1 4)	3(2 2)	3(3 0)	2(0 3)	2(1 1)

2 2 2 2 2 0 0 0 0 0

1(10 4)	1(12 0)	1(7 7)	1(8 5)	2(9 3)	2(10 1)
1(4 10)	1(5 8)	4(6 6)	4(7 4)	6(8 2)	2(3 9)
4(4 7)	8(5 5)	7(6 3)	6(7 1)	1(0 12)	2(1 10)
6(2 8)	7(3 6)	14(4 4)	9(5 2)	6(6 0)	6(1 7)
9(2 5)	11(3 3)	7(4 1)	6(0 6)	7(1 4)	11(2 2)
1(3 0)	1(0 3)	4(1 1)	1(0 0)		

2 2 2 2 1 1 0 0 0 0

1(11 2)	1(7 7)	2(8 5)	3(9 3)	2(10 1)	2(5 8)
4(6 6)	7(7 4)	6(8 2)	4(9 0)	1(2 11)	3(3 9)
7(4 7)	13(5 5)	14(6 3)	10(7 1)	2(1 10)	6(2 8)
14(3 6)	19(4 4)	18(5 2)	6(6 0)	4(0 9)	10(1 7)
18(2 5)	22(3 3)	15(4 1)	6(0 6)	15(1 4)	14(2 2)
7(3 0)	7(0 3)	7(1 1)	1(0 0)		

2 2 2 1 1 1 1 0 0 0

1(9 3)	2(6 6)	2(7 4)	3(8 2)	1(9 0)	1(3 9)
2(4 7)	6(5 5)	6(6 3)	5(7 1)	3(2 8)	6(3 6)
11(4 4)	9(5 2)	6(6 0)	1(0 9)	5(1 7)	9(2 5)
4(3 3)	8(4 1)	6(0 6)	8(1 4)	12(2 2)	4(3 0)
4(0 3)	4(1 1)	2(0 0)			

2 2 1 1 1 1 1 1 0 0

1(5 5)	1(6 3)	1(7 1)	1(3 6)	2(4 4)	2(5 2)
1(6 0)	1(1 7)	2(2 5)	4(3 3)	3(4 1)	1(0 6)
1(1 4)	4(2 2)	1(3 0)	1(0 3)	2(1 1)	1(0 0)

2 1 1 1 1 1 1 1 1 0

1(3 3)	1(2 2)	1(1 1)

1 1 1 1 1 1 1 1 1 1

1(0 0)

4 4 3 0 0 0 0 0 0 0

(22 1)	1(19 4)	1(20 2)	1(21 0)	1(16 7)	
(18 3)	3(19 1)	1(13 10)	2(14 8)	6(15 6)	2(17 5)
(17 2)	3(18 0)	1(11 11)	5(12 9)	12(13 7)	10(16 4)
(15 3)	18(16 1)	2(9 12)	7(10 10)	21(11 8)	23(14 5)
					38(12 6)

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 52(13  4)      43(14  2)      21(15  0)       2( 7 13)      10( 8 11)      28( 9  9)
 61(10  7)      85(11  5)      90(12  3)      59(13  1)       2( 5 14)      10( 6 12)
 34( 7 10)      73( 8  8)     122( 9  6)     142(10  4)     124(11  2)      44(12  0)
  2( 3 15)      10( 4 13)      33( 5 11)      84( 6  9)     144( 7  7)     198( 8  5)
196( 9  3)     124(10  1)       1( 1 16)       6(-2 14)      27( 3-12)      71( 4 10)
147( 5  8)     217( 6  6)     259( 7  4)     204( 8  2)      85( 9  0)       3( 0 15)
 15( 1 13)      54( 2 11)     119( 3  9)     210( 4  7)     274( 5  5)     273( 6  3)
170( 7  1)      16( 0 12)      67( 1 10)     143( 2  8)     235( 3  6)     268( 4  4)
230( 5  2)      84( 6  0)      57( 0  9)     134( 1  7)     209( 2  5)     216( 3  3)
143( 4  1)      71( 0  6)     134( 1  4)     122( 2  2)      56( 3  0)      55( 0  3)
 47( 1  1)       5( 0  0)
```

```
                              4   4   2   1   0   0   0   0   0   0

  1(19  4)       1(20  2)       1(21  0)       1(16  7)       3(17  5)       5(18  3)
  4(19  1)       3(14  8)       9(15  6)      15(16  4)      17(17  2)       6(18  0)
  1(11 11)       6(12  9)      19(13  7)      36(14  5)      44(15  3)      31(16  1)
  1( 9 12)      10(10 10)      33(11  8)      67(12  6)      95(13  4)      84(14  2)
 37(15  0)       2( 7 13)      14( 8 11)      48( 9  9)     105(10  7)     164(11  5)
178(12  3)     118(13  1)       2( 5 14)      16( 6 12)      58( 7 10)     139( 8  8)
239( 9  6)     295(10  4)     257(11  2)      98(12  0)       2( 3 15)      15( 4 13)
 60( 5 11)     155( 6  9)     294( 7  7)     411( 8  5)     422( 9  3)     271(10  1)
  1( 1 16)      11( 2 14)      49( 3 12)     144( 4 10)     303( 5  8)     475( 6  6)
566( 7  4)     466( 8  2)     187( 9  0)       4( 0 15)      28( 1 13)     102( 2 11)
252( 3  9)     453( 4  7)     618( 5  5)     619( 6  3)     394( 7  1)      37( 0 12)
143( 1 10)     326( 2  8)     533( 3  6)     636( 4  4)     536( 5  2)     206( 6  0)
120( 0  9)     310( 1  7)     484( 2  5)     518( 3  3)     338( 4  1)     179( 0  6)
320( 1  4)     307( 2  2)     130( 3  0)     125( 0  3)     117( 1  1)      16( 0  0)
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                              4   4   1   1   1   0   0   0   0   0

  1(17  5)       1(18  3)       1(19  1)       1(14  8)       2(15  6)       5(16  4)
  5(17  2)       2(18  0)       1(12  9)       6(13  7)      11(14  5)      16(15  3)
 11(16  1)       3(10 10)      10(11  8)      25(12  6)      35(13  4)      35(14  2)
 14(15  0)       3( 8 11)      15( 9  9)      37(10  7)      65(11  5)      71(12  3)
 51(13  1)       5( 6 12)      19( 7 10)      54( 8  8)      96( 9  6)     129(10  4)
111(11  2)      47(12  0)       3( 4 13)      20( 5 11)      57( 6  9)     121( 7  7)
176( 8  5)     191( 9  3)     122(10  1)       4( 2 14)      16( 3 12)      59( 4 10)
127( 5  8)     215( 6  6)     259( 7  4)     225( 8  2)      84( 9  0)      15( 1 13)
 37( 2 11)     108( 3  9)     200( 4  7)     290( 5  5)     294( 6  3)     192( 7  1)
 18( 0 12)      61( 1 10)     155( 2  8)     253( 3  6)     317( 4  4)     263( 5  2)
110( 6  0)      49( 0  9)     149( 1  7)     234( 2  5)     261( 3  3)     171( 4  1)
 97( 0  6)     162( 1  4)     165( 2  2)      64( 3  0)      61( 0  3)      61( 1  1)
 11( 0  0)
```

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                              4   3   3   1   0   0   0   0   0   0

  1(20  2)       1(17  5)       3(18  3)       2(19  1)       1(14  8)       4(15  6)
  9(16  4)       8(17  2)       5(18  0)       3(12  9)      10(13  7)      22(14  5)
 26(15  3)      20(16  1)       1( 9 12)       6(10 10)      20(11  8)      45(12  6)
 60(13  4)      59(14  2)      21(15  0)       1( 7 13)       9( 8 11)      31( 9  9)
 74(10  7)     113(11  5)     127(12  3)      83(13  1)       2( 5 14)      11( 6 12)
 41( 7 10)     102( 8  8)     173( 9  6)     223(10  4)     187(11  2)      79(12  0)
  1( 3 15)      11( 4 13)      43( 5 11)     118( 6  9)     221( 7  7)     318( 8  5)
325( 9  3)     211(10  1)       1( 1 16)       8( 2 14)      37( 3 12)     112( 4 10)
234( 5  8)     378( 6  6)     445( 7  4)     379( 8  2)     143( 9  0)       3( 0 15)
 21( 1 13)      81( 2 11)     198( 3  9)     365( 4  7)     497( 5  5)     505( 6  3)
321( 7  1)      29( 0 12)     114( 1 10)     266( 2  8)     433( 3  6)     528( 4  4)
438( 5  2)     177( 6  0)      98( 0  9)     254( 1  7)     401( 2  5)     430( 3  3)
283( 4  1)     151( 0  6)     265( 1  4)     261( 2  2)     105( 3  0)     104( 0  3)
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TABLE. IRREDUCIBLE REPRESENTATIONS OF SU(3) CONTAINED IN A PARTITION OF U(10)

98(1 1)   15(0 0)

4 3 2 2 0 0 0 0 0 0

1(17 5)	1(18 3)	1(19 1)	3(15 6)	5(16 4)	6(17 2)
2(18 0)	1(12 9)	8(13 7)	15(14 5)	20(15 3)	14(16 1)
3(10 10)	15(11 8)	32(12 6)	50(13 4)	45(14 2)	20(15 0)
1(7 13)	5(8 11)	25(9 9)	57(10 7)	96(11 5)	106(12 3)
73(13 1)	1(5 14)	7(6 12)	33(7 10)	82(8 8)	151(9 6)
192(10 4)	172(11 2)	66(12 0)	1(3 15)	8(4 13)	37(5 11)
98(6 9)	199(7 7)	285(8 5)	301(9 3)	196(10 1)	1(1 16)
6(2 14)	32(3 12)	97(4 10)	215(5 8)	347(6 6)	425(7 4)
355(8 2)	143(9 0)	2(0 15)	19(1 13)	71(2 11)	185(3 9)
342(4 7)	481(5 5)	488(6 3)	315(7 1)	26(0 12)	108(1 10)
254(2 8)	425(3 6)	518(4 4)	440(5 2)	170(6 0)	93(0 9)
252(1 7)	398(2 5)	433(3 3)	285(4 1)	150(0 6)	271(1 4)
263(2 2)	110(3 0)	105(0 3)	102(1 1)	14(0 0)	

4 3 2 1 1 0 0 0 0 0

1(18 3)	1(19 1)	2(15 6)	5(16 4)	6(17 2)	3(18 0)
1(12 9)	6(13 7)	16(14 5)	22(15 3)	17(16 1)	3(10 10)
14(11 8)	37(12 6)	58(13 4)	57(14 2)	24(15 0)	5(8 11)
25(9 9)	67(10 7)	116(11 5)	137(12 3)	94(13 1)	7(6 12)
34(7 10)	100(8 8)	189(9 6)	255(10 4)	228(11 2)	93(12 0)
7(4 13)	38(5 11)	121(6 9)	254(7 7)	384(8 5)	412(9 3)
273(10 1)	5(2 14)	34(3 12)	119(4 10)	279(5 8)	476(6 6)
591(7 4)	508(8 2)	202(9 0)	2(0 15)	19(1 13)	38(2 11)
242(3 9)	474(4 7)	681(5 5)	708(6 3)	459(7 1)	32(0 12)
142(1 10)	353(2 8)	609(3 6)	761(4 4)	651(5 2)	258(6 0)
132(0 9)	362(1 7)	592(2 5)	652(3 3)	433(4 1)	223(0 6)
409(1 4)	405(2 2)	169(3 0)	165(0 3)	158(1 1)	23(0 0)

4 3 1 1 1 1 0 0 0 0

1(17 2)	1(13 7)	2(14 5)	4(15 3)	3(16 1)	2(11 8)
6(12 6)	12(13 4)	11(14 2)	7(15 0)	4(9 9)	12(10 7)
27(11 5)	32(12 3)	24(13 1)	5(7 10)	19(8 8)	46(9 6)
64(10 4)	64(11 2)	23(12 0)	6(5 11)	24(6 9)	63(7 7)
102(8 5)	120(9 3)	79(10 1)	5(3 12)	24(4 10)	71(5 8)
131(6 6)	179(7 4)	155(8 2)	67(9 0)	3(1 13)	18(2 11)
63(3 9)	134(4 7)	211(5 5)	227(6 3)	153(7 1)	7(0 12)
37(1 0)	102(2 8)	194(3 6)	250(4 4)	226(5 2)	38(6 0)
38(0 9)	116(1 7)	199(2 5)	230(3 3)	155(4 1)	76(2 6)
147(1 4)	147(2 2)	65(3 0)	62(0 3)	59(1 1)	9(0 0)

4 2 2 2 1 0 0 0 0 0

1(16 4)	1(17 2)	1(13 7)	3(14 5)	5(15 3)	4(16 1)
3(11 8)	9(12 6)	15(13 4)	16(14 2)	7(15 0)	1(8 11)
6(9 9)	19(10 7)	35(11 5)	42(12 3)	31(13 1)	1(6 12)
10(7 0)	30(8 8)	62(9 6)	86(10 4)	79(11 2)	33(12 0)
2(4 13)	12(5 11)	41(6 9)	89(7 7)	140(8 5)	154(9 3)
102(10 1)	1(2 14)	11(3 12)	41(4 10)	164(5 8)	180(6 6)
132(7 4)	201(8 2)	79(9 0)	1(0 15)	7(1 13)	55(2 11)
94(3 9)	191(4 7)	278(5 5)	294(6 3)	191(7 1)	11(0 12)
56(1 10)	143(2 8)	257(3 6)	322(4 4)	280(5 2)	113(6 0)
56(0 9)	155(1 7)	260(2 5)	286(3 3)	193(4 1)	97(0 6)
183(1 4)	181(2 2)	77(3 0)	77(0 3)	71(1 1)	13(0 0)

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                          4   2   2   1   1   1   0   0   0   0
   1(18   0)        1(14   5)        2(15   3)        2(16   1)        1(11   8)        4(12   6)
   7(13   4)       10(14   2)        2(15   0)        2( 9   9)        9(10   7)       19(11   5)
  26(12   3)       18(13   1)        4( 7  10)       16( 8   8)       36( 9   6)       57(10   4)
  50(11   2)       25(12   0)        4( 5  11)       21( 6   9)       54( 7   7)       94( 8   5)
 106( 9   3)       74(10   1)        4( 3  12)       22( 4  10)       64( 5   8)      127( 6   6)
 165( 7   4)      155( 8   2)       57( 9   0)        2( 1  13)       17( 2  11)       58( 3   9)
 133( 4   7)      206( 5   5)      228( 6   3)      151( 7   1)        6( 0  12)       35( 1  10)
 103( 2   8)      192( 3   6)      261( 4   4)      225( 5   2)       97( 6   0)       39( 0   9)
 118( 1   7)      208( 2   5)      239( 3   3)      163( 4   1)       81( 0   6)      153( 1   4)
 161( 2   2)       64( 3   0)       64( 0   3)       64( 1   1)       11( 0   0)
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                          4   2   1   1   1   1   1   0   0   0
   1(13   4)        1(14   2)        1(10   7)        3(11   5)        4(12   3)        3(13   1)
   1( 8   8)        6( 9   6)       10(10   4)       10(11   2)        5(12   0)        2( 6   9)
   9( 7   7)       19( 8   5)       24( 9   3)       18(10   1)        1( 4  10)       11( 5   8)
  25( 6   6)       40( 7   4)       39( 8   2)       16( 9   0)        2( 2  11)       10( 3   9)
  29( 4   7)       52( 5   5)       64( 6   3)       44( 7   1)        6( 1  10)       21( 2   8)
  50( 3   6)       73( 4   4)       70( 5   2)       29( 6   0)       10( 0   9)       31( 1   7)
  63( 2   5)       76( 3   3)       55( 4   1)       22( 0   6)       50( 1   4)       53( 2   2)
  24( 3   0)       24( 0   3)       23( 1   1)        3( 0   0)
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                          4   1   1   1   1   1   1   1   0   0
   1(10   4)        1(12   0)        1( 8   5)        1( 9   3)        1(10   1)        1( 6   6)
   2( 7   4)        4( 8   2)        2( 4   7)        3( 5   5)        6( 6   3)        4( 7   1)
   1( 2   8)        3( 3   6)        7( 4   4)        6( 5   2)        5( 6   0)        2( 1   7)
   6( 2   5)        8( 3   3)        7( 4   1)        3( 0   6)        5( 1   4)        8( 2   2)
   2( 3   0)        3( 0   3)        3( 1   1)        1( 0   0)
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                          3   3   3   2   0   0   0   0   0   0
   1(16   4)        1(18   0)        1(13   7)        2(14   5)        3(15   3)        2(16   1)
   2(11   8)        7(12   6)        8(13   4)       10(14   2)        2(15   0)        1( 8  11)
   5( 9   9)       12(10   7)       21(11   5)       24(12   3)       16(13   1)        2( 6  12)
   7( 7  10)       21( 8   8)       36( 9   6)       51(10   4)       40(11   2)       21(12   0)
   1( 3  15)        2( 4  13)       10( 5  11)       27( 6   9)       53( 7   7)       78( 8   5)
  83( 9   3)       54(10   1)        2( 2  14)        9( 3  12)       29( 4  10)       60( 5   8)
 103( 6   6)      119( 7   4)      109( 8   2)       37( 9   0)        1( 0  15)        6( 1  13)
  21( 2  11)       56( 3   9)      102( 4   7)      144( 5   5)      148( 6   3)       95( 7   1)
  10( 0  12)       32( 1  10)       81( 2   8)      129( 3   6)      164( 4   4)      132( 5   2)
  60( 6   0)       27( 0   9)       77( 1   7)      123( 2   5)      136( 3   3)       88( 4   1)
  52( 0   6)       83( 1   4)       88( 2   2)       32( 3   0)       32( 0   3)       31( 1   1)
   7( 0   0)
```

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                          3   3   3   1   1   0   0   0   0   0
   1(17   2)        2(14   5)        2(15   3)        2(16   1)        2(11   8)        4(12   6)
   9(13   4)        7(14   2)        5(15   0)        1( 8  11)        3( 9   9)       12(10   7)
  19(11   5)       25(12   3)       16(13   1)        1( 6  12)        7( 7  10)       16( 8   8)
  39( 9   6)       48(10   4)       49(11   2)       15(12   0)        2( 4  13)        3( 5  11)
  28( 6   9)       54( 7   7)       87( 8   5)       90( 9   3)       62(10   1)        1( 2  14)
   8( 3  12)       26( 4  10)       67( 5   8)      107( 6   6)      143( 7   4)      114( 8   2)
  54( 9   0)        1( 0  15)        5( 1  13)       24( 2  11)       59( 3   9)      120( 4   7)
 166( 5   5)      178( 6   3)      113( 7   1)        6( 0  12)       36( 1  10)       84( 2   8)
 156( 3   6)      185( 4   4)      171( 5   2)       58( 6   0)       38( 0   9)       92( 1   7)
  57( 2   5)      167( 3   3)      114( 4   1)       51( 0   6)      109( 1   4)       98( 2   2)
  50( 3   0)       48( 0   3)       41( 1   1)        3( 0   0)
```

5(0   0)

3   2   2   1   1   1   1   0   0

1(12 3)	2(9 6)	3(10 4)	4(11 - 2)	1(12 0)	1(6
4(7 7)	10(8 5)	11(9 3)	9(10 1)	1(4 10)	7(5
16(6 6)	26(7 4)	23(8 2)	12(9 0)	1(2 11)	7(3
22(4 7)	37(5 5)	46(6 3)	31(7 1)	5(1 10)	17(2
41(3 6)	57(4 4)	57(5 2)	20(6 0)	8(0 9)	26(
53(2 5)	63(3 3)	46(4 1)	19(0 6)	44(1 4)	44(2
22(3 0)	22(0 3)	20(1 1)	2(0 0)		

3   2   1   1   1   1   1   0   0

1(8 5)	1(9 3)	1(10 1)	2(6 6)		
1(9 0)	2(4 7)	5(5 5)	8(6 3)	3(7 4)	4(8 2
6(3 6)	12(4 4)	12(5 2)	6(6 0)	6(7 1)	2(2 8
11(2 5)	15(3 3)	12(4 1)	4(0 6)	1(0 9)	4(7
6(3 0)	6(0 3)	6(1 1)	1(0 0)	11(1 4)	13(2 2

3   1   1   1   1   1   1   1   1   0

| 1(6   3) | 1(5   2) | 1(2   5) | 1(3   3) | | |
| 1(2   2) | 1(3   0) | 1(0   3) | 1(1   1) | 2(4   1) | 1(1   4) |

2   2   2   2   2   1   0   0   0   0

1(11 - 2)	1(7 7)	2(8 5)	2(9 3)		
2(5 8)	4(6 6)	7(7 4)	5(8 2)	2(10 1)	1(4 10)
3(3 9)	7(4 7)	11(5 5)	12(6 3)	3(9 0)	1(2 11)
7(2 8)	13(3 6)	17(4 4)	16(5 2)	8(7 1)	3(1 10)
10(1 7)	16(2 5)	18(3 3)	13(4 1)	4(6 0)	3(0 9)
12(2 2)	6(3 0)	5(0 3)	6(1 1)	6(0 6)	13(1 4)

2   2   2   2   1   1   1   0   0   0

1(8 5)	1(5 3)	1(10 1)	1(5 8)		
4(3 2)	2(9 0)	2(3 9)	4(4 7)	3(6 6)	4(7 4)
6(7 1)	1(0 12)	1(1 10)	6(2 8)	8(5 5)	10(6 3)
14(5 2)	6(6 0)	1(0 9)	7(1 7)	11(3 6)	15(4 4)
11(4 1)	8(0 6)	12(1 4)	14(2 2)	13(2 5)	17(3 3)
5(1 1)	2(0 0)			6(3 0)	5(0 3)

2   2   2   1   1   1   1   0   0

1(7 4)	1(9 0)	1(4 7)	2(5 5)		
1(2 8)	3(3 6)	4(4 4)	6(5 2)	3(6 3)	2(7 1)
5(2 5)	7(3 3)	5(4 1)	2(0 6)	1(6 0)	2(1 7)
4(3 0)	3(0 3)	3(1 1)		6(1 4)	5(2 2)

2   2   1   1   1   1   1   1   0

| 1(4   4) | 1(5   2) | 1(3   3) | 1(4   1) | | |
| 2(2   2) | 1(3   0) | 1(1   1) | | 1(0   6) | 1(1   4) |

2   1   1   1   1   1   1   1   1   1   1

1(3   0)

4 4 4 0 0 0 0 0 0 0

1(24 0)	1(21 3)	1(18 6)	1(19 4)	3(20 2)	1(15 9)
1(16 7)	4(17 5)	5(18 3)	3(19 1)	1(12 12)	1(13 10)
5(14 8)	8(15 6)	14(16 4)	8(17 2)	8(18 0)	3(11 11)
7(12 9)	16(13 7)	22(14 5)	25(15 3)	16(16 1)	1(8 14)
4(9 12)	12(10 10)	24(11 8)	45(12 6)	44(13 4)	45(14 2)
12(15 0)	1(6 15)	4(7 13)	13(8 11)	35(9 9)	56(10 7)
78(11 5)	77(12 3)	47(13 1)	1(4 16)	4(5 14)	17(6 12)
37(7 10)	79(8 8)	104(9 6)	128(10 4)	91(11 2)	47(12 0)
4(3 15)	121(4 13)	38(5 11)	76(6 9)	126(7 7)	158(8 5)
155(9 3)	91(10 1)	1(0 18)	2(1 16)	11(2 14)	31(3 12)
75(4 10)	124(5 8)	189(6 6)	189(7 4)	167(8 2)	53(9 0)
2(0 15)	16(1 13)	45(2 11)	103(3 9)	159(4 7)	208(5 5)
196(6 3)	121(7 1)	24(0 12)	55(1 10)	125(2 8)	173(3 6)
208(4 4)	152(5 2)	75(6 0)	38(0 9)	98(1 7)	140(2 5)
154(3 3)	92(4 1)	65(0 6)	87(1 4)	95(2 2)	31(3 0)
31(0 3)	29(1 1)	12(0 0)			

4 4 3 1 0 0 0 0 0 0

1(21 3)	1(22 1)	1(18 6)	3(19 4)	4(20 2)	1(21 0)
1(15 9)	4(16 7)	10(17 5)	13(18 3)	10(19 1)	3(13 10)
10(14 8)	24(15 6)	35(16 4)	33(17 2)	15(18 0)	1(10 13)
6(11 11)	21(12 9)	50(13 7)	79(14 5)	87(15 3)	58(16 1)
1(8 14)	9(9 12)	33(10 10)	83(11 8)	143(12 6)	179(13 4)
156(14 2)	60(15 0)	2(6 15)	12(7 13)	46(8 11)	119(9 9)
222(10 7)	309(11 5)	315(12 3)	201(13 1)	1(4 16)	13(5 14)
50(6 12)	143(7 10)	287(8 8)	444(9 6)	518(10 4)	424(11 2)
166(12 0)	2(2 17)	11(3 15)	49(4 13)	146(5 11)	323(6 9)
543(7 7)	710(8 5)	694(9 3)	436(10 1)	6(1 16)	33(2 14)
120(3 12)	294(4 10)	556(5 8)	814(6 6)	916(7 4)	741(8 2)
284(9 0)	14(0 15)	68(1 13)	212(2 11)	461(3 9)	771(4 7)
593(5 5)	965(6 3)	601(7 1)	73(0 12)	262(1 10)	551(2 8)
850(3 6)	981(4 4)	802(5 2)	312(6 0)	203(0 9)	492(7)
741(2 5)	769(3 3)	495(4 1)	273(0 6)	470(1 4)	448(2 2)
83(3 0)	180(0 3)	166(1 1)	23(0 0)		

4 4 2 2 0 0 0 0 0 0

1(18 6)	1(19 4)	2(20 2)	2(16 7)	5(17 5)	6(18 3)
5(19 1)	1(13 10)	7(14 8)	13(15 6)	23(16 4)	13(17 2)
10(18 0)	2(11 11)	11(12 9)	29(13 7)	48(14 5)	55(15 3)
37(16 1)	1(8 14)	4(9 12)	22(10 10)	51(11 8)	97(12 6)
18(13 4)	110(14 2)	37(15 0)	6(7 13)	26(8 11)	74(9 9)
46(10 7)	211(11 5)	218(12 3)	143(13 1)	2(4 16)	7(5 14)
34(6 12)	94(7 10)	205(8 8)	311(9 6)	381(10 4)	304(11 2)
30(12 0)	6(3 15)	29(4 13)	98(5 11)	221(6 9)	390(7 7)
57(8 5)	514(9 2)	325(10 1)	1(0 18)	4(1 16)	27(2 14)
82(3 12)	221(4 10)	407(5 8)	619(6 6)	691(7 4)	578(8 2)
208(9 0)	5(0 15)	48(1 13)	146(2 11)	342(3 9)	577(4 7)
262(5 5)	742(6 3)	468(7 1)	63(0 12)	196(1 10)	436(2 8)
257(3 6)	786(4 4)	626(5 2)	257(6 0)	143(0 9)	385(7)
375(2 5)	610(3 3)	394(4 1)	231(0 6)	376(1 4)	372(2 2)
240(3 0)	135(0 3)	136(1 1)	22(0 0)		

4 4 2 1 1 0 0 0 0 0

1(19 4)	1(20 2)	1(21 0)	2(16 7)	4(17 5)	7(18 3)
5(19 1)	1(13 10)	4(14 8)	14(15 6)	21(16 4)	23(17 2)
8(18 0)	2(11 11)	2(12 9)	30(13 7)	56(14 5)	64(15 3)

46(16 1)	4(9 12)	18(10 10)	57(11 8)	105(12 6)	147(13 4)
126(14 2)	56(15 0)	5(7 13)	29(8 11)	84(9 9)	178(10 7)
261(11 5)	282(12 3)	183(13 1)	6(5 14)	31(6 12)	108(7 10)
236(8 8)	397(9 6)	474(10 4)	413(11 2)	154(12 0)	5(3 15)
33(4 13)	112(5 11)	279(6 9)	498(7 7)	689(8 5)	689(9 3)
442(10 1)	3(1 16)	21(2 14)	95(3 12)	256(4 10)	529(5 8)
800(6 6)	948(7 4)	766(8 2)	312(9 0)	10(0 15)	54(1 13)
192(2 11)	444(3 9)	789(4 7)	1046(5 5)	1045(6 3)	656(7 1)
64(0 12)	256(1 10)	562(2 8)	918(3 6)	1073(4 4)	908(5 2)
340(6 0)	218(0 9)	535(1 7)	836(2 5)	879(3 3)	577(4 1)
300(0 6)	549(1 4)	515(2 2)	225(3 0)	220(0 3)	199(1 1)
25(0 0)					

4 4 1 1 1 1 0 0 0 0

1(18 3)	1(14 8)	2(15 6)	3(16 4)	4(17 2)	2(18 0)
1(12 9)	4(13 7)	10(14 5)	11(15 3)	9(16 1)	3(10 10)
9(11 8)	22(12 6)	30(13 4)	29(14 2)	13(15 0)	3(8 11)
14(9 9)	35(10 7)	57(11 5)	67(12 3)	43(13 1)	5(6 12)
18(7 10)	51(8 8)	91(9 6)	120(10 4)	105(11 2)	41(12 0)
3(4 13)	19(5 11)	59(6 9)	116(7 7)	174(8 5)	184(9 3)
120(10 1)	4(2 14)	17(3 12)	57(4 10)	127(5 8)	214(6 6)
258(7 4)	220(8 2)	89(9 0)	9(1 13)	40(2 11)	108(3 9)
207(4 7)	293(5 5)	303(6 3)	195(7 1)	17(0 12)	63(1 10)
156(2 8)	263(3 6)	322(4 4)	276(5 2)	110(6 0)	56(0 9)
153(1 7)	250(2 5)	275(3 3)	179(4 1)	96(0 6)	171(1 4)
170(2 2)	72(3 0)	70(0 3)	64(1 1)	11(0 0)	

4 3 3 2 0 0 0 0 0 0

1(19 4)	1(21 0)	1(16 7)	3(17 5)	4(18 3)	3(19 1)
3(14 8)	10(15 6)	13(16 4)	15(17 2)	4(18 0)	1(21 11)
8(12 9)	22(13 7)	37(14 5)	43(15 3)	29(16 1)	3(9 12)
14(10 10)	42(11 8)	74(12 6)	103(13 4)	84(14 2)	59(15 0)
1(6 15)	5(7 13)	23(8 11)	65(9 9)	129(10 7)	188(1 5)
96(12 3)	128(13 1)	1(4 16)	6(5 14)	28(6 12)	86(7 10)
178(8 8)	292(9 6)	341(10 4)	296(11 2)	108(12 0)	1(2 7)
6(3 15)	30(4 13)	93(5 11)	214(6 9)	374(7 7)	502(8 5)
501(9 3)	317(10 1)	4(1 16)	21(2 14)	81(3 12)	233(4 10)
404(5 8)	594(6 6)	696(7 4)	556(8 2)	228(9 0)	91(0 5)
47(1 13)	153(2 11)	343(3 9)	588(4 7)	772(5 5)	700(6 3)
477(7 1)	53(0 12)	199(1 10)	425(2 8)	683(3 6)	784(2 4)
659(5 2)	245(6 0)	163(0 9)	397(1 7)	608(2 5)	636(3 3)
414(4 1)	220(0 6)	397(1 4)	368(2 2)	161(3 0)	156(0 3)
141(1 1)	18(0 0)				

4 3 3 1 1 0 0 0 0 0

1(20 2)	2(17 5)	3(18 3)	3(19 1)	2(14 8)	5(15 6)
13(16 4)	11(17 2)	7(18 0)	1(11 11)	5(12 9)	18(13 7)
32(14 5)	41(15 3)	28(16 1)	2(9 12)	12(10 10)	35(11 8)
73(12 6)	95(13 4)	92(14 2)	32(15 0)	4(7 13)	18(8 11)
60(9 9)	123(10 7)	190(11 5)	202(12 3)	135(13 1)	4(5 14)
24(6 12)	78(7 10)	182(8 8)	296(9 6)	373(10 4)	307(11 2)
132(12 0)	4(3 15)	23(4 13)	88(5 11)	213(6 9)	395(7 7)
54(8 5)	553(9 3)	352(10 1)	2(1 16)	18(2 14)	74(3 12)
212(4 10)	424(5 8)	667(6 6)	768(7 4)	651(8 2)	240(9 0)
6(0 15)	44(1 13)	151(2 11)	369(3 9)	648(4 7)	879(5 5)
873(6 3)	555(7 1)	59(0 12)	212(1 10)	488(2 8)	

760(3 3)   494(4 1)   277(0 6)   470(1 4)   467(2 2)   182(3 0
179(0 3)   174(1 1)   29(0 0)

4 3 2 2 1 0 0 0 0 0

1(17 5)	2(18 3)	1(19 1)	1(14 8)	5(15 6)	9(16 4)
10(17 2)	4(18 0)	4(12 9)	14(13 7)	29(14 5)	36(15 3)
26(16 1)	1(9 12)	9(10 10)	32(11 8)	67(12 6)	95(13 4)
88(14 2)	38(15 0)	2(7 13)	16(8 11)	55(9 9)	124(10 7)
193(11 5)	214(12 3)	143(13 1)	3(5 14)	22(6 12)	78(7 10)
186(8 8)	321(9 6)	401(10 4)	349(11 2)	137(12 0)	3(3 15)
23(4 13)	89(5 11)	232(6 9)	434(7 7)	614(8 5)	632(9 3)
407(10 1)	2(1 16)	18(2 14)	80(3 12)	232(4 10)	486(5 8)
767(6 6)	913(7 4)	758(8 2)	300(9 0)	7(0 15)	47(1 13)
174(2 11)	427(3 9)	773(4 7)	1055(5 5)	1063(6 3)	675(7 1)
64(0 12)	251(1 10)	579(2 8)	950(3 6)	1139(4 4)	959(5 2)
374(6 0)	217(0 9)	565(1 7)	891(2 5)	956(3 3)	626(4 1)
336(0 6)	600(1 4)	582(2 2)	245(3 0)	239(0 3)	223(1)
32(0 0)					

4 3 2 1 1 1 0 0 0 0

1(19 1)	1(15 6)	3(16 4)	4(17 2)	2(18 0)	1(12 9)
5(13 7)	12(14 5)	17(15 3)	13(16 1)	3(10 10)	3(11 8)
31(12 6)	50(13 4)	48(14 2)	19(15 0)	5(8 11)	24(9 9)
63(10 7)	107(11 5)	124(12 3)	85(13 1)	7(6 12)	35(7 10)
98(8 8)	185(9 6)	245(10 4)	218(11 2)	88(12 0)	7(4 13)
40(5 11)	123(6 9)	259(7 7)	387(8 5)	411(9 3)	273(10 1)
5(2 14)	35(3 12)	125(4 10)	292(5 8)	494(6 6)	613(7 4)
524(8 2)	208(9 0)	2(0 15)	21(1 13)	93(2 11)	259(3 9)
505(4 7)	724(5 5)	752(6 3)	487(7 1)	34(0 12)	153(1 10)
382(2 8)	658(3 6)	825(4 4)	706(5 2)	278(6 0)	142(0 9)
397(1 7)	649(2 5)	716(3 3)	478(4 1)	247(0 6)	455(1 4)
451(2 2)	189(3 0)	183(0 3)	178(1 1)	25(0 0)	

4 3 1 1 1 1 1 0 0 0

1(14 5)	1(15 3)	1(16 1)	1(11 8)	3(12 6)	6(13 4)
5(14 2)	3(15 0)	1(9 9)	7(10 7)	13(11 5)	18(12 3)
12(13 1)	2(7 10)	11(8 8)	26(9 6)	38(10 4)	38(11 2)
14(12 0)	2(5 11)	14(6 9)	36(7 7)	65(8 5)	74(9 3)
52(10 1)	2(3 12)	14(4 10)	43(5 8)	84(6 6)	118(7 4)
104(8 2)	46(9 0)	1(1 13)	11(2 11)	38(3 9)	90(4 7)
142(5 5)	160(6 3)	167(7 1)	4(0 12)	23(1 10)	98(2 8)
134(3 6)	178(4 4)	164(5 2)	63(6 0)	27(0 9)	61(1 7)
146(2 5)	169(3 3)	117(4 1)	54(0 6)	110(1 4)	110(2 2)
50(3 0)	48(0 3)	46(1 1)	6(0 0)		

4 2 2 2 2 0 0 0 0 0

1(16 4)	1(18 0)	1(13 7)	2(14 5)	3(15 3)	3(16 1)
1(10 10)	2(11 8)	8(12 6)	9(13 4)	13(14 2)	2(15 0)
1(8 11)	6(9 9)	14(10 7)	25(11 5)	29(12 3)	20(13 1)
3(6 12)	9(7 10)	28(8 8)	43(9 6)	66(10 4)	50(11 2)
27(12 0)	2(4 13)	12(5 11)	33(6 9)	69(7 7)	55(8 5)
107(9 3)	69(10 1)	3(2 14)	11(3 12)	40(4 10)	80(5 8)
142(6 6)	159(7 4)	148(8 2)	48(9 0)	7(1 13)	27(2 11)
76(3 9)	141(4 7)	202(5 5)	203(6 3)	133(7 1)	14(0 12)
45(1 10)	118(2 8)	185(3 6)	241(4 4)	188(5 2)	87(6 0)
38(0 9)	115(1 7)	180(2 5)	203(3 3)	131(4 1)	79(0 6)

760(3 3)   494(4 1)   277(0 6)   470(1 4)   467(2 2)   182(3 0)
179(0 3)   174(1 1)   29(0 0)

4 3 2 2 1 0 0 0 0 0

1(17 5)	2(18 3)	1(19 1)	1(14 8)	5(15 6)	9(16 4)
10(17 2)	4(18 0)	4(12 9)	14(13 7)	29(14 5)	36(15 3)
26(16 1)	1(9 12)	9(10 10)	32(11 8)	67(12 6)	95(13 4)
88(14 2)	38(15 0)	2(7 13)	16(8 11)	55(9 9)	124(10 7)
193(11 5)	214(12 13)	143(13 1)	3(5 14)	22(6 12)	78(7 10)
186(8 8)	321(9 6)	401(10 4)	349(11 2)	137(12 0)	3(3 15)
23(4 13)	89(5 11)	232(6 9)	434(7 7)	614(8 5)	632(9 3)
407(10 1)	2(1 16)	18(2 14)	80(3 12)	232(4 10)	486(5 8)
767(6 6)	913(7 4)	758(8 2)	300(9 0)	7(0 15)	47(1 13)
174(2 11)	427(3 9)	773(4 7)	1055(5 5)	1063(6 3)	675(7 1)
64(0 12)	251(1 10)	579(2 8)	950(3 6)	1139(4 4)	959(5 2)
374(6 0)	217(0 9)	565(1 7)	891(2 5)	956(3 3)	626(4 1)
336(0 6)	600(1 4)	582(2 2)	245(3 0)	239(0 3)	223(1)
32(0 0)					

4 3 2 1 1 1 0 0 0 0

1(19 1)	1(15 6)	3(16 4)	4(17 2)	2(18 0)	1(12 9)
5(13 7)	12(14 5)	17(15 3)	13(16 1)	3(10 10)	3(11 8)
31(12 6)	50(13 4)	48(14 2)	19(15 0)	5(8 11)	24(9 9)
63(10 7)	107(11 5)	124(12 3)	85(13 1)	7(6 12)	35(7 10)
98(8 8)	185(9 6)	245(10 4)	218(11 2)	88(12 0)	7(4 13)
40(5 11)	123(6 9)	259(7 7)	387(8 5)	411(9 3)	273(10 1)
5(2 14)	35(3 12)	125(4 10)	292(5 8)	494(6 5)	613(7 4)
524(8 2)	208(9 0)	2(0 15)	21(1 13)	93(2 11)	259(3 9)
505(4 7)	724(5 5)	752(6 3)	487(7 1)	34(0 12)	153(1 10)
382(2 8)	658(3 6)	825(4 4)	706(5 2)	278(6 0)	142(0 9)
397(1 7)	649(2 5)	716(3 3)	478(4 1)	247(0 6)	455(1 4)
451(2 2)	189(3 0)	183(0 3)	178(1 1)	25(0 0)	

4 3 1 1 1 1 1 0 0 0

1(14 5)	1(15 3)	1(16 1)	1(11 8)	3(12 6)	6(13 4)
5(14 2)	3(15 0)	1(9 9)	7(10 7)	13(11 5)	18(12 3)
12(13 1)	2(7 10)	11(8 8)	26(9 6)	38(10 4)	38(11 3)
14(12 0)	2(5 11)	14(6 9)	36(7 7)	65(8 5)	74(9 3)
52(10 1)	2(3 12)	14(4 10)	43(5 8)	84(6 6)	118(7 4)
104(8 2)	46(9 0)	1(1 13)	11(2 11)	38(3 9)	90(4 7)
142(5 5)	160(6 3)	107(7 1)	4(0 2)	23(1 10)	98(2 8)
134(3 6)	178(4 4)	164(5 2)	63(6 0)	27(0 9)	81(3 7)
46(2 5)	169(3 3)	117(4 1)	54(0 6)	110(1 4)	110(2 2)
50(3 0)	48(0 3)	46(1 1)	6(0 0)		

4 2 2 2 2 0 0 0 0 0

1(16 4)	1(18 0)	1(13 7)	2(14 5)	3(15 3)	3(16 1)
1(10 10)	2(11 8)	8(12 6)	9(13 4)	13(14 2)	2(15 0)
1(8 11)	6(9 9)	14(10 7)	25(11 5)	29(12 3)	20(13 1)
3(6 12)	9(7 10)	28(8 8)	43(9 6)	66(10 4)	50(11 2)
27(12 0)	2(4 13)	12(5 11)	33(6 9)	69(7 7)	56(8 5)
107(9 3)	69(10 1)	3(2 14)	11(3 12)	40(4 10)	60(5 8)
142(6 6)	159(7 4)	148(8 2)	48(9 0)	7(1 13)	27(2 11)
76(3 9)	141(4 7)	202(5 5)	203(6 3)	133(7 1)	4(0 2)
45(1 10)	118(2 8)	185(3 6)	241(4 4)	188(5 2)	87(6 0)
38(0 9)	115(1 7)	180(2 5)	203(3 3)	131(4 1)	79(0 6)

```
127( 1  4)     136( 2  2)      46( 3  0)       47( 0  3)      50( 1  1)     12( 0
```

4	2	2	2	1	1	0	0	0	0

```
  1(17  2)       1(13  7)       2(14  5)        4(15  3)       3(16  1)      3(11
  7(12  6)      14(13  4)      12(14  2)        8(15  0)       1( 8 11)      7( 9
 18(10  7)      35(11  5)      40(12  3)       29(13  1)       1( 6 12)     11( 7 10
 31( 8  8)      66( 9  6)      86(10  4)       93(11  2)      29(12  0)      2( 4 13
 14( 5 11)      45( 6  9)     100( 7  7)      151( 8  5)     167( 9  3)    108(10
  1( 2 14)      13( 3 12)      46( 4 10)      120( 5  8)     203( 6  6)    263( 7  4
220( 8  2)      94( 9  0)       1( 0 15)        8( 1 13)      38( 2 11)    111( 3  9
221( 4  7)     325( 5  5)     338( 6  3)      222( 7  1)      13( 0 12)     67( 1 10
169( 2  8)     307( 3  6)     380( 4  4)      336( 5  2)     128( 6  0)     67( 5
187( 1  7)     312( 2  5)     348( 3  3)      232( 4  1)     117( 0  6)    225(    4
220( 2  2)      97( 3  0)      95( 0  3)       89( 1  1)      12( 0  0)
```

4	2	2	1	1	1	1	0	0	0

```
  1(15  3)       2(12  6)       3(13  4)        4(14  2)       1(15  0)      1( 9  9)
  4(10  7)      11(11  5)      12(12  3)       10(13  1)       1( 7 10)      9( 8  8)
 20( 9  6)      33(10  4)      29(11  2)       15(12  0)       2( 5 11)     11( 6  9)
 24( 7  7)      56( 8  5)      69( 9  3)       46(10  1)       1( 3 12)     13( 4 10)
 39( 5  8)      83( 6  6)     110( 7  4)      106( 8  2)      38( 9  0)      1( 1 13)
  9( 2 11)      38( 3  9)      86( 4  7)      145( 5  5)     159( 6  3)    109( 7
  4( 0 12)      22( 1 10)      72( 2  8)      136( 3  6)     192( 4  4)    166( 5  2
 74( 6  0)      24( 0  9)      86( 1  7)      151( 2  5)     182( 3  3)    124( 4
 64( 0  6)     117( 1  4)     128( 2  2)       49( 3  0)      48( 0  3)     51(
 10( 0  0)
```

4	2	1	1	1	1	1	1	0	0

```
  1(11  5)       1(12  3)       1(13  1)        2( 9  6)       3(10  4)      4(11  2)
  1(12  0)       3( 7  7)       6( 8  5)       10( 9  3)       7(10  1)      3( 5  8)
  9( 6  6)      17( 7  4)      17( 8  2)        8( 9  0)       3( 3  9)     10( 4  7)
 23( 5  5)      28( 6  3)      22( 7  1)        2( 1 10)       8( 2  8)     22( 3  6)
 35( 4  4)      36( 5  2)      15( 6  0)        3( 0  9)      14( 1  7)     29( 2  5)
 40( 3  3)      28( 4  1)      12( 0  6)       26( 1  4)      30( 2  2)     13( 3  0)
 12( 0  3)      13( 1  1)       2( 0  0)
```

4	1	1	1	1	1	1	1	1	0

```
  1( 9  3)       1( 8  2)       1( 5  5)        1( 6  3)       2( 7  1)      1( 2  6)
  2( 4  4)       2( 5  2)       2( 6  0)        1( 2  5)       3( 3  3)      2( 4  1)
  1( 0  6)       2( 1  4)       3( 2  2)        1( 3  0)       1( 0  3)      1( 1  1)
  1( 0  0)
```

3	3	3	3	0	0	0	0	0	0

```
  1(15  6)       1(17  2)       1(13  7)        2(14  5)       3(15  3)      1(16  1)
  1(10 10)       3(11  8)       6(12  6)        8(13  4)       6(14  2)      4(15  0)
  1( 8 11)       6( 9  9)       9(10  7)       17(11  5)      18(12  3)     11(13  1)
  1( 5 14)       3( 6 12)       8( 7 10)       18( 8  8)      31( 9  5)     34(10  4)
 32(11  2)      14(12  0)       1( 3 15)        2( 4 13)      10( 5 11)     22( 6  9)
 41( 7  7)      53( 8  5)      58( 9  3)       35(10  1)       1( 0 18)      4( 2 14)
 11( 3 12)      25( 4 10)      48( 5  8)       74( 6  6)      83( 7  4)     68( 8  2)
 30( 9  0)       5( 1 13)      16( 2 11)       43( 3  9)      68( 4  7)     97( 5  5)
 94( 6  3)      59( 7  1)      10( 0 12)       26( 1 10)      57( 2  3)     90( 3  6)
102( 4  4)      87( 5  2)      34( 6  0)       19( 0  9)      50( 1  7)     77( 2  5)
 87( 3  3)      50( 4  1)      34( 0  6)       50( 1  4)      52( 2  2)     23( 3  0)
 21( 0  3)      17( 1  1)       5( 0  0)
```

3 3 3 2 1 0 0 0 0 0

1(16 4)	1(17 2)	2(13 7)	4(14 5)	5(15 3)	4(16 1)
1(10 10)	5(11 8)	12(12 6)	18(13 4)	17(14 2)	7(15 0)
3(8 11)	1(9 9)	27(10 7)	44(11 5)	48(12 3)	34(13 1)
1(5 14)	5(6 12)	20(7 10)	47(8 8)	81(9 6)	105(10 4)
91(11 2)	36(12 0)	1(3 15)	7(4 13)	25(5 11)	65(6 9)
123(7 7)	173(8 5)	180(9 3)	117(10 1)	1(1 16)	6(2 14)
25(3 12)	71(4 10)	147(5 8)	230(6 6)	276(7 4)	231(8 2)
89(9 0)	2(0 15)	16(1 13)	56(2 11)	134(3 9)	244(4 7)
32(5 5)	333(6 3)	215(7 1)	21(0 12)	83(1 10)	187(2 8)
06(3 6)	370(4 4)	309(5 2)	121(6 0)	70(0 9)	186(1 7)
92(2 5)	312(3 3)	207(4 1)	109(0 6)	200(1 4)	193(2 2)
78(3 0)	78(0 3)	76(1 1)	9(0 0)		

3 3 3 1 1 1 0 0 0 0

1(18 0)	1(14 5)	2(15 3)	1(16 1)	1(11 8)	4(12 6)
5(13 4)	8(14 2)	1(15 0)	1(8 11)	4(9 9)	10(10 7)
18(11 5)	22(12 3)	14(13 1)	1(6 12)	6(7 10)	19(8 8)
35(9 6)	50(10 4)	40(11 2)	22(12 0)	2(4 13)	9(5 11)
29(6 9)	57(7 7)	87(8 5)	92(9 3)	61(10 1)	1(2 14)
9(3 12)	29(4 10)	69(5 8)	121(6 6)	142(7 4)	130(8 2)
46(9 0)	1(0 15)	5(1 13)	25(2 11)	66(3 9)	128(4 7)
182(5 5)	192(6 3)	121(7 1)	9(0 12)	39(1 10)	100(2 8)
170(3 6)	216(4 4)	179(5 2)	79(6 0)	39(0 9)	103(1 7)
173(2 5)	191(3 3)	125(4 1)	68(0 6)	118(1 4)	124(2 2)
49(3 0)	51(0 3)	46(1 1)	10(0 0)		

3 3 2 2 2 0 0 0 0 0

1(14 5)	7(15 3)	1(16 1)	1(11 8)	3(12 6)	5(13 4)
5(14 2)	3(15 0)	1(8 11)	3(9 9)	9(10 7)	14(11 5)
19(12 3)	12(13 1)	1(6 12)	6(7 10)	16(8 8)	31(9 6)
40(10 4)	38(11 2)	14(12 0)	3(4 13)	9(5 11)	28(6 9)
50(7 7)	77(8 5)	79(9 3)	53(10 1)	1(2 14)	10(3 12)
28(4 10)	65(5 8)	104(6 6)	129(7 4)	106(8 2)	46(9 0)
2(0 15)	6(1 13)	28(2 11)	63(3 9)	121(4 7)	163(5 5)
170(6 3)	116(7 1)	7(0 12)	39(1 10)	89(2 8)	157(3 6)
185(4 4)	163(5 2)	60(6 0)	42(0 9)	96(1 7)	160(2 5)
169(3 3)	112(4 1)	54(0 6)	108(1 4)	101(2 2)	48(3 0)
49(3 3)	41(1 1)	5(0 0)			

3 3 2 2 1 1 0 0 0 0

1(15 3)	1(16 1)	1(11 8)	3(12 6)	6(13 4)	6(14 2)
2(15 0)	3(9 9)	9(10 7)	18(11 5)	22(12 3)	16(13 1)
1(8 12)	7(7 10)	21(8 8)	42(9 6)	57(10 4)	53(11 2)
21(12 0)	1(4 13)	10(5 11)	31(6 9)	70(7 7)	107(8 5)
117(9 3)	77(10 1)	2(2 14)	11(3 12)	39(4 10)	93(5 8)
158(5 6)	199(7 4)	170(8 2)	69(9 0)	7(1 13)	30(2 11)
89(3 9)	174(4 7)	255(5 5)	265(6 3)	173(7 1)	14(0 12)
56(1 0)	143(2 8)	248(3 6)	312(4 4)	268(5 2)	100(6 0)
52(0 9)	153(1 7)	251(2 5)	282(3 3)	188(4 1)	131(0 6)
184(1 4)	184(2 2)	77(3 0)	74(0 3)	73(1 1)	12(0 0)

3 3 2 1 1 1 1 1 0 0 0

1(13 4)	1(14 2)	2(10 7)	4(11 5)	6(12 3)	4(13 1)

1(7 10)	4(8 8)	12(9 6)	17(10 4)	17(11 2)	7(12 0)
1(5 11)	8(6 9)	21(7 7)	38(8 5)	42(9 3)	31(10 1)
1(3 12)	9(4 10)	29(5 8)	56(6 6)	79(7 4)	70(8 2)
29(9 0)	1(1 13)	8(2 11)	28(3 9)	68(4 7)	105(5 5)
19(6 3)	79(7 1)	2(0 12)	18(1 10)	52(2 8)	105(3 6)
40(4 4)	129(5 2)	49(6 0)	22(0 9)	66(1 7)	121(2 5)
38(3 3)	97(4 1)	44(0 6)	93(1 4)	93(2 2)	42(3 0)
41(0 3)	40(1 1)	4(0 0)			

3   3   1   1   1   1   1   1   0   0

1(9 6)	1(10 4)	2(11 2)	1(7 7)	3(8 5)	4(9 3)
3(10 1)	2(5 8)	5(6 6)	10(7 4)	8(8 2)	6(9 0)
2(3 9)	6(4 7)	13(5 5)	17(6 3)	12(7 1)	2(1 10)
5(2 8)	14(3 6)	20(4 4)	23(5 2)	7(6 0)	2(0 9)
9(1 7)	19(2 5)	25(3 3)	18(4 1)	7(0 6)	17(1 4)
17(2 2)	10(3 0)	9(0 3)	8(1 1)	1(0 0)	

3   2   2   2   2   1   0   0   0   0

1(14 2)	1(10 7)	2(11 5)	3(12 3)	3(13 1)	1(7 10)
3(8 8)	7(9 6)	12(10 4)	10(11 2)	5(12 0)	2(5 11)
7(6 9)	16(7 7)	26(8 5)	29(9 3)	20(10 1)	2(3 12)
10(4 10)	24(5 8)	44(6 6)	56(7 4)	50(8 2)	17(9 0)
2(1 13)	9(2 11)	27(3 9)	56(4 7)	81(5 5)	85(6 3)
56(7 1)	3(0 12)	18(1 10)	48(2 8)	83(3 6)	108(4 4)
91(5 2)	38(6 0)	18(0 9)	56(1 7)	93(2 5)	102(3 3)
70(4 1)	37(0 6)	69(1 4)	71(2 2)	27(3 0)	28(0 3)
29(1 1)	3(0 0)				

3   2   2   2   1   1   1   0   0   0

1(11 5)	1(12 3)	1(13 1)	2(8 8)	4(9 6)	6(13 4)
6(11 2)	3(12 0)	3(6 9)	9(7 7)	16(8 5)	20(9 3)
3(10 1)	1(3 12)	4(4 10)	15(5 8)	30(6 6)	41(7 4)
18(8 2)	15(9 0)	4(2 11)	16(3 9)	39(4 7)	62(5 5)
69(6 3)	46(7 1)	2(0 12)	11(1 10)	33(2 8)	67(3 6)
89(4 4)	80(5 2)	34(6 0)	14(0 9)	43(1 7)	79(2 5)
93(3 3)	63(4 1)	31(0 6)	62(1 4)	65(2 2)	28(3 0)
29(0 3)	27(1 1)	5(0 0)			

3   2   2   1   1   1   1   1   0   0

3(10 4)	1(12 0)	1(7 7)	3(8 5)	4(9 3)	3(10 1)
2(5 8)	6(6 6)	9(7 4)	11(8 2)	3(9 0)	2(3 9)
8(4 7)	16(5 5)	21(6 3)	15(7 1)	1(1 10)	7(2 8)
7(3 6)	30(4 4)	26(5 2)	14(6 0)	3(0 9)	12(7)
26(2 5)	34(3 3)	25(4 1)	11(0 6)	23(1 4)	28(2 2)
3(3 0)	11(0 3)	12(1 1)	3(0 0)		

3   2   1   1   1   1   1   1   1   0

1(7 4)	1(8 2)	1(5 5)	2(6 3)	2(7 1)	1(3 6)
3(4 4)	4(5 2)	2(6 0)	1(1 7)	3(2 5)	5(3 3)
3(4 1)	2(0 6)	4(1 4)	5(2 2)	2(3 0)	2(0 3)
3(1 1)					

3   1   1   1   1   1   1   1   1   1

1(6 0)
1(2 2)

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                    2  2  2  2  2  2  0  0  0  0
1(12  0)      1( 8  5)      1( 9  3)      1( 4 10)      1( 5  8)      3( 6  6)
2( 7  4)      4( 8  2)      2( 3  9)      3( 4  7)      5( 5  5)      6( 6  3)
3( 7  1)      1( 0 12)      1( 1 10)      5( 2  8)      7( 3  6)     10( 4  4)
6( 5  2)      5( 6  0)      1( 0  9)      5( 1  7)      7( 2  5)      9( 3  3)
6( 4  1)      6( 0  6)      6( 1  4)      8( 2  2)      2( 3  0)      2( 0  3)
2( 1  1)      2( 0  0)
```

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                    2  2  2  2  2  1  1  0  0  0
1( 8  5)      1( 9  3)      1(10  1)      2( 5  8)      2( 6  6)      5( 7  4)
3( 8  2)      2( 9  0)      1( 2 11)      2( 3  9)      6( 4  7)      8( 5  5)
10( 6  3)     6( 7  1)      2( 1 10)      5( 2  8)     12( 3  6)     13( 4  4)
14( 5  2)     4( 6  0)      4( 0  9)      8( 1  7)     16( 2  5)     16( 3  3)
12( 4  1)     4( 0  6)     13( 1  4)     10( 2  2)      7( 3  0)      7( 0  3)
5( 1  1)
```

```
                    2  2  2  2  1  1  1  1  0  0
1( 6  6)      1( 7  4)      2( 8  2)      2( 4  7)      3( 5  5)      4( 6  3)
3( 7  1)      1( 1 10)      2( 2  8)      5( 3  6)      8( 4  4)      7( 5  2)
3( 6  0)      1( 0  9)      3( 1  7)      8( 2  5)      9( 3  3)      7( 4  1)
3( 0  6)      7( 1  4)      8( 2  2)      3( 3  0)      4( 0  3)      4( 1  1)
```

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                    2  2  2  1  1  1  1  1  1  0
1( 6  3)      1( 3  6)      1( 4  4)      2( 5  2)      1( 6  0)      2( 2  5)
2( 3  3)      2( 4  1)      2( 1  4)      2( 2  2)      2( 3  0)      2( 1  3)
1( 1  1)
```

```
                    2  2  1  1  1  1  1  1  1  1
1( 4  1)      1( 0  3)
```

```
                    4  4  4  1  0  0  0  0  0  0
1(23  2)      1(20  5)      2(21  3)      1(22  1)      1(17  8)      3(18  6)
6(19  4)      5(20  2)      4(21  0)      1(14 11)      3(15  9)      6(16  7)
15(17  5)    17(18  3)     12(19  1)      2(12 12)      7(13 10)     13(14  8)
35(15  6)    41(16  4)     40(17  2)     13(18  0)      1( 9 15)      3(10 13)
13(11 11)    34(12  9)     64(13  7)     89(14  5)     93(15  3)     58(16  1)
5( 8  4)     18( 9 12)     50(10 10)    104(11  8)    155(12  6)    184(13  4)
45(14  2)    62(15  0)      1( 5 17)      6( 6 15)     23( 7 13)     65( 8 11)
143( 9  9)  232(10  7)    302(11  5)    291(12  3)    180(13  1)      1( 3 18)
5( 4 16)     23( 5 14)     73( 6 12)    166( 7 10)    296( 8  8)    426( 9  6)
458(10  4)   374(11  2)    137(12  0)      4( 2 17)     29( 3 15)     65( 4  3)
168( 5 11)   324( 6  9)    505( 7  7)    621( 8  5)    587( 9  3)    357(10  1)
2( 0  8)     11( 1 16)     47( 2 14)    137( 3 12)    295( 4 10)    512( 5  8)
699( 6  6)   762( 7  4)    590( 8  2)    235( 9  0)     18( 0 15)     76( 1  3)
208( 2 11)   422( 3  9)    652( 4  7)    809( 5  5)    762( 6  3)    464( 7  1)
75( 0  2)    235( 1 10)    464( 2  8)    687( 3  6)    757( 4  4)    6?0( 5  2)
230( 6  0)   172( 0  9)    393( 1  7)    569( 2  5)    581( 3  3)    305( 4  1)
211( 0  6)   350( 1  4)    324( 2  2)    140( 3  0)    134( 0  3)    117(    )
18( 0  0)
```

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                    4  4  3  2  0  0  0  0  0  0
1(20  5)      1(21  3)      1(22  1)      1(17  8)      3(18  6)      ?(19  4)
```

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  19(10 10)     53(11  8)    101(12  6)    132(13  4)    122(14  2)      44(15  0)
   5( 7 13)     28( 8 11)     84( 9  9)    172(10  7)    255(11  5)     270(12  3)
 177(13  1)      6( 5 14)     34( 6 12)    110( 7 10)    246( 8  8)     399( 9  6)
 489(10  4)    405(11  2)    168(12  0)      5( 3 15)     33( 4 13)     118( 5 11)
 289( 6  9)    522( 7  7)    713( 8  5)    717( 9  3)    458(10  1)       3( 1 16)
  24( 2 14)    101( 3 12)    280( 4 10)    563( 5  8)    869( 6  6)    1003( 7  4)
 836( 8  2)    316( 9  0)      9( 0 15)     58( 1 13)    203( 2 11)     483( 3  9)
 851( 4  7)   1140( 5  5)   1134( 6  3)    715( 7  1)     75( 0 12)     280( 1 10)
 632( 2  8)   1008( 3  6)   1207( 4  4)    993( 5  2)    397( 6  0)     231( 0  9)
 596( 1  7)    925( 2  5)    986( 3  3)    643( 4  1)    353( 0  6)     614( 1  4)
 601( 2  2)    243( 3  0)    239( 0  3)    227( 1  1)     35( 0  0)
```

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                          4  4  1  1  1  1  1  0  0  0
   1(15  6)     1(16  4)     1(17  2)     1(18  0)      1(12  9)      2(13  7)
   5(14  5)     6(15  3)     4(16  1)     5(11  8)     10(12  6)     16(13  4)
  15(14  2)     6(15  0)     2( 8 11)     8( 9  9)     21(10  7)     34(11  5)
  41(12  3)    26(13  1)     1( 6 12)    10( 7 10)     27( 8  8)     56( 9  6)
  72(10  4)    66(11  2)    27(12  0)     2( 4 13)     11( 5 11)     37( 6  9)
  74( 7  7)   116( 8  5)   122( 9  3)    82(10  1)     10( 3 12)     31( 4 10)
  82( 5  8)   138( 6  6)   176( 7  4)   150( 8  2)     63( 9  0)      2( 0 15)
   5( 1 13)    28( 2 11)    72( 3  9)   145( 4  7)    205( 5  5)     220( 6  3)
 139( 7  1)     6( 0 12)    41( 1 10)   101( 2  8)    186( 3  6)     228( 4  4)
 203( 5  2)    78( 6  0)    46( 0  9)   110( 1  7)    189( 2  5)     205( 3  3)
 137( 4  1)    65( 0  6)   128( 1  4)   124( 2  2)     58( 3  0)      58( 0  3)
  49( 1  1)     7( 0  0)
```

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                          4  3  3  3  0  0  0  0  0  0
   1(18  6)     1(20  2)     2(16  7)     3(17  5)      4(18  3)      2(19  1)
   1(13 10)     5(14  8)     9(15  6)    14(16  4)     10(17  2)      6(18  0)
   2(11 11)    11(12  9)    20(13  7)    34(14  5)     35(15  3)     22(16  1)
   1( 8 14)     5( 9 12)    18(10 10)    39(11  8)     68(12  6)     78(13  4)
  71(14  2)    24(15  0)     2( 6 15)     7( 7 13)     27( 8 11)     61( 9  9)
 112(10  7)   147(11  5)   151(12  3)    94(13  1)      1( 3 18)      2( 4 16)
  10( 5 14)    35( 6 12)    80( 7 10)   157( 8  8)    228( 9  6)     255(10  4)
 209(11  2)    89(12  0)     2( 2 17)     9( 3 15)     34( 4 13)      88( 5 11)
 185( 6  9)   292( 7  7)   378( 8  5)   361( 9  3)    226(10  1)       1( 0 18)
   6( 1 16)    26( 2 14)    78( 3 12)   179( 4 10)    315( 5  8)     453( 6  6)
 492( 7  4)   401( 8  2)   148( 9  0)    11( 0 15)     44( 1 13)     132( 2 11)
 272( 3  9)   438( 4  7)   551( 5  5)   533( 6  3)    323( 7  1)      48( 0 12)
 155( 1 10)   323( 2  8)   481( 3  6)   550( 4  4)    439( 5  2)     176( 6  0)
 121( 0  9)   282( 1  7)   419( 2  5)   430( 3  3)    274( 4  1)     159( 1  6)
 261( 1  4)   251( 2  2)   102( 3  0)   101( 0  3)     90( 1  1)      16( 0  0)
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                          4  3  3  2  1  0  0  0  0  0
   1(19  4)     1(20  2)     2(16  7)     5(17  5)      7(18  3)      5(19  1)
   1(13 10)     7(14  8)    18(15  6)    27(16  4)     26(17  2)     11(18  0)
   4(11 11)    18(12  9)    46(13  7)    76(14  5)     85(15  3)     59(16  1)
   1( 8 14)     9( 9 12)    37(10 10)    93(11  8)    165(12  6)     211(13  4)
 184(14  2)    74(15  0)     2( 6 15)    15( 7 13)     59( 8 11)     154( 9  9)
 291(10  7)   411(11  5)   425(12  3)   274(13  1)      3( 4 16)      19( 5 14)
  77( 6 12)   211( 7 10)   427( 8  8)   658( 9  6)    775(10  4)     642(11  2)
 249(12  0)     2( 2 17)    18( 3 15)    79( 4 13)     236( 5 11)     518( 6  9)
 877( 7  7)  1151( 8  5)  1132( 9  3)   712(10  1)      1( 0 18)      11( 1 16)
  61( 2 14)   208( 3 12)   514( 4 10)   964( 5  8)    1414( 6  6)    1597( 7  4)
1292( 8  2)   500( 9  0)    22( 0 15)   123( 1 13)     380( 2 11)     838( 3  9)
1404( 4  7)  1818( 5  5)  1765( 6  3)  1104( 7  1)     142( 0 12)     491( 1 10)
1046( 2  8)  1615( 3  6)  1872( 4  4)  1530( 5  2)     593( 6  0)     385( 0  3)
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956( 1  7)   1441( 2  5)   1506( 3  3)    971( 4  1)    544( 0  6)    939( 1  4
895( 2  2)    366( 3  0)    360( 0  3)    337( 1  1)     48( 0  0)
```

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                      4   3   3   1   1   1   0   0   0   0

   1(21   0)       1(17   5)       2(18   3)       2(19   1)      1(14   8)       5(15   6
   8(16   4)      11(17   2)       2(18   0)       1(11  11)      5(12   9)      15(13   7
  27(14   5)      35(15   3)      23(16   1)       2( 9  12)     11(10  10)      34(11   8
  64(12   6)      92(13   4)      77(14   2)      37(15   0)      4( 7  13)      19( 8  11
  60( 9   9)     122(10   7)     186(11   5)     195(12   3)    131(13   1)       4( 5  14
  25( 6  12)      83( 7  10)     184( 8   8)     311( 9   6)    369(10   4)     324(11   2
 120(12   0)       4( 3  15)      25( 4  13)      94( 5  11)    229( 6   9)     421( 7   7
 573( 8   5)     584( 9   3)     370(10   1)       2( 1  16)     19( 2  14)      82( 3  12
 228( 4  10)     470( 5   8)     716( 6   6)     849( 7   4)    688( 8   2)     279( 9   0
   7( 0  15)      48( 1  13)     169( 2  11)     411( 3   9)    723( 4   7)     979( 5   5
 973( 6   3)     616( 7   1)      63( 0  12)     241( 1  10)    541( 2   8)     883( 3   6
1041( 4   4)     880( 5   2)     334( 6   0)     202( 0   9)    524( 1   7)     816( 2   5
 873( 3   3)     570( 4   1)     307( 0   6)     550( 1   4)    526( 2   2)     226( 3   0
 218( 0   3)     203( 1   1)      28( 0   0)
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                      4   3   2   2   2   0   0   0   0   0

   1(17   5)       1(18   3)       1(19   1)      1(14   8)      4(15   6)       6(16   4)
   7(17   2)       3(18   0)       1(11  11)      4(12   9)     12(13   7)      21(14   5)
  27(15   3)      18(16   1)       2( 9  12)      9(10  10)     28(11   8)      51(12   6)
  71(13   4)      63(14   2)      27(15   0)      4( 7  13)     17( 8  11)      51( 9   9)
  99(10   7)     149(11   5)     158(12   3)    104(13   1)      5( 5  14)      24( 6  12)
  73( 7  10)     155( 8   8)     254( 9   6)    302(10   4)    258(11   2)     101(12   0)
   5( 3  15)      25( 4  13)      87( 5  11)    199( 6   9)    353( 7   7)     474( 8   5)
 476( 9   3)     301(10   1)       3( 1  16)     20( 2  14)     79( 3  12)     204( 4  10)
 403( 5   8)     605( 6   6)     698( 7   4)    568( 8   2)    224( 9   0)       8( 0  15)
  47( 1  13)     155( 2  11)     362( 3   9)    618( 4   7)    820( 5   5)     807( 6   3)
 505( 7   1)      59( 0  12)     213( 1  10)    471( 2   8)    746( 3   6)     874( 4   4)
 724( 5   2)     281( 6   0)     176( 0   9)    447( 1   7)    686( 2   5)     728( 3   3)
 473( 4   1)     264( 0   6)     457( 1   4)    441( 2   2)    185( 3   0)     180( 0   3)
 167( 1   1)      26( 0   0)
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                      4   3   2   2   1   1   0   0   0   0

   1(18   3)       1(19   1)       1(14   8)      3(15   6)      7(16   4)       7(17   2)
   4(18   0)       4(12   9)      12(13   7)     25(14   5)     31(15   3)      23(16   1)
   1( 9  12)      10(10  10)      31(11   8)     66(12   6)     90(13   4)      85(14   2)
  33(15   0)       2( 7  13)      18( 8  11)     58( 9   9)    131(10   7)     200(11   5)
 220(12   3)     145(13   1)       3( 5  14)     25( 6  12)     87( 7  10)     208( 8   8)
 350( 9   6)     440(10   4)     372(11   2)    152(12   0)      3( 3  15)      27( 4  13)
 102( 5  11)     268( 6   9)     497( 7   7)    700( 8   5)    712( 9   3)     459(10   1)
   2( 1  16)      21( 2  14)      93( 3  12)    275( 4  10)    572( 5   8)     904( 6   6)
1064( 7   4)     890( 8   2)     343( 9   0)      8( 0  15)     56( 1  13)     209( 2  11)
 5?5( 3   9)     932( 4   7)    1266( 5   5)   1276( 6   3)    809( 7   1)      78( 0  12)
 305( 1  10)     709( 2   8)    1159( 3   6)   1400( 4   4)   1169( 5   2)     463( 6   0)
 266( 0   9)     698( 1   7)    1105( 2   5)   1187( 3   3)    781( 4   1)     421( 0   6)
 752( 1   4)     736( 2   2)     304( 3   0)    301( 0   3)    284( 1   1)      42( 0   0)
```

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                      4   3   2   1   1   1   1   0   0   0

   1(16   4)       1(17   2)       2(13   7)      5(14   5)      7(15   3)       5(16   1)
   1(10  10)       6(11   8)      16(12   6)     25(13   4)     24(14   2)      10(15   0)
   2( 8  11)      12( 9   9)      35(10   7)     61(11   5)     70(12   3)      50(13   1)
   2( 6  12)      19( 7  10)      57( 8   8)    112( 9   6)    152(10   4)     137(11   2)
  55(12   0)       3( 4  13)      22( 5  11)     75( 6   9)    165( 7   7)     253( 8   5)
```

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275( 9 -3)  183(10  1)    2( 2 14)   19( 3 12)    77( 4 10)  192( 5  8)
334( 6  6)  427( 7  4)  369( 8  2)  146( 9  0)   12( 1 13)   58( 2 11)
172( 3  9)  352( 4  7)  518( 5  5)  546( 6  3)  359( 7  1)   22( 0 12)
104( 1 10)  270( 2  8)  481( 3  6)  615( 4  4)  533( 5  2)  212( 6  0)
100( 0  9)  293( 1  7)  491( 2  5)  549( 3  3)  372( 4  1)  187( 0  6)
355( 1  4)  355( 2  2)  148( 3  0)  145( 0  3)  143( 1  1)   19( 0  0)
```

```
                    4  3  1  1  1  1  1  1  0  0
  1(12  6)    1(13  4)    2(14  2)    2(10  7)    4(11  5)    6(12  3)
  4(13  1)    3( 8  8)    8( 9  6)   15(10  4)   13(11  2)    8(12  0)
  4( 6  9)   12( 7  7)   26( 8  5)   31( 9  3)   23(10  1)    4( 4 10)
 14( 5  8)   35( 6  6)   49( 7  4)   51( 8  2)   18( 9  0)    3( 2 11)
 13( 3  9)   37( 4  7)   63( 5  5)   77( 6  3)   52( 7  1)    1( 0 12)
  8( 1 10)   29( 2  8)   60( 3  6)   89( 4  4)   80( 5  2)   36( 6  0)
 11( 0  9)   37( 1  7)   72( 2  5)   87( 3  3)   62( 4  1)   29( 0  6)
 56( 1  4)   62( 2  2)   25( 3  0)   25( 0  3)   25( 1  1)    5( 0  0)
```

```
                    4  2  2  2  2  1  0  0  0  0
  1(17  2)    1(13  7)    2(14  5)    3(15  3)    3(16  1)    1(10 10)
  3(11  8)    7(12  6)   13(13  4)   11(14  2)    6(15  0)    2( 8 11)
  8( 9  9)   19(10  7)   32(11  5)   37(12  3)   25(13  1)    3( 6 12)
 14( 7 10)   35( 8  8)   65( 9  6)   82(10  4)   75(11  2)   26(12  0)
  4( 4 13)   18( 5 11)   51( 6  9)  102( 7  7)  147( 8  5)  153( 9  3)
100(10  1)    3( 2 14)   17( 3 12)   56( 4 10)  127( 5  8)  204( 6  6)
250( 7  4)  205( 8  2)   86( 9  0)    1( 0 15)   11( 1 13)   45( 2 11)
119( 3  9)  225( 4  7)  314( 5  5)  319( 6  3)  205( 7  1)   17( 0 12)
 74( 1 10)  177( 2  8)  302( 3  6)  366( 4  4)  315( 5  2)  118( 6  0)
 68( 0  9)  186( 1  7)  301( 2  5)  328( 3  3)  217( 4  1)  114( 0  6)
215( 1  4)  207( 2  2)   90( 3  0)   88( 0  3)   84( 1  1)   11( 0  0)
```

```
                    4  2  2  2  1  1  1  0  0  0
  1(14  5)    1(15  3)    1(16  1)    1(11  8)    4(12  6)    6(13  4)
  6(14  2)    3(15  0)    3( 9  9)   10(10  7)   18(11  5)   23(12  3)
 15(13  1)    1( 6 12)    5( 7 10)   20( 8  8)   40( 9  6)   55(10  4)
 51(11  2)   20(12  0)    7( 5 11)   27( 6  9)   63( 7  7)  101( 8  5)
 11( 9  3)   74(10  1)    1( 2 14)    7( 3 12)   32( 4 10)   80( 5  8)
147( 8  6)  187( 7  4)  163( 8  2)   67( 9  0)    4( 1 13)   23( 2 11)
 76( 3  9)  158( 4  7)  240( 5  5)  256( 6  3)  168( 7  1)   11( 0 12)
 46( 1  0)  130( 2  8)  233( 3  6)  302( 4  4)  264( 5  2)  106( 6  0)
 47( 0  9)  144( 1  7)  245( 2  5)  282( 3  3)  188( 4  1)  100( 0  6)
183( 1  4)  188( 2  2)   80( 3  0)   76( 0  3)   75( 1  1)   13( 0  0)
```

```
                    4  2  2  1  1  1  1  1  0  0
  1(13  4)    1(15  0)    1(10  7)    3(11  5)    4(12  3)    3(13  1)
  2( 8  8)    7( 9  6)   10(10  4)   13(11  2)    3(12  0)    3( 6  9)
 11( 7  7)   22( 8  5)   28( 9  3)   20(10  1)    3( 4 10)   14( 5  8)
 31( 6  6)   51( 7  4)   44( 8  2)   23( 9  0)    2( 2 11)   13( 3  9)
 36( 4  7)   65( 5  5)   77( 6  3)   54( 7  1)    1( 0 12)    8( 1 10)
 28( 2  8)   65( 3  6)   90( 4  4)   91( 5  2)   32( 6  0)   11( 0  9)
 40( 1  7)   78( 2  5)   96( 3  3)   68( 4  1)   29( 0  6)   65( 1  4)
 65( 2  2)   33( 3  0)   30( 0  3)   29( 1  1)    3( 0  0)
```

```
                    4  2  1  1  1  1  1  1  1  0
  1( 0  4)    1(11  2)    1( 8  5)    2( 9  3)    2(10  1)    2( 6  6)
  4( 7  4)    5( 8  2)    3( 9  0)    1( 4  7)    5( 5  5)    8( 6  3)
```

```
   7( 7  1)      2( 2  8)      5( 3  6)     11( 4  4)      12( 5  2)      5( 6  0)
   3( 1  7)      8( 2  5)     13( 3  3)     10( 4  1)      -4( 0  6)      9( -  4)
  11( 2  2)      5( 3  0)     -4( 0  3)      5( 1  1)       1( 0  0)
```

```
                          4  1  1  1  1  1  1  1  1  1
   1( 9  0)      1( 5  2)      1( 3  3)       1( 3  0)       1( 0  3)
```

```
                          3  3  3  3  1  0  0  0  0  0
   1(15  6)     1(16  4)     1(17  2)      1(12  9)       2(13  7)      5(14  5)
   5(15  3)     4(16  1)     2(10 10)      7(11  8)      12(12  6)     18(13  4)
  14(14  2)     7(15  0)     1( 7 13)      5( 8 11)      13( 9  9)     28(10  7)
  38(11  5)    43(12  3)    27(13  1)      2( 5 14)       7( 6 12)     22( 7 10)
  44( 8  8)    73( 9  6)    83(10  4)     75(11  2)      26(12  0)      1( 2 17)
   2( 3 15)    11( 4 13)    28( 5 11)     64( 6  9)     105( 7  7)    143( 8  5)
 138( 9  3)    90(10  1)     2( 1 16)      7( 2 14)      28( 3 12)     65( 4 10)
 126( 5  8)   181( 6  6)   213( 7  4)    166( 8  2)      71( 9  0)      5( 0 15)
  17( 1 13)    56( 2 11)   115( 3  9)    197( 4  7)     250( 5  5)    248( 6  3)
 152( 7  1)    16( 0 12)    70( 1 10)    143( 2  8)     231( 3  6)    261( 4  4)
 223( 5  2)    78( 6  0)    62( 0  9)    139( 1  7)     215( 2  5)    220( 3  3)
 144( 4  1)    74( 0  6)   139( 1  4)    126( 2  2)      59( 3  0)     58( 0  3)
  50( 1  1)     5( 0  0)
```

```
                          3  3  3  2  2  0  0  0  0  0
   1(16  4)     1(18  0)     2(13  7)      3(14  5)       4(15  3)      3(16  1)
   2(10 10)     4(11  8)    11(12  6)     13(13  4)      16(14  2)      3(15  0)
   1( 7 13)     3( 8 11)    12( 9  9)     23(10  7)      37(11  5)     39(12  3)
  27(13  1)     1( 5 14)    69(11  2)     19( 7 10)      45( 8  8)     67( 9  6)
  90(10  4)    69(11  2)    34(12  0)      2( 3 15)       8( 4 13)     28( 5 11)
  60( 6  9)   110( 7  7)   145( 8  5)    148( 9  3)      94(10  1)      1( 1 16)
   8( 2 14)    26( 3 12)    72( 4 10)    130( 5  8)     205( 6  6)    224( 7  4)
 196( 8  2)    65( 9  0)     2( 0 15)     18( 1 13)      53( 2 11)    126( 3  9)
 212( 4  7)   283( 5  5)   274( 6  3)    175( 7  -)      24( 0 12)     76( 1 10)
 174( 2  8)   259( 3  6)   319( 4  4)    247( 5  2)     108( 6  0)     58( 1  9)
 162( 1  7)   241( 2  5)   260( 3  3)    167( 4  1)     102( 0  6)    163( 0  4)
 168( 2  2)    58( 3  0)    58( 0  3)     62( 1  1)      12( 0  0)
```

```
                          3  3  3  2  1  1  0  0  0  0
   1(17  2)     1(13  7)     3(14  5)      4(15  3)       3(16  1)      1(10 10)
   5(11  8)    10(12  6)    17(13  4)     14(14  2)       8(15  0)      3( 8 11)
  12( 9  9)    27(10  7)    44(11  5)     49(12  3)      33(13  1)      1( 5 14)
   6( 6 12)    22( 7 10)    52( 8  8)     91( 9  6)     111(10  4)    100(11  2)
  36(12  0)     1( 3 15)     8( 4 13)     30( 5 11)      76( 6  9)    143( 7  7)
 199( 8  5)   205( 9  3)   132(10  1)      1( 1 16)       7( 2 14)     51( 3 12)
  85( 4  0)   179( 5  8)   276( 6  6)    331( 7  4)     269( 8  2)    111( 9  0)
   3( 0  5)    19( 1 13)    70( 2 11)    168( 3  9)     301( 4  7)    410( 5  5)
 410( 6  3)   261( 7  1)    26( 0 12)    104( 1 10)     235( 2  8)    388( 3  6)
 461( 4  4)   392( 5  2)   148( 6  0)     92( 0  9)     237( 1  7)    374( 2  5)
 402( 3  3)   263( 4  1)   140( 0  6)    258( 1  4)     247( 2  2)    107( 3  0)
 104( 0  3)    98( 1  1)    13( 0  0)
```

```
                          3  3  3  1  1  1  1  0  0  0
   1(15  3)     2(12  6)     2(13  4)      3(14  2)       1(15  0)      2( 9  9)
   4(10  7)    10(11  5)    10(12  3)      8(13  1)       1( 6 12)      3( 7 10)
  12( 8  8)    21( 9  6)    30(10  4)     25(11  2)      13(12  0)      5( 5 11)
   5( 6  9)    37( 7  7)    53( 8  5)     62( 9  3)      38(10  1)      1( 2 14)
```

5(3 12)	21(4 10)	46(5 8)	85(6 6)	100(7 4)	93(8 2)
32(9 0)	3(1 13)	13(2 11)	46(3 9)	86(4 7)	134(5 5)
137(6 3)	91(7 1)	8(0 12)	27(1 10)	76(2 8)	127(3 6)
168(4 4)	137(5 2)	63(6 0)	24(0 9)	79(1 7)	128(2 5)
151(3 3)	97(4 1)	59(0 6)	94(1 4)	104(2 2)	38(3 0)
37(0 3)	38(1 1)	10(0 0)			

3 3 2 2 2 1 0 0 0 0

1(15 3)	1(16 1)	1(11 8)	3(12 6)	5(13 4)	6(14 2)
2(15 0)	1(8 11)	4(9 9)	10(10 7)	18(11 5)	21(12 3)
15(13 1)	2(6 12)	9(7 10)	23(8 8)	42(9 6)	56(10 4)
48(11 2)	21(12 0)	3(4 13)	14(5 11)	38(6 9)	75(7 7)
108(8 5)	113(9 3)	73(10 1)	3(2 14)	15(3 12)	47(4 10)
101(5 8)	163(6 6)	194(7 4)	165(8 2)	62(9 0)	1(0 15)
10(1 13)	39(2 11)	101(3 9)	186(4 7)	257(5 5)	260(6 3)
166(7 1)	16(0 12)	64(1 10)	153(2 8)	253(3 6)	309(4 4)
258(5 2)	104(6 0)	58(0 9)	159(1 7)	254(2 5)	276(3 3)
182(4 1)	101(0 6)	180(1 4)	179(2 2)	73(3 0)	73(0 3)
70(1 1)	11(0 0)				

3 3 2 2 1 1 1 0 0 0

1(12 6)	2(13 4)	2(14 2)	1(15 0)	1(9 9)	3(10 7)
9(11 5)	11(12 3)	8(13 1)	3(7 10)	11(8 8)	24(9 6)
33(10 4)	31(11 2)	12(12 0)	1(4 13)	5(5 11)	21(6 9)
45(7 7)	72(8 5)	78(9 3)	52(10 1)	6(3 12)	23(4 10)
62(5 8)	109(6 6)	141(7 4)	121(8 2)	50(9 0)	1(0 15)
4(1 13)	23(2 11)	63(3 9)	132(4 7)	192(5 5)	205(6 3)
123(7 1)	6(0 12)	40(1 10)	103(2 8)	191(3 6)	242(4 4)
214(5 2)	83(6 0)	45(0 9)	121(1 7)	209(2 5)	252(3 3)
158(4 1)	76(0 6)	153(1 4)	151(2 2)	67(3 0)	58(0 3)
63(1 1)	8(0 0)				

3 3 2 1 1 1 1 1 0 0

1(11 5)	1(12 3)	1(13 1)	1(8 8)	3(9 6)	6(10 4)
5(11 2)	3(12 0)	2(6 9)	7(7 7)	13(8 5)	17(9 3)
12(10 1)	2(4 10)	10(5 8)	23(6 6)	33(7 4)	33(8 2)
12(9 0)	2(2 11)	10(3 9)	27(4 7)	48(5 5)	56(6 3)
39(7 1)	1(0 12)	6(1 10)	23(2 8)	49(3 5)	72(4 4)
65(5 2)	29(6 0)	8(0 9)	31(1 7)	60(2 5)	74(3 3)
52(4 1)	25(0 6)	50(1 4)	55(2 2)	22(3 0)	22(0 3)
23(1 1)	4(0 0)				

3 3 1 1 1 1 1 1 1 0

1(8 5)	1(9 3)	1(10 1)	2(7 4)	2(8 2)	1(9 0)
2(4 7)	3(5 5)	6(6 3)	4(7 1)	3(3 6)	5(4 4)
7(5 2)	3(6 0)	1(0 9)	2(1 7)	7(2 5)	3(3 3)
7(4 1)	1(0 6)	6(1 4)	6(2 2)	4(3 0)	4(0 3)
3(1 1)					

3 2 2 2 2 2 0 0 0 0

1(15 0)	7(11 5)	1(12 3)	1(13 1)	1(7 10)	1(8 8)
4(9 6)	4(10 4)	6(11 2)	1(5 11)	4(6 9)	8(7 7)
12(8 3)	14(9 3)	8(10 1)	2(3 12)	5(4 10)	13(5 8)
21(6 6)	30(7 4)	21(8 2)	12(9 0)	1(1 13)	5(2 11)
15(3 9)	30(4 7)	42(5 5)	42(6 3)	28(7 1)	4(0 12)

```
11( 1 10)    25( 2  8)     48( 3  6)    53( 4  4)    50( 5  2)    16( 6  0)
11( 0  9)    30( 1  7)     50( 2  5)    54( 3  3)    36( 4  1)    18( 5  6)
29( 1  4)    34( 2  2)     17( 3  0)    17( 0  3)    15( 1  1)     1( 0  0)


                      3  2  2  2  2  1  1  0  0  0
 1(11  5)     1(12  3)      1(13  1)     2( 8  8)     3( 9  6)     7(10  4)
 5(11  2)     3(12  0)      1( 5 11)     4( 6  9)    11( 7  7)    17( 8  5)
20( 9  3)    13(10  1)      1( 3 12)     7( 4 10)    17( 5  8)    34( 6  6)
41( 7  4)    39( 8  2)     13( 9  0)     1( 1 13)     6( 2 11)    21( 3  9)
44( 4  7)    67( 5  5)     69( 6  3)    47( 7  1)     3( 0 12)    14( 1 10)
41( 2  8)    71( 3  6)     96( 4  4)    79( 5  2)    35( 6  0)    15( 0  9)
49( 1  7)    82( 2  5)     95( 3  3)    63( 4  1)    36( 0  6)    54( 1  4)
69( 2  2)    25( 3  0)     26( 0  3)    28( 1  1)     5( 0  0)


                      3  2  2  2  1  1  1  1  0  0
 1( 9  6)     1(10  4)      2(11  2)     3( 7  7)     5( 8  5)     7( 9  3)
 5(10  1)     1( 4 10)      5( 5  8)    11( 6  6)    18( 7  4)    15( 8  2)
 8( 9  0)     1( 2 11)      6( 3  9)    15( 4  7)    29( 5  5)    33( 6  3)
23( 7  1)     4( 1 10)     14( 2  8)    32( 3  6)    45( 4  4)    44( 5  2)
16( 6  0)     6( 0  9)     22( 1  7)    41( 2  5)    52( 3  3)    36( 4  1)
17( 0  6)    36( 1  4)     38( 2  2)    18( 3  0)    16( 0  3)    17( 1  1)
 3( 0  0)


                      3  2  2  1  1  1  1  1  1  0
1( 9  3)     1( 6  6)      2( 7  4)     3( 8  2)     1( 9  0)     1( 4  7)
4( 5  5)     5( 6  3)      5( 7  1)     1( 2  8)     4( 5  6)     9( 4  4)
9( 5  2)     5( 6  0)      3( 1  7)     7( 2  5)    12( 3  3)     9( 4  1)
4( 0  6)     8( 1  4)     11( 2  2)     4( 3  0)     4( 0  3)     5( 1  1)
1( 0  0)


                      3  2  1  1  1  1  1  1  1  1
1( 7  1)     1( 5  2)      1( 3  3)     1( 4  1)     1( 1  4)     1( 2  2)
1( 1  1)


                      2  2  2  2  2  2  1  0  0  0
1( 9  3)     1( 5  8)      2( 6  6)     2( 7  4)     2( 8  2)     1( 9  0)
1( 2 11)     2( 3  9)      4( 4  7)     6( 5  5)     6( 6  3)     4( 7  1)
1( 1 10)     4( 2  8)      8( 3  6)     9( 4  4)     8( 5  2)     4( 6  0)
3( 0  9)     6( 1  7)     11( 2  5)    12( 3  3)     7( 4  1)     4( 0  6)
8( 1  4)     8( 2  2)      4( 3  0)     5( 0  3)     3( 1  1)     1( 0  0)


                      2  2  2  2  2  1  1  1  0  0
1( 6  6)     1( 7  4)      2( 8  2)     1( 3  9)     2( 4  7)     4( 5  5)
4( 6  3)     3( 7  1)      1( 1 10)     3( 2  8)     5( 3  6)     9( 4  4)
6( 5  2)     4( 6  0)      1( 0  9)     5( 1  7)     8( 2  5)    10( 3  3)
7( 4  1)     4( 0  6)      7( 1  4)     9( 2  2)     2( 3  0)     5( 0  3)
4( 1  1)     1( 0  0)


                      2  2  2  2  1  1  1  1  1  0
1( 5  5)     1( 6  3)      1( 7  1)     1( 3  6)     2( 4  4)     2( 5  2)
1( 6  0)     1( 0  9)      1( 1  7)     3( 2  5)     4( 3  3)     3( 4  1)
2( 1  4)     3( 2  2)      1( 3  0)     2( 0  3)     2( 1  1)
```

TABLE. IRREDUCIBLE REPRESENTATIONS OF SU(3) CONTAINED IN A PARTITION OF U(10)

2 2 2 1 1 1 1 1 1 1

1(6 0)	1(3 3)	1(2 2)	1(0 0)		

4 4 4 2 0 0 0 0 0 0

1(22 4)	1(24 0)	1(19 7)	2(20 5)	3(21 3)	2(22 1)
1(16 10)	3(17 8)	9(18 6)	9(19 4)	12(20 2)	2(21 0)
2(14 11)	9(15 9)	19(16 7)	30(17 5)	32(18 3)	21(19 1)
1(11 14)	6(12 12)	18(13 10)	45(14 8)	67(15 6)	88(16 4)
65(17 2)	33(18 0)	2(9 15)	9(10 13)	32(11 11)	75(12 9)
132(13 7)	175(14 5)	173(15 3)	108(16 1)	1(6 18)	3(7 16)
16(8 14)	48(9 12)	120(10 10)	212(11 8)	319(12 6)	340(13 4)
288(14 2)	97(15 0)	4(5 17)	17(6 15)	60(7 13)	150(8 11)
298(9 9)	464(10 7)	577(11 5)	544(12 3)	334(13 1)	1(2 20)
4(3 18)	20(4 16)	64(5 14)	177(6 12)	356(7 10)	613(8 8)
811(9 6)	890(10 4)	673(11 2)	277(12 0)	2(1 19)	12(2 17)
55(3 15)	156(4 13)	364(5 11)	662(6 9)	985(7 7)	1175(8 5)
1089(9 3)	658(10 1)	7(0 18)	31(1 16)	121(2 14)	300(3 12)
626(4 0)	1003(5 8)	1257(6 6)	1402(7 4)	1117(8 2)	398(9 0)
37(0 15)	171(1 13)	428(2 11)	833(3 9)	1248(4 7)	1511(5 5)
1395(6 3)	848(7 1)	170(0 12)	470(1 10)	918(2 8)	1280(3 6)
1428(4 4)	1098(5 2)	445(6 0)	314(0 9)	739(1 7)	1038(2 5)
1051(3 3)	656(4 1)	408(0 6)	633(1 4)	607(2 2)	228(3 0)
225(0 3)	212(1 1)	38(0 0)			

4 4 4 1 1 0 0 0 0 0

1(23 2)	2(20 5)	2(21 3)	2(22 1)	2(17 8)	4(18 6)
9(19 4)	7(20 2)	5(21 0)	2(14 11)	5(15 9)	15(16 7)
23(17 5)	28(18 3)	18(19 1)	1(11 14)	3(12 12)	14(13 10)
31(14 8)	58(15 6)	68(16 4)	65(17 2)	20(18 0)	1(9 15)
8(10 13)	24(11 11)	64(12 9)	111(13 7)	157(14 5)	155(15 3)
101(16 1)	2(7 16)	10(8 14)	39(9 12)	94(10 10)	191(11 8)
274(12 6)	325(13 4)	251(14 2)	109(15 0)	2(5 17)	13(6 15)
47(7 13)	133(8 11)	264(9 9)	434(10 7)	541(11 5)	523(12 3)
321(13 1)	2(3 18)	12(4 16)	51(5 14)	143(6 12)	325(7 10)
554(8 8)	787(9 6)	836(10 4)	682(11 2)	242(12 0)	1(1 19)
10(2 7)	42(3 15)	140(4 13)	329(5 11)	633(6 9)	950(7 7)
366(8 5)	1080(9 3)	662(10 1)	2(0 18)	25(1 16)	94(2 14)
274(3 2)	572(4 10)	987(5 8)	1312(6 6)	1434(7 4)	1092(8 2)
439(9 0)	40(0 15)	155(1 13)	421(2 11)	813(3 9)	1257(4 7)
632(5 5)	1442(6 3)	874(7 1)	141(0 12)	464(1 10)	838(3 8)
320(3 6)	1434(4 4)	1172(5 2)	424(6 0)	342(0 9)	758(1 7)
103(2 5)	1101(3 3)	704(4 1)	389(0 6)	580(1 4)	609(2 2)
268(3 0)	262(0 3)	228(1 1)	26(0 0)		

4 4 3 3 0 0 0 0 0 0

1(19 7)	1(20 5)	1(21 3)	1(22 1)	2(17 8)	4(18 6)
6(19 4)	5(20 2)	2(21 0)	1(14 11)	6(15 9)	13(16 7)
20(17 5)	21(18 3)	13(19 1)	2(12 12)	12(13 10)	27(14 8)
48(15 6)	58(16 4)	49(17 2)	18(18 0)	1(9 15)	6(10 13)
22(11 11)	54(12 9)	97(13 7)	131(14 5)	130(15 3)	82(16 1)
2(7 16)	8(8 14)	34(9 12)	82(10 10)	162(11 8)	230(12 6)
270(13 4)	216(14 2)	86(15 0)	1(4 19)	3(5 17)	14(6 15)
46(7 13)	118(8 11)	234(9 9)	373(10 7)	465(11 5)	444(12 3)
275(13 1)	3(3 18)	12(4 16)	50(5 14)	131(6 12)	288(7 0)
286(8 8)	674(9 6)	724(10 4)	576(11 2)	216(12 0)	1(0 21)
2(1 19)	13(2 17)	45(3 15)	134(4 13)	302(5 11)	561(6 9)

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?( 7  7)  1007( 8  5)    934( 9  3)    569(10  1)       2( 0 18)    26( ? 16)
?( 2 14)   253( 3 12)    515( 4 10)    865( 5  8)    1150( 6  6)  1233( 7  4)
?( 8  2)   366( 9  0)     40( 0 15)    146( 1 13)     382( 2 11)   725( 3  9)
?( 4  7)  1335( 5  5)   1244( 6  3)    754( 7  1)     129( 0 ?2)   4?4( 1 10)
?( 2  8)  1146( 3  6)   1251( 4  4)   1000( 5  2)     376( ? 0)    300( 0  9)
?( 1  7)   953( 2  5)    950( 3  3)    602( 4  1)     343( 0  6)    58?( ?  4)
?( 2  2)   221( 3  0)    220( 0  3)    195( 1  1)      25( 0  0)
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                                4 4 3 2 1 0 0 0 0 0 0

?(20  5)     2(21  3)     1(22  1)     2(17  8)     6(18  6)   10(19  4)
?(20  2)     4(21  0)     1(14 11)     7(15  9)    21(16  7)   36(17  5)
?(18  3)    29(19  1)     4(12 12)    19(13 10)    53(14  8)   99(15  6)
?(16  4)   112(17  2)    46(18  0)     1( 9 15)     9(10 13)   4?(11 11)
?(12  9)   211(13  7)   302(14  5)   312(15  3)   202(16  1)    2( 7 16)
?( 8 14)    66( 9 12)   185(10 10)   376(11  8)   581(12  6)  682(13  4)
?(14  2)   219(15  0)     3( 5 17)    22( 6 15)    91( 7 13)  262( 8 11)
?( 9  9)   938(10  7)  1216(11  5)  1188(12  3)   740(13  1)    3( 3 18)
?( 4 16)   102( 5 14)   312( 6 12)   715( 7 10)  1283( 8  8)  182?( 9  6)
?(10  4)  1611(11  2)   618(12  0)     2( 1 19)    18( 2 17)   90( 3 15)
?( 4 13)   760( 5 11)  1481( 6  9)  2304( 7  7)  2846( 8  5)  2686( 9  3)
?(10  1)     7( 0 18)    53( 1 16)   223( 2 14)   646( 3 12)  1412( 4 10)
?( 5  8)  3356( 6  6)  3630( 7  4)  2858( 8  2)  1092( 9  0)   82( 0 15)
?( 1 13)  1023( 2 11)  2062( 3  9)  3237( 4  7)  4004( 5  5)  3773( 6  3)
?( 7  1)   374( 0 12)  1188( 1 10)  2363( 2  8)  3478( 3  6)  3896( 4  4)
?( 5  2)  1194( 6  0)   868( 0  9)  2032( 1  7)  2953( 2  5)  3009( 3  3)
?( 4  1)  1103( 0  6)  1851( 1  4)  1733( 2  2)   706( 3  0)   694( 0  3)
?( 1  1)    91( 0  0)
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                                4 4 3 1 1 1 0 0 0 0

1(22  1)     1(18  6)     3(19  4)     3(20  2)     2(21  0)     1(15  9)
?(16  7)    10(17  5)    15(18  3)    10(19  1)     1(12 12)     5(13 10)
?(14  8)    33(15  6)    47(16  4)    45(17  2)    16(18  0)     2(10 13)
?( ? 11)    36(12  9)    76(13  7)   119(14  5)   127(15  3)    85(16  1)
?( 8 14)    20( 9 12)    66(10 10)   146(11  8)   241(12  6)   295(13  4)
?( 4  2)   102(15  0)     4( 6 15)    27( 7 13)    94( 8 11)   224( 9  9)
?( ? 7)    543(11  5)   545(12  3)   347(13  1)     5( 4 16)    3?( 5 14)
?( 6 12)   291( 7 10)   563( 8  8)   840( 9  6)   955(10  4)   785(1?  2)
?(?2  0)     3( 2 17)    26( 3 15)   108( 4 13)   309( 5 11)   658( 6  9)
?( 7  7)  1381( 8  5)  1335( 9  3)   830(10  1)     2( 0 18)    15( 1 16)
?( 2 14)   263( 3 12)   631( 4 10)  1154( 5  8)  1653( 6  6)  1844( 7  4)
?( 8  2)   572( 9  0)    28( 0 15)   151( 1 13)   456( 2 11)   981( 3  9)
?( 4  7)  2057( 5  5)  1979( 6  3)  1227( 7  1)   168( 0 12)   567( 1 10)
?( 2  8)  1807( 3  6)  2065( 4  4)  1686( 5  2)   646( 6  0)   435( 0  9)
?( ? 7)   1583( 2  5)  1641( 3  3)  1055( 4  ?)   592( 0  6)  1019( ?  4)
?( 2  2)   400( 3  0)   391( 0  3)   361( 1  1)    50( 0  0)
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                                4 4 2 2 2 0 0 0 0 0

?(19  6)     1(19  4)     2(20  2)     1(15  9)     3(16  7)     7(17  5)
?(13  3)     6(?9  1)     1(12 12)     3(13 10)    12(14  8)    20(15  6)
?(16  4)    25(17  2)    14(18  0)     1(10 13)     8(11 11)    23(12  9)
?(13  7)    75(14  5)    83(15  3)    54(16  1)     4( 8 14)    14( 9 12)
?(10 10)    96(11  8)   164(12  6)   188(13  4)   170(14  2)    58(15  0)
?( 6 15)    2?( 7 13)    65( 8 11)   155( 9  9)   266(1? 7)    36?(1? 5)
?(12  3)   229(13  1)     6( 4 16)    24( 5 14)    89( 6 12)   204( 7 10)
?( 8  3)   560( 9  6)   652(10  4)   508(11  2)   213(12  0)     2( 2 17)
?( 3 15)    80( 4 13)   226( 5 11)   454( 6  9)   740( 7  7)   927( 8  5)
?( 9  3)   551(10  1)     3( 0 18)    13( 1 16)    69( 2 14)   195( 3 12)
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463( 4 10)      800( 5  8)    1151( 6  6)   1237( 7  4)   1010( 8  2)
 18( 0 15)      115( 1 13)     322( 2 11)    695( 3  9)   1106( 4  7)    363( 9  0)
1333( 6  3)     828( 7  1)     135( 0 12)    403( 1 10)    848( 2  8)   1438( 5  5)
1435( 4  4)    1127( 5  2)     460( 6  0)    289( 0  9)    735( 1  7)   1239( 3  6)
1118( 3  3)     709( 4  1)     430( 0  6)    690( 1  4)    676( 2  2)   1070( 2  5)
 251( 0  3)     245( 1  1)      43( 0  0)                                256( 3  0)
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```
                                 4  4  2  2  1  1  0  0  0  0
   1(19  4)       1(20  2)       1(21  0)       1(15  9)
   9(18  3)       7(19  1)       3(13 10)      10(14  8)       3(16  7)
  34(17  2)      12(18  0)       1(10 13)       8(11 11)      24(15  6)      7(17  5)
  96(14  5)     107(15  3)      71(16  1)       1( 8 14)      27(12  9)     33(16  4)
 121(11  8)     203(12  6)     259(13  4)     217(14  2)      14( 9 12)     62(13  7)
  21( 7 13)      78( 8 11)     197( 9  9)     360(10  7)      91(15  0)     49(10 10)
 325(13  1)       2( 4 16)      24( 5 14)      93( 6 12)     501(11  5)      3( 6 15)
 794( 9  6)     912(10  4)     758(11  2)     287(12  0)     261( 7 10)    506(12  3)
  98( 4 13)     288( 5 11)     627( 6  9)    1052( 7  7)       3( 2 17)    515( 8  8)
 932(10  1)      13( 1 16)      69( 2 14)     249( 3 12)    1364( 8  5)     22( 3 15)
 561( 6  6)    1879( 7  4)    1503( 8  2)     589( 9  0)     606( 4 10)   1333( 9  3)
 455( 2 11)     994( 3  9)    1659( 4  7)    2140( 5  5)      29( 0 15)   1147( 5  8)
  61( 0 12)     579( 1 10)    1221( 2  8)    1901( 3  6)    2073( 6  3)    146( 1 13)
  89( 6  0)     462( 0  9)    1125( 1  7)    1702( 2  5)    2188( 4  4)   1292( 7  1)
  31( 0  6)    1108( 1  4)    1049( 2  2)     439( 3  0)    1775( 3  3)   1800( 5  2)
  55( 0  0)                                                   433( 0  3)   1146( 4  1)
                                                                            399(    1)
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                                 4  4  2  1  1  1  1  0  0  0
   1(17  5)       1(18  3)       1(19  1)       2(14  8)
   7(17  2)       3(18  0)       1(11 11)       4(12  9)       4(15  6)
  29(15  3)      19(16  1)       1( 9 12)      10(10 10)      14(13  7)      8(16  4)
  75(13  4)      70(14  2)      27(15  0)       2( 7 13)      28(11  8)     23(14  5)
  51(10  7)     158(11  5)     166(12  3)     112(13  1)      14( 8 11)     58(12  6)
  24( 7 10)     156( 8  8)     256( 9  6)     323(10  4)       2( 5 14)     49( 9  9)
  52( 3 15)      17( 4 13)      72( 5 11)     183( 6  9)     270(11  2)     19( 6 12)
  80( 9  3)     318(10  1)       1( 1 16)      14( 2 14)     350( 7  7)    112(12  0)
  83( 5  8)     613( 6  6)     717( 7  4)     607( 3 12)      61( 3 12)    483( 8  5)
  56( 1 13)     131( 2 11)     336( 3  9)     604( 4  7)     229( 9  0)    180( 4 10)
  77( 7  1)      53( 0 12)     195( 1 10)     462( 2  8)     837( 5  5)      4( 0 15)
  17( 5  2)     308( 6  0)     163( 0  9)     448( 1  7)     748( 3  6)    837( 6  3)
  20( 4  1)     277( 0  5)     479( 1  4)     479( 2  2)     702( 2  5)    916( 4  4)
  12(    1)      30( 0  0)                                   190( 3  0)    706( 3  3)
                                                                           180( 0  3)
```

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                                 4  4  1  1  1  1  1  1  0  0
   (13  7)        1(14  5)       2(15  3)       1(16  1)
   (13  4)        5(14  2)       2(15  0)       2( 9  9)       1(11  8)
   (12  3)       11(13  1)       3( 7 10)       9( 8  8)       6(10  7)      3(12  6)
   (11  2)       12(12  0)       3( 5 11)      11( 6  9)      21( 9  6)     13(11  5)
   ( 9  3)       36(10  1)       2( 3 12)      11( 4 10)      29( 7  7)     35(   4)
   ( 7  4)       73( 8  2)      28( 9  0)       2( 1 13)      32( 5  8)     45( 8  5)
   ( 4  7)       96( 5  5)     103( 6  3)      70( 7  1)       8( 2 11)     63( 6  6)
   ( 2  8)       87( 3  6)     116( 4  4)     101( 5  2)       3( 0 12)     29( 3  9)
   ( 1  7)       90( 2  5)     105( 3  3)      71( 4  1)      43( 6  0)     16(   0)
   ( 2  2)       28( 3  0)      27( 0  3)      27( 1  1)      37( 0  6)     15( 3  9)
                                                               5( 0  0)     37(    4)
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                                 4  3  3  3  1  0  0  0  0  0
  18  6)          1(19  4)       1(20  2)       1(15  9)
  18  3)          5(19  1)       3(13 10)      11(14  8)       3(16  7)      7(17  5)
                                                              20(15  6)
```

24(17 2)   11(18   0)   1(10 13)   8(11 11)   24(12 9)   52(13 7)
75(14 5)   81(15   3)   52(16 1)   3(8 14)   15(9 12)   47(10 10)
100(11 8)   162(12   6)   190(13 4)   165(14 2)   61(15 0)   1(5 17)
5(6 15)   25(7 13)   73(8 11)   165(9 9)   279(10 7)   372(11 5)
365(12 3)   233(13   1)   1(3 18)   7(4 16)   30(5 14)   98(6 12)
223(7 10)   409(8   8)   586(9 6)   664(10 4)   527(11 2)   211(12 0)
1(1 19)   6(2 17)   30(3 15)   98(4 13)   253(5 11)   495(6 9)
782(7 7)   973(8   5)   930(9 3)   572(10 1)   2(0 18)   18(1 16)
77(2 14)   221(3 12)   494(4 10)   855(5 8)   1195(6 6)   1294(7 4)
1034(8 2)   384(9   0)   28(0 15)   133(1 13)   364(2 11)   748(3 9)
1179(4 7)   1472(5   5)   1391(6 3)   856(7 1)   138(0 12)   435(1 10)
883(2 8)   1300(3   6)   1471(4 4)   1170(5 2)   461(6 0)   320(0 9)
770(1 7)   1122(2 5)   1150(3 3)   731(4 1)   430(0 6)   712(1 4)
677(2 2)   269(3   0)   266(0 3)   248(1 1)   38(0 0)

                                    4 3 3 2 2 0 0 0 0 0
1(19 4)   1(21   0)   2(16 7)   4(17 5)   5(18 3)   4(19 1)
2(13 10)   6(14   8)   16(15 6)   20(16 4)   23(17 2)   6(18 0)
1(10 13)   5(11 11)   19(12 9)   40(13 7)   64(14 5)   70(15 3)
47(16 1)   2(8 14)   12(9 12)   37(10 10)   88(11 8)   139(12 6)
181(13 4)   146(14   2)   66(15 0)   4(6 15)   19(7 13)   65(8 11)
147(9 9)   262(10   7)   353(11 5)   357(12 3)   227(13 1)   4(4 16)
25(5 14)   83(6 12)   211(7 10)   388(8 8)   587(9 6)   652(10 4)
548(11 2)   198(12   0)   4(2 17)   23(3 15)   91(4 13)   239(5 11)
494(6 9)   790(7   7)   1006(8 5)   964(9 3)   601(10 1)   1(0 18)
14(1 16)   67(2 14)   217(3 12)   490(4 10)   892(5 8)   1242(6 6)
392(7 4)   1085(8   2)   436(9 0)   28(0 15)   128(1 13)   377(2 11)
782(3 9)   1269(4   7)   1592(5 5)   1525(6 3)   938(7 1)   134(0 12)
465(1 10)   939(2   8)   1438(3 6)   1609(4 4)   1326(5 2)   469(6 0)
362(0 9)   851(1   7)   1270(2 5)   1299(3 3)   835(4 1)   404(0 6)
818(1 4)   754(2   2)   326(3 0)   320(0 3)   288(1 1)   35(0 0)

                                    4 3 3 2 1 1 0 0 0 0
1(20 2)   1(16   7)   3(17 5)   5(18 3)   4(19 1)   1(13 10)
6(14 8)   14(15   6)   24(16 4)   21(17 2)   11(18 0)   4(17 11)
18(12 9)   43(13   7)   72(14 5)   81(15 3)   56(16 1)   1(8 14)
10(9 12)   40(10 10)   97(11 8)   173(12 6)   216(13 4)   192(14 2)
72(15 0)   2(6 15)   17(7 13)   67(8 11)   172(9 9)   324(10 7)
452(11 5)   465(12   3)   298(13 1)   3(4 16)   22(5 14)   92(6 12)
146(7 10)   500(8   8)   760(9 6)   894(10 4)   729(11 2)   292(12 0)
2(2 17)   21(3 15)   95(4 13)   284(5 11)   625(6 9)   1053(7 7)
78(8 5)   1346(9   3)   845(10 1)   1(0 18)   13(1 16)   74(2 14)
55(3 12)   636(4 10)   1188(5 8)   1745(6 6)   1956(7 4)   1590(8 2)
104(9 0)   27(0 15)   152(1 13)   476(2 11)   1053(3 9)   1760(4 7)
184(5 5)   2219(6   3)   1383(7 1)   180(0 12)   622(1 10)   1330(2 8)
60(3 6)   2400(4   4)   1951(5 2)   766(6 0)   495(0 9)   1232(1 7)
64(2 5)   1953(3   3)   1262(4 1)   712(0 6)   1225(1 4)   176(2 2)
78(3 0)   473(0   3)   445(1 1)   67(0 0)

                                    4 3 3 1 1 1 1 0 0 0
1(18 3)   2(15   6)   3(16 4)   4(17 2)   1(18 0)   2(12 9)
6(13 7)   14(14   5)   15(15 3)   12(16 1)   1(9 12)   5(17 0)
8(11 8)   35(12   6)   50(13 4)   43(14 2)   21(15 0)   4(7 3)
10(8 11)   32(9   9)   74(10 7)   109(11 5)   122(12 3)   79(13 1)
2(5 4)   13(6 12)   50(7 10)   115(8 8)   199(9 6)   242(10 4)
4(11 2)   78(12   0)   1(3 15)   14(4 13)   55(5 11)   151(6 9)
8(7 7)   397(8   5)   403(9 3)   261(10 1)   1(1 16)   19(2 4)

TABLE. IRREDUCIBLE REPRESENTATIONS OF SU(3) CONTAINED IN A PARTITION OF U(10)

```
  51( 3 12)    150( 4 10)     324( 5  8)     507( 6  6)     613( 7  4)     500( 8  2)
 206( 9  0)      4( 0 15)      29( 1 13)     116( 2 11)     285( 3  9)     530( 4  7)
 722( 5  5)    734( 6  3)     466( 7  1)      40( 0 12)     171( 1 10)     395( 2  8)
 666( 3  6)    796( 4  4)     684( 5  2)     258( 6  0)     154( 0  9)     598( ? 7)
 640( 2  5)    687( 3  3)     455( 4  1)     235( 0  6)     439( 1  4)     420( 2  2)
 184( 3  0)    180( 0  3)     166( 1  1)      21( 0  0)
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                        4   3   2   2   2   1   0   0   0   0

   1(18  3)      1(19  1)       1(14  8)       3(15  6)       6(16  4)       7(17  2)
   3(18  0)      1(11 11)       5(12  9)      13(13  7)      24(14  5)      30(15  3)
  21(16  1)      3( 9 12)      13(10 10)      35(11  8)      67(12  6)      89(13  4)
  80(14  2)     33(15  0)       5( 7 13)      25( 8 11)      70( 9  9)     139(10  7)
 204(11  5)    214(12  3)     140(13  1)       7( 5 14)      36( 6 12)     108( 7 10)
 231( 8  8)    369( 9  6)     440(10  4)     368(11  2)     145(12  0)       7( 3 15)
  39( 4 13)    131( 5 11)     308( 6  9)     538( 7  7)     720( 8  5)     717( 9  3)
 451(10  1)      4( 1 16)      31( 2 14)     122( 3 12)     323( 4 10)     635( 5  8)
 952( 6  6)   1090( 7  4)     889( 8  2)     344( 9  0)      12( 0 15)      74( 1 13)
 250( 2 11)    579( 3  9)     999( 4  7)    1318( 5  5)    1295( 6  3)     812( 7  1)
  95( 0 12)    348( 1 10)     770( 2  8)    1223( 3  6)    1436( 4  4)    1186( 5  2)
 464( 6  0)    291( 0  9)     740( 1  7)    1144( 2  5)    1212( 3  3)     787( 4  1)
 438( 0  6)    771( 1  4)     745( 2  2)     309( 3  0)     307( 0  3)     286( ? 1)
  43( 0  0)
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                        4   3   2   2   1   1   1   0   0   0

   1(15  6)      2(16  4)      2(17  2)       1(18  0)       1(12  9)       6(13  7)
  11(14  5)     14(15  3)     10(16  1)       4(10 10)      16(11  8)      35(12  6)
  49(13  4)     46(14  2)     18(15  0)       1( 7 13)       8( 8 11)      34( 9  9)
  77(10  7)    123(11  5)    134(12  3)      90(13  1)       1( 5 14)      12( 6 12)
  52( 7 10)    131( 8  8)    229( 9  6)     292(10  4)     250(11  2)     101(12  0)
   1( 3 15)     14( 4 13)     64( 5 11)     175( 6  9)     344( 7  7)     490( 8  5)
 509( 9  3)    329(10  1)      1( 1 16)      11( 2 14)      59( 3 12)     186( 4 10)
 407( 5  8)    660( 6  6)    793( 7  4)     669( 8  2)     260( 9  0)       4( 0 15)
  36( ? 3)     143( 2 11)    373( 3  9)     697( 4  7)     974( 5  5)     991( 6  3)
 637( 7  1)     54( 0 12)    225( 1 10)     541( 2  8)     908( 3  6)    1118( 4  4)
 944( 5  2)    375( 6  0)    203( 0  9)     555( 1  7)     893( 2  5)     977( 3  3)
 647( 4  1)    344( 0  6)    626( 1  4)     620( 2  2)     256( 3  0)     252( ? 3)
 244( ? 1)     36( 0  0)
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                        4   3   2   1   1   1   1   1   0   0

   1(14  5)      1(15  3)      1(16  1)       1(11  8)       4(12  6)       7(13  4)
   7(14  2)      3(15  0)      3( 9  9)      10(10  7)      20(11  5)      25(12  3)
  18(13  1)      4( 7 10)     18( 8  8)      40( 9  6)      59(10  4)      56(1?  2)
  23(12  0)      5( 5 11)     24( 6  9)      62( 7  7)     104( 8  5)     120( 9  3)
  82(10  1)      5( 3 12)     25( 4 10)      74( 5  8)     144( 6  6)     194( 7  4)
 175( 8  2)      7( 9  0)      2( 1 13)      19( 2 11)      67( 3  9)     153( 4  7)
 243( 5  5)    268( 6  3)    180( 7  1)       7( 0 12)      41( 1 10)     119( 2  8)
 230( 3  6)    309( 4  4)    276( 5  2)     112( 6  0)      46( 0  9)     141( ? 7)
 251( 2  5)    292( 3  3)    200( 4  1)      96( ? 6)     189( 1  4)     195( 2  2)
  83( 3  0)     81( 0  3)     80( 1  1)      12( 0  0)
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                        4   3   1   1   1   1   1   1   1   0

   1(11  5)      1(12  3)      1(13  1)       1( 9  6)       3(10  4)       3(1?  2)
   2(12  0)      2( 7  7)      5( 8  5)       9( 9  3)       6(10  1)       2( 5  8)
   7( 6  6)     13( 7  4)     15( 8  2)       6( 9  0)       2( 3  9)       7( 4  7)
  17( 5  5)     22( 6  3)     17( 7  1)       1( 1 10)       6( 2  8)      16( 3  6)
  27( 4  4)     26( 5  2)     13( 6  0)       2( 0  9)      10( 1  7)      21( ? 5)
```

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   29( 3  3)      21( 4  1)        9( 0  6)       19( 1  4)      22( 2  2)        9( 3  0
    9( 0  3)       9( 1  1)        2( 0  0)
```

```
                              4 2 2 2 2  2 0 0 0 0
    1(18  0)       1(14  5)         1(15  3)         1(16  1)          1(10 10)         1(11  8)
    4(12  6)       4(13  4)         7(14  2)         1( 8 11)          4( 9  9)         9(10  7)
   14(11  5)      17(12  3)        10(13  1)         3( 6 12)          7( 7 10)        21( 8  8)
   30( 9  6)      44(10  4)        30(11  2)        18(12  0)          2( 4 13)        10( 5 11)
   28( 6  9)      53( 7  7)        74( 8  5)        74( 9  3)         49(10  1)         3( 2 14)
   10( 3 12)      35( 4 10)        67( 5  8)       115( 6  6)        123( 7  4)       112( 8  2)
   35( 9  0)       6( 1 13)        25( 2 11)        66( 3  9)        121( 4  7)       166( 5  5)
  166( 6  3)     205( 7  1)        12( 0 12)        41( 1 10)        104( 2  8)       160( 3  6)
  205( 4  4)     159( 5  2)        72( 6  0)        35( 0  9)        102( 1  7)       161( 2  5)
  177( 3  3)     114( 4  1)        69( 0  6)       113( 1  4)        121( 2  2)        42( 3  0)
   43( 0  3)      46( 1  1)         9( 0  0)
```

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                              4 2 2 2 2  1 1 0 0 0
    1(14  5)       1(15  3)         1(16  1)         2(11  8)          3(12  6)         7(13  4)
    5(14  2)       3(15  0)         1( 8 11)         4( 9  9)         12(10  7)        19(11  5)
   23(12  3)      15(13  1)         1( 6 12)         9( 7 10)         22( 8  8)        46( 9  6)
   55(10  4)      53(11  2)        18(12  0)         2( 4 13)         11( 5 11)        37( 6  9)
   74( 7  7)     112( 8  5)       115( 9  3)        77(10  1)          1( 2 14)        12( 3 12)
   39( 4 10)      99( 5  8)       159( 6  6)       204( 7  4)        165( 8  2)        72( 9  0)
    1( 0 15)       7( 1 13)        35( 2 11)        94( 3  9)        188( 4  7)       263( 5  5)
  276( 6  3)     175( 7  1)        11( 0 12)        60( 1 10)        145( 2  8)       263( 3  6)
  319( 4  4)     284( 5  2)       103( 6  0)        62( 0  9)        163( 1  7)       276( 2  5)
  300( 3  3)     203( 4  1)       100( 0  6)       200( 1  4)        191( 2  2)        89( 3  0)
   88( 0  3)      80( 1  1)         9( 0  0)
```

```
                              4 2 2 2 1  1 1 1 0 0
    1(12  6)       1(13  4)         2(14  2)         3(10  7)          5(11  5)         7(12  3)
    5(13  1)       1( 7 10)         6( 8  8)        13( 9  6)         22(10  4)        18(11  2)
   10(12  0)       1( 5 11)         9( 6  9)        22( 7  7)         42( 8  5)        47( 9  3)
   33(10  1)       1( 2 12)        10( 4 10)        30( 5  8)         63( 6  6)        84( 7  4)
   80( 8  2)      29( 9  0)         1( 1 13)         8( 2 11)         29( 3  9)        72( 4  7)
  113( 5  5)     130( 6  3)        86( 7  1)         3( 0 12)         18( 1 10)        58( 2  8)
  113( 3  6)     157( 4  4)       139( 5  2)        60( 6  0)         22( 0  9)        71( 1  7)
  132( 2  5)     153( 3  3)       108( 4  1)        52( 0  6)        102( 1  4)       108( 2  2)
   45( 2  0)      46( 0  3)        44( 1  1)         7( 0  0)
```

```
                              4 2 2 1 1  1 1 1 1 0
    1(12  3)       1( 9  6)         2(10  4)         3(11  2)          1(12  0)         1( 7  7)
    5( 8  5)       6( 9  3)         6(10  1)         2( 5  8)          6( 8  6)        13( 7  4)
   13( 8  2)       7( 9  0)         1( 3  9)         8( 4  7)         16( 5  5)        24( 6  3)
   17( 7  1)       1( 1 10)         5( 2  8)        17( 3  6)         27( 4  4)        30( 5  2)
    1( 6  0)       3( 0  9)        10( 1  7)        25( 2  5)         32( 3  3)        25( 4  1)
    8( 0  6)      22( 1  4)        23( 2  2)        12( 3  0)         12( 0  3)        11( 1  1)
    1( 0  0)
```

```
                              4 2 1 1 1  1 1 1 1 1
    1(10  1)       1( 8  2)         2( 6  3)         1( 7  1)          1( 4  4)         2( 5  2)
    1( 6  0)       2( 2  5)         2( 3  3)         2( 4  1)          1( 1  4)         2( 2  2)
    1( 3  0)       1( 0  3)         1( 1  1)
```

3 3 3 3 2 0 0 0 0 0

1(15 6)	1(16 4)	1(17 2)	1(12 9)	3(13 7)	4(14 5)
6(15 3)	4(16 1)	1(9 12)	3(10 10)	8(11 8)	14(12 6)
19(13 4)	16(14 2)	7(15 0)	2(7 13)	6(8 11)	17(9 9)
30(10 7)	44(11 5)	44(12 3)	30(13 1)	1(4 16)	3(5 14)
12(6 12)	29(7 10)	55(8 8)	82(9 6)	95(10 4)	79(11 2)
31(12 0)	4(3 15)	13(4 13)	38(5 11)	74(6 9)	3(5 14)
156(8 5)	154(9 3)	94(10 1)	1(0 18)	3(1 16)	14(2 14)
38(3 12)	87(4 10)	152(5 8)	214(6 6)	236(7 4)	189(8 2)
72(9 0)	3(0 15)	24(1 13)	64(2 11)	141(3 9)	222(4 7)
285(5 5)	269(6 3)	168(7 1)	30(0 12)	86(1 10)	180(2 8)
266(3 6)	304(4 4)	242(5 2)	95(6 0)	62(0 9)	161(1 7)
233(2 5)	245(3 3)	156(4 1)	96(0 6)	156(1 4)	149(2 2)
59(3 0)	57(0 3)	55(1 1)	10(0 0)		

3 3 3 3 1 1 0 0 0 0

1(16 4)	1(18 0)	1(12 9)	2(13 7)	4(14 5)	5(15 3)
3(16 1)	2(10 10)	6(11 8)	13(12 6)	15(13 4)	17(14 2)
4(15 0)	1(7 13)	6(8 11)	15(9 9)	31(10 7)	43(11 5)
46(12 3)	30(13 1)	2(5 14)	9(6 12)	25(7 10)	54(8 8)
83(9 6)	102(10 4)	80(11 2)	37(12 0)	1(2 17)	3(3 15)
13(4 13)	36(5 11)	80(6 9)	132(7 7)	176(8 5)	171(9 3)
109(10 1)	2(1 16)	10(2 14)	35(3 12)	87(4 10)	160(5 8)
239(6 6)	265(7 4)	221(8 2)	78(9 0)	6(0 15)	23(1 13)
72(2 11)	154(3 9)	259(4 7)	331(5 5)	325(6 3)	200(7 1)
25(0 12)	93(1 10)	200(2 8)	307(3 6)	361(4 4)	290(5 2)
118(6 0)	78(0 9)	190(1 7)	290(2 5)	300(3 3)	196(4 1)
110(0 6)	189(1 4)	185(2 2)	73(3 0)	75(0 3)	70(1 1)
10(0 0)					

3 3 3 2 2 1 0 0 0 0

1(17 2)	1(13 7)	3(14 5)	4(15 3)	3(16 1)	2(10 10)
6(11 8)	11(12 6)	18(13 4)	15(14 2)	8(15 0)	1(7 13)
5(8 11)	15(9 9)	32(10 7)	48(11 5)	52(12 3)	35(13 1)
2(5 14)	10(6 12)	30(7 10)	63(8 8)	104(9 6)	122(10 4)
107(11 2)	38(12 0)	2(3 15)	13(4 13)	42(5 11)	96(6 9)
168(7 7)	224(8 5)	223(9 3)	142(10 1)	2(1 16)	12(2 14)
44(3 12)	112(4 10)	217(5 8)	319(6 6)	370(7 4)	294(8 2)
119(9 0)	4(0 15)	28(1 13)	92(2 11)	208(3 9)	355(4 7)
465(5 5)	454(6 3)	285(7 1)	35(0 12)	131(1 10)	283(2 8)
447(3 6)	519(4 4)	433(5 2)	162(6 0)	109(0 9)	277(1 7)
424(2 5)	446(3 3)	290(4 1)	161(0 6)	289(1 4)	274(2 2)
117(3 0)	114(0 3)	108(1 1)	13(0 0)		

3 3 3 2 1 1 1 0 0 0

1(14 5)	1(15 3)	1(16 1)	2(11 8)	5(12 6)	7(13 4)
7(14 2)	3(15 0)	1(8 11)	6(9 9)	15(10 7)	24(11 5)
28(12 3)	18(13 1)	3(6 12)	12(7 10)	32(8 8)	57(9 6)
72(10 4)	63(11 2)	25(12 0)	1(3 15)	4(4 13)	49(5 11)
51(6 9)	97(7 7)	140(8 5)	144(9 3)	93(10 1)	4(2 14)
19(3 12)	59(4 10)	127(5 8)	205(6 6)	245(7 4)	205(8 2)
82(9 0)	2(0 15)	13(1 13)	49(2 11)	126(3 9)	230(4 7)
319(5 5)	325(6 3)	206(7 1)	20(0 12)	77(1 10)	186(2 8)
340(3 6)	377(4 4)	320(5 2)	126(6 0)	71(0 9)	192(1 7)
309(2 5)	333(3 3)	222(4 1)	122(0 6)	218(1 4)	216(2 2)
92(3 0)	90(0 3)	84(1 1)	14(0 0)		

```
                          3  3  3  1  1  1  1  0  0
   1(13  4)      1(15  0)      1(10  7)      2(11  5)      3(12  3)      2(13  1)
   1( 7 10)      3( 8  8)      8( 9  6)      9(10  4)     12(11  2)      2(12  0)
   1( 5 11)      5( 6  9)     13( 7  7)     22( 8  5)     25( 9  3)     17(10  1)
   1( 3 12)      6( 4 10)     19( 5  8)      ?( 6  6)     49( 7  4)     38( 8  2)
  21( 9  0)      1( 1 13)      5( 2 11)      3( 3  9)     40( 4  7)     63( 5  5)
  69( 6  3)     46( 7  1)      2( 0 12)     11( 1 10)     31( 2  8)     64( 3  6)
  80( 4  4)     78( 5  2)     25( 6  0)     13( 0  9)     39( 1  7)     70( 2  5)
  81( 3  3)     56( 4  1)     25( 0  6)     55( 1  4)     51( 2  2)     27( 3  0)
  25( 0  3)     23( 1  1)      2( 0  0)
```

```
                          3  3  2  2  2  2  0  0  0  0
   1(16  1)      1(12  6)      2(13  4)      2(14  2)      1(15  0)      1( 8 11)
   2( 9  9)      5(10  7)      8(11  5)     10(12  3)      6(13  1)      1( 6 12)
   5( 7 10)     12( 8  8)     20( 9  6)     26(10  4)     23(11  2)      8(12  0)
   3( 4 13)      8( 5 11)     23( 6  9)     40( 7  7)     57( 8  5)     56( 9  3)
  36(10  1)      1( 2 14)      9( 3 12)     26( 4 10)     56( 5  8)     86( 6  6)
 101( 7  4)     82( 8  2)     34( 9  0)      2( 0 15)      6( 1 13)     25( 2 11)
  58( 3  9)    108( 4  7)    140( 5  5)    140( 6  3)     88( 7  1)      7( 0 12)
  37( 1 10)     83( 2  8)    141( 3  6)    165( 4  4)    140( 5  2)     52( 6  0)
  39( 0  9)     90( 1  7)    146( 2  5)    153( 3  3)    101( 4  1)     51( 3  6)
 101( 1  4)     94( 2  2)     42( 3  0)     45( 0  3)     39( 1  1)      5( 0  0)
```

```
                          3  3  2  2  2  1  1  0  0  0
   1(12  6)      2(13  4)      2(14  2)      1(15  0)      2( 9  9)      5(10  7)
  10(11  5)     11(12  3)      8(13  1)      1( 6 12)      5( 7 10)     15( 8  8)
  27( 9  6)     37(10  4)     32(11  2)     13(12  0)      1( 4 13)      9( 5  1)
  25( 6  9)     55( 7  7)     78( 8  5)     84( 9  3)     54(10  1)      2( 3  4)
  10( 3 12)     36( 4 10)     78( 5  8)    131( 6  6)    156( 7  4)    134( 8  2)
  51( 9  0)      7( 1 13)     28( 2 11)     82( 3  9)    152( 4  7)    229( 5  5)
 221( 6  3)    144( 7  1)     14( 0 12)     53( 1 10)    134( 2  8)    222( 3  6)
 179( 4  4)    232( 5  2)     95( 6  0)     47( 0  9)    143( 1  7)    229( 2  5)
 257( 3  3)    169( 4  1)     97( 0  6)    170( 1  4)    174( 2  2)     88( 3  0)
  67( 0  3)     69( 1  1)     12( 0  0)
```

```
                          3  3  2  2  1  1  1  1  0  0
   1(10  7)      2(11  5)      3(12  3)      2(13  1)      3( 8  8)      7( 9  6)
  11(10  4)     10(11  2)      5(12  0)      1( 5 11)      6( 6  9)     16( 7  7)
  28( 8  5)     32( 9  3)     22(10  1)      1( 3 12)      8( 4 10)     23( 5  8)
  47( 6  6)     63( 7  4)     58( 8  2)     22( 9  0)      1( 1 13)      7( 3 11)
  25( 3  9)     58( 4  7)     92( 5  5)    102( 6  3)     68( 7  1)      3( 0 12)
   6( 1 10)     49( 2  8)     94( 3  6)    129( 4  4)    114( 5  2)     43( 6  0)
   9( 0  9)     6 ( 1  7)    110( 2  5)    129( 3  3)     89( 4  1)     47( 3  0)
  36( 1  4)     91( 2  2)     38( 3  0)     38( 0  3)     38( 2  1)      0( 0  0)
```

```
                          3  3  2  1  1  1  1  1  1  0
   ?(10  4)      ?(11  2)      1( 7  7)      2( 8  5)      4( 9  3)      5(10  1)
   ( 5  8)      5( 6  6)      3( 7  4)      9( 8  2)      4( 9  0)      1( 3  9)
   5( 4  7)     13( 5  5)     16( 6  3)     13( 7  1)      1( 1 10)      5( 2  8)
   3( 3  6)     22( 4  4)     22( 5  2)     10( 6  0)      1( 0  9)      8( 1  7)
   ?( 2  5)     26( 3  3)     18( 4  1)      8( 0  6)     17( 1  4)      ?( 0 12)
   ?( 2  0)      8( 0  3)      9( 1  1)      2( 0  0)
```

```
                          3  3  1  1  1  1  1  1  1  1
```

```
 1( 8  2)      1( 7  1)      2( 4  4)      1( 5  2)      1( 6  0)      1( 3  3)
 1( 4  1)      1( 0  6)      1( 1  4)      2( 2  2)      1( 1  1)
```

```
                           3  2  2  2  2  2  1  0  0  0
 1(12  3)      1( 8  8)      2( 9  6)      3(10  4)      3(11  2)      1(12  0)
 1( 5 11)      3( 6  9)      7( 7  7)     11( 8  5)     11( 9  3)      8(10  1)
 1( 3 12)      5( 4 10)     13( 5  8)     23( 6  6)     27( 7  4)     25( 8  2)
10( 9  0)      1( 1 13)      5( 2 11)     16( 3  9)     32( 4  7)     46( 5  5)
47( 6  3)     30( 7  1)      2( 0 12)     11( 1 10)     30( 2  8)     52( 3  6)
66( 4  4)     56( 5  2)     21( 6  0)     12( 0  9)     36( 1  7)     50( 2  5)
67( 3  3)     44( 4  1)     25( 0  6)     47( 1  4)     47( 2  2)     20( 3  0)
20( 0  3)     20( 1  1)      3( 0  0)
```

```
                           3  2  2  2  2  1  1  1  0  0
 1( 9  6)      1(10  4)      2(11  2)      1( 6  9)      3( 7  7)      6( 8  5)
 7( 9  3)      5(10  1)      2( 4 10)      7( 5  8)     13( 6  6)     20( 7  4)
16( 8  2)      8( 9  0)      2( 2 11)      8( 3  9)     20( 4  7)     32( 5  5)
36( 6  3)     24( 7  1)      1( 0 12)      6( 1 10)     19( 2  8)     39( 3  6)
50( 4  4)     48( 5  2)     17( 6  0)      8( 0  9)     26( 1  7)     48( 2  5)
56( 3  3)     39( 4  1)     19( 0  6)     41( 1  4)     40( 2  2)     20( 3  0)
19( 0  3)     18( 1  1)      2( 0  0)
```

```
                           3  2  2  2  1  1  1  1  1  0
 1( 8  5)      1( 9  3)      1(10  1)      2( 6  6)      4( 7  4)      4( 8  2)
 2( 9  0)      1( 3  9)      3( 4  7)      7( 5  5)     10( 6  3)      7( 7  1)
 3( 2  8)      8( 3  6)     14( 4  4)     15( 5  2)      6( 6  0)      1( 0  9)
 6( 1  7)     13( 2  5)     18( 3  3)     14( 4  1)      6( 0  6)     -3( 1  4)
15( 2  2)      7( 3  0)      6( 0  3)      7( 1  1)      1( 0  0)
```

```
                           3  2  2  1  1  1  1  1  1  1
 1( 9  0)      1( 6  3)      1( 7  1)      1( 4  4)      2( 5  2)      1( 2  5)
 2( 3  3)      2( 4  1)      2( 1  4)      1( 2  2)      2( 3  0)      1( 0  3)
 1( 1  1)
```

```
                           2  2  2  2  2  2  2  0  0  0
 1( 6  6)      1( 8  2)      1( 3  9)      1( 4  7)      2( 5  5)      2( 6  3)
 1( 7  1)      1( 0 12)      3( 2  8)      3( 3  6)      5( 4  4)      2( 5  2)
 3( 6  0)      2( 1  7)      3( 2  5)      5( 3  3)      2( 4  1)      4( 0  6)
 3( 1  4)      5( 2  2)      1( 3  0)      1( 0  3)      1( 1  1)      2( 3  0)
```

```
                           2  2  2  2  2  2  1  1  0  0
 1( 7  4)      1( 9  0)      1( 3  9)      2( 4  7)      3( 5  5)      3( 6  3)
 2( 7  1)      1( 1 10)      2( 2  8)      5( 3  6)      5( 4  4)      6( 5  2)
 1( 6  0)      1( 0  9)      4( 1  7)      7( 2  5)      8( 3  3)      5( 4  1)
 3( 0  6)      6( 1  4)      6( 2  2)      3( 3  0)      3( 0  3)      3( 1  1)
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                           2  2  2  2  2  1  1  1  1  0
 1( 5  5)      1( 6  3)      1( 7  1)      1( 2  8)      1( 3  6)      3( 4  4)
 2( 5  2)      1( 6  0)      2( 1  7)      2( 2  5)      4( 3  3)      5( 4  1)
 2( 0  6)      3( 1  4)      4( 2  2)      1( 3  0)      2( 1  1)      1( 0  0)
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                           2  2  2  2  1  1  1  1  1  1
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1(5 2)   1(3 3)   1(0 6)   1(2 2)   1(3 0)

4 4 4 3 0 0 0 0 0 0

1(21 6)	1(23 2)	1(18 9)	2(19 7)	3(20 5)	4(21 3)
2(22 1)	2(16 10)	7(17 8)	11(18 6)	15(19 4)	10(20 2)
6(23 0)	1(13 13)	5(14 11)	16(15 9)	28(16 7)	40(17 5)
40(18 3)	24(19 1)	2(11 14)	11(12 12)	30(13 10)	59(14 8)
93(15 6)	99(16 4)	85(17 2)	29(18 0)	1(8 17)	5(9 15)
18(10 13)	52(11 11)	105(12 9)	171(13 7)	213(14 5)	204(15 3)
124(16 1)	2(6 18)	7(7 16)	27(8 14)	76(9 12)	159(10 10)
276(11 8)	373(12 6)	406(13 4)	311(14 2)	127(15 0)	1(3 21)
2(4 19)	10(5 17)	35(6 15)	96(7 13)	211(8 11)	386(9 9)
559(10 7)	670(11 5)	616(12 3)	372(13 1)	2(2 20)	9(3 18)
34(4 16)	102(5 14)	239(6 12)	460(7 10)	724(8 8)	947(9 6)
975(10 4)	762(11 2)	278(12 0)	1(0 21)	6(1 19)	26(2 17)
89(3 15)	225(4 13)	473(5 11)	806(6 9)	1141(7 7)	1315(8 5)
1196(9 3)	711(10 1)	11(0 18)	50(1 16)	163(2 14)	394(3 12)
743(4 10)	1169(5 8)	1494(6 6)	1544(7 4)	1169(8 2)	453(9 0)
59(0 15)	222(1 13)	531(2 11)	968(3 9)	1400(4 7)	1646(5 5)
1494(6 3)	895(7 1)	194(0 12)	549(1 10)	1004(2 8)	1403(3 6)
1490(4 4)	1172(5 2)	438(6 0)	370(0 9)	802(1 7)	1114(2 5)
1104(3 3)	681(4 1)	412(0 6)	665(1 4)	604(2 2)	252(3 0)
247(0 3)	215(1 1)	33(0 0)			

4 4 4 2 1 0 0 0 0 0

1(22 4)	1(23 2)	2(19 7)	4(20 5)	5(21 3)	4(22 1)
2(16 10)	7(17 8)	15(18 6)	21(19 4)	19(20 2)	8(21 0)
1(13 13)	6(14 11)	20(15 9)	43(16 7)	64(17 5)	67(18 3)
45(19 1)	3(11 14)	14(12 12)	45(13 10)	97(14 8)	154(15 6)
184(16 4)	153(17 2)	59(18 0)	1(8 17)	6(9 15)	28(10 13)
83(11 11)	183(12 9)	310(13 7)	404(14 5)	395(15 3)	247(16 1)
1(6 8)	10(7 16)	41(8 14)	127(9 12)	291(10 10)	521(11 8)
736(12 6)	815(13 4)	648(14 2)	247(15 0)	2(4 19)	12(5 17)
53(6 15)	165(7 13)	397(8 11)	749(9 9)	1145(10 7)	1395(11 5)
1304(12 3)	799(13 1)	1(2 20)	11(3 18)	52(4 16)	178(5 14)
452(6 12)	923(7 10)	1512(8 8)	2019(9 6)	2140(10 4)	1664(11 2)
630(12 0)	1(0 21)	7(1 19)	41(2 17)	153(3 15)	436(4 13)
958(5 11)	1712(6 9)	2493(7 7)	2942(8 5)	2692(9 3)	1628(10 1)
13(0 18)	89(1 16)	311(2 14)	801(3 12)	1599(4 10)	2587(5 8)
3388(6 6)	3553(7 4)	2735(8 2)	1031(9 0)	117(0 15)	460(1 13)
1154(2 11)	2162(3 9)	3233(4 7)	3847(5 5)	3538(6 3)	2139(7 1)
413(0 12)	1238(1 10)	2326(2 8)	3300(3 6)	3592(4 4)	2825(5 2)
1071(6 0)	856(0 9)	1915(1 7)	2703(2 5)	2688(3 3)	1694(4 1)
995(0 6)	1646(1 4)	1511(2 2)	612(3 0)	606(0 3)	552(1 1)
73(0 0)					

4 4 4 1 1 0 0 0 0

1(24 0)	1(20 5)	2(21 3)	1(22 1)	1(17 8)	4(18 6)
5(19 4)	8(20 2)	1(21 0)	1(14 11)	5(15 9)	11(16 7)
20(17 5)	24(18 3)	15(19 1)	1(11 14)	4(12 12)	12(13 10)
31(14 8)	51(15 6)	68(16 4)	53(17 2)	28(18 0)	1(9 15)
7(10 13)	25(11 11)	61(12 9)	110(13 7)	152(14 5)	53(15 3)
98(16 1)	2(7 16)	11(8 14)	41(9 12)	102(10 10)	193(11 8)
295(12 6)	322(13 4)	275(14 2)	97(15 0)	2(5 17)	14(6 15)
5(7 13)	141(8 11)	288(9 9)	461(10 7)	581(11 5)	559(12 3)
342(13 1)	2(3 18)	13(4 16)	56(5 14)	163(6 12)	357(7 10)
228(8 8)	858(9 6)	947(10 4)	730(11 2)	295(12 0)	1(1 9)

TABLE. IRREDUCIBLE REPRESENTATIONS OF SU(3) CONTAINED IN A PARTITION OF U(10)

```
  10( 2 17)      48( 3 15)      154( 4 13)    373( 5 11)    714( 6  9)   1078( 7  7)
1315( 8  5)    1227( 9  3)      745(10  1)      4( 0 18)     27( 1 16)    112( 2 14)
 314( 3 12)     672( 4 10)     1130( 5  8)   1549( 6  6)   1633( 7  4)   1299( 8  2)
 477( 9  0)      41( 0 15)      178( 1 13)    481( 2 11)    952( 3  9)   1473( 4  7)
 802( 5  5)    1688( 6  3)     1027( 7  1)    179( 0 12)    543( 1 10)   1077( 2  8)
1558( 3  6)    1742( 4  4)     1370( 5  2)    546( 6  0)    391( 0  9)    904( 1  7)
1308( 2  5)    1330( 3  3)      837( 4  1)    498( 0  6)    809( 1  4)    771( 2  2)
 304( 3  0)     305( 0  3)      276( 1  1)     47( 0  0)
```

```
                              4  4  3  3  1  0  0  0  0  0
   1(19  7)      2(20  5)       2(21  3)      1(22  1)      1(16 10)      4(17  8)
   9(18  6)     12(19  4)      11(20  2)      4(21  0)      3(14 11)     13(15  9)
  28(16  7)     44(17  5)      45(18  3)     30(19  1)      1(11 14)      9(12 12)
  30(13 10)     70(14  8)     113(15  6)    138(16  4)    114(17  2)     46(18  0)
   3( 9 15)     17(10 13)      59(11 11)    136(12  9)    240(13  7)    316(14  5)
 316(15  3)    198(16  1)       1( 6 18)      6( 7 16)     31( 8 14)     96( 9 12)
 232(10 10)    420(11  8)      610(12  6)    677(13  4)    549(14  2)    208(15  0)
   1( 4 19)      9( 5 17)      39( 6 15)    132( 7 13)    322( 8 11)    630( 9  9)
 970(10  7)   1204(11  5)     1133(12  3)    699(13  1)      2( 2 20)      9( 3 18)
  46( 4 16)    149( 5 14)     393( 6 12)    800( 7 10)   1337( 8  8)   1792( 9  6)
1924(10  4)   1495(11  2)     576(12  0)      6( 1 19)     32( 2 17)    133( 3 15)
 376( 4 13)    854( 5 11)    1533( 6  9)   2267( 7  7)   2687( 8  5)   2482( 9  3)
1499(10  1)     16( 0 18)      79( 1 16)    288( 2 14)    729( 3 12)   1483( 4 10)
2397( 5  8)   3181( 6  6)    3330( 7  4)   2588( 8  2)    966( 9  0)     98( 0 15)
 422( 1 13)   1059( 2 11)    2034( 3  9)   3045( 4  7)   3665( 5  5)   3372( 6  3)
2047( 7  1)    404( 0 12)    1172( 1 10)   2245( 2  8)   3175( 3  6)   3488( 4  4)
2732( 5  2)   1054( 6  0)     804( 0  9)   1854( 1  7)   2615( 2  5)   2529( 3  3)
1649( 4  1)    996( 0  6)    1611( 1  4)   1504( 2  2)    597( 3  0)    587( 0  3)
 544( 1  1)     82( 0  0)
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                              4  4  3  2  2  0  0  0  0  0
   1(20  5)      1(21  3)       1(22  1)      2(17  8)      5(18  6)      8(19  4)
   7(20  2)      4(21  0)       2(14 11)      7(15  9)     19(16  7)     30(17  5)
  35(18  3)     23(19  1)       1(11 14)      5(12 12)     21(13 10)     49(14  8)
  87(15  6)    107(16  4)      96(17  2)     35(18  0)      2( 9 15)     15(10 13)
  43(11 11)    108(12  9)     191(13  7)    266(14  5)    268(15  3)    172(16  1)
   4( 7 16)     21( 8 14)      76( 9 12)    185(10 10)    356(11  8)    521(12  6)
 602(13  4)    483(14  2)     194(15  0)      5( 5 17)     30( 6 15)    105( 7 13)
 276( 3 11)    546( 9  9)     873(10  7)   1091(11  5)   1047(12  3)    647(13  1)
   5( 5  8)     30( 4 16)     121( 5 14)    331( 6 12)    715( 7 10)   1211( 8  8)
 675( 9  6)   1798(10  4)    1431(11  2)    535(12  0)      3( 1 19)     25( 2 17)
 107( 3 15)    334( 4 13)     772( 5 11)   1441( 6  9)   2150( 7  7)   2598( 8  5)
2406( 9  3)   1467(10  1)       8( 0 18)     64( 1 16)    242( 2 14)    668( 3 12)
 383( 4 10)   2316( 5  8)    3088( 6  6)   3301( 7  4)   2548( 8  2)    981( 9  0)
  95( 0 15)    388( 1 13)    1026( 2 11)   1981( 3  9)   3037( 4  7)   3669( 5  5)
 449( 6  3)   2073( 7  1)     366( 0 12)   1151( 1 10)   2215( 2  8)   3221( 3  6)
 532( 4  4)   2822( 5  2)    1060( 6  0)    834( 0  9)   1888( 1  7)   2717( 2  5)
 726( 3  3)   1729( 4  1)     999( 0  6)   1688( 1  4)   1552( 2  2)    646( 3  0)
 639( 0  3)    576( 1  1)      76( 0  0)
```

```
                              4  4  3  2  1  1  0  0  0  0
   1(21  3)      1(22  1)       1(17  8)      4(18  6)      7(19  4)      8(20  2)
   3(21  0)      1(14 11)       6(15  9)     17(16  7)     31(17  5)     36(18  3)
  26(19  1)      4(12 12)      19(13 10)     51(14  8)     93(15  6)    124(16  4)
 107(17  2)     45(18  0)       1( 9 15)     10(10 13)     43(11 11)    115(12  9)
 221(13  7)    314(14  5)     325(15  3)    209(16  1)      2( 7 16)     18( 8 14)
  75( 9 12)    208(10 10)     419(11  8)    645(12  6)    750(13  4)    622(14  2)
```

TABLE. IRREDUCIBLE REPRESENTATIONS OF SU(3) CONTAINED IN A PARTITION OF U(10)

```
 238(15  0)      3( 5 17)      25( 6 15)     107( 7 13)     307( 8 11)     659( 9  9)
1092(10  7)   1408(11  5)    1367(12  3)     854(13  1)       3( 3 18)      27( 4 16)
 122( 5 14)    377( 6 12)     864( 7 10)    1549( 8  8)    2188( 9  6)    2419(10  4)
1921(11  2)    743(12  0)       2( 1 19)      21( 2 17)     109( 3 15)     373( 4 13)
 940( 5 11)   1834( 6  9)    2851( 7  7)    3515( 8  5)    3312( 9  3)    2034(10  1)
   8( 0 18)     65( 1 16)     278( 2 14)     810( 3 12)    1785( 4 10)    3078( 5  8)
4245( 6  6)   4586( 7  4)    3614( 8  2)    1369( 9  0)     102( 0 15)     472( 1 13)
1305( 2 11)   2646( 3  9)    4161( 4  7)    5154( 5  5)    4859( 6  3)    2978( 7  1)
 482( 0 12)   1536( 1 10)    3076( 2  8)    4534( 3  6)    5095( 4  4)    4073( 5  2)
1570( 6  0)   1130( 0  9)    2671( 1  7)    3893( 2  5)    3977( 3  3)    2535( 4  1)
1467( 0  6)   2464( 1  4)    2319( 2  2)     941( 3  0)     927( 0  3)     860( 1  1)
 124( 0  0)
```

```
                          4   4   3   1   1   1   1   0   0   0

   1(19  4)      1(20  2)      2(16  7)      4(17  5)      6(18  3)      4(19  1)
   2(13 10)      6(14  8)     16(15  6)     22(16  4)     21(17  2)      9(18  0)
   1(10 13)      5(11 11)     19(12  9)     41(13  7)     66(14  5)     70(15  3)
  49(16  1)      1( 8 14)     10( 9 12)     34(10 10)     85(11  8)    141(12  6)
 178(13  4)    151(14  2)     61(15  0)      2( 6 15)     14( 7 13)     56( 8 11)
 138( 9  9)    257(10  7)    350(11  5)    360(12  3)    227(13  1)      1( 4 16)
  16( 5 14)     64( 6 12)    185( 7 10)    366( 8  8)    566( 9  6)    652(10  4)
 541(11  2)    206(12  0)      2( 2 17)     14( 3 15)     68( 4 13)    201( 5 11)
 450( 6  9)    751( 7  7)    988( 8  5)    959( 9  3)    604(10  1)      8( 1 16)
  45( 2 14)    173( 3 12)    428( 4 10)    822( 5  8)   1199( 6  6)   1364( 7  4)
1093( 8  2)    430( 9  0)     21( 0 15)    100( 1 13)    324( 2 11)    709( 3  9)
1206( 4  7)   1554( 5  5)   1520( 6  3)    945( 7  1)    110( 0 12)    413( 1 10)
 878( 2  8)   1385( 3  6)   1599( 4  4)   1325( 5  2)    504( 6  0)    339( 0  9)
 818( 1  7)   1254( 2  5)   1306( 3  3)    849( 4  1)    458( 0  6)    818( 0  4)
 772( 2  2)    328( 3  0)    325( 0  3)    296( 1  1)     39( 0  0)
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                          4   4   2   2   2   1   0   0   0   0

   1(19  4)      1(20  2)      1(21  0)      1(15  9)      3(16  7)      6(17  5)
   9(18  3)      6(19  1)      1(12 12)      4(13 10)     12(14  8)     25(15  6)
  33(16  4)     33(17  2)     12(18  0)      2(10 13)     11(11 11)     52(12  9)
  65(13  7)     99(14  5)    105(15  3)     70(16  1)      4( 8 14)     21( 9 12)
  63(10  0)    137(11  8)    219(12  6)    266(13  4)    219(14  2)     92(15  0)
   6( 6 15)     31( 7 13)    101( 8 11)    230( 9  9)    397(10  7)    527(11  5)
 524(12  3)    328(13  1)      6( 4 16)     37( 5 14)    128( 6 12)    316( 7 10)
 590( 8  8)    864( 9  6)    965(10  4)    787(11  2)    295(12  0)      5( 2 17)
  34( 3  5)    132( 4 13)    356( 5 11)    731( 6  9)   1167( 7  7)   1471( 8  5)
1435( 9  3)    867(10  1)      2( 0 18)     20( 1 16)     99( 2 14)    316( 3 12)
 725( 4  0)   1302( 5  8)   1829( 6  6)   2015( 7  4)   1589( 8  2)    621( 9  0)
  38( 0 15)    185( 1 13)    545( 2 11)   1142( 3  9)   1844( 4  7)   2322( 5  5)
2215( 6  3)   1365( 7  1)    201( 0 12)    672( 1 10)   1378( 2  8)   2088( 3  6)
2361( 4  4)   1921( 5  2)    732( 6  0)    519( 0  9)   1239( 1  7)   1344( 2  5)
 904( 3  3)   1217( 4  1)    692( 0  6)   1191( 1  4)   1122( 2  2)    469( 3  0)
 463( 1  3)    423( 1  1)     61( 0  0)
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                          4   4   2   2   1   1   1   0   0   0

   1(16  7)      2(17  5)      3(18  3)      2(19  1)      1(13 10)      5(14  8)
   1(15  6)     16(16  4)     15(17  2)      6(18  0)      3(11 11)     13(12  9)
  32(13  7)     52(14  5)     57(15  3)     39(16  1)      1( 8 14)      6( 9 12)
  29(10  0)     71(11  8)    125(12  6)    158(13  4)    136(14  2)     54(15  0)
  10( 7 13)    143( 8 11)    120( 9  9)    230(10  7)    326(11  5)    335(12  3)
 216(13  1)      2( 4 16)     12( 5 14)     60( 6 12)    168( 7 10)    354( 8  8)
 549( 9  6)    648(10  4)    536(11  2)    209(12  0)     11( 3 15)     56( 4 13)
 199( 5 11)    430( 6  9)    751( 7  7)    994( 8  5)    984( 9  3)    620(10  1)
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   1( 0 18)      7( 1 16)     48( 2 14)    167( 3 12)     441( 4 10)      843( 5  8)
1263( 6  6)   1438( 7  4)   1172( 8  2)    452( 9  0)      13( 0 15)       99( 1 13)
 318( 2 11)    741( 3  9)   1266( 4  7)   1674( 5  5)    1639( 6  3)     1032( 7  1)
 127( 0 12)    437( 1 10)    967( 2  8)   1512( 3  6)    1786( 4  4)     1467( 5  2)
 574( 6  0)    346( 0  9)    904( 1  7)   1380( 2  5)    1469( 3  3)      953( 4  1)
 537( 0  6)    926( 1  4)    899( 2  2)    366( 3  0)     355( 0  3)      342(    1)
  51( 0  0)
```

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                               4   4   2   1   1   1   1   1   0   0

   1(15  6)      1(16  4)      2(17  2)      1(12  9)       3(13  7)        7(14  5)
   8(15  3)      6(16  1)      2(10 10)      8(11  8)      17(12  6)       27(13  4)
  23(14  2)     12(15  0)      3( 8 11)     14( 9  9)      36(10  7)       58(11  5)
  67(12  3)     45(13  1)      4( 6 12)     20( 7 10)      54( 8  8)      103( 9  6)
 131(10  4)    122(11  2)     44(12  0)      4( 4 13)      22( 5 11)       69( 6  9)
 142( 7  7)    214( 8  5)    227( 9  3)    150(10  1)       3( 2 14)       19( 3 12)
  67( 4 10)    161( 5  8)    269( 6  6)    342( 7  4)     285( 8  2)      121( 9  0)
   1( 0 15)     11( 1 13)     51( 2 11)    141( 3  9)     279( 4  7)      432( 5  5)
 420( 6  3)    272( 7  1)     18( 0 12)     83( 1 10)     207( 2  8)      363( 3  6)
 455( 4  4)    401( 5  2)    151( 6  0)     80( 0  9)     220( 1  7)      360( 2  5)
 404( 3  3)    271( 4  1)    135( 0  6)    259( 1  4)     251( 2  2)      112( 3  0)
 108( 0  3)    101( 1  1)     13( 0  0)
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                               4   4   1   1   1   1   1   1   1   0

   1(12  6)      1(13  4)      1(14  2)      1(15  0)       2(11  5)        3(12  3)
   2(13  1)      2( 8  8)      4( 9  6)      8(10  4)       8(11  2)        3(12  0)
   1( 6  9)      5( 7  7)     10( 8  5)     15( 9  3)      10(10  1)        2( 4  0)
   6( 5  8)     16( 6  6)     22( 7  4)     22( 8  2)      10( 9  0)        5( 3  9)
  13( 4  7)     26( 5  5)     30( 6  3)     22( 7  1)       2( 0 12)        3( 1 10)
  13( 2  8)     25( 3  6)     36( 4  4)     33( 5  2)      15( 6  0)        2( 2  9)
  14( 1  7)     26( 2  5)     35( 3  3)     22( 4  1)      13( 0  6)       22( 1  4)
  25( 2  2)     10( 3  0)      9( 0  3)      9( 1  1)       3( 0  0)
```

```
                               4   3   3   3   2   0   0   0   0   0

   1(18  6)      1(19  4)      1(20  2)      1(15  9)       4(16  7)        6(17  5)
   8(18  3)      5(19  1)      1(12 12)      4(13 10)      13(14  8)       22(15  6)
  31(16  4)     26(17  2)     12(18  0)      3(10 13)      11(11 11)       31(12  9)
  58(13  7)     85(14  5)     87(15  3)     58(16  1)       3( 7 16)        6( 8 14)
  23( 9  2)     62(10 10)    120(11  8)    186(12  6)     214(13  4)      181(14  2)
  68(15  0)      1( 5 17)     10( 6 15)     36( 7 13)     101( 8 11)      203( 9  9)
 332(10  7)    423(11  5)    413(12  3)    257(13  1)       2( 3 18)       12( 4 16)
  47( 6  4)    133( 6 12)    286( 7 10)    499( 8  3)     687( 9  6)      758(10  4)
 596(11  2)    232(12  0)      1( 1 19)     10( 2 17)      44( 3 15)      141( 4 13)
 328( 5 11)    620( 6  9)    933( 7  7)   1136( 8  5)    1059( 9  3)      548(10  1)
   4( 0 18)     28( 1 16)    109( 2 14)    297( 3 12)     625( 4 10)     1044( 5  8)
 473( 6  6)   1501( 7  4)   1177( 8  2)    442( 9  0)      41( 0 15)      177( 1 13)
 472( 2 11)    920( 3  9)   1420( 4  7)   1724( 5  5)    1609( 6  3)      979( 7  1)
 175( 0 12)    544( 1 10)   1064( 2  8)   1542( 3  6)    1710( 4  4)     1352( 5  2)
 522( 6  0)    398( 0  9)    916( 1  7)   1322( 2  5)    1335( 3  3)      844( 4  1)
 497( 0  6)    820( 1  4)    776( 2  2)    313( 3  0)     314( 0  3)      287(    1)
  41( 0  0)
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                               4   3   3   3   1   1   0   0   0   0

   1(19  4)      1(21  0)      1(15  9)      2(16  7)       5(17  5)        6(18  3)
   4(19  1)      3(13 10)      9(14  8)     20(15  6)      24(16  4)       25(17  2)
   7(18  0)      1(10 13)      9(11 11)     25(12  9)      54(13  7)       77(14  5)
  84(15  3)     54(16  1)      3( 8 14)     18( 9 12)      52(10 10)      115(11  8)
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TABLE. IRREDUCIBLE REPRESENTATIONS OF SU(3) CONTAINED IN A PARTITION OF U(10)

```
178(12  6)    218(13  4)    175(14  2)     77(15  0)      1( 5 17)       6( 6 15)
 30( 7 13)     88( 8 11)    199( 9  9)    332(10  7)    442(11  5)     430(12  3)
273(13  1)      1( 3 18)      8( 4 16)     38( 5 14)    118( 6 12)     282( 7 10)
506( 8  8)    736( 9  6)    809(10  4)    662(11  2)    243(12  0)       1( 1 19)
  7( 2 17)     38( 3 15)    126( 4 13)    326( 5 11)    639( 6  9)    1008( 7  7)
294( 3 12)    647( 4 10)    727(10  1)      3( 0 18)     23( 1 16)      99( 2 14)
525( 9  0)     37( 0 15)   1138( 5  8)   1566( 6  6)   1717( 7  4)    1340( 8  2)
1983( 5  5)   1870( 6  3)    176( 1 13)    489( 2 11)   1006( 3  9)    1588( 4  7)
1788( 3  6)   1998( 4  4)   1152( 7  1)    184( 0 12)    595( 1 10)    1195( 2  8)
1557( 2  5)   1598( 3  3)   1619( 5  2)    612( 6  0)    446( 0  9)    1062( 1  7)
 390( 3  0)    383( 0  3)   1017( 4  1)    587( 0  6)   1002( 1  4)     935( 2  2)
                             351( 1  1)     49( 0  0)
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                        4  3  3  2  2  1  0  0  0  0
  1(20  2)     1(16  7)      3(17  5)      5(18  3)
  7(14  8)    15(15  6)     25(16  4)     22(17  2)     4(19  1)
  7(11 11)    23(12  9)     50(13  7)     79(14  5)    11(18  0)      2(13 10)
  3( 8 14)    17( 9 12)     54(10 10)    118(11  8)    87(15  5)      1(10 13)
208(14  2)    78(15  0)      5( 6 15)     29( 7 13)   198(12  6)     59(16  1)
385(10  7)   516(11  5)    516(12  3)    327(13  1)    95( 8 11)    238(13  4)
132( 6  2)   324( 7 10)    613( 8  8)    892( 9  6)     6( 4 16)    219( 9  9)
322(12  0)     5( 2 17)     36( 3 15)    142( 4 13)  1016(10  4)     38( 5 14)
1268( 7  7)  1602( 8  5)   1532( 9  3)    948(10  1)   385( 5 11)    814(11  2)
111( 2 14)    352( 3 12)    819( 4 10)   1460( 5  8)     2( 0 18)     22( 1 16)
1808( 8  2)   682( 9  0)     42( 0 15)    212( 1 13)  2068( 6  6)   2252( 7  4)
2128( 4  7)  2681( 5  5)   2557( 6  3)   1577( 7  1)   625( 2 11)   1316( 3  9)
1625( 2  8)  2445( 3  6)   2791( 4  4)   2244( 5  2)   235( 0 12)    785( 1 10)
1473( 1  7)  2188( 2  5)   2261( 3  3)   1449( 4  1)   875( 6  0)    608( 0  9)
1557( 2  2)   549( 3  0)    548( 0  3)    511( 1  1)   836( 0  6)   1423( 1  4)
                                                        76( 0  0)
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                        4  3  3  2  1  1  1  0  0  0
  1(17  5)     1(18  3)      1(19  1)      2(14  8)
  9(17  2)     4(18  0)      1(11 11)      8(12  9)     6(15  6)
 42(15  3)    28(15  1)      4( 9 12)     20(10 10)    22(13  7)      9(16  4)
128(13  4)   112(14  2)     44(15  0)      1( 6 15)    55(11  8)     58(14  5)
106( 9  9)   205(10  7)    294(11  5)    303(12  3)     8( 7 13)     99(12  6)
 11( 5 14)    53( 6 12)    159( 7 10)    333( 3  8)   196(13  1)     58( 8 11)
516(11  2)   203(12  0)      1( 2 17)     11( 3 15)   526( 9  6)      1( 4 16)
438( 6  9)   761( 7  7)   1012( 8  5)   1002( 9  3)    59( 4 13)    622(10  4)
 45( 2 14)   174( 3 12)    453( 4 10)    885( 5  8)   632(10  1)    490( 5 11)
234( 8  2)   477( 9  0)     18( 0 15)    105( 1 13)  1323( 6  6)      7( 1 16)
878( 4  7)  1815( 5  5)   1785( 6  3)   1120( 7  1)   349( 2 11)   1534( 7  4)
852( 2  8)  1669( 3  6)   1964( 4  4)   1623( 5  2)   129( 0 12)    800( 3  9)
408( 1  7)  1557( 2  5)   1648( 3  3)   1073( 4  1)   633( 6  0)    473( 1 10)
468( 2  2)   418( 3  0)    414( 0  3)    388( 1  1)   591( 0  6)    398( 0  9)
                                                       56( 0  0)   1545( 1  4)
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                        4  3  3  1  1  1  1  1  0  0
  1(16  4)     1(18  0)      1(13  7)      3(14  5)
  1(10  0)     4(12  8)     11(12  6)     14(13  4)     4(15  3)      3(16  1)
  2( 8 11)     9( 9  9)     24(10  7)     39(11  5)    17(14  2)      4(15  0)
  3( 6 12)    14( 7 10)     42( 8  8)     74( 9  6)    46(12  3)     51(13  1)
  2(12  0)     3( 4 13)     17( 5 11)     55( 6  9)   104(10  4)     85(11  2)
  9( 9  3)   122(10  1)      2( 2 14)     15( 3 12)   113( 7  7)    172( 8  5)
  3( 6  6)   282( 7  4)    252( 8  2)     91( 9  0)    57( 4 10)    132( 5  8)
  2( 2 11)   121( 3  9)    242( 4  7)    350( 5  5)     1( 0 15)      9( 1 13)
  1( 0 12)    71( 1 10)    188( 2  8)    323( 3  6)   368( 6  3)    238( 7  1)
  1( 6  0)    69( 0  9)    198( 1  7)    330( 2  5)   418( 4  4)    350( 5  2)
                                                       368( 3  3)   247( 4  1)
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130(0 6)   234(1 4)   242(2 2)   95(3 0)   95(0 3)   94(1 1)
 16(0 0)

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              4   3   2   2   2   2   0   0   0   0
    1(19  1)      1(15  6)        2(16  4)          3(17  2)
    2(12  9)      6(13  7)       10(14  5)         13(15  3)        1(18  0)
    7(10 10)     18(11  8)       30(12  6)         43(13  4)        9(16  1)        1(11 11)
    4( 7 13)     14( 8 11)       39( 9  9)         71(10  7)       35(14  2)        2( 9 12)
   67(13  1)      5( 5 14)       21( 6 12)         63( 7 10)      102(11  5)       45(15  0)
  223(10  4)    187(11  2)       69(12  0)          5( 3 15)      125( 8  8)      103(12  3)
  173( 6  9)    299( 7  7)      384( 8  5)        375( 9  3)       24( 4 13)      195( 9  6)
   19( 2 14)     74( 3 12)      188( 4 10)        361( 5  8)      235(10  1)       79( 5 11)
  473( 8  2)    186( 9  0)        7( 0 15)         46( 1 13)      525( 6  6)        3( 1 16)
  565( 4  7)    736( 5  5)      710( 6  3)        444( 7  1)      147( 2 11)      594( 7  4)
  443( 2  8)    693( 3  6)      806( 4  4)        662( 5  2)       56( 0 12)      336( 3  9)
  426( 1  7)    648( 2  5)      684( 3  3)        442( 4  1)      252( 6  0)      205( 1 10)
  422( 2  2)    175( 3  0)      172( 0  3)        165( 1  1)      250( 0  6)      167( 0  9)
                                                                   23( 0  0)      440( 1  4)
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              4   3   2   2   2   1   1   0   0   0
    1(15  6)        2(16  4)          2(17  2)          1(18  0)
   12(14  5)       14(15  3)         10(16  1)          1( 9 12)        2(12  9)
   40(12  6)       53(13  4)         48(14  2)         19(15  0)        7(10 10)        6(13  7)
   44( 9  9)       93(10  7)        137(11  5)        146(12  3)        2( 7 13)       20(11  8)
   22( 6 12)       73( 7 10)        166( 8  8)        270( 9  6)       95(13  1)       14( 8 11)
  109(12  0)        3( 3 15)         25( 4 13)         92( 5 11)      328(10  4)        3( 5 14)
  570( 8  5)      572( 9  3)        364(10  1)          2( 1 16)      231( 6  9)      275(11  2)
  251( 4 10)      510( 5  8)        787( 6  6)        914( 7  4)       20( 2 14)      417( 7  7)
    8( 0 15)       54( 1 13)        198( 2 11)        477( 3  9)      753( 8  2)       88( 3 12)
 1138( 6  3)      719( 7  1)         75( 0 12)        291( 1 10)      850( 4  7)      292( 9  0)
 1297( 4  4)     1081( 5  2)        424( 6  0)        255( 0  9)      667( 2  8)     1143( 5  5)
 1127( 3  3)      739( 4  1)        404( 0  6)        726( 1  4)      666( 1  7)     1083( 3  6)
  293( 0  3)      278( 1  1)         41( 0  0)                         739( 2  2)     1050( 2  5)
                                                                                      295( 3  0)
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```
              4   3   2   2   1   1   1   0   0
    1(13  7)        2(14  5)          3(15  3)          2(16  1)
   15(13  4)       13(14  2)          7(15  0)          1( 8 11)
   43(11  5)       49(12  3)         34(13  1)          2( 6 12)        4(11  8)
   89( 9  6)      117(10  4)        108(11  2)         41(12  0)        9( 9  9)        9(12  6)
   62( 6  9)      139( 7  7)        212( 8  5)        232( 9  3)       15( 7 10)       24(10  7)
   18( 3 12)       68( 4 10)        171( 5  8)        297( 6  6)        2( 4 13)       44( 8  8)
  134( 9  0)        1( 0 15)         11( 1 13)         53( 2 11)      152(10  1)       19( 5 11)
  481( 5  5)      507( 6  3)        333( 7  1)         20( 0 12)      381( 7  4)        2( 2 14)
  459( 3  6)      584( 4  4)        513( 5  2)        202( 6  0)      160( 3  9)      326( 8  2)
  417( 2  5)      540( 3  3)        363( 4  1)        185( 0  6)       97( 1 10)      323( 4  7)
  151( 3  0)      147( 0  3)        142( 1  1)         21( 0  0)       97( 0  9)      254( 2  8)
                                                                      350( 1  4)      283( 1  7)
                                                                                      352( 2  2)
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              4   3   2   1   1   1   1   1   0
    1(13  4)        1(14  2)          1(10  7)          3(11  5)
    2( 8  8)        7( 9  6)         13(10  4)         14(11  2)
    4( 7  7)       24( 8  5)         31( 9  3)         24(10  1)        5(12  3)        4(13  1)
   24( 6  6)       53( 7  4)         52( 8  2)         22( 9  0)        6(12  0)        2( 6  9)
   26( 4  7)       67( 5  5)         82( 6  3)         58( 7  1)        3( 4 10)        3( 5  8)
   43( 3  6)       96( 4  4)         91( 5  2)         37( 6  0)        2( 2 11)       12( 3  9)
   78( 2  5)       98( 3  3)         70( 4  1)         30( 0  6)        7( 1 10)       28( 2  8)
   30( 3  0)       28( 0  3)         36( 1  1)          4( 0  0)       11( 0  9)       40( 1  7)
                                                                       64( 1  4)       69( 2  2)
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                    4  3  1  1  1  1  1  1  1  1
 1(11   2)       1( 9   3)       1(10   1)       2( 7   4)       2( 8   2)       2( 9   0)
 2( 5   5)       3( 6   3)       3( 7   1)       2( 3   6)       3( 4   4)       5( 5   2)
 1( 6   0)       1( 1   7)       3( 2   5)       5( 3   3)       4( 4   1)       1( 0   6)
 3( 1   4)       3( 2   2)       2( 3   0)       2( 0   3)       2( 1   1)


                    4  2  2  2  2  2  1  0  0  0
 1(15   3)       1(11   8)       2(12   6)       3(13   4)       3(14   2)       1(15   0)
 1( 8  11)       3( 9   9)       7(10   7)      12(11   5)      12(12   3)       9(13   1)
 1( 6  12)       6( 7  10)      16( 8   8)      29( 9   6)      35(10   4)      30(11   2)
13(12   0)       2( 4  13)       9( 5  11)      27( 6   9)      53( 7   7)      74( 8   5)
76( 9   3)      48(10   1)       1( 2  14)       9( 3  12)      31( 4  10)      71( 5   8)
14( 6   6)     137( 7   4)     114( 8   2)      43( 9   0)       1( 0  15)       6( 1  13)
27( 2  11)      72( 3   9)     136( 4   7)     189( 5   5)     192( 6   3)     121( 7   1)
 9( 0  12)      45( 1  10)     110( 2   8)     190( 3   6)     233( 4   4)     197( 5   2)
78( 6   0)      45( 0   9)     122( 1   7)     200( 2   5)     218( 3   3)     146( 4   1)
77( 0   6)     145( 1   4)     144( 2   2)      61( 3   0)      62( 0   3)      59( 1   1)
 8( 0   0)


                    4  2  2  2  2  1  1  1  0  0
 1(12   6)       1(13   4)       2(14   2)       1( 9   9)       3(10   7)       6(11   5)
 7(12   3)       5(13   1)       2( 7  10)       8( 8   8)      15( 9   6)      24(10   4)
19(11   2)      10(12   0)       3( 5  11)      12( 6   9)      30( 7   7)      47( 8   5)
53( 9   3)      35(10   1)       3( 3  12)      15( 4  10)      40( 5   8)      77( 6   6)
95( 7   4)      89( 8   2)      31( 9   0)       2( 1  13)      12( 2  11)      41( 3   9)
88( 4   7)     136( 5   5)     145( 6   3)      97( 7   1)       5( 0  12)      26( 1  10)
75( 2   8)     136( 3   6)     184( 4   4)     155( 5   2)      69( 6   0)      28( 0   9)
88( 1   7)     153( 2   5)     178( 3   3)     120( 4   1)      63( 0   6)     117( 1   4)
126( 2   2)      48( 3   0)      50( 0   3)      51( 1   1)      10( 0   0)


                    4  2  2  2  1  1  1  1  0
 1(11   5)       1(12   3)       1(13   1)       2( 9   6)       4(10   4)       4(11   2)
 2(12   0)       1( 6   9)       4( 7   7)       9( 8   5)      13( 9   3)       9(10   1)
 5( 5   8)      13( 6   6)      22( 7   4)      23( 8   2)       9( 9   0)       1( 2  11)
 5( 3   9)      17( 4   7)      32( 5   5)      40( 6   3)      29( 7   1)       5( 1  10)
12( 2   8)      32( 3   6)      48( 4   4)      47( 5   2)      21( 6   0)       6( 0   9)
20( 1   7)      43( 2   5)      54( 3   3)      39( 4   1)      15( 0   6)      36( 1   4)
39( 2   2)      17( 3   0)      18( 0   3)      17( 1   1)       3( 0   0)


                    4  2  2  1  1  1  1  1  1
 1(12   0)       1( 9   3)       1(10   1)       1( 7   4)       3( 8   2)       2( 5   5)
 3( 6   3)       3( 7   1)       1( 3   6)       5( 4   4)       4( 5   2)       4( 6   0)
 1( 1   7)       3( 2   5)       5( 3   3)       4( 4   1)       2( 0   6)       3( 1   4)
 6( 2   2)       1( 3   0)       1( 0   3)       2( 1   1)       7( 0   0)


                    3  3  3  3  3  0  0  0  0  0
 1(15   6)       1(17   2)       1(12   9)       1(13   7)       3(14   5)       3(15   3)
 2(16   1)       1( 9  12)       2(10  10)       5(11   8)       7(12   6)      11(13   4)
 7(14   2)       6(15   0)       1( 6  15)       1( 7  13)       5( 8  11)      10( 9   9)
18(10   7)      22(11   5)      25(12   3)      13(13   1)       3( 5  14)       7( 6  12)
18( 7   0)      28( 8   8)      46( 9   6)      44(10   4)      43(11   2)      12(12   0)
 1( 2   7)       3( 3  15)      11( 4  13)      22( 5  11)      46( 6   9)      64( 7   7)
83( 8   5)      76( 9   3)      47(10   1)       2( 1  16)       7( 2  14)      25( 3  12)
44( 4   0)      83( 5   8)     106( 6   6)     120( 7   4)      85( 8   2)      43( 9   0)
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 0 15)    13( 1 13)    43( 2 11)    76( 3  9)   120( 4  7)   142( 5  5)
 6  3)    79( 7  1)    12( 0 12)    47( 1 10)    85( 2  8)   137( 3  6)
 4  4)   123( 5  2)    38( 6  0)    43( 0  9)    79( 1  7)   123( 2  5)
 3  3)    75( 4  1)    38( 0  6)    75( 1  4)    62( 2  2)    30( 3  0)
 0  3)    24( 1  1)     4( 0  0)
```

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                       3  3  3  3  2  1  0  0  0  0
16  4)     1(17  2)     1(12  9)     3(13  7)     5(14  5)     6(15  3)
16  1)     1( 9 12)     4(10 10)    10(11  8)    18(12  6)    24(13  4)
14  2)     9(15  0)     3( 7 13)    10( 8 11)    24( 9  9)    46(10  7)
11  5)    64(12  3)    43(13  1)     1( 4 16)     5( 5 14)     8( 6 12)
 7 10)    86( 8  8)   128( 9  6)   148(10  4)   121(11  2)    45(12  0)
 2 17)     6( 3 15)    24( 4 13)    63( 5 11)   128( 6  9)   200( 7  7)
 8  5)   250( 9  3)   156(10  1)     5( 1 16)    21( 2 14)    64( 3 12)
 4 10)   261( 5  8)   364( 6  6)   404( 7  4)   318( 8  2)   121( 9  0)
 0 15)    43( 1 13)   121( 2 11)   250( 3  9)   404( 4  7)   504( 5  5)
 6  3)   297( 7  1)    45( 0 12)   156( 1 10)   318( 2  8)   478( 3  6)
 4  4)   438( 5  2)   166( 6  0)   121( 0  9)   297( 1  7)   438( 2  5)
 3  3)   291( 4  1)   166( 0  6)   291( 1  4)   272( 2  2)   110( 3  0)
 0  3)   106( 1  1)    12( 0  0)
```

```
                       3  3  3  3  1  1  1  0  0  0
13  7)     1(14  5)     2(15  3)     1(16  1)     1(10 10)     3(1?  8)
12  6)     8(13  4)     8(14  2)     3(15  0)     2( 8 11)     9( 9  9)
10  7)    27(11  5)    27(12  3)    18(13  1)     1( 5 14)     6( 6 12)
 7 10)    37( 8  8)    57( 9  6)    70(10  4)    56(11  2)    25(12  0)
 3 15)     6( 4 13)    24( 5 11)    53( 6  9)    96( 7  7)   125( 8  5)
 9  3)    78(10  1)     1( 0 18)     1( 1 16)     9( 2 14)    26( 3 12)
 4 10)   124( 5  8)   190( 6  6)   209( 7  4)   177( 8  2)    64( 9  0)
 0 15)    16( 1 13)    49( 2 11)   121( 3  9)   200( 4  7)   271( 5  5)
 6  3)   166( 7  1)    26( 0 12)    75( 1 10)   171( 2  8)   261( 3  6)
 4  4)   249( 5  2)   106( 6  0)    58( 0  9)   160( 1  7)   242( 2  5)
 3  3)   167( 4  1)   105( 0  6)   167( 1  4)   171( 2  2)    65( 3  0)
 0  3)    62( 1  1)    14( 0  0)
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                       3  3  3  2  2  2  0  0  0  0
 8  0)     1(14  5)     2(15  3)     1(16  1)     1(10 10)     2(11  8)
 2  6)     6(13  4)     9(14  2)     1(15  0)     1( 7 13)     3( 8 11)
 9  9)    16(10  7)    24(11  5)    26(12  3)    16(13  1)     1( 5 14)
 5 12)    16( 7 10)    37( 8  8)    53( 9  6)    67(10  4)    49(11  2)
 2  0)     2( 3 15)     8( 4 13)    27( 5 11)    57( 6  9)    90( 7  7)
 8  5)   121( 9  3)    75(10  1)     1( 1 16)     8( 2 14)    27( 3 12)
 4 10)   125( 5  8)   190( 6  6)   200( 7  4)   171( 8  2)    53( 9  0)
 0 15)    18( 1 13)    56( 2 11)   129( 3  9)   209( 4  7)   271( 5  5)
 6  3)   160( 7  1)    25( 0 12)    78( 1 10)   177( 2  8)   252( 3  6)
 4  4)   242( 5  2)   105( 6  0)    64( 0  9)   166( 1  7)   249( 2  5)
 3  3)   167( 4  1)   106( 0  6)   167( 1  4)   171( 2  2)    64( 3  0)
 0  3)    62( 1  1)    14( 0  0)
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                       3  3  3  2  2  1  1  0  0  0
 4  5)     1(15  3)     1(16  1)     3(11  8)     5(12  6)     9(13  4)
 4  2)     4(15  0)     3( 8 11)     8( 9  9)    20(10  7)    29(1?  5)
 2  3)    21(13  1)     1( 5 14)     5( 6 12)    20( 7 10)    42( 8  8)
 9  6)    86(10  4)    77(11  2)    27(12  0)     1( 3 15)     9( 4 13)
 5 11)    74( 6  9)   128( 7  7)   178( 8  5)   175( 9  3)   113(10  1)
 1 16)     7( 2 14)    33( 3 12)    86( 4 10)   178( 5  8)   202( 6  6)
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 312( 7  4)     247( 8  2)      103( 9  0)       4( 0 15)      21( 1 13)      77( 2 11)
 175( 3  9)     312( 4  7)      408( 5  5)     408( 6  3)     254( 7  1)      27( 0 12)
 113( 1 10)     247( 2  8)      408( 3  6)     472( 4  4)     404( 5  2)     148( 6  0)
 103( 0  9)     254( 1  7)      404( 2  5)     424( 3  3)     280( 4  1)     148( 0  6)
 280( 1  4)     262( 2  2)      118( 3  0)     118( 0  3)     106( 1  1)      12( 0  0)
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                            3   3   3   2   1   1   1   1   0   0
   1(12  6)       1(13  4)        2(14  2)        1( 9  9)       4(10  7)       7(11  5)
   8(12  3)       6(13  1)        3( 7 10)       10( 8  8)      19( 9  6)      28(10  4)
  23(11  2)      11(12  0)        1( 4 13)        5( 5 11)      18( 6  9)      38( 7  7)
  59( 8  5)      63( 9  3)       42(10  1)        1( 2 14)       6( 3 12)      22( 4 10)
  53( 5  8)      93( 6  6)      115( 7  4)      102( 8  2)      37( 9  0)       4( 1 13)
  19( 2 11)      53( 3  9)      109( 4  7)      158( 5  5)     167( 6  3)     109( 7  1)
   8( 0 12)      35( 1 10)       90( 2  8)      158( 3  6)     204( 4  4)     173( 5  2)
  72( 6  0)      34( 0  9)      100( 1  7)      169( 2  5)     189( 3  3)     129( 4  1)
  66( 0  6)     125( 1  4)      128( 2  2)       51( 3  0)      52( 0  3)      52( 1  1)
   8( 0  0)
```

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                            3   3   3   1   1   1   1   1   1   0
   1(12  3)       1( 9  6)        1(10  4)        2(11  2)       1(12  0)       1( 6  9)
   2( 7  7)       6( 8  5)        6( 9  3)        5(10  1)       3( 5  8)       7( 6  6)
  12( 7  4)      11( 8  2)        6( 9  0)        1( 2 11)       3( 3  9)      11( 4  7)
  17( 5  5)      23( 6  3)       14( 7  1)        2( 1 10)       6( 2  8)      18( 3  6)
  24( 4  4)      26( 5  2)        9( 6  0)        5( 0  9)      10( 1  7)      24( 2  5)
  28( 3  3)      20( 4  1)        7( 0  6)       18( 1  4)      18( 2  2)      11( 3  0)
  11( 0  3)       8( 1  1)        1( 0  0)
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```
                            3   3   2   2   2   2   1   0   0   0
   1(13  4)       1(14  2)        1( 9  9)        3(10  7)       5(11  5)       6(12  3)
   4(13  1)       1( 6 12)        4( 7 10)       10( 8  8)      18( 9  6)      22(10  4)
  19(11  2)       8(12  0)        1( 4 13)        7( 5 11)      19( 6  9)      38( 7  7)
  53( 8  5)      53( 9  3)       35(10  1)        2( 2 14)       8( 3 12)      28( 4 10)
  59( 5  8)      93( 6  6)      109( 7  4)       90( 8  2)      34( 9  0)       6( 1 13)
  23( 2 11)      63( 3  9)      115( 4  7)      158( 5  5)     158( 6  3)     100( 7  1)
  17( 0  2)      42( 1 10)      102( 2  8)      167( 3  6)     204( 4  4)     169( 5  2)
  66( 6  0)      37( 0  9)      109( 1  7)      173( 2  5)     189( 3  3)     125( 4  1)
  72( 0  6)     129( 1  4)      128( 2  2)       52( 3  0)      51( 0  3)      52( 1  1)
   8( 0  0)
```

```
                            3   3   2   2   2   1   1   0   0
   1(10  7)       2(11  5)        3(12  3)        2(13  1)       1( 7 10)       4( 8  9)
   9( 9  6)      12(10  4)       12(11  2)        4(12  0)       2( 5 11)       9( 6  9)
  20( 7  7)      33( 8  5)       36( 9  3)       24(10  1)       3( 3 12)      12( 4 10)
  33( 5  8)      58( 6  6)       76( 7  4)       64( 8  2)      28( 9  0)       2( 1 13)
  12( 2 11)      36( 3  9)       76( 4  7)      112( 5  5)     120( 6  3)      78( 7  1)
   4( 0  2)      24( 1 10)       64( 2  8)      120( 3  6)     152( 4  4)     130( 5  2)
  52( 6  0)      28( 0  9)       78( 1  7)      136( 2  5)     154( 3  3)     104( 4  1)
  52( 0  6)     104( 1  4)      104( 2  2)       47( 3  0)      47( 0  3)      44( 1  1)
   6( 0  0)
```

```
                            3   3   2   2   1   1   1   1   0
   1( 9  6)       2(10  4)        2(11  2)        1(12  0)       2( 7  7)       5( 8  5)
   7( 9  3)       5(10  1)        1( 4 10)        4( 5  8)      11( 6  6)      17( 7  4)
  17( 8  2)       7( 9  0)        4( 3  9)       12( 4  7)      25( 5  5)      30( 6  3)
  22( 7  1)       1( 0 12)        3( 1 10)       13( 2  8)      27( 3  6)      42( 4  4)
```

40(5 2)	17(6 0)	3(0 9)	17(1 7)	34(2 5)	45(3 3)
32(4 1)	16(0 6)	31(1 4)	35(2 2)	15(3 0)	13(0 3)
35(1 1)	3(0 0)				

		3	3	2	1	1	1	1	1	1	1
1(10 1)	1(7 4)	1(8 2)	1(9 0)	1(5 5)	3(6 3)
2(7 1)	1(3 6)	3(4 4)	4(5 2)	1(6 0)	1(1 7)
3(2 5)	4(3 3)	4(4 1)	3(1 4)	3(2 2)	2(3 0)
2(0 3)	2(1 1)				

		3	2	2	2	2	2	2	0	0	0
1(9 6)	1(11 2)	1(6 9)	2(7 7)	3(8 5)	3(9 3)
2(10 1)	1(3 12)	1(4 10)	6(5 8)	7(6 6)	11(7 4)
6(8 2)	5(9 0)	2(2 11)	6(3 9)	12(4 7)	17(5 5)
18(6 3)	10(7 1)	1(0 12)	5(1 10)	11(2 8)	23(3 6)
24(4 4)	24(5 2)	7(6 0)	6(0 9)	14(1 7)	26(2 5)
28(3 3)	18(4 1)	9(0 6)	20(1 4)	18(2 2)	11(3 0)
11(0 3)	8(1 1)	1(0 0)			

		3	2	2	2	2	2	1	1	0	0
1(10 4)	1(12 0)	1(6 9)	2(7 7)	4(8 5)	4(9 3)
3(10 1)	2(4 10)	5(5 8)	11(6 6)	12(7 4)	13(8 2)
3(9 0)	2(2 11)	7(3 9)	17(4 7)	25(5 5)	27(6 3)
17(7 1)	1(0 12)	5(1 10)	17(2 8)	30(3 6)	42(4 4)
24(5 2)	16(6 0)	7(0 9)	22(1 7)	40(2 5)	45(3 3)
21(4 1)	17(0 6)	32(1 4)	35(2 2)	13(3 0)	15(0 3)
15(1 1)	3(0 0)				

		3	2	2	2	2	1	1	1	1	0
1(8 5)	1(9 3)	1(10 1)	1(5 8)	2(6 6)	5(7 4)
4(8 2)	2(9 0)	1(3 9)	5(4 7)	8(5 5)	11(6 3)
8(7 1)	1(1 10)	4(2 8)	11(3 6)	16(4 4)	17(5 2)
8(6 0)	2(0 9)	8(1 7)	17(2 5)	20(3 3)	16(4 1)
8(0 6)	16(1 4)	16(2 2)	8(3 0)	8(0 3)	8(1 1)

		3	2	2	2	1	1	1	1	1	1
1(8 2)	2(6 3)	1(7 1)	1(3 6)	2(4 4)	2(5 2)
2(5 0)	2(2 5)	3(3 3)	3(4 1)	1(0 6)	2(1 4)
3(2 2)	1(3 0)	2(0 3)	1(1 1)		

		2	2	2	2	2	2	2	1	0	0
1(4 7)	1(5 5)	1(6 3)	1(7 1)	1(1 10)	1(2 8)
3(3 6)	3(4 4)	3(5 2)	1(0 9)	2(1 7)	4(2 5)
4(3 3)	3(4 1)	1(0 6)	4(1 4)	3(2 2)	2(3 0)
2(3 3)	2(1 1)				

		2	2	2	2	2	2	1	1	1	0
1(6 3)	1(2 8)	2(3 6)	2(4 4)	2(5 2)	1(6 0)
1(1 7)	2(2 5)	3(3 3)	2(4 1)	2(0 6)	3(1 4)
3(2 2)	2(3 0)	1(0 3)	1(1 1)		

| | | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 |

TABLE. IRREDUCIBLE REPRESENTATIONS OF SU(3) CONTAINED IN A PARTITION OF U(10)

1(5 2)	1(2 5)	1(4 1)	1(1 4)	1(3 0)	1(0 3)

4 4 4 4 0 0 0 0 0 0

1(20 8)	1(22 4)	1(24 0)	1(18 9)	2(19 7)	3(20 5)
3(21 3)	1(22 1)	1(15 12)	3(16 10)	6(17 8)	11(18 6)
9(19 4)	10(20 2)	2(21 0)	1(13 13)	6(14 11)	13(15 9)
22(16 7)	29(17 5)	27(18 3)	16(19 1)	1(10 16)	3(11 14)
13(12 12)	24(13 10)	48(14 8)	62(15 6)	72(16 4)	49(17 2)
25(18 0)	1(8 17)	6(9 15)	16(10 13)	41(11 11)	78(12 9)
114(13 7)	137(14 5)	128(15 3)	76(16 1)	1(5 20)	3(6 18)
8(7 6)	28(8 14)	60(9 12)	119(10 10)	182(11 8)	244(12 6)
242(13 4)	197(14 2)	65(15 0)	1(3 21)	2(4 19)	10(5 17)
30(6 15)	74(7 13)	148(8 11)	252(9 9)	348(10 7)	400(11 5)
361(12 3)	214(13 1)	1(0 24)	4(2 20)	11(3 18)	34(4 16)
79(5 14)	178(6 12)	298(7 10)	460(8 8)	557(9 6)	576(10 4)
420(11 2)	175(12 0)	5(1 19)	20(2 17)	67(3 15)	153(4 13)
306(5 11)	489(6 9)	667(7 7)	749(8 5)	665(9 3)	390(10 1)
13(0 18)	40(1 16)	121(2 14)	255(3 12)	468(4 10)	680(5 8)
862(6 6)	843(7 4)	654(8 2)	230(9 0)	37(0 15)	142(1 13)
316(2 11)	565(3 9)	779(4 7)	900(5 5)	803(6 3)	473(7 1)
130(0 12)	314(1 10)	580(2 8)	758(3 6)	815(4 4)	605(5 2)
247(6 0)	197(0 9)	436(1 7)	582(2 5)	578(3 3)	351(4 1)
237(0 6)	342(1 4)	325(2 2)	122(3 0)	118(0 3)	108(1 1)
25(0 0)					

4 4 4 3 1 0 0 0 0 0

1(21 6)	1(22 4)	1(23 2)	2(18 9)	4(19 7)	7(20 5)
7(21 3)	5(22 1)	1(15 12)	5(16 10)	15(17 8)	25(18 6)
32(19 4)	25(20 2)	11(21 0)	3(13 13)	15(14 11)	37(15 9)
71(16 7)	94(17 5)	95(18 3)	59(19 1)	1(10 16)	8(11 14)
30(12 12)	81(13 10)	152(14 8)	228(15 6)	252(16 4)	208(17 2)
76(18 0)	3(8 17)	15(9 15)	56(10 13)	142(11 11)	286(12 9)
444(13 7)	556(14 5)	522(15 3)	322(16 1)	1(5 20)	5(6 18)
25(7 16)	83(8 14)	219(9 12)	448(10 0)	749(11 8)	993(12 6)
1074(13 4)	328(14 2)	323(15 0)	1(3 21)	7(4 19)	30(5 17)
107(6 15)	283(7 13)	613(8 11)	1071(9 9)	1553(10 7)	1816(11 5)
1665(12 3)	1001(13 1)	1(1 22)	6(2 20)	30(3 18)	107(4 16)
311(5 14)	705(6 12)	1327(7 10)	2047(8 8)	2635(9 6)	2700(10 4)
2080(11 2)	767(12 0)	2(0 21)	18(1 19)	84(2 17)	267(3 15)
681(4 13)	1380(5 11)	2328(6 9)	3238(7 7)	3713(8 5)	3324(9 3)
1988(10 1)	30(0 18)	158(1 16)	491(2 14)	1165(3 12)	2179(4 10)
3373(5 8)	4265(6 6)	4379(7 4)	3302(8 2)	1255(9 0)	185(1 15)
666(1 13)	1578(2 11)	2820(3 9)	4070(4 7)	4719(5 5)	4270(6 3)
2548(7 1)	564(0 12)	1617(1 10)	2926(2 8)	4051(3 6)	4303(4 4)
3363(5 2)	1252(6 0)	1084(0 9)	2344(1 7)	3245(2 5)	3179(3 3)
1982(4 1)	1189(0 6)	1940(1 4)	1755(2 2)	721(3 0)	711(0 3)
635(1 1)	84(0 0)				

4 4 4 2 2 0 0 0 0 0

1(22 4)	1(24 0)	2(19 7)	3(20 5)	4(21 3)	5(22 1)
3(16 10)	6(17 8)	15(18 6)	16(19 4)	19(20 2)	3(2 0)
2(13 13)	6(14 11)	21(15 9)	39(16 7)	58(17 5)	59(18 3)
29(19 1)	1(10 16)	4(11 14)	19(12 12)	46(13 10)	99(14 8)
140(15 6)	176(16 4)	131(17 2)	62(13 0)	1(8 17)	9(9 15)
32(10 13)	91(11 11)	181(12 9)	300(13 7)	376(14 5)	365(15 3)
226(16 1)	3(6 18)	14(7 16)	55(8 14)	141(9 12)	312(10 10)
511(11 8)	723(12 6)	756(13 4)	622(14 2)	214(15 0)	2(4 19)

IRREDUCIBLE REPRESENTATIONS OF SU(3) CONTAINED IN A PARTITION OF U(10)

17(5 17)	63(6 15)	191(7 13)	418(8 11)	765(9 9)	1118(10 7)
(11 5)	1229(12 3)	751(13 1)	3(2 20)	15(3 18)	72(4 16)
07(5 14)	508(6 12)	956(7 10)	-1541(8 8)	1960(9 6)	2086(10 4)
59(11 2)	623(12 0)	10(1 19)	47(2 17)	182(3 15)	475(4 13)
18(5 11)	1736(6 9)	2481(7 7)	2854(8 5)	2591(9 3)	1547(10 1)
23(0 18)	106(1 16)	365(2 14)	858(3 12)	1686(4 10)	2597(5 8)
83(6 6)	3432(7 4)	2673(8 2)	954(9 0)	118(0 15)	499(1 13)
86(2 11)	2204(3 9)	3201(4 7)	3779(5 5)	3417(6 3)	2064(7 1)
62(0 12)	1266(1 10)	2378(2 8)	3250(3 6)	3556(4 4)	2712(5 2)
76(6 0)	829(0 9)	1904(1 7)	2625(2 5)	2620(3 3)	1633(4 1)
21(0 6)	1597(1 4)	1507(2 2)	566(3 0)	563(0 3)	536(1)
86(0 0)					

4 4 4 2 1 1 0 0 0 0

1(23 2)	1(19 7)	3(20 5)	4(21 3)	3(22 1)	1(16 10)
6(17 8)	11(18 6)	19(19 4)	15(20 2)	9(21 0)	1(13 13)
6(14 11)	19(15 9)	40(16 7)	61(17 5)	65(18 3)	43(19 1)
3(11 14)	15(12 12)	47(13 10)	98(14 8)	162(15 6)	187(16 4)
63(17 2)	57(18 0)	1(8 17)	7(9 15)	31(10 13)	94(11 11)
04(12 9)	344(13 7)	446(14 5)	437(15 3)	273(16 1)	1(6 18)
11(7 16)	48(8 14)	150(9 12)	338(10 10)	611(11 8)	852(12 6)
51(13 4)	742(14 2)	297(15 0)	2(4 19)	14(5 17)	64(6 15)
01(7 13)	482(8 11)	914(9 9)	1386(10 7)	1688(11 5)	1574(12 3)
62(13 1)	1(2 20)	13(3 18)	63(4 16)	221(5 14)	563(6 12)
56(7 10)	1887(8 8)	2528(9 6)	2656(10 4)	2083(11 2)	771(12 0)
1(0 21)	8(1 19)	50(2 17)	193(3 15)	553(4 13)	1226(5 11)
91(6 9)	3195(7 7)	3765(8 5)	3446(9 3)	2076(10 1)	17(0 18)
13(1 16)	398(2 14)	1041(3 12)	2078(4 10)	3381(5 8)	4419(6 6)
50(7 4)	3557(8 2)	1364(9 0)	152(0 15)	600(1 13)	1518(2 11)
62(3 9)	4283(4 7)	5112(5 5)	4702(6 3)	2842(7 1)	546(0 12)
49(1 10)	3108(2 8)	4440(3 6)	4821(4 4)	3819(5 2)	1433(6 0)
57(0 9)	2539(1 7)	3669(2 5)	3664(3 3)	2307(4 1)	1353(0 6)
54(1 4)	2065(2 2)	852(3 0)	841(0 3)	760(1 1)	103(0 0)

4 4 4 1 1 1 0 0 0

1(21 3)	2(18 6)	2(19 4)	3(20 2)	1(21 0)	2(15 9)
4(16 7)	10(17 5)	10(18 3)	8(19 1)	2(12 12)	5(13 10)
6(14 8)	27(15 6)	36(16 4)	30(17 2)	15(18 0)	1(9 15)
3(10 13)	14(11 11)	33(12 9)	65(13 7)	87(14 5)	94(15 3)
57(16 1)	6(8 14)	21(9 12)	62(10 10)	118(11 8)	186(12 6)
07(12 4)	178(14 2)	63(15 0)	1(5 17)	7(6 15)	31(7 13)
85(8 11)	191(9 9)	301(10 7)	396(11 5)	378(12 3)	236(13 1)
1(3 8)	7(4 16)	32(5 14)	107(6 12)	236(7 10)	434(8 8)
03(9 6)	674(10 4)	523(11 2)	214(12 0)	5(2 17)	29(3 15)
96(4 13)	257(5 11)	496(6 9)	783(7 7)	957(8 5)	912(9 3)
53(10 1)	3(0 18)	16(1 16)	76(2 14)	216(3 12)	436(4 10)
30(5 8)	1168(6 6)	1239(7 4)	998(8 2)	365(9 0)	25(0 15)
24(1 13)	341(2 11)	715(3 9)	1112(4 7)	1399(5 5)	1315(6 3)
08(7 1)	135(0 12)	406(1 10)	836(2 8)	1218(3 6)	1388(4 4)
93(5 2)	442(6 0)	294(0 9)	716(1 7)	1039(2 5)	1080(3 3)
77(4 1)	411(0 6)	656(1 4)	640(2 2)	249(3 0)	245(0 3)
29(1 1)	43(0 0)				

4 4 3 3 2 0 0 0 0 0

1(19 7)	2(20 5)	2(21 3)	1(22 1)	1(16 10)	5(17 8)
9(18 6)	13(19 4)	11(20 2)	5(21 0)	1(13 13)	5(14 11)
6(15 9)	33(16 7)	48(17 5)	51(18 3)	33(19 1)	5(1 4)

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  13(12 12)      40(13 10)      82(14  8)     132(15  6)     154(16  4)     131(17  2)
  49(18  0)       1( 8 17)       7( 9 15)      29(10 13)      82(11 11)     175(12  9)
 287(13  7)     373(14  5)     363(15  3)     229(16  1)       1( 6 18)      12( 7 16)
  46( 8 14)     138( 9 12)     297(10 10)     523(11  8)     723(12  6)     800(13  4)
 629(14  2)     247(15  0)       3( 4 19)      16( 5 17)      67( 6 15)     193( 7 13)
 442( 8 11)     804( 9  9)    1202(10  7)    1442(11  5)    1344(12  3)     817(13  1)
   1( 2 20)      16( 3 18)      67( 4 16)     221( 5 14)     530( 6 12)    1048( 7 10)
1666( 8  8)    2195( 9  6)    2289(10  4)    1781(11  2)     663(12  0)       2( 0 21)
  10( 1 19)      58( 2 17)     199( 3 15)     541( 4 13)    1139( 5 11)    1983( 6  9)
2821( 7  7)    3289( 8  5)    2977( 9  3)    1789(10  1)      17( 0 18)     119( 1 16)
 391( 2 14)     986( 3 12)    1905( 4 10)    3032( 5  8)    3899( 6  6)    4054( 7  4)
3083( 8  2)    1174( 9  0)     157( 0 15)     576( 1 13)    1419( 2 11)    2599( 3  9)
3830( 4  7)    4498( 5  5)    4107( 6  3)    2464( 7  1)     505( 0 12)    1508( 1 10)
2790( 2  8)    3935( 3  6)    4228( 4  4)    3324( 5  2)    1245( 6  0)    1052( 0  9)
2306( 1  7)    3240( 2  5)    3202( 3  3)    2010( 4  1)    1191( 0  6)    1975( 1  4)
 798( 2  2)     740( 3  0)     737( 0  3)     660( 1  1)      89( 0  0)
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                           4  4  3  3  1  1  0  0  0  0
   1(20  5)      1(21  3)      1(22  1)      1(16 10)      3(17  8)       7(18  6)
  10(19  4)      9(20  2)      4(21  0)      3(14 11)     11(15  9)      26(16  7)
  39(17  5)     44(18  3)     28(19  1)      1(11 14)     10(12 12)     32(13 10)
  73(14  8)    118(15  6)    143(16  4)    121(17  2)     47(18  0)      3( 9 15)
  20(10 13)     66(11 11)    155(12  9)    267(13  7)    357(14  5)    351(15  3)
 223(16  1)      1( 6 18)      7( 7 16)     37( 8 14)    116( 9 12)    278(10 10)
 504(11  8)    725(12  6)    806(13  4)    646(14  2)    250(15  0)      1( 4 19)
  10( 5 17)     49( 6 15)    163( 7 13)    406( 8 11)    784( 9  9)   1214(10  7)
1491(11  5)   1406(12  3)    861(13  1)      2( 2 20)     11( 3 18)     57( 4 16)
 191( 5 14)    505( 6 12)   1035( 7 10)   1724( 8  8)   2313( 9  6)   2466(10  4)
1923(11  2)    728(12  0)      7( 1 19)     42( 2 17)    172( 3 15)    499( 4 13)
1127( 5 11)   2041( 6  9)   3000( 7  7)   3564( 8  5)   3275( 9  3)   1980(10  1)
  19( 0 18)    104( 1 16)    380( 2 14)    981( 3 12)   1996( 4 10)   3248( 5  8)
4296( 6  6)   4514( 7  4)   3486( 8  2)   1318( 9  0)    136( 0 15)    572( 1 13)
1459( 2 11)   2790( 3  9)   4204( 4  7)   5046( 5  5)   4657( 6  3)   2821( 7  1)
 545( 0 12)   1624( 1 10)   3109( 2  8)   4436( 3  6)   4860( 4  4)   3835( 5  2)
 461( 6  0)   1140( 0  9)   2605( 1  7)   3704( 2  5)   3719( 3  3)   2343( 4  1)
1394( 0  6)   2299( 1  4)   2132( 2  2)    865( 3  0)    854( 0  3)    782( 1  1)
 111( 0  0)
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                           4  4  3  2  2  1  0  0  0  0
   1(21  3)      1(22  1)      1(17  8)      4(18  6)      7(19  4)       8(20  2)
   3(20  0)      2(14 11)      8(15  9)     19(16  7)     34(17  5)      39(18  3)
  27(19  1)      1(11 14)      7(12 12)     26(13 10)     62(14  8)     107(15  6)
 137(16  4)    118(17  2)     49(18  0)      3( 9 15)     18(10 13)     62(11 11)
 147(12  9)    266(13  7)    363(14  5)    368(15  3)    234(16  1)      5( 7 16)
  82( 8 14)    112( 9 12)    277(10 10)    523(11  8)    771(12  6)     871(13  4)
 712(14  2)    272(15  0)      7( 5 17)     45( 6 15)    164( 7 13)     425( 8 11)
 652( 9  9)   1344(10  7)   1682(11  5)   1600(12  3)    988(13  1)      7( 3 18)
  47( 4 16)    191( 5 14)    535( 6 12)   1147( 7 10)   1957( 8  8)   2675( 9  6)
2887(10  4)   2261(11  2)    867(12  0)      4( 1 19)     38( 2 17)    173( 3 15)
 540( 4 13)   1277( 5 11)   2374( 6  9)   3557( 7  7)   4275( 8  5)   3903( 9  3)
2406(10  1)     14( 0 18)    103( 1 16)    407( 2 14)   1118( 3 12)   2346( 4 10)
3907( 5  8)   5246( 6  6)   5560( 7  4)   4328( 8  2)   1631( 9  0)    152( 0 15)
 657( 1 13)   1739( 2 11)   3404( 3  9)   5210( 4  7)   6326( 5  5)   5862( 6  3)
3576( 7  1)    644( 0 12)   1990( 1 10)   3883( 2  8)   5617( 3  6)   6214( 4  4)
4926( 5  2)   1891( 6  0)   1437( 0  9)   3326( 1  7)   4783( 2  5)   4837( 3  3)
3059( 4  1)   1806( 0  6)   3004( 1  4)   2810( 2  2)   1139( 3  0)   1129( 0  3)
1038( 1  1)    150( 0  0)
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                    4  4  3  2  1  1  1  0  0  0

   1(18  6)      2(19  4)      2(20  2)      1(21  0)      2(15  9)      7(16  7)
  13(17  5)     15(18  3)     11(19  1)      1(12 12)      8(13 10)     25(14  8)
  47(15  6)     63(16  4)     56(17  2)     22(18  0)      4(10 13)     21(12 11)
  63(12  9)    127(13  7)    183(14  5)    192(15  3)    124(16  1)      1( 7 16)
   8( 8 14)     41( 9 12)    124(10 10)    261(11  8)    411(12  6)    486(13  4)
 403(14  2)    157(15  0)      1( 5 17)     12( 6 15)     61( 7 13)    195( 8 11)
 433( 9  9)    740(10  7)    972(11  5)    951(12  3)    599(13  1)      1( 3 18)
  14( 4 16)     73( 5 14)    244( 6 12)    593( 7 10)   1095( 8  8)   1583( 9  6)
 771(10  4)   1421(11  2)    547(12  0)      1( 1 19)     11( 2 17)     66( 3 15)
 249( 4 13)    660( 5 11)   1339( 6  9)   2133( 7  7)   2673( 8  5)   2547( 9  3)
 572(10  1)      4( 0 18)     40( 1 16)    187( 2 14)    579( 3 12)   1327( 4 10)
2360( 5  8)   3313( 6  6)   3635( 7  4)   2883( 8  2)   1100( 9  0)     69( 0 15)
 341( 1 13)    985( 2 11)   2058( 3  9)   3317( 4  7)   4172( 5  5)   3975( 6  3)
2454( 7  1)    364( 0 12)   1208( 1 10)   2475( 2  8)   3727( 3  6)   4238( 4  4)
3423( 5  2)   1320( 6  0)    918( 0  9)   2213( 1  7)   3281( 2  5)   3384( 3  3)
2172( 4  1)   1236( 0  6)   2117( 1  4)   2003( 2  2)    819( 3  0)    810( 0  3)
 754( 1  1)    106( 0  0)
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                    4  4  3  1  1  1  1  1  0  0

   1(17  5)      1(18  3)      1(19  1)      1(14  8)      3(15  6)      6(16  4)
   5(17  2)      3(18  0)      1(11 11)      4(12  9)     12(13  7)     19(14  5)
  24(15  3)     16(16  1)      2( 9 12)      9(10 10)     26(11  8)     49(12  6)
  64(13  4)     59(14  2)     22(15  0)      3( 7 13)     15( 8 11)     47( 9  9)
  93(10  7)    140(11  5)    146(12  3)     97(13  1)      3( 5 14)     19( 6 12)
  64( 7 10)    144( 8  8)    234( 9  6)    288(10  4)    239(11  2)     99(12  0)
   3( 3 15)     19( 4 13)     72( 5 11)    176( 6  9)    325( 7  7)    444( 8  5)
 451( 9  3)    286(10  1)      2( 1 16)     14( 2 14)     62( 3 12)    176( 4 10)
 361( 5  8)    564( 6  6)    656( 7  4)    549( 8  2)    208( 9  0)      5( 0 15)
  36( 1 13)    128( 2 11)    316( 3  9)    564( 4  7)    769( 5  5)    767( 6  3)
 488( 7  1)     49( 0 12)    184( 1 10)    427( 2  8)    691( 3  6)    838( 4  4)
 692( 5  2)    279( 6  0)    155( 0  9)    413( 1  7)    647( 2  5)    700( 3  3)
 458( 4  1)    251( 0  6)    440( 1  4)    435( 2  2)    175( 3  0)    172( 0  3)
 166( 1  1)     27( 0  0)
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                    4  4  2  2  2  2  0  0  0  0

   1(20  2)      1(16  7)      2(17  5)      3(18  3)      3(19  1)      1(12 12)
   2(13 10)      6(14  8)     10(15  6)     17(16  4)     12(17  2)      8(18  0)
   1(10 13)      6(11 11)     16(12  9)     31(13  7)     46(14  5)     49(15  3)
  32(16  1)      4( 8 14)     12( 9 12)     38(10 10)     71(11  8)    116(12  6)
 129(13  4)    115(14  2)     36(15  0)      3( 6 15)     19( 7 13)     57( 8 11)
 127( 9  9)    212(10  7)    275(11  5)    268(12  3)    167(13  1)      6( 4 16)
  23( 5 14)     82( 6 12)    182( 7 10)    341( 8  8)    469( 9  6)    531(10  4)
 407(11  2)    171(12  0)      2( 2 17)     21( 3 15)     78( 4 13)    211( 5 11)
 417( 6  9)    660( 7  7)    814( 8  5)    767( 9  3)    471(10  1)      3( 1 18)
  13( 1 16)     67( 2 14)    190( 3 12)    442( 4 10)    752( 5  8)   1061( 6  6)
 126( 7  4)    908( 8  2)    327( 9  0)     19( 0 15)    113( 1 13)    518( 2 11)
 673( 3  9)   1063( 4  7)   1333( 5  5)   1257( 6  3)    772( 7  1)    132( 0 12)
 399( 1 10)    830( 2  8)   1210( 3  6)   1391( 4  4)   1092( 5  2)    459( 6  0)
 292( 0  9)    729( 1  7)   1064( 2  5)   1106( 3  3)    703( 4  1)    427( 0  6)
 693( 1  4)    675( 2  2)    261( 3  0)    257( 0  3)    249( 1  1)     43( 0  0)
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                    4  4  2  2  2  1  1  0  0  0

   1(16  7)      2(17  5)      3(18  3)      2(19  1)      2(13 10)      5(14  8)
   3(15  6)     16(16  4)     16(17  2)      6(18  0)      1(10 13)      5(11 11)
  19(12  9)     38(13  7)     60(14  5)     63(15  3)     42(16  1)      1( 8 14)
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   12( 9 12)      37(10 10)      91(11  8)     144(12  6)     181(13  4)     148(14  2)
   62(15  0)       3( 6 15)      18( 7 13)      68( 8 11)     160( 9  9)     290(10  7)
  386(11  5)     390(12  3)     244(13  1)       2( 4 16)      23( 5 14)      85( 6 12)
  233( 7 10)     443( 8  8)     674( 9  6)     756(10  4)     626(11  2)     234(12  0)
    3( 2 17)      21( 3 15)      95( 4 13)     268( 5 11)     580( 6  9)     943( 7  7)
 1218( 8  5)    1168( 9  3)     730(10  1)      13( 1 16)      67( 2 14)     244( 3 12)
  578( 4 10)    1086( 5  8)    1547( 6  6)    1743( 7  4)    1378( 8  2)     546( 9  0)
   31( 0 15)     144( 1 13)     453( 2 11)     968( 3  9)    1614( 4  7)    2054( 5  5)
 1993( 6  3)    1230( 7  1)     157( 0 12)     577( 1 10)    1205( 2  8)    1883( 3  6)
 2149( 4  4)    1778( 5  2)     670( 6  0)     472( 0  9)    1128( 1  7)    1720( 2  5)
 1783( 3  3)    1156( 4  1)     633( 0  6)    1130( 1  4)    1062( 2  2)     456( 3  0)
  453( 0  3)     410( 1  1)      54( 0  0)
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                            4  4  2  2  1  1  1  1  0  0
    1(14  8)       2(15  6)       4(16  4)       3(17  2)       2(18  0)       3(12  9)
    8(13  7)      15(14  5)      17(15  3)      12(16  1)       1( 9 12)       7(10 10)
   21(11  8)      43(12  6)      55(13  4)      52(14  2)      19(15  0)       1( 7 13)
   12( 8 11)      38( 9  9)      85(10  7)     127(11  5)     138(12  3)      90(13  1)
    2( 5 14)      16( 6 12)      57( 7 10)     136( 8  8)     227( 9  6)     285(10  4)
  239(11  2)      98(12  0)       2( 3 15)      17( 4 13)      65( 5 11)     174( 6  9)
  323( 7  7)     458( 8  5)     466( 9  3)     301(10  1)       1( 1 16)      13( 2 14)
   59( 3 12)     177( 4 10)     373( 5  8)     595( 6  6)     704( 7  4)     592( 8  2)
  228( 9  0)       5( 0 15)      35( 1 13)     134( 2 11)     332( 3  9)     614( 4  7)
  841( 5  5)     855( 6  3)     544( 7  1)      50( 0 12)     198( 1 10)     467( 2  8)
  774( 3  6)     943( 4  4)     793( 5  2)     315( 6  0)     175( 0  9)     465( 1  7)
  747( 2  5)     808( 3  3)     535( 4  1)     284( 0  6)     515( 1  4)     506( 2  2)
  210( 3  0)     208( 0  3)     197( 1  1)      29( 0  0)
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                            4  4  2  1  1  1  1  1  1  0
    1(14  5)       1(15  3)       1(16  1)       1(11  8)       2(12  6)       5(13  4)
    5(14  2)       2(15  0)       1( 9  9)       6(10  7)      11(11  5)      16(12  3)
   11(13  1)       2( 7 10)       8( 8  8)      22( 9  6)      32(10  4)      52(11  2)
   13(12  0)       2( 5 11)      12( 6  9)      30( 7  7)      55( 8  5)      62( 9  3)
   45(10  1)       2( 3 12)      10( 4 10)      35( 5  8)      68( 6  6)      97( 7  4)
   86( 8  2)      37( 9  0)       1( 1 13)       9( 2 11)      30( 3  9)      73( 4  7)
  114( 5  5)     131( 6  3)      86( 7  1)       2( 0 12)      18( 1 10)      52( 2  8)
  106( 3  6)     141( 4  4)     131( 5  2)      50( 6  0)      22( 0  9)      63( 1  7)
  117( 2  5)     135( 3  3)      93( 4  1)      41( 0  6)      86( 1  4)      80( 2  2)
   40( 3  0)      39( 0  3)      36( 1  1)       4( 0  0)
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                            4  4  1  1  1  1  1  1  1  1
    1(12  3)       1(11  2)       1(12  0)       2( 8  5)       2( 9  3)       2(10  1)
    1( 6  6)       2( 7  4)       3( 8  2)       2( 9  0)       2( 4  7)       3( 5  5)
    6( 6  3)       3( 7  1)       3( 3  6)       4( 4  4)       5( 5  2)       2( 6  0)
    2( 0  9)       1( 1  7)       5( 2  5)       6( 3  3)       4( 4  1)       1( 0  6)
    3( 1  4)       3( 2  2)       3( 3  0)       3( 0  3)       1( 1  1)       1( 0  0)
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                            4  3  3  3  3  0  0  0  0  0
    1(18  6)       1(20  2)       1(15  9)       2(16  7)       4(17  5)       4(18  3)
    3(19  1)       1(12 12)       3(13 10)       8(14  8)      12(15  6)      18(16  4)
   13(17  2)       8(18  0)       1( 9 15)       2(10 13)       9(11 11)      19(12  9)
   34(13  7)      46(14  5)      49(15  3)      29(16  1)       1( 7 16)       6( 8 14)
   16( 9 12)      40(10 10)      69(11  8)     105(12  6)     112(13  4)      99(14  2)
   32(15  0)       2( 5 17)       8( 6 15)      28( 7 13)      63( 8 11)     123( 9  9)
  184(10  7)     230(11  5)     216(12  3)     134(13  1)       2( 3 18)      10( 4 16)
   34( 5 14)      89( 6 12)     169( 7 10)     285( 8  8)     372( 9  6)     403(10  4)
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303(11 2)	128(12 0)	1(1 19)	8(2 17)	34(3 15)	90(4 13
203(5 11)	352(6 9)	514(7 7)	600(8 5)	552(9 3)	331(10 1
4(0 18)	20(1 16)	74(2 14)	182(3 12)	366(4 10)	573(5 8
763(6 6)	776(7 4)	613(8 2)	216(9 0)	27(0 15)	110(1 13
271(2 11)	518(3 9)	756(4 7)	906(5 5)	827(6 3)	496(7 1
107(0 12)	302(1 10)	583(2 8)	806(3 6)	890(4 4)	631(5 2
275(6 0)	209(0 9)	484(1 7)	676(2 5)	682(3 3)	422(4 1
270(0 6)	416(1 4)	402(2 2)	153(3 0)	152(0 3)	142(1 1
26(0 0)					

4 3 3 3 2 1 0 0 0 0

1(19 4)	1(20 2)	1(15 9)	3(16 7)	6(17 5)	8(18 3
6(19 1)	1(12 12)	5(13 10)	14(14 8)	27(15 6)	36(16 4
33(17 2)	14(18 0)	4(10 13)	16(11 11)	41(12 9)	80(13 7
114(14 5)	118(15 3)	79(16 1)	1(7 16)	9(8 14)	35(9 2)
92(10 10)	180(11 8)	273(12 6)	318(13 4)	262(14 2)	102(15 0)
2(5 17)	15(6 15)	59(7 13)	159(8 11)	326(9 9)	525(10 7)
667(11 5)	644(12 3)	399(13 1)	2(3 18)	19(4 16)	77(5 14)
219(6 12)	479(7 10)	826(8 8)	1140(9 6)	1242(10 4)	980(11 2)
372(12 0)	2(1 19)	16(2 17)	75(3 15)	239(4 13)	568(5 11)
1065(6 9)	1608(7 7)	1943(8 5)	1806(9 3)	1101(10 1)	6(0 18)
47(1 16)	188(2 14)	521(3 12)	1102(4 10)	1847(5 8)	2488(6 6)
2647(7 4)	2060(8 2)	782(9 0)	71(0 15)	316(1 13)	843(2 11)
1659(3 9)	2557(4 7)	3110(5 5)	2894(6 3)	1764(7 1)	517(0 12)
992(1 10)	1945(2 8)	2827(3 6)	3134(4 4)	2489(5 2)	950(6 0)
728(0 9)	1697(1 7)	2451(2 5)	2483(3 3)	1573(4 1)	929(0 6)
1561(1 4)	1458(2 2)	592(3 0)	590(0 3)	546(1 1)	77(0 0)

4 3 3 3 1 1 1 0 0 0

1(16 7)	1(17 5)	2(18 3)	1(19 1)		
9(15 6)	11(16 4)	11(17 2)	4(18 0)	1(13 10)	4(14 8)
27(13 7)	44(14 5)	45(15 3)	30(16 1)	3(11 11)	14(12 9)
30(10 10)	69(11 8)	111(12 6)	136(13 4)	1(8 14)	9(9 2)
3(6 15)	15(7 13)	55(8 11)	127(9 9)	111(14 2)	47(15 0)
300(12 3)	186(13 1)	1(3 18)	4(4 16)	226(10 7)	296(1 5)
193(7 10)	362(8 8)	535(9 6)	596(10 4)	23(5 14)	76(6 12)
4(2 17)	22(3 15)	86(4 13)	229(5 11)	489(11 2)	183(12 0)
967(8 5)	922(9 3)	572(10 1)	2(0 13)	477(6 9)	760(7 7)
216(3 12)	493(4 10)	890(5 8)	1253(6 6)	15(1 16)	63(2 14)
430(9 0)	28(0 15)	128(1 13)	383(2 11)	1386(7 4)	1093(8 2)
1643(5 5)	577(6 3)	969(7 1)	141(0 12)	802(3 9)	1303(4 7)
1511(3 6)	1711(4 4)	1399(5 2)	531(6 0)	480(1 10)	990(2 8)
1359(2 5)	1405(3 3)	901(4 1)	511(0 6)	380(0 9)	906(1 7)
353(3 0)	349(0 3)	317(1 1)	46(0 0)	386(1 4)	835(2 2)

4 3 3 2 2 2 0 0 0 0

1(21 0)	1(17 5)	2(18 3)	2(19 1)		
7(15 6)	9(16 4)	12(17 2)	2(18 0)	1(13 10)	2(14 8)
12(12 9)	24(13 7)	37(14 5)	42(15 3)	1(10 13)	4(11 11)
11(9 12)	29(10 10)	65(11 8)	98(12 6)	27(16 1)	2(8 4)
45(15 0)	4(6 15)	19(7 13)	58(8 11)	125(13 4)	97(14 2)
278(11 5)	271(12 3)	171(13 1)	4(4 16)	126(9 9)	213(10 7)
197(7 10)	350(8 8)	511(9 6)	550(10 4)	25(5 14)	84(6 12)
4(2 17)	24(3 15)	92(4 13)	239(5 11)	454(11 2)	163(12 0)
921(8 5)	867(9 3)	531(10 1)	1(0 18)	477(6 9)	745(7 7)
224(3 12)	499(4 10)	888(5 8)	1211(6 6)	5(1 16)	70(2 14)
408(9 0)	29(0 15)	135(1 13)	393(2 11)	1332(7 4)	1026(8 2)
				810(3 9)	1289(4 7)

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1600( 5  5)    1513( 6  3)     924( 7  1)     144( 0 12)     490( 1 10)     986( 2  8)
1492( 3  6)    1660( 4  4)    1355( 5  2)     502( 6  0)     382( 0  9)     902( ?  7)
 336( 2  5)    1367( 3  3)     876( 4  1)     500( 0  6)     873( 1  4)     809( 2  2)
 347( 3  0)     343( 0  3)     311( 1  1)      41( 0  0)
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                          4   3   3   2   2   1   1   0   0   0
   ?(17  5)       1(18  3)        1(19  1)        3(14  8)        6(15  6)       11(16  4)
   9(17  2)       5(18  0)        3(11 11)       11(12  9)       28(13  7)       43(14  5)
  49(15  3)      32(16  1)        1( 8 14)        8( 9 12)       32(10 10)       73(11  8)
 128(12  6)     154(13  4)      136(14  2)       50(15  0)        2( 6 15)       17( 7 13)
  60( 8 11)     152( 9  9)      271(10  7)      374(11  5)      373(12  3)      239(13  1)
   3( 4 16)      22( 5 14)       91( 6 12)      235( 7 10)      466( 8  8)      688( 9  6)
 798(10  4)     639(11  2)      257(12  0)        2( 2 17)       23( 3 15)       99( 4 13)
 294( 5 11)     623( 6  9)     1034( 7  7)     1320( 8  5)     1281( 9  3)      794(10  1)
   1( 0 18)      14( 1 16)       81( 2 14)      273( 3 12)      671( 4 10)     1227( 5  8)
1780( 6  6)    1966( 7  4)     1591( 8  2)      597( 9  0)       29( 0 15)      168( 1 13)
 515( 2 11)    1135( 3  9)     1871( 4  7)     2408( 5  5)     2315( 6  3)     1441( 7  1)
 201( 0 12)     683( 1 10)     1464( 2  8)     2236( 3  6)     2599( 4  4)     2398( 5  2)
 830( 6  0)     543( 0  9)     1366( 1  7)     2056( 2  5)     2159( 3  3)     1389( 4  1)
 802( 0  6)    1371( 1  4)     1328( 2  2)      533( 3  0)      531( 0  3)      505( ?  1)
  79( 0  0)
```

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                          4   3   3   2   1   1   1   1   0   0
   1(15  6)       1(16  4)        2(17  2)        1(12  9)        5(13  7)        9(14  5)
  11(15  3)       8(16  1)        4(10 10)       15(11  8)       30(12  6)       43(13  4)
  37(14  2)      17(15  0)        1( 7 13)        9( 8 11)       33( 9  9)       71(10  7)
 111(11  5)     119(12  3)       79(13  1)        2( 5 14)       14( 6 12)       53( 7 10)
  25( 8  8)     216( 9  6)      265(10  4)      231(11  2)       87(12  0)        2( 3 15)
  16( 4 13)      66( 5 11)      172( 6  9)      328( 7  7)      459( 8  5)      473( 9  3)
 303(10  1)       2( 1 16)       13( 2 14)       62( 3 12)      184( 4 10)      394( 5  8)
 624( 6  6)     749( 7  4)      620( 8  2)      248( 9  0)        5( 0 15)       38( 1 13)
 143( 2 11)     363( 3  9)      667( 4  7)      923( 5  5)      932( 6  3)      598( 7  1)
  54( 0 12)     220( 1 10)      517( 2  8)      866( 3  6)     1051( 4  4)      894( 5  2)
 247( 6  0)     296( 0  9)      528( 1  7)      846( 2  5)      922( 3  3)      608( 4  1)
 324( 0  6)     592( 1  4)      580( 2  2)      245( 3  0)      240( 0  3)      229( 1  1)
  32( 0  0)
```

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                          4   3   3   1   1   1   1   1   ?   0
   1(15  3)       1(12  6)        2(13  4)        3(14  2)        1(15  0)        ?( 9  9)
   3(10  7)       8(11  5)        9(12  3)        8(13  ?)        1( 7 10)        6( 8  8)
  15( 9  6)      24(10  4)       22(11  2)       11(12  0)        2( 5 11)        8( 6  9)
  25( 7  7)      41( 8  5)       51( 9  3)       34(10  ?)        1( 3 12)        9( 4 10)
  28( 5  8)      59( 6  6)       80( 7  4)       76( 8  2)       28( 9  0)        1( 1 13)
   6( 2 11)      27( 3  9)       60( 4  7)      102( 5  5)      113( 6  3)       77( 7  1)
   3( 0 12)      15( 1 10)       49( 2  8)       94( 3  6)      132( 4  4)      116( 5  2)
  51( 5  0)      16( 0  9)       58( 1  7)      103( 2  5)      124( 3  3)       85( 4  1)
  43( 0  6)      79( 1  4)       86( 2  2)       34( 3  0)       33( 0  3)       34( ?  1)
   6( 0  0)
```

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                          4   3   2   2   2   2   1   0   0   0
   1(16  4)       1(17  2)        1(12  9)        3(13  7)        6(14  5)        7(15  3)
   5(16  1)       1( 9 12)        5(10 10)       13(11  8)       24(12  6)       31(13  4)
  27(14  2)      11(15  0)        2( 7 13)       11( 8 11)       31( 9  9)       63(10  7)
  88(13  5)      90(12  3)       59(13  1)        3( 5 14)       17( 6 12)       56( 7 10)
  19( 8  8)     187( 9  6)      219(10  4)      181(11  2)       69(12  0)        3( 3 15)
   2( 4  3)      73( 5 11)      175( 6  9)      305( 7  7)      404( 8  5)      396( 9  3)
```

249(10 1)	2(1 16)	17(2 14)	71(3 12)	196(4 10)	387(5 8)
579(6 6)	663(7 4)	535(8 2)	206(9 0)	6(0 15)	45(1 13)
157(2 11)	369(3 9)	646(4 7)	852(5 5)	836(6 3)	525(7 1)
60(0 12)	230(1 10)	515(2 8)	825(3 6)	976(4 4)	808(5 2)
313(6 0)	197(0 9)	514(1 7)	802(2 5)	853(3 3)	560(4 1)
309(0 6)	558(1 4)	541(2 2)	224(3 0)	224(0 3)	215(1 1)
29(0 0)					

4 3 2 2 2 1 1 1 0 0

1(13 7)	2(14 5)	3(15 3)	2(16 1)	1(10 10)	5(11 8)
11(12 6)	16(13 4)	15(14 2)	6(15 0)	3(8 11)	13(9 9)
31(10 7)	50(11 5)	56(12 3)	37(13 1)	5(6 12)	23(7 10)
61(8 8)	110(9 6)	140(10 4)	122(11 2)	49(12 0)	6(4 13)
31(5 11)	91(6 9)	181(7 7)	264(8 5)	275(9 3)	179(10 1)
5(2 14)	30(3 12)	102(4 10)	231(5 8)	382(6 6)	465(7 4)
393(8 2)	156(9 0)	2(0 15)	19(1 13)	82(2 11)	223(3 9)
426(4 7)	604(5 5)	623(6 3)	400(7 1)	32(0 12)	137(1 10)
342(2 8)	587(3 6)	730(4 4)	625(5 2)	247(6 0)	131(0 9)
366(1 7)	602(2 5)	667(3 3)	444(4 1)	236(0 6)	435(1 4)
435(2 2)	184(3 0)	181(0 3)	174(1 1)	27(0 0)	

4 3 2 2 1 1 1 1 1 0

1(12 6)	2(13 4)	2(14 2)	1(15 0)	3(10 7)	7(11 5)
10(12 3)	7(13 1)	1(7 10)	6(8 8)	17(9 6)	27(10 4)
27(11 2)	11(12 0)	1(5 11)	9(6 9)	27(7 7)	52(8 5)
62(9 3)	44(10 1)	1(3 12)	10(4 10)	35(5 8)	74(6 6)
107(7 4)	99(8 2)	42(9 0)	1(1 13)	8(2 11)	33(3 9)
83(4 7)	138(5 5)	160(6 3)	109(7 1)	3(0 12)	23(1 10)
65(2 8)	134(3 6)	187(4 4)	173(5 2)	70(6 0)	25(0 9)
83(1 7)	155(2 5)	185(3 3)	130(4 1)	60(0 6)	122(1 4)
127(2 2)	56(3 0)	54(0 3)	53(1 1)	8(0 0)	

4 3 2 1 1 1 1 1 1 1

1(13 1)	1(10 4)	2(11 2)	1(12 0)	2(8 5)	4(9 3)
4(10 1)	2(6 6)	7(7 4)	8(8 2)	3(9 0)	3(4 7)
8(5 5)	12(6 3)	10(7 1)	2(2 8)	7(3 6)	14(4 4)
15(5 2)	6(6 0)	5(1 7)	11(2 5)	15(3 3)	13(4 1)
4(0 6)	1(1 4)	12(2 2)	5(3 0)	4(0 3)	6(1 1)

4 2 2 2 2 2 2 0 0 0

1(12 6)	1(14 2)	1(9 9)	2(10 7)	3(11 5)	3(12 3)
2(13 1)	1(6 12)	1(7 10)	7(8 8)	8(9 6)	13(10 4)
7(11 2)	6(12 0)	3(5 11)	9(6 9)	18(7 7)	25(8 5)
26(9 3)	15(10 1)	1(2 14)	3(3 12)	14(4 10)	25(5 8)
47(6 6)	48(7 4)	46(8 2)	12(9 0)	2(1 13)	9(2 11)
28(3 9)	51(4 7)	74(5 5)	73(6 3)	47(7 1)	6(0 12)
17(1 10)	49(2 8)	75(3 6)	100(4 4)	76(5 2)	38(6 0)
15(0 9)	50(1 7)	79(2 5)	92(3 3)	59(4 1)	39(0 6)
59(1 4)	68(2 2)	22(3 0)	23(0 3)	25(1 1)	7(0 0)

4 2 2 2 2 2 1 1 0 0

1(13 4)	1(15 0)	1(9 9)	2(10 7)	4(11 5)	4(12 3)
3(13 1)	2(7 10)	5(3 8)	12(9 6)	13(10 4)	15(11 2)
3(12 0)	3(5 11)	10(6 9)	24(7 7)	35(8 5)	38(9 3)
24(10 1)	3(3 12)	12(4 10)	35(5 8)	57(6 6)	77(7 4)

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   60( 8   2)      29( 9   0)       2( 1  13)     11( 2  11)     36( 3   9)      75( 4   7)
  110( 5   5)     114( 6   3)      75( 7   1)      4( 0  12)     23( 1  10)      61( 2   8)
  116( 3   6)     144( 4   4)     131( 5   2)     47( 6   0)     25( 0   9)      75(     7)
  128( 2   5)     147( 3   3)      99( 4   1)     50( 0   6)    101( 1   4)      99( 2   2)
   46( 3   0)      44( 0   3)      43( 1   1)      6( 0   0)
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                                    4   2   2   2   2   1   1   1   1   0
    1(11   5)       1(12   3)       1(13   1)       1( 8   8)
    4(11   2)       2(12   0)       1( 6   9)       6( 7   7)        2( 9   6)       5(10   4)
   10(10   1)       2( 4  10)       7( 5   8)      19( 6   6)       10( 8   5)      14( 9   3)
   10( 9   0)       1( 2  11)       8( 3   9)      21( 4   7)       26( 7   4)      27( 8   2)
   33( 7   1)       1( 0  12)       5( 1  10)      20( 2   8)       40( 5   5)      45( 6   3)
   55( 5   2)      25( 6   0)       6( 0   9)      27( 1   7)       40( 3   6)      62( 4   4)
   44( 4   1)      23( 0   6)      43( 1   4)      50( 2   2)       50( 2   5)      65( 3   3)
   21( 1   1)       4( 0   0)                                       19( 3   0)      18( 0   3)
```

```
                                    4   2   2   2   1   1   1   1   1   1
    1(11   2)       2( 9   3)       1(10   1)       1( 6   6)
    3( 9   0)       4( 5   5)       5( 6   3)       5( 7   1)        3( 7   4)       3( 8   2)
    7( 4   4)       9( 5   2)       3( 6   0)       2( 1   7)        1( 2   8)       4( 3   6)
    6( 4   1)       3( 0   6)       6( 1   4)       7( 2   2)        5( 2   5)      10( 3   3)
    3( 1   1)       1( 0   0)                                        4( 3   0)       3( 0   3)
```

```
                                    3   3   3   3   3   1   0   0   0   0
    1(16   4)       1(18   0)       1(12   9)       2(13   7)
    3(16   1)       1( 9  12)       3(10  10)       6(11   8)        3(14   5)       4(15   3)
   14(14   2)       3(15   0)       1( 6  15)       3( 7  13)       12(12   6)      13(13   4)
   29(10   7)      38(11   5)      38(12   3)      24(13   1)        8( 8  11)      17( 9   9)
    4( 6  12)      30( 7  10)      55( 8   8)      74( 9   6)        1( 4  16)       4( 5  14)
   30(12   0)       1( 2  17)       6( 3  15)      19( 4  13)       87(10   4)      64(11   2)
  124( 7   7)     152( 8   5)     141( 9   3)      36(10   1)       44( 5  11)      62( 6   9)
   44( 3  12)      95( 4  10)     156( 5   8)     214( 6   6)        4( 1  16)      16( 2  14)
   62( 9   0)       7( 0  15)      30( 1  13)      79( 2  11)      222( 7   4)     180( 8   2)
  285( 5   5)     266( 6   3)     161( 7   1)      31( 0  12)      154( 3   9)     236( 4   7)
  269( 3   6)     304( 4   4)     233( 5   2)      96( 6   0)       94( 1  10)     189( 2   8)
  242( 2   5)     245( 3   3)     156( 4   1)      95( 0   6)       72( 0   9)     166(     7)
   57( 3   0)      59( 0   3)      55( 1   1)      10( 0   0)      156( 1   4)     149( 2   2)
```

```
                                    3   3   3   3   2   2   0   0   0   0
    1( 7   2)       1(13   7)       2(14   5)       3(15   3)
    2(18  10)       6(11   8)       9(12   6)      13(13   4)        2(15   1)       1( 9   2)
    2( 7  13)       6( 8  11)      15( 9   9)      25(10   7)       10(14   2)       6(15   0)
   23(13   1)       1( 4  16)       4( 5  14)      13( 6  12)       36(11   5)      55(12   3)
   80( 9   6)      87(10   4)      72(11   2)      25(12   0)       31( 7  10)      54( 8   8)
   43( 5  11)      83( 6   9)     132( 7   7)     160( 8   5)        5( 3  15)      15( 4  13)
    1( 0   8)       3( 1  16)      17( 2  14)      46( 3  12)      154( 9   3)      93(10   1)
  239( 6   6)     259( 7   4)     200( 8   2)      78( 9   0)      102( 4  10)     176( 5   8)
   85( 2  11)     171( 3   9)     265( 4   7)     331( 5   5)        4( 0  15)      50( 1  13)
   37( 0   2)     109( 1  10)     221( 2   8)     325( 3   6)      307( 6   3)     190( 7   1)
   20( 6   0)      78( 0   9)     200( 1   7)     290( 2   5)      361( 4   4)     290( 5   2)
  118( 0   6)     196( 1   4)     185( 2   2)      75( 3   0)      300( 3   3)     189( 4   1)
    0( 0   0)                                                       73( 0   3)      70(     )
```

```
                                    3   3   3   3   2   1   1   0   0   0
    1(13   7)       2(14   5)       2(15   3)       2(16   1)
                                                                    2(10  10)       5(11   8)
```

10(12 6)	13(13 4)	12(14 2)	4(15 0)	1(7 13)	6(8 11)
15(9 9)	30(10 7)	42(11 5)	44(12 3)	28(13 1)	3(5 14)
11(6 12)	32(7 10)	63(8 8)	96(9 6)	112(10 4)	92(11 2)
35(12 0)	1(2 17)	4(3 15)	28(4 13)	48(5 11)	104(6 9)
168(7 7)	217(8 5)	208(9 3)	131(10 1)	3(1 16)	15(2 14)
52(3 12)	122(4 10)	224(5 8)	319(6 6)	355(7 4)	283(8 2)
109(9 0)	8(0 15)	35(1 13)	107(2 11)	223(3 9)	370(4 7)
465(5 5)	447(6 3)	277(7 1)	38(0 12)	142(1 10)	294(2 8)
454(3 6)	519(4 4)	424(5 2)	161(6 0)	119(0 9)	285(1 7)
433(2 5)	446(3 3)	289(4 1)	162(0 6)	290(1 4)	274(2 2)
114(3 0)	117(0 3)	108(1 1)	13(0 0)		

3 3 3 3 1 1 1 1 0 0

1(11 8)	1(12 6)	3(13 4)	1(14 2)	2(15 0)	2(9 9)
5(10 7)	8(11 5)	9(12 3)	6(13 1)	1(6 12)	5(7 10)
12(8 8)	23(9 6)	26(10 4)	26(11 2)	7(12 0)	2(4 13)
8(5 11)	20(6 9)	40(7 7)	56(8 5)	58(9 3)	37(10 1)
1(1 16)	2(2 14)	10(3 12)	26(4 10)	57(5 8)	86(6 6)
108(7 4)	83(8 2)	39(9 0)	1(0 15)	6(1 13)	23(2 11)
56(3 9)	101(4 7)	140(5 5)	141(6 3)	90(7 1)	8(0 12)
36(1 10)	82(2 8)	140(3 6)	165(4 4)	146(5 2)	51(6 0)
34(0 9)	88(1 7)	140(2 5)	153(3 3)	101(4 1)	52(5 6)
101(1 4)	94(2 2)	45(3 0)	42(0 3)	39(1 1)	5(0 0)

3 3 3 2 2 2 1 0 0 0

1(15 3)	1(11 8)	3(12 6)	4(13 4)	4(14 2)	2(15 0)
2(8 11)	6(9 9)	12(10 7)	19(11 5)	19(12 3)	13(13 1)
1(5 14)	5(6 12)	15(7 10)	32(8 8)	51(9 6)	59(10 4)
49(11 2)	20(12 0)	1(3 15)	7(4 13)	24(5 11)	57(6 9)
97(7 7)	127(8 5)	126(9 3)	77(10 1)	1(1 16)	7(2 14)
28(3 12)	72(4 10)	140(5 8)	205(6 6)	230(7 4)	186(8 2)
71(9 0)	8(0 15)	18(1 13)	63(2 11)	144(3 9)	245(4 7)
319(5 5)	310(6 3)	192(7 1)	25(0 12)	93(1 10)	235(2 8)
325(3 6)	377(4 4)	309(5 2)	122(6 0)	82(0 9)	256(1 7)
320(2 5)	338(3 3)	218(4 1)	126(0 6)	222(1 4)	216(2 2)
90(3 0)	92(0 3)	84(1 1)	14(0 0)		

3 3 3 2 2 1 1 1 0 0

1(12 6)	1(13 4)	2(14 2)	2(9 9)	5(10 7)	9(11 5)
10(12 3)	7(13 1)	1(6 12)	5(7 10)	15(8 8)	25(9 6)
36(10 4)	28(11 2)	14(12 0)	2(4 13)	10(5 11)	27(6 9)
55(7 7)	78(8 5)	82(9 3)	53(10 1)	2(2 14)	11(3 12)
37(4 10)	78(5 8)	131(6 6)	152(7 4)	134(8 2)	47(9 0)
1(0 15)	8(1 13)	32(2 11)	84(3 9)	156(4 7)	239(5 5)
222(6 3)	143(7 1)	13(0 12)	54(1 10)	134(2 8)	221(3 6)
279(4 4)	229(5 2)	97(6 0)	51(0 9)	144(1 7)	232(2 5)
257(3 3)	170(4 1)	95(0 6)	169(1 4)	174(2 2)	67(3 0)
68(0 3)	69(1 1)	12(0 0)			

3 3 3 2 1 1 1 1 1 0

1(11 5)	1(12 3)	1(13 1)	1(8 8)	3(9 6)	5(10 4)
5(11 2)	2(12 0)	2(6 9)	7(7 7)	13(8 5)	16(9 3)
11(10 1)	1(3 12)	3(4 10)	11(5 8)	23(6 6)	32(7 4)
30(8 2)	12(9 0)	3(2 11)	11(3 9)	27(4 7)	40(5 5)
52(6 3)	36(7 1)	1(0 12)	8(1 10)	23(2 8)	47(3 6)
56(4 4)	60(5 2)	25(6 0)	10(0 9)	30(1 7)	50(2 5)

TABLE. IRREDUCIBLE REPRESENTATIONS OF SU(3) CONTAINED IN A PARTITION OF U(10)

```
  67( 3  3)      47( 4  1)      21( 0  6)      44( 1  4)      47( 2  2)
  20( 0  3)      20( 1  1)       3( 0  0)                     20( 3  0)


                            3  3  3  1  1  1  1  1  1  1  1
   1(12  0)      1( 9  3)      1( 6  6)      1( 7  4)
   3( 6  3)      2( 7  1)      1( 2  8)      2( 3  6)      3( 8  2)       2( 5  5)
   4( 6  0)      1( 1  7)      2( 2  5)      5( 3  3)      5( 4  4)       3( 5  2)
   2( 1  4)      5( 2  2)      1( 3  0)      1( 0  3)      3( 4  1)       3( 0  6)
                                                          1( 1  1)       2( 0  0)


                            3  3  2  2  2  2  2  0  0  0
   1(10  7)      1(11  5)      1(12  3)      1(13  1)      1( 7 10)       3( 8  8)
   5( 9  6)      6(10  4)      5(11  2)      2(12  0)      1( 4 13)       2( 5 11)
   8( 6  9)     13( 7  7)     19( 8  5)     18( 9  3)     11(10  1)       3( 3 12)
   9( 4 10)     22( 5  8)     33( 6  6)     40( 7  4)     31( 8  2)      13( 9  0)
   1( 0 15)      2( 1 13)     12( 2 11)     25( 3  9)     49( 4  7)      63( 5  5)
  64( 6  3)     39( 7  1)      2( 0 12)     17( 1 10)     38( 2  8)      69( 3  6)
  80( 4  4)     70( 5  2)     25( 6  0)     21( 0  9)     46( 1  7)      78( 2  5)
  81( 3  3)     55( 4  1)     25( 0  6)     56( 1  4)     51( 2  2)      25( 3  0)
  27( 0  3)     23( 1  1)      2( 0  0)


                            3  3  2  2  2  2  1  1  0  0
   1(11  5)      1(12  3)      1(13  1)      1( 7 10)       3( 8  8)       6( 9  6)
   8(10  4)      7(11  2)      3(12  0)      2( 5 11)       7( 6  9)      18( 7  7)
  23( 8  5)     25( 9  3)     16(10  1)      3( 3 12)      11( 4 10)     28( 5  8)
  47( 6  6)     58( 7  4)     49( 8  2)     19( 9  0)       2( 1 13)     10( 2 11)
  32( 5  9)     63( 4  7)     92( 5  5)     94( 6  3)      61( 7  1)       5( 0 12)
  22( 1 10)     58( 2  8)    102( 3  6)    129( 4  4)     110( 5  2)      44( 6  0)
  22( 0  9)     68( 1  7)    114( 2  5)    129( 3  3)      86( 4  1)      48( 0  6)
  89( 1  4)     91( 2  2)     38( 3  0)     38( 0  3)      38( 1  1)       6( 1  0)


                            3  3  2  2  2       1  1     0
   1( 9  6)      2(10  4)      2(11  2)      1(12  0)       1( 6  9)       6( 7  7)
   7( 8  5)      8( 9  3)      6(10  1)      1( 4 10)       6( 5  8)      13( 6  6)
  20( 7  4)     19( 8  2)      8( 9  0)      2( 2  7)       7( 3  9)      20( 4  7)
  32( 5  5)     39( 6  3)     26( 7  1)      5( 1 10)      16( 2  8)      36( 3  6)
  50( 4  4)     48( 5  2)     19( 6  0)      8( 0  9)      24( 1  7)      46( 2  5)
  56( 3  3)     41( 4  1)     17( 0  6)     39( 1  4)      40( 2  2)      19( 3  0)
  20( 0  3)     18( 1  1)      2( 0  0)


                            3  3  2  2  1  1  1
   1( 9  3)      1(10  1)      2( 7  4)      2( 8  2)       1( 9  0)       1( 4  7)
   3( 5  5)      5( 6  3)      4( 7  1)      3( 3  6)       5( 4  4)       7( 3  2)
   3( 6  0)      1( 0  9)      2( 1  7)      6( 2  5)       8( 3  3)       6( 2  1)
   1( 0  6)      5( 1  4)      6( 2  2)      3( 3  0)       3( 0  3)       5( 1  1)


                            3  2  2  2  2  2  2  0  0
   1( 7  7)      1( 8  5)      1( 9  3)      1(10  1)       1( 4 10)       2( 5  8)
   5( 6  6)      5( 7  4)      5( 8  2)      1( 9  0)       1( 2 11)       4( 3  9)
   8( 4  7)     13( 5  5)     13( 6  3)      8( 7  1)       3( 1  0)       9( 2  8)
  16( 3  6)     22( 4  4)     18( 5  2)      8( 5  0)       4( 0  9)     10( 1  7)
  22( 2  5)     26( 3  3)     17( 4  1)     10( 1  6)      18( 1  4)      21( 2  0)
   8( 3  0)      8( 0  3)      9( 1  1)      2( 0  0)
```

	3	2	2	2	2	2	1	1	1	0
1(9 3)	1(5 8)	2(6 4)	3(7 4)	3(8 2)	1(9 0)
1(3 9)	4(4 7)	7(5 5)	8(6 3)	6(7 1)	1(1 10)
4(2 8)	10(3 6)	14(4 4)	13(5 2)	6(6 0)	2(0 9)
7(1 7)	15(2 5)	18(3 3)	13(4 1)	6(0 6)	14(1 4)
15(2 2)	6(3 0)	7(0 3)	7(1 1)	1(0 0)	

	3	2	2	2	2	1	1	1	1	1
1(8 2)	1(5 5)	1(6 3)	2(7 1)	1(3 6)	3(4 4)
2(5 2)	2(6 0)	1(1 7)	2(2 5)	4(3 3)	3(4 1)
1(0 6)	3(1 4)	4(2 2)	1(0 3)	2(1 1)	1(0 0)

	2	2	2	2	2	2	2	2	0	0
1(2 8)	2(4 4)	1(6 0)	1(1 7)	1(2 5)	1(3 3)
1(4 1)	1(0 6)	1(1 4)	2(2 2)	1(1 1)	

	2	2	2	2	2	2	2	1	1	0
1(3 6)	1(4 4)	1(5 2)	1(0 9)	1(1 7)	2(2 5)
2(3 3)	2(4 1)	2(1 4)	1(2 2)	1(3 0)	2(0 3)
1(1 1)					

	2	2	2	2	2	2	1	1	1	1
1(6 0)	1(2 5)	1(3 3)	1(2 2)	1(0 3)	

	4	4	4	4	1	0	0	0	0	0
1(20 8)	1(21 6)	1(22 4)	1(23 2)	1(17 11)	2(18 9)
5(19 7)	7(20 5)	6(21 3)	4(22 1)	2(15 12)	7(16 10)
15(17 8)	23(18 6)	26(19 4)	20(20 2)	8(21 0)	1(12 15)
5(13 13)	17(14 11)	36(15 9)	59(16 7)	75(17 5)	71(18 3)
43(19 1)	2(10 16)	11(11 14)	31(12 12)	72(13 10)	124(14 8)
170(15 6)	183(16 4)	144(17 2)	53(18 0)	1(7 19)	5(8 17)
19(9 15)	56(10 12)	123(11 11)	224(12 9)	326(13 7)	386(14 5)
354(15 3)	214(16 1)	2(5 20)	7(6 18)	28(7 16)	79(8 14)
184(9 12)	341(10 10)	504(11 8)	690(12 6)	703(13 4)	556(14 2)
204(15 0)	1(2 22)	2(3 21)	11(4 19)	35(5 17)	101(6 15)
236(7 13)	465(8 11)	754(9 9)	1040(10 7)	1174(11 5)	1047(12 3)
624(13 1)	2(3 20)	7(2 22)	33(1 18)	90(4 16)	254(5 14)
525(6 12)	924(7 10)	1351(8 8)	1673(9 6)	1677(10 4)	1251(11 2)
467(12 0)	5(2 21)	27(1 19)	80(2 17)	220(3 15)	509(4 13)
958(5 11)	1531(4 9)	2039(7 7)	2272(8 5)	1994(9 3)	1175(10 1)
24(0 19)	129(1 16)	360(2 14)	806(3 12)	1417(4 10)	2107(5 8)
2578(6 6)	2599(7 4)	1929(8 2)	721(9 0)	142(0 15)	401(1 13)
1031(2 11)	1758(3 9)	2453(4 7)	2771(5 5)	2467(6 3)	1455(7 1)
362(0 12)	1001(1 10)	1751(2 8)	2244(3 6)	2460(4 4)	1393(5 2)
707(6 0)	660(1 9)	1364(1 7)	1853(2 5)	1793(3 3)	1105(4 1)
674(0 6)	1085(1 4)	969(2 2)	396(3 0)	396(0 3)	346(1 1)
45(0 0)					

	4	4	4	4	0	0	0	0	0	0
1(21 6)	1(22 4)	1(23 2)	2(18 9)	5(19 7)	7(20 5)
8(21 3)	5(22 1)	3(18 12)	7(16 11)	18(17 9)	29(18 6)
37(19 4)	29(20 2)	15(21 0)	1(12 15)	6(13 13)	20(14 11)
49(15 9)	85(16 7)	104(17 5)	112(18 3)	71(19 1)	5(10 16)
14(11 14)	46(12 12)	109(13 10)	195(14 8)	282(15 6)	310(16 4)
252(17 2)	94(18 0)	1(7 19)	6(8 17)	28(9 15)	85(10 13)
202(11 11)	376(12 9)	571(13 7)	692(14 5)	649(15 3)	395(16 1)
1(5 20)	10(6 18)	42(7 16)	131(8 14)	317(9 12)	614(10 10)
983(11 8)	1282(12 6)	1351(13 4)	1038(14 2)	398(15 0)	2(3 21)
12(4 19)	53(5 17)	169(6 15)	423(7 13)	857(8 11)	1449(9 9)

2027(10 7)	2336(11 5)	2105(12 3)	1261(13 1)	1(1 22)	10(2 20)
49(3 18)	173(4 16)	466(5 14)	1013(6 12)	1825(7 10)	2740(8 8)
3426(9 6)	3479(10 4)	2640(11 2)	980(12 0)	4(0 21)	31(1 19)
132(2 17)	411(3 15)	986(4 13)	1938(5 11)	3155(6 9)	4303(7 7)
4833(8 5)	4286(9 3)	2537(10 1)	500(0 18)	241(1 16)	726(2 14)
1649(3 12)	3007(4 10)	4532(5 8)	5640(6 6)	5695(7 4)	4274(8 2)
1602(9 0)	267(0 15)	954(1 13)	2181(2 11)	3833(3 9)	5416(4 7)
6208(5 5)	5548(6 3)	3299(7 1)	800(0 12)	2207(1 10)	3943(2 8)
5361(3 6)	5656(4 4)	4367(5 2)	1638(6 0)	1446(0 9)	3119(1 7)
4260(2 5)	4158(3 3)	2576(4 1)	1585(0 6)	2543(1 4)	2304(2 2)
930(3 0)	920(0 3)	829(1 1)	115(0 0)		

4 4 4 3 1 1 0 0 0 0

1(22 4)	1(24 0)	1(18 9)	3(19 7)	5(20 5)	6(21 3)
4(22 1)	1(16 12)	5(16 10)	12(17 8)	24(18 6)	27(19 4)
27(20 2)	7(21 0)	3(13 13)	15(14 11)	38(15 9)	71(16 7)
97(17 5)	98(18 3)	62(19 1)	1(10 16)	9(11 14)	35(12 12)
89(13 10)	173(14 8)	249(15 6)	289(16 4)	224(17 2)	95(18 0)
3(8 17)	18(9 15)	65(10 13)	170(11 11)	340(12 9)	529(13 7)
658(14 5)	620(15 3)	382(16 1)	1(5 20)	6(6 18)	30(7 16)
105(8 14)	273(9 12)	566(10 10)	931(11 8)	1258(12 6)	1323(13 4)
1047(14 2)	382(15 0)	1(3 21)	8(4 19)	38(5 17)	136(6 15)
367(7 13)	795(8 11)	1393(9 9)	2014(10 7)	2354(11 5)	2150(12 3)
947(6 12)	1770(7 10)	2756(8 8)	3508(9 6)	3630(10 4)	2740(11 2)
1052(12 0)	3(0 21)	23(1 19)	110(2 17)	361(3 15)	923(4 13)
1888(5 11)	3186(6 9)	4440(7 7)	5085(8 5)	4551(9 3)	2715(10 1)
41(0 18)	214(1 16)	681(2 14)	1611(3 12)	3051(4 10)	4099(5 8)
5983(6 6)	6097(7 4)	4652(8 2)	1718(9 0)	252(0 15)	933(1 13)
2214(2 11)	3991(3 9)	5766(4 7)	6704(5 5)	6065(6 3)	3625(7 1)
813(0 12)	2299(1 10)	4215(2 8)	5805(3 6)	6231(4 4)	4819(5 2)
1844(6 0)	1542(1 9)	3390(1 7)	4695(2 5)	4626(3 3)	2886(4 1)
1760(0 6)	2830(1 4)	2605(2 2)	1036(3 0)	1031(0 3)	938(1 1)
136(0 0)					

4 4 4 2 2 1 0 0 0 0

1(13 2)	1(19 7)	3(20 5)	4(21 3)	3(22 1)	2(16 10)
7(17 9)	13(18 6)	21(19 4)	17(20 2)	9(21 0)	2(13 13)
9(14 11)	24(15 9)	49(16 7)	71(17 5)	75(18 3)	49(19 1)
1(13 16)	6(11 14)	24(12 13)	65(13 10)	127(14 8)	199(15 6)
226(16 4)	103(17 2)	69(18 0)	2(8 17)	13(9 15)	50(10 13)
133(11 11)	272(12 9)	437(13 7)	554(14 5)	531(15 3)	351(16 1)
3(6 18)	21(7 15)	81(8 14)	222(9 12)	471(10 10)	805(11 8)
1094(12 6)	1198(13 4)	934(7 13)	361(15 2)	4(4 19)	26(5 17)
982(13 0)	1199(14 1)	634(4 13)	1726(9 9)	1816(10 7)	2154(11 5)
827(6 13)	1607(7 10)	8(2 20)	24(3 18)	109(4 16)	344(5 14)
973(12 0)	1(1 21)	2530(3 9)	3298(5 6)	3405(10 4)	2635(11 2)
1735(5 11)	2991(6 9)	35(1 19)	24(2 17)	303(3 15)	819(4 13)
3(1 18)	1800(1 13)	4241(7 7)	4903(8 5)	4421(9 3)	2647(10 1)
5944(6 6)	6047(7 4)	634(2 14)	1495(3 12)	2891(4 10)	4559(5 8)
2122(2 11)	3901(3 9)	4568(8 2)	1742(9 0)	225(0 15)	859(1 13)
774(1 12)	2256(1 10)	5713(4 7)	6775(5 5)	6109(6 3)	3559(7 1)
1853(6 0)	1555(0 9)	4194(2 8)	5881(3 6)	6322(4 4)	4902(5 2)
1794(0 6)	2953(1 4)	2449(1 7)	4827(2 5)	4782(3 3)	2397(4 1)
133(0 0)		2658(2 2)	1104(3 0)	1091(0 3)	990(1 1)

4 4 4 2 1 1 1 0 0 0

1(20 5)	1(21 3)	1(22 1)	2(17 8)	5(18 6)	7(19 4)
7(20 2)	3(21 0)	2(14 11)	8(15 9)	19(16 7)	29(17 5)

```
 33(18  3)     21(19  1)      1(11 14)      7(12 12)     24(13 10)     55(14  8)
 90(15  6)    109(16  4)     92(17  2)     36(18  0)      3( 9 15)     15(10 13)
 52(11 11)    122(12  9)    210(13  7)    281(14  5)    276(15  3)    174(16  1)
  1( 6 18)      5( 7 16)     28( 8 14)     91( 9 12)    220(10 10)    403(11  8)
581(12  6)    646(13  4)    517(14  2)    200(15  0)      7( 5 17)     35( 6 15)
126( 7 13)    320( 8 11)    631( 9  9)    983(10  7)   1213(11  5)   1145(12  3)
701(13  1)      1( 2 20)      7( 3 18)     40( 4 16)    144( 5 14)    396( 6 12)
829( 7 10)   1401( 8  8)   1896( 9  6)   2028(10  4)   1586(11  2)    602(12  0)
  4( 1 19)     28( 2 17)    128( 3 15)    384( 4 13)    899( 5 11)   1655( 6  9)
465( 7  7)   2949( 8  5)   2725( 9  3)   1650(10  1)     13( 0 18)     75( 1 16)
292( 2 14)    776( 3 12)   1615( 4 10)   2667( 5  8)   3567( 6  6)   3771( 7  4)
927( 8  2)   1109( 9  0)    103( 0 15)    451( 1 13)   1174( 2 11)   2291( 3  9)
487( 4  7)   4230( 5  5)   3927( 6  3)   2386( 7  1)    442( 0 12)   1329( 1 10)
585( 2  8)   3723( 3  6)   4111( 4  4)   3258( 5  2)   1248( 6  0)    943( 0  9)
186( 1  7)   3132( 2  5)   3171( 3  3)   2001( 4  1)   1188( 0  6)   1960( 1  4)
832( 2  2)    744( 3  0)    721( 0  3)    672( 1  1)    100( 0  0)


                              4   4   4   1   1   1   1   1   0   0

  1(19  4)      1(21  0)      1(16  7)      2(17  5)      3(18  3)      2(19  1)
  1(13 10)      3(14  8)      8(15  6)      9(16  4)     12(17  2)      2(18  0)
  1(10 13)      3(11 11)     10(12  9)     20(13  7)     31(14  5)     33(15  3)
 22(16  1)      1( 8 14)      6( 9 12)     18(10 10)     43(11  8)     65(12  6)
 86(13  4)     65(14  2)     33(15  0)      1( 6 15)      8( 7 13)     29( 8 11)
 68( 9  9)    122(10  7)    164(11  5)    164(12  3)    104(13  1)      2( 4 16)
  9( 5 14)     35( 6 12)     93( 7 10)    174( 8  8)    259( 9  6)    295(10  4)
253(11  2)     86(12  0)      1( 2 17)      8( 3 15)     34( 4 13)     99( 5 11)
213( 6  9)    351( 7  7)    452( 8  5)    437( 9  3)    272(10  1)      5( 1 16)
 25( 2 14)     85( 3 12)    203( 4 10)    386( 5  8)    545( 6  6)    625( 7  4)
484( 8  2)    202( 9  0)     10( 0 15)     50( 1 13)    152( 2 11)    350( 3  0)
549( 4  7)    704( 5  5)    682( 6  3)    423( 7  1)     53( 0 12)    191( 1 10)
398( 2  8)    628( 3  6)    709( 4  4)    598( 5  2)    216( 6  0)    192( 0  9)
363( 1  7)    559( 2  5)    580( 3  3)    376( 4  1)    202( 0  6)    350( 1  4)
336( 2  2)    151( 3  0)    145( 0  3)    130( 1  1)     15( 0  0)


                              4   4   3   3   3   2   2   0   0   0

  1(19  7)      1(20  5)      1(21  3)      1(22  1)      1(16 10)      3(17  8)
  6(18  4)      7(19  4)      7(20  2)      2(21  0)      1(13 13)      4(14 11)
 11(15  9)     19(16  7)     29(17  5)     29(18  3)     19(19  1)      1(10 16)
  3(11 14)     11(12 12)     27(13 10)     53(14  8)     76(15  6)     92(16  4)
 72(17  2)     32(18  0)      1( 8 17)      7( 9 15)     22(10 13)     57(11 11)
108(12  9)    173(13  7)    233(14  5)    207(15  3)    127(16  1)      5( 6 16)
 ??( 7 16)     4?( 8 14)     96( 9 12)    196(10 10)    315(11  8)    429(12  6)
449(13  4)    386(14  2)    191(15  0)      2( 4 19)     15( 5 17)     55( 6 15)
 ??( 7 13)    243( 8 11)    496( 9  9)    702(10  7)    826(11  5)    747(12  3)
455(13  1)      2( 2 20)     14( 3 18)     69( 4 16)    158( 5 14)    351( 6 12)
 ??(  ?  ?)   1005( 8  9)   1230( 9  4)   1504(10  4)    978(11  2)    379(12  0)
  4( 1 19)     41( 2 17)    145( 3 15)    632( 4 12)    720( 5 11)   1152( 6  9)
641( 7  7)   1852( 8  5)   1660( 9  3)    980(10  1)     20( 0 18)     85( 1 16)
779( 2 14)    626( 3 12)   1178( 4 10)   1773( 5  8)   2246( 6  6)   2253( 7  4)
774( ?  2)    605( 9  0)     90( 0 15)    370( 1 13)    849( 2 11)   1555( 3  9)
177( 4  7)   2527( 5  5)   2260( 6  3)   1372( 7  1)    333( 0 12)    692( 1 10)
636( 2  8)   2210( 3  6)   2372( 4  4)   1911( 5  2)    704( 6  0)    579( 0  9)
603( 1  7)   1778( 2  5)   1753( 3  3)   1038( 4  1)    692( 0  6)   1150( 1  4)
304( 2  2)    388( 3  0)    384( 0  3)    357( 1  1)     57( 0  0)


                              4   4   3   3   2   1   0   0   0   0

  1(20  5)      2(21  3)      1(22  1)      1(16 13)      4(17  3)      9(18  6)
 13(19  4)     13(20  2)      5(21  0)      1(13 13)      5(14 11)     13(15  9)
 38(16  7)     58(17  5)     42(18  3)     42(19  1)      4(11 14)     19(12 12)
 54(13 10)    113(14  9)     78(15  6)    212(16  4)    177(17  2)     72(18  0)
```

1(8 17)	10(9 15)	43(10 13)	122(11 11)	258(12 9)	426(13 7
549(14 5)	536(15 3)	235(16 1)	2(6 18)	18(7 16)	76(8 14
218(9 12)	478(10 10)	827(11 8)	1148(12 6)	1251(13 4)	994(14 2
376(15 0)	3(4 19)	25(5 17)	106(6 15)	318(7 13)	729(8 11
1337(9 9)	1985(10 7)	2281(11 5)	2204(12 3)	1338(13 1)	3(2 20
25(3 18)	117(4 16)	375(5 14)	921(6 12)	1803(7 10)	2884(8 8
3765(9 6)	3938(10 4)	2026(11 2)	1147(12 0)	1(0 21)	16(1 19
92(2 17)	343(3 15)	936(4 13)	2011(5 11)	3496(6 9)	4993(7 7
5797(8 5)	5248(9 3)	3146(10 1)	36(0 18)	207(1 16)	711(2 14
1770(3 12)	3464(4 10)	5483(5 8)	7090(6 6)	7322(7 4)	5603(8 2
2099(9 0)	264(0 15)	1044(1 13)	2571(2 11)	4775(3 9)	7031(4 7
8295(5 5)	7563(6 3)	4547(7 1)	956(0 12)	2796(1 10)	5236(2 8
7348(3 6)	7956(4 4)	6218(5 2)	2366(6 0)	1936(0 9)	4344(1 7
6103(2 5)	6073(3 3)	3806(4 1)	2300(0 6)	3763(1 4)	3475(2 2
1401(3 0)	1394(0 3)	1273(1 1)	182(0 0)		

			4 4 3 3 1 1 1 0 0 0		
1(17 8)	2(18 6)	3(19 4)	3(20 2)	1(21 0)	1(14 11)
5(15 9)	12(16 7)	18(17 5)	20(18 3)	13(19 1)	3(12 12)
16(13 10)	37(14 8)	64(15 6)	78(16 4)	66(17 2)	26(18 0)
1(9 15)	10(10 13)	37(11 11)	93(12 9)	164(13 7)	223(14 5)
220(15 3)	140(16 1)	3(7 16)	17(8 14)	69(9 12)	172(10 10)
332(11 8)	464(12 6)	548(13 4)	440(14 3)	171(15 0)	4(4 19)
5(5 17)	30(6 15)	104(7 13)	276(8 11)	549(9 9)	873(10 7)
1083(11 5)	1032(12 3)	633(13 1)	6(3 18)	30(4 16)	125(5 14)
343(6 12)	750(7 10)	1275(8 8)	1755(9 6)	1885(10 4)	1430(11 2)
561(12 0)	1(0 21)	4(1 19)	30(2 17)	117(3 15)	505(4 13)
844(5 11)	1581(6 9)	2360(7 7)	2850(8 5)	2635(9 3)	1635(10 1)
7(0 18)	71(1 16)	265(2 14)	745(3 12)	1552(4 10)	2612(5 8)
3499(6 6)	3737(7 4)	2895(8 2)	1107(9 0)	111(0 15)	441(1 13)
1179(2 11)	2225(3 9)	3525(4 7)	4272(5 5)	3991(6 3)	2424(7 1)
418(0 12)	1340(1 10)	2602(2 8)	3803(3 6)	4203(4 4)	3501(5 2)
1273(6 0)	992(0 9)	2257(1 7)	3274(2 5)	4203(3 3)	2599(2 1)
1208(0 6)	2057(1 4)	1926(2 2)	790(3 0)	788(0 0)	715(1 1)
96(0 0)					

			4 4 3 2 2 2 0 0 0 0		
1(22 1)	1(13 6)	3(19 4)	3(20 0)	2(21 2)	1(14 11)
3(15 9)	8(16 7)	14(17 5)	18(16 3)	20(19 1)	3(12 12)
4(12 12)	14(13 10)	30(14 8)	52(15 2)	68(16 4)	59(17 2)
20(18 0)	2(9 15)	12(10 13)	25(11 11)	83(12 9)	159(13 7)
189(14 5)	187(15 3)	119(16 1)	4(7 16)	57(8 14)	70(9 12)
161(10 10)	257(11 8)	421(12 6)	474(13 4)	374(14 3)	452(15 0)
5(5 17)	31(6 15)	104(7 13)	262(8 11)	502(9 9)	779(10 7)
553(11 5)	891(12 3)	547(13 1)	5(2 19)	30(4 16)	125(5 14)
335(6 12)	767(7 10)	1169(8 8)	1577(9 6)	1563(10 4)	1384(11 2)
484(12 0)	3(1 19)	26(2 17)	114(3 15)	356(4 13)	502(5 11)
1468(6 9)	2152(7 7)	2554(8 5)	2339(6 3)	1410(10 1)	9(0 18)
69(1 16)	263(2 14)	716(3 12)	1470(4 10)	2405(5 8)	3193(6 6)
3372(7 4)	2584(8 2)	997(9 0)	102(0 15)	434(1 13)	1419(2 11)
2239(3 9)	3247(4 7)	3895(5 5)	3601(6 3)	2177(7 1)	407(0 12)
1264(1 10)	2436(2 8)	3512(3 6)	3838(4 4)	3652(5 2)	1151(6 0)
918(0 9)	2091(1 7)	2003(2 5)	3015(3 3)	1909(4 1)	1122(0 6)
1891(1 4)	1746(2 2)	723(3 0)	720(3 3)	652(1 1)	69(0 0)

			4 4 3 2 2 1 1 0 0 0		
1(18 6)	2(19 4)	2(20 2)	1(21 0)	3(15 9)	8(16 7)
15(17 5)	17(18 3)	12(19 1)	3(12 12)	12(13 10)	34(14 8)
59(15 4)	77(16 4)	66(17 2)	27(18 0)	1(9 15)	8(10 13)
35(11 11)	89(12 9)	169(13 7)	223(14 5)	239(15 3)	152(16 1)

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   2( 7  16)      18( 8  14)     69( 9  12)     187(10  10)    363(11   8)    550(12   6
 626(13   4)     514(14   2)    197(15   0)       3( 3  17)     25( 6  15)    198( 7  13
 300( 6  11)     631( 9   9)   1018(10   7)    1298(11   5)   1242(12   3)    772(13   1
   3( 3  18)      30( 4  16)    130( 5  14)     398( 6  12)    887( 7  10)   1565( 8   8
2171( 9   6)    2377(10   4)   1871(11   2)     721(12   0)      2( 1  19)     22( 2  17
 121( 3  15)     407( 4  13)   1018( 5  11)    1952( 6   9)   3001( 7   7)   3654( 8   5
3426( 9   3)    2088(10   1)     10( 0  18)      73( 1  16)    317( 2  14)    908( 3  12
1986( 4  10)    3383( 5   8)   4632( 6   6)    4963( 7   4)   3900( 8   2)   1471( 9   0
 114( 0  15)     540( 1  13)   1481( 2  11)    3000( 3   9)   4684( 4   7)   5785( 5   5
5425( 6   3)    3324( 7   1)    565( 0  12)    1772( 1  10)   3553( 2   8)   5218( 3   6
5859( 4   4)    4672( 5   2)   1807( 6   0)    1309( 0   9)   3120( 1   7)   4546( 2   5
4657( 3   3)    2960( 4   1)   1741( 0   6)    2917( 1   4)   2760( 2   2)   1114( 3   0
1104( 0   3)    1030( 1   1)    163( 0   0)
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                                  4  4  3  2  1  1  1  1  0  0
   1(16   7)       2(17   5)      3(18   3)      2(19   1)       1(13  10)       5(14   8)
  12(15   6)      16(16   4)     16(17   2)      6(18   0)       4(11  11)      16(12   9)
  37(13   7)      59(14   5)     64(15   3)     43(16   1)       1( 8  14)       9( 9  12)
  36(10  10)      87(11   8)    148(12   6)    186(13   4)     157(14   2)      54(15   0)
   2( 6  15)      15( 7  13)     60( 8  11)    156( 9   9)     289(10   7)     401(11   5)
 408(12   3)     260(13   1)      2( 4  16)     19( 5  14)      80( 6  12)     222( 7  10)
 450( 8   9)     692( 9   6)    803(10   4)    664(11   2)     255(12   0)       2( 2  17)
  18( 3  15)      84( 4  13)    256( 5  11)    569( 6   9)     968( 7   7)    1263( 8   5)
1243( 9   3)     780(10   1)      1( 0  18)     11( 1  16)      64( 2  14)     229( 3  12)
 575( 4  10)    1097( 5   8)   1618( 6   6)   1836( 7   4)    1483( 8   2)     578( 9   0)
  24( 0  15)     135( 1  13)    433( 2  11)    972( 3   9)    1650( 4   7)    2157( 5   5)
2107( 6   3)    1319( 7   1)    160( 0  12)    575( 1  10)    1245( 2   8)    1956( 3   6)
2287( 4   4)    1886( 5   2)    729( 6   0)    467( 0   9)    1171( 1   7)    1794( 2   5)
1994( 3   3)    1229( 4   1)    678( 0   6)   1193( 1   4)    1148( 2   2)     476( 3   0)
 469( 0   3)     440( 1   1)     63( 0   0)
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                                  4  4  3  3  1  1  1  1
   1(16   4)       1(17   2)      1(13   7)      2(14   5)       4(15   3)       3(16   1)
   1(10  10)       3(11   8)      9(12   5)     13(13   4)      13(14   2)       5(15   0)
   1( 8  11)       6( 9   9)     16(10   7)     30(11   5)      34(12   0)      25(13   1)
   2( 6  12)       9( 7  10)     29( 8   9)     54( 9   6)      74(10   7)      50(11   2)
  17(12   0)       1( 4  13)     19( 5  11)     37( 6   9)      74( 7   7)     135( 3   5)
 128( 9   2)      83(10   1)      2( 2  14)      9( 3  13)      87( 4  10)      35( 5   0)
 183( 6   6)     192( 7   4)    168( 8   2)     65( 9   0)       8( 1  13)      15( 2  11)
  73( 3   9)     150( 4   7)    237( 5   5)    237( 6   3)     157( 7   1)      44( 0  12)
  44( 1  10)     118( 2   9)    206( 3   6)    266( 4   4)     229( 5   2)      94( 6   0)
  39( 0   9)     123( 1   7)    203( 2   5)    233( 3   3)     155( 4   0)      93( 0   6)
 147( 1   4)     152( 2   0)     61( 3   3)     59( 0   3)      76( 1   1)      20( 0   0)
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                                  4  4  2  2  2  2  1  0  0  2
   1(17   2)       1(18   0)      1(14   5)      1(13  10)       1(14   8)       6(15   6)
   3(16   4)       8(17   2)      3(18   0)      1(10  15)       4(11  11)      44(12   5)
  25(13   7)      35(14   5)     69(15   3)     24(15   1)       1( 6  14)       9( 9  12)
  28(10  10)      61(11   8)     97(12   6)    114(13   4)      35( 7   9)      37(15   0)
   3( 6  15)      15( 7  13)     52( 8  11)    119( 9   9)     214(13   7)     250(11   5)
 260(12   3)     164(13   1)      2( 4  16)     19( 5  14)      69( 6  12)     175( 7  10)
 380( 9   9)     485( 6   6)    547(10   4)    433(11   2)     467(12   0)       5( 2  17)
  18( 3  15)      78( 4  13)    224( 5  11)    446( 6   9)     714( 7   7)     697( 8   5)
 854( 9   3)     525(10   1)     11( 1  16)     57( 2  14)     196( 3  12)     451( 4  10)
 839( 5   8)    1185( 6   6)    205( 7   4)   1026( 3   9)     395( 9   0)      26( 0  15)
 119( 1  13)     363( 2  11)    787( 3   9)    364( 4   7)    1535( 5   5)    1517( 6   3)
 936( 7   1)     130( 0  12)    465( 1  10)    670( 2   8)    1469( 3   6)    1679( 4   4)
1345( 5   2)     527( 6   0)    279( 0   6)    293( 1   4)    1346( 2   2)    1393( 3   3)
 901( 4   1)     507( 0   6)    899( 1   4)    345( 3   3)     353( 2   2)     352( 0   3)
 325( 1   1)      46( 0   0)
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                            4  4  2  2  2  1  1  1  0  0
     1(14   8)      2(15   6)       4(16   4)      3(17   2)        2(18   0)           1(10  11)
     4(12   9)     11(13   7)      17(14   5)     20(15   3)       13(16   1)           20( 9  12)
    11(10  10)     28(11   8)      53(12   6)     65(13   4)       60(14   2)           21(15   0)
     4( 7  13)     19( 8  11)      57( 9   9)    110(10   7)      161(11   5)          165(12   3)
   108(13   1)      5( 5  14)      28( 6  12)     86( 7  10)      188( 8   8)          295( 9   6)
   358(10   4)    291(11   2)     121(12   0)      5( 3  15)       29( 4  13)          104( 5  11)
   245( 6   9)    439( 7   7)     588( 8   5)    590( 9   3)      372(10   1)            3( 1  16)
    24( 2  14)     95( 3  12)     252( 4  10)    516( 5   8)      793( 6   6)          906( 7   4)
   755( 8   2)    282( 9   0)       8( 0  15)     58( 1  13)     197( 2  11)          473( 3   9)
   826( 4   7)   1110( 5   5)    1098( 6   3)    695( 7   1)       78( 0  12)          283( 1  10)
   646( 2   8)   1029( 3   6)    1239( 4   4)   1017( 5   2)      411( 6   0)          237( 0   9)
   628( 1   7)    978( 2   5)    1053( 3   3)    687( 4   1)      384( 0   6)          670( 1   4)
   664( 2   2)    266( 3   0)     264( 0   3)    255( 1   1)       41( 0   0)
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                            4  4  2  2  1  1  1  1  0
     1(13   7)      2(14   5)      3(15   3)      2(16   1)         2(11   8)           6(12   6)
    10(13   4)     10(14   2)      4(15   0)      1( 8  11)         5( 9   9)          15(10   7)
    28(11   5)     23(12   3)     23(13   1)      7( 7  10)        23( 8   8)          50( 9   6)
    70(10   4)     64(11   2)     27(12   0)      2( 4  13)         9( 5  11)          34( 6   9)
    76( 7   7)    121( 8   5)    134( 9   3)     90(10   1)         8( 3  12)          31( 4  10)
    87( 5   8)    156( 6   6)    205( 7   4)    181( 8   2)        72( 9   0)           1( 0  15)
     5( 1  13)     28( 2  11)     79( 3   9)    169( 4   7)       252( 5   5)         272( 6   3)
   179( 7   1)      7( 0  12)     47( 1  10)    123( 2   8)       232( 3   6)         300( 4   4)
   265( 5   2)    107( 6   0)     52( 0   9)    141( 1   7)       246( 2   5)         276( 3   3)
   188( 4   1)     88( 0   6)    176( 1   4)    177( 2   2)        76( 3   0)          77( 0   3)
    72( 1   1)     10( 0   0)
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                            4  4  2  1  1  1  1  1  1
     1(14   2)      1(11   5)      1(12   3)      2(13   1)         1( 9   6)           4(10   4)
     4(11   2)      3(12   0)      2( 7   7)      5( 3   5)         9( 9   3)           6(10   1)
     2( 5   5)      8( 6   6)     12( 7   4)     15( 8   2)         4( 9   0)           2( 3   9)
     6( 4   7)     15( 5   5)     18( 6   3)     14( 7   1)         1( 1  10)          6( 2   8)
    13( 3   0)     23( 4   4)     19( 5   2)     11( 5   0)         2( 0   9)           8( 1   7)
    15( 2   5)     21( 3   3)     15( 4   1)      5( 3   0)        13( 1   4)         17( 2   2)
     5( 3   0)      5( 0   3)      4( 1   1)      5( 0   0)
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                            4  3  3  3  3  1  0  0  0  0
     1(19   4)      1(21   0)      1(25   0)      2(16   7)         4(17   5)           5(18   3)
     4(19   1)      1(12  13)      4(13  10)      2(14   8)        16(16   6)          24(16   4)
    23(17   2)      6(18   3)      1( 9  15)      4(10  13)        13(11  11)          29(12   9)
    52(13   7)     72(14   5)     73(15   3)     46(15   1)         2( 7  16)           9( 8  14)
    29( 9  12)     64(10  10)     23(11   8)    163(12   5)        95(13   4)          15(14   2)
    65(15   0)      3( 5  17)     15( 6  15)     46( 7  13)       115( 8  11)         218( 9   9)
   320(10   7)    407(11   5)    290(12   3)    274(13   1)         3( 5  18)          18( 4  16)
    64( 5  14)    161( 6  12)    326( 7  10)    574( 8   3)       704( 9   5)         732(10   4)
   579(11   2)     21(12   0)      2( 1  19)     15( 2  17)        63( 3  15)         177( 4  13)
   391( 5  10)    645( 4   9)    995( 7   7)   1162( 8   5)      1061( 9   3)         635(10   1)
     6( 0  18)     39( 1  16)    141( 2  14)    363( 3  12)       713( 4  10)        1156( 5   8)
  1495( 6   6)   1566( 7   4)   1186( 8   2)    453( 9   0)        54( 0  15)         221( 1  13)
   585( 2  11)   1047( 3   9)   1541( 4   7)   1341( 5   5)      1682( 6   3)        1013( 7   1)
   210( 0  12)    670( 1  10)   1104( 2   8)   1686( 2   6)      1817( 4   4)        1459( 5   2)
   536( 6   0)    447( 0   6)   1011( 1   7)   1431( 2   5)      1429( 3   3)         897( 4   1)
   541( 0   6)    960( 1   4)    825( 2   2)    343( 3   0)       340( 0   3)         307( 1   1)
    42( 0   0)
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                            4  3  3  3  2  2  0  0  0  0
     1(20   2)      1(16   7)      1(17   5)      4(18   3)         3(19   1)           1(12  12)
     2(13  10)      7(14   8)     12(15   6)     19(16   4)        15(17   2)           9(18   0)
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   3(10 13)      9(11 11)     24(12  9)     42(13  7)     62(14  5)     63(15  3)
  42(16  1)      1( 7 16)      7( 8 14)     23( 9 12)     59(10 10)    136(11  8)
 162(12  6)    179(13  4)    152(14  2)     53(15  0)      1( 5 17)     12( 6 15)
  40( 7 13)    107( 8 11)    207( 9  9)    328(10  7)    403(11  5)    386(12  3)
 235(13  1)      2( 3 18)    146( 4 16)     55( 5 14)    153( 6 12)    319( 7 10)
 542( 8  8)    723( 9  6)    781(10  4)    599(11  2)    236(12  0)      1( 1 19)
  12( 2 17)    530( 3 15)    170( 4 13)    389( 5 11)    721( 6  9)   1059( 7  7)
1263( 8  5)   1154( 9  3)    700(10  1)      5( 0 18)     34( 1 16)    135( 2 14)
 366( 6 12)    762( 4 10)   1250( 5  8)   1667( 6  6)   1738( 7  4)   1353( 8  2)
 500( 9  0)     52( 0 15)    222( 1 13)    593( 2 11)   1144( 3  9)   1745( 4  7)
2093( 5  5)   1936( 6  3)   1169( 7  1)    223( 0 12)    691( 1 10)   1345( 2  8)
1931( 3  6)   2133( 4  4)   1674( 5  2)    647( 6  0)    510( 0  9)   1171( 1  7)
1686( 2  5)   1697( 3  3)   1073( 4  1)    642( 0  6)   1071( 1  4)   1005( 2  2)
 403( 3  0)    408( 0  3)    376( 1  1)     55( 0  0)
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                       4  3  3  3  2  1  1  0  0  0
   1(16  7)      2(17  5)      2(18  3)      2(19  1)      2(13 10)      6(14  8)
  13(15  6)     17(16  4)     16(17  2)      6(18  0)      1(10 13)      5(11 11)
  23(12  9)     47(13  7)     69(14  5)     72(15  3)     46(16  1)      4( 8 14)
  20( 9 12)     58(10 10)    121(11  8)    186(12  6)    221(13  4)    181(14  2)
  71(15  0)      1( 5 17)      8( 6 15)     38( 7 13)    110( 8 11)    239( 9  9)
 394(10  7)    509(11  5)    493(12  3)    308(13  1)      1( 3 18)     11( 4 16)
  52( 5 14)    162( 6 12)    372( 7 10)    660( 8  8)    932( 9  6)   1020(10  4)
 813(11  2)    310(12  0)      1( 1 19)     10( 2 17)     54( 3 15)    183( 4 13)
 461( 5 11)    891( 6  9)   1377( 7  7)   1685( 8  5)   1581( 9  3)    968(10  1)
   4( 0 18)     34( 1 16)    148( 2 14)    434( 3 12)    951( 4 10)   1637( 5  8)
2240( 6  6)   2414( 7  4)   1889( 8  2)    721( 9  0)     57( 0 15)    267( 1 13)
 741( 2 11)   1516( 3  9)   2362( 4  7)   2919( 5  5)   2744( 6  3)   1678( 7  1)
 282( 0 12)    910( 1 10)   1829( 2  8)   2708( 3  6)   3036( 4  4)   2433( 5  2)
 931( 6  0)    690( 0  9)   1644( 1  7)   2410( 2  5)   2469( 3  3)   1573( 4  1)
 923( 0  6)   1557( 1  4)   1477( 2  2)    606( 3  0)    602( 0  3)    559( 1  1)
  81( 0  0)
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                       4  3  3  3  1  1  1  1  0  0
   1(14  8)      2(15  6)      3(16  4)      1(17  2)      2(18  0)      5(12  9)
   7(13  7)     12(14  5)     13(15  3)      9(15  1)      1( 9 12)      8(10 10)
  21(11  8)     30(12  6)     45(13  4)     44(14  2)     13(15  0)      3( 7 13)
  16( 8 11)     42( 9  9)     85(10  7)    118(11  5)    123(12  3)     78(13  1)
   1( 4 16)      5( 5 14)     25( 6 12)     69( 7 10)    148( 8  8)    225( 9  6)
 273(10  4)    216(11  2)     93(12  0)      1( 2 17)      5( 3 15)     29( 4 13)
  69( 5 11)    202( 6  9)    342( 7  7)    459( 8  5)    449( 9  3)    284(10  1)
   4( 1 16)     24( 2 14)     83( 3 12)    213( 9  0)    412( 5  3)    622( 6  6)
 693( 7  4)    590( 8  2)    213( 9  0)     10( 0 15)     53( 1 13)    170( 2 11)
 384( 3  9)    560( 4  7)    262( 5  5)    350( 6  3)    531( 7  1)     65( 5 12)
 231( 1 13)    514( 2  3)    603( 3  6)    735( 4  4)    777( 5  2)    314( 6  0)
 192( 0  9)    461( 1  7)    756( 2  3)    803( 3  3)    524( 4  1)    295( 0  6)
 511( 0  4)    502( 2  3)    571( 0  0)    282( 0  3)    191( 1  1)     33( 0  0)
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                       4  3  3  2  2  2  1  0  0  0
   1(13  9)      1(14  8)      5(15  6)      5(16  4)      5(17  2)      2(18  0)
   2(11 11)      7(12  9)     16(13  7)     26(14  5)     27(15  3)     13(16  1)
   3( 9  4)      7( 9 12)     23(11 10)     51(11  8)     84(12  6)    100(13  4)
  84(14  2)     54(15  0)      2( 5 15)     14( 7 13)     48( 8 11)    113( 9  9)
 137(10  7)    259(11  5)    255(12  3)    160(13  1)      3( 4 16)     20( 5 14)
  75( 6 12)    189( 7 10)    356( 8  8)    515( 9  6)    574(10  4)    452(11  2)
 176(12  0)      2( 2 17)     20( 3 15)     95( 4 13)    241( 5 11)    501( 6  9)
 803( 7  7)   1008( 8  5)    958( 9  3)    589(10  1)      1( 0 18)     13( 1 16)
  70( 2 14)    232( 3 12)    551( 4 10)    992( 5  8)   1401( 6  6)   1535( 7  4)
1214( 8  2)    465( 9  0)     36( 0 15)    143( 1 13)    434( 2 11)    932( 3  9)
1519( 4  7)   1921( 5  5)   1831( 6  3)   1130( 7  1)    167( 0 12)    571( 1 10)
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    3(10 13)       9(11 11)     -24(12  9)     42(13  7)     62(14  5)     63(15  3
   42(16  1)       1( 7 16)      70( 8 14)     23( 9 12)     59(10 10)    136(11  8
  162(12  6)     179(13  4)    -152(14  2)     53(15  0)      1( 5 17)     12( 6 15
   40( 7 13)     107( 8 11)     207( 9  9)    328(10  7)    403(11  5)    386(12  3
  235(13  1)       2( 3 18)      14( 4 16)     55( 5 14)    153( 6 12)    319( 7 10
  542( 8  8)     723( 9  6)     781(10  4)    599(11  2)    236(12  0)      1( 1 19)
   12( 2 17)      53( 3 15)     170( 4 13)    389( 5 11)    721( 6  9)   1059( 7  7)
 1263( 8  5)    1154( 9  3)     700(10  1)      5( 0 18)     34( 1 16)    135( 2 14)
  366( 3 12)     763( 4 10)    1250( 5  8)   1667( 6  6)   1738( 7  4)   1353( 8  2)
  500( 9  0)      52( 0 15)     222( 1 13)    593( 2 11)   1144( 3  9)   1745( 4  7)
 2093( 5  5)    1936( 6  3)    1169( 7  1)    223( 0 12)    691( 1 10)   1345( 2  8)
 1931( 3  6)    2133( 4  4)    1674( 5  2)    647( 6  0)    510( 0  9)   1171( 1  7)
 1686( 2  5)    1697( 3  3)    1073( 4  1)    642( 0  6)   1071( 1  4)   1005( 2  2)
  403( 3  0)     408( 0  3)     276( 1  1)     55( 0  0)
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   1(16  7)       2(17  5)       2(18  3)      2(19  1)      2(13 10)      6(14  8)
  13(15  6)      17(16  4)      16(17  2)      6(18  0)      1(10 13)      3(11 11)
  23(12  9)      47(13  7)      68(14  5)     72(15  3)     46(16  1)      4( 8 14)
  20( 9 12)      58(10 10)     121(11  8)    186(12  6)    221(13  4)    181(14  2)
  71(15  0)       1( 5 17)       8( 6 15)     38( 7 13)    110( 8 11)    239( 9  9)
 394(10  7)     509(11  5)     493(12  3)    308(13  1)      1( 3 18)     11( 4 16)
  52( 5 14)     162( 6 12)     372( 7 10)    660( 8  8)    932( 9  6)   1025(10  4)
 813(11  2)     310(12  0)       1( 1 19)     10( 2 17)     54( 3 15)    183( 4 13)
 461( 5 11)     891( 6  9)    1377( 7  7)   1685( 8  5)   1591( 9  3)    968(10  1)
   4( 0 18)      34( 1 16)     148( 2 14)    434( 3 12)    951( 4 10)   1637( 5  8)
2240( 6  6)    2414( 7  4)    1889( 8  2)    721( 9  0)     57( 0 15)    267( 1 13)
 741( 2 11)    1506( 3  9)    2362( 4  7)   2919( 5  5)   2744( 6  3)   1678( 7  1)
 282( 0 12)     910( 1 10)    1829( 2  8)   2708( 3  6)   3036( 4  4)   2435( 5  2)
 931( 6  0)     690( 0  9)    1644( 1  7)   2410( 2  5)   2469( 3  3)   1573( 4  1)
 923( 0  6)    1567( 1  4)    1477( 2  2)    606( 3  0)    602( 0  3)    559( 1  1)
  81( 0  0)
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   1(14  9)       2(15  6)       3(16  4)      1(17  2)      2(18  0)      5(12  9)
   7(13  7)      12(14  5)      13(15  3)      9(16  1)      1( 9 12)      8(10 10)
   2(11  9)      37(12  6)      45(13  4)     44(14  2)     13(15  0)      3( 7 13)
  16( 8 11)      42( 9  9)      85(10  7)    118(11  5)    123(12  3)     78(13  1)
   1( 4 16)       5( 5 14)      25( 6 12)     69( 7 10)      5( 3 15)    225( 9  6)
 273(10  4)     216(11  2)      63(12  0)      1( 2 17)    449( 9  3)     29( 4 13)
  68( 5 11)     202( 6  9)     343( 7  7)    459( 8  5)    412( 5  3)    284(10  1)
   4( 0 18)      34( 1 16)      88( 2 14)    219( 4 10)     10( 0 17)    522( 6  6)
 690( 7  4)     690( 6  2)     213( 9  0)    650( 5  3)     53( 1 13)    170( 2 11)
 384( 3  0)     150( 4  7)     362( 6  5)    935( 4  4)    531( 7  1)     85( 4 12)
 231( 1  5)     514( 2  3)     803( 3  6)    983( 3  3)    777( 5  2)    514( 6  0)
 192( 0  9)     491( 1  7)     750( 2  5)    242( 0  3)    524( 4  1)    295( 0  6)
 511( 4  1)     502( 2  3)     571( 3  3)                  192( 2  1)     30( 0  0)
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   1(12  9)       1(13  8)       3(15  6)      5(16  4)      5(17  2)      2(18  0)
   2(11 11)       7(13  9)      15(13  7)     26(14  5)     27(15  3)     19(16  1)
   1( 9  4)       7( 9 12)      23(11 10)     51(11  8)     54(12  0)    133(13  4)
  84(14  2)      34(15  0)       2( 5 15)     14( 7 13)     48( 6 11)    113( 9  9)
 137(10  7)     259(11  5)     255(12  3)    160(13  1)      3( 4 16)     29( 5 14)
  75( 6 12)     169( 7 10)     356( 8  2)    515( 9  6)    574(10  4)    452(11  2)
 175(12  0)       2( 0 17)      20( 3 15)     95( 4 13)    241( 5 11)    502( 6  9)
 803( 7  7)    1008( 9  5)     653( 9  3)    629(10  1)      1( 0 18)     83( 1 16)
  70( 2 14)     232( 3 12)     551( 4 10)    892( 5  8)   1401( 6  6)   1535( 7  4)
 214( 8  2)     465( 9  0)      76( 0 15)    143( 1 13)    434( 2 11)    932( 3  9)
 519( 4  7)    1921( 5  5)    1831( 6  3)   1120( 7  1)    167( 0 12)    571( 1 10)
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TABLE. IRREDUCIBLE REPRESENTATIONS OF SU(3) CONTAINED IN A PARTITION OF U(10)

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1199( 2  8)   1825( 3  6)   2086( 4  4)   1690( 5  2)    652( 6  0)    455( 0  9)
1123( 1  7)   1685( 2  5)   1754( 3  3)   1127( 4  1)    652( 0  6)   1128( 1  4)
1078( 2  2)    443( 3  0)    442( 0  3)    415( 1  1)     61( 0  0)
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                       4    3    3    2    2    1    1    1    0    0
    1(15  6)      1(16  4)        2(17  2)        2(12  9)       6(13  7)      11(14  5)
   13(15  3)      9(16  1)        1( 9 12)        7(10 10)      22(11  8)      39(12  6)
   55(13  4)     45(14  2)       21(15  0)        3( 7 13)      17( 8 11)      53( 9  9)
  101(10  7)    147(11  5)      154(12  3)      100(13  1)       5( 5 14)      27( 6 12)
   87( 7 10)    185( 8  8)      303( 9  6)      355(10  4)     305(11  2)     113(12  0)
    5( 3 15)     32( 4 13)      112( 5 11)       268( 6  9)     475( 7  7)     641( 8  5)
  639( 9  3)    405(10  1)        3( 1 16)        26( 2 14)     109( 3 12)     294( 4 10)
  593( 5  8)    893( 6  6)     1043( 7  4)       843( 8  2)     339( 9  0)      10( 0 15)
   67( 1 13)    235( 2 11)      557( 3  9)       980( 4  7)    1308( 5  5)    1298( 6  3)
  818( 7  1)     89( 0 12)      343( 1 10)       770( 2  3)    1252( 3  6)    1480( 4  4)
 1245( 5  2)    475( 6  0)      297( 0  9)       769( 1  7)    1209( 2  5)    1293( 3  3)
  848( 4  1)    462( 0  6)      838( 1  4)       807( 2  2)     345( 3  0)     340( 0  3)
  319( 2  1)     44( 0  0)
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                       4    3    3    2    1    1    1    1    1    0
    1(14  5)      1(15  3)        1(16  1)        1(11  8)       4(12  6)       7(13  4)
    7(14  2)      3(15  0)        3( 9  9)       11(10  7)      21(11  5)      26(12  3)
   18(13  1)      1( 6 12)        6( 7 10)       22( 8  8)      46( 9  6)      65(10  4)
   60(11  2)     24(12  0)        1( 4 13)        8( 5 11)      31( 6  9)      73( 7  7)
  118( 8  5)    131( 9  3)       89(10  1)        1( 2 14)       8( 3 12)      55( 4 10)
   91( 5  8)    167( 6  6)      218( 7  4)       192( 8  2)      78( 9  0)       5( 1 13)
   27( 2 11)     85( 3  9)      180( 4  7)       275( 5  5)     297( 6  3)     197( 7  1)
   11( 0 12)     52( 1 10)      143( 2  8)       262( 3  6)     343( 4  4)     303( 5  2)
  121( 6  0)     53( 0  9)      161( 1  7)       277( 2  5)     318( 3  3)     216( 4  1)
  108( 0  6)    206( 1  4)      210( 2  2)        89( 3  0)      86( 0  3)      65( 1  1)
   13( 0  0)
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                       4    3    3    1    1    1    1    1    1    1
    1(15  0)      1(12  3)        1(13  1)        1( 9  6)       2(10  4)       4(11  2)
    1( 7  7)      4( 8  5)        7( 9  3)        5(10  1)       2( 8  6)       5( 6  6)
   12( 7  4)      9( 5  2)        7( 9  0)        1( 3  9)       6( 4  7)      13( 5  5)
   17( 4  3)     13( 7  1)        1( 1 10)        4( 2  6)      13( 3  6)      17( 4  4)
   11( 5  2)      8( 5  0)        1( 0  9)        7( 1  7)      16( 2  5)      20( 3  3)
   15( 4  1)      4( 0  6)       14( 1  4)       12( 2  2)       8( 3  0)       7( 0  3)
    6( 1  1)
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                       4    3    2    2    2    2    2    0    0    0
    1(13  7)      1(14  5)        1(15  3)        1(16  1)       1(10 10)       4(11  8)
    4(12  6)      8(13  2)        5(14  2)        3(15  0)       1( 7 13)       3( 8 11)
    1( 9  9)      2(10  7)       28(11  5)       27(12  3)      17(13  1)       1( 5 14)
    5( 4 12)     33( 7 10)       41( 8  3)       65( 9  6)      74(10  4)      61(11  2)
   22(12  0)      1( 3 15)        7( 4 13)       28( 5 11)      64( 6  9)     115( 7  7)
  148( 3  5)    145( 9  3)       90(10  1)        1( 1 16)       6( 2 14)      28( 3 12)
   76( 4 10)    152( 5  8)      226( 6  6)       259( 7  4)     206( 8  2)      31( 9  0)
    2( 0 15)     18( 1 16)       62( 2 11)       150( 3  9)     261( 4  7)     347( 5  5)
  338( 6  3)    214( 7  1)       24( 0 12)        95( 1 10)     214( 2  3)     344( 3  6)
  409( 4  4)    346( 5  2)      130( 6  0)        82( 0  9)     219( 1  7)     341( 2  5)
  367( 3  3)    241( 4  1)      134( 2  6)       243( 1  4)     237( 2  2)      93( 3  0)
   97(10  3)     56( 1  1)       13( 3  0)
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                       4    3    2    2    2    2    1    0    0    0
    1(14  5)      1(15  3)        1(16  1)        1(10 10)       3(11  8)       7(12  6)
    9(13  4)      9(14  2)        3(15  0)        3( 8 11)      10( 9  9)      23(10  7)
   34(11  5)     37(12  3)       24(13  1)        5( 6 12)      19( 7 10)      50( 8  8)
   82( 9  6)    104(10  4)       85(11  2)       36(12  0)       6( 4 13)      27( 5 11)
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78(6 9)	147(7 7)	208(8 5)	210(9 3)	135(10 1)	5(2 14)
28(3 12)	91(4 10)	197(5 8)	318(6 6)	375(7 4)	315(8 2)
120(9 0)	2(0 15)	17(1 13)	75(2 11)	194(3 9)	367(4 7)
507(5 5)	516(6 3)	328(7 1)	29(0 12)	123(1 10)	300(2 8)
506(3 6)	624(4 4)	525(5 2)	210(6 0)	117(0 9)	320(1 7)
524(2 5)	574(3 3)	382(4 1)	205(0 6)	379(1 4)	379(2 2)
158(3 0)	159(0 3)	153(1 1)	23(0 0)		

	4	2	2	2	1 1 1 1 0
1(12 6)	2(13 4)	2(14 2)	1(15 0)	1(9 9)	4(10 7)
9(11 5)	11(12 3)	8(13 1)	2(7 10)	9(8 8)	22(9 6)
32(10 4)	31(11 2)	13(12 0)	3(5 11)	15(6 9)	39(7 7)
66(8 5)	77(9 3)	52(10 1)	3(3 12)	17(4 10)	52(5 8)
100(6 6)	136(7 4)	123(8 2)	50(9 0)	2(1 13)	14(2 11)
51(3 9)	115(4 7)	183(5 5)	203(6 3)	136(7 1)	5(0 12)
32(1 10)	94(2 8)	183(3 6)	244(4 4)	220(5 2)	90(6 0)
36(0 9)	114(1 7)	205(2 5)	240(3 3)	165(4 1)	81(0 6)
159(1 4)	165(2 2)	71(3 0)	70(0 3)	68(1 1)	11(0 0)

	4	2	2	1	1 1 1 1 1
1(12 3)	1(13 1)	3(10 4)	3(11 2)	2(12 0)	1(7 7)
5(8 5)	8(9 3)	7(10 1)	1(5 8)	7(6 6)	13(7 4)
16(8 2)	6(9 0)	1(3 9)	8(4 7)	17(5 5)	24(6 3)
18(7 1)	1(1 10)	6(2 8)	16(3 6)	29(4 4)	28(5 2)
13(6 0)	2(0 9)	10(1 7)	23(2 5)	30(3 3)	25(4 1)
9(0 6)	20(1 4)	23(2 2)	9(3 0)	9(0 3)	10(1 1)
1(0 0)					

	4	2	2	2	2 2 1 0 0
1(10 7)	1(11 5)	1(12 3)	1(13 1)	1(7 13)	2(8 8)
5(9 6)	5(10 4)	5(11 2)	1(12 0)	1(5 11)	5(6 9)
10(7 7)	16(8 5)	16(9 3)	10(10 1)	1(3 12)	6(4 10)
17(5 8)	23(6 6)	37(7 4)	29(8 2)	13(9 0)	1(1 13)
6(2 11)	18(3 9)	39(4 7)	56(5 5)	60(6 3)	33(7 1)
3(0 12)	12(1 10)	33(2 8)	63(3 6)	78(4 4)	72(5 2)
36(6 0)	34(0 9)	41(1 7)	73(2 5)	82(3 3)	57(4 1)
25(0 6)	59(1 4)	57(2 2)	28(3 0)	27(0 3)	25(1 1)
3(0 0)					

	4	2	2	2	2 1 1 1 0
1(12 3)	1(8 8)	2(9 6)	3(10 4)	3(11 2)	1(12 0)
1(6 9)	4(7 7)	6(8 5)	9(9 3)	7(10 1)	2(4 10)
7(5 9)	16(6 6)	22(7 4)	20(8 2)	9(5 0)	1(3 11)
7(3 9)	18(4 7)	33(5 5)	33(6 3)	26(7 1)	1(2 12)
5(1 10)	18(3 9)	37(3 6)	53(4 4)	49(5 2)	9(6 0)
4(0 9)	24(1 7)	46(2 5)	57(3 3)	40(4 1)	3(0 6)
4(0 4)	43(2 2)	19(3 0)	19(0 3)	19(1 1)	3(0 0)

	4	2	2	2	1 1 1 1 1
1(11 2)	1(8 5)	1(9 3)	2(10 1)	1(6 6)	4(7 4)
3(8 2)	2(9 0)	2(4 7)	4(5 5)	8(5 3)	5(7 1)
1(2 9)	5(7 4)	8(4 4)	11(6 2)	2(6 0)	1(0 6)
3(1 7)	9(2 5)	11(3 3)	9(4 1)	2(0 0)	3(1 4)
7(2 2)	6(3 0)	5(0 3)	4(1 1)		

	3	3	3	3	2 2 0 0 0
1(17 2)	1(13 7)	2(14 5)	2(15 3)	2(16 1)	1(9 12)
2(10 10)	5(11 8)	7(12 6)	11(13 4)	7(14 2)	5(15 0)
1(6 15)	2(7 13)	7(8 11)	13(9 9)	23(10 7)	28(11 5)
29(12 3)	17(13 1)	1(4 16)	5(5 14)	12(6 12)	28(7 10)

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 44( 8   8)      64( 9   6)      65(10   4)      56(11   2)      16(12   0)       1( 2 17)
  5( 3  15)      18( 4  13)      38( 5  11)      73( 6   9)     105( 7   7)     126( 8   5)
115( 9   3)      70(10   1)       4( 1  16)      14( 2  14)      43( 3  12)      83( 4  10)
143( 5   8)     181( 6   6)     197( 7   4)     143( 8   2)      62( 9   0)       7( 0  15)
 27( 1  13)      75( 2  11)     138( 3   9)     213( 4   7)     250( 5   5)     231( 6   3)
139( 7   1)      26( 0  12)      90( 1  10)     166( 2   3)     248( 3   6)     261( 4   4)
215( 5   2)      74( 6   0)      71( 0   9)     152( 1   7)     223( 2   5)     220( 3   3)
139( 4   1)      78( 0   6)     144( 1   4)     126( 2   2)      58( 3   0)      59( 0   3)
 50( 1   1)       5( 0   0)
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                                3   3   3   3   3   1   1   0   0   0
  1(13   7)       1(14   5)       2(15   3)       1(16   1)       2(10  10)       3(11   8)
  7(12   6)       8(13   4)       8(14   2)       2(15   0)       2( 7  13)       4( 3  11)
 12( 9   9)      19(10   7)      28(11   5)      26(12   3)      18(13   1)       1( 4  16)
  3( 5  14)      11( 6  12)      23( 7  10)      45( 8   8)      60( 9   0)      72(10   4)
 53(11   2)      24(12   0)       4( 3  15)      13( 4  13)      37( 5  11)      67( 6   9)
110( 7   7)     130( 8   5)     126( 9   3)      76(10   1)       1( 0  18)       3( 1  16)
 16( 2  14)      39( 3  12)      90( 4  10)     145( 5   8)     205( 6   0)     211( 7   4)
174( 3   2)      58( 9   0)       3( 0  15)      27( 1  13)      69( 2  11)     148( 3   9)
224( 4   7)     283( 5   5)     269( 6   3)     162( 7   1)      34( 0  12)      94( 1  10)
196( 2   8)     274( 3   6)     319( 4   4)     241( 5   2)     102( 6   0)      65( 0   9)
175( 1   7)     247( 2   5)     260( 3   3)     163( 4   1)     108( 0   6)     167( 1   4)
168( 2   2)      58( 3   0)      58( 0   3)      62( 1   1)      12( 0   0)
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                                3   3   3   3   2   2   1   0   0   0
  1(14   5)       1(15   3)       1(16   1)       1(10  10)       3( 1   8)       6(12   6)
  8(13   4)       7(14   2)       3(15   0)       1( 7  13)       5( 8  11)      12( 9   9)
 22(10   7)      30(11   5)      31(12   3)      19(13   1)       3( 5  14)      10( 6  12)
 27( 7  10)      52( 8   8)      76( 9   6)      85(10   4)      70(11   2)      26(12   0)
  1( 2  17)       4( 3  15)      17( 4  13)      44( 5  11)      91( 6   9)     143( 7   7)
179( 8   5)     168( 9   3)     104(10   1)       3( 1  16)      14( 2  14)      49( 3  12)
111( 4  10)     199( 5   8)     276( 6   6)     301( 7   4)     235( 8   2)      92( 9   0)
  8( 0  15)      33( 1  13)     100( 2  11)     205( 3   9)     321( 4   7)     410( 5   5)
388( 6   3)     237( 7   1)      36( 0  12)     132( 1  10)     269( 2   8)     410( 3   6)
461( 4   4)     374( 5   2)     140( 6   0)                     341( 1   7)     392( 2   5)
402( 3   2)     258( 4   1)     143( 2   6)                     247( 2   2)
187( 0   3)      98( 1   1)      13( 0   3)
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                                3   3   3   3   2   1   0   0
  1(11   8)       2(12   6)       2(13   4)       3(14   2)       1(15   0)       1( 9  11)
  4( 9   9)       9(10   7)      14(11   5)      13(12   3)                       5( 6  12)
 10( 7  10)      23( 8   8)      38( 9   6)      47(10   4)      30(11   2)      45(13   0)
  1( 3  15)       5( 4  13)      10( 5  11)      42( 6   9)      73( 7   7)     101( 8   5)
137( 9   3)      64( 0   0)     138( 4  10)                     51( 0  12)     255( 4  10)
108( 5   8)     163( 6   6)     131( 3   9)     180( 2   7)                       2( 0  15)
 15( 1  13)      43( 1  13)                      75( 1   0)                     253( 6   3)
159( 7   1)      21( 0  12)                                     257( 5   2)     319( 4   4)
254( 5   2)     101( 4   7)                     143( 2   8)     256( 3   0)     175( 3   3)
230( 4   1)     104( 2   6)     132( 1   4)     170( 2   2)     254( 2   0)      73( 2   3)
 70( 1   1)      11( 0   0)                                      73( 5   0)
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  1(10   7)       1(11   5)       2(12   3)       1(13   1)
  5(10   4)       5(11   3)       4( 0   0)       1( 5  11)       4( 0   0)       4( 9   6)
 15( 8   5)      15( 9   3)      11(10   1)       1( 5  12)       4( 4  10)       3( 7   7)
 21( 6   6)      30( 7   4)      25( 2   2)                       4( 4  10)      12( 5   8)
  9( 2  11)      14( 3   9)      30( 4   7)      42( 5   5)       2( 0  15)       1( 1  13)
  9( 1  10)      21( 2   8)      42( 3   6)      52( 4   4)      49( 6   0)      30( 7   1)
 12( 0   9)      28( 1   7)      50( 2   5)      54( 3   3)      50( 3   2)      18( 6   0)
 36( 1   4)      34( 2   2)      17( 2   3)      17( 2   2)      39( 4   1)      15( 0   6)
                                                                 15( 1   1)       1( 0   0)
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                                         3   2   2   2   2   1       1   1   1
  1( 9   3)        1(10   1)      1( 6   6)           2( 7   4)
  1( 4   7)        4( 5   5)      5( 6   3)           5( 7   1)      3( 8   2)      1( 9
  9( 4   4)        8( 5   2)      4( 6   0)           3( 1   7)      2( 2   5)      4( 3
  7( 4   1)        4( 0   6)      7( 1   4)           9( 2   2)      6( 2   5)     10( 3
  4( 1   1)        1( 0   0)                                         3( 3   0)      2( 0
```

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                                 3   2   2   2   2   2   2   0   0
  1( 5   6)        2( 7   4)      1( 9   0)           1( 3   9)
  3( 6   3)        2( 7   1)      1( 1  10)           2( 2   8)      2( 4   7)
  7( 5   2)        1( 6   0)      1( 0   9)           4( 1   7)      6( 3   5)      3( 5
  6( 4   1)        3( 0   6)      7( 1   4)           6( 2   2)      7( 2   5)      5( 4
  3( 1   1)                                                         4( 3   0)      8( 3
                                                                                   4( 0
```

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                                 3   2   2   2   2   2   2   1   0
  1( 6   6)        1( 7   4)      1( 8   2)           1( 3   9)
  4( 6   3)        3( 7   1)      3( 2   8)           5( 3   6)      2( 4   7)
  4( 6   0)        1( 0   9)      5( 1   7)           9( 2   5)      9( 4   4)      4( 5   5
  5( 3   6)        9( 1   4)     11( 2   2)           4( 3   0)     12( 3   3)      7( 5   2
  1( 0   0)                                                         4( 0   3)      8( 4   1
                                                                                   5( 1   1
```

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                                 3   2   2   2   2   2   1   1   1   1   1
  1( 9   0)        1( 5   5)      1( 6   3)           1( 7   1)
  3( 5   2)        1( 1   7)      2( 2   5)           4( 3   3)      1( 5   5)
  3( 1   4)        3( 2   2)      2( 3   0)           1( 0   3)      2( 4   1)      2( 4   4)
                                                                    2( 1   1)      1( 0   6)
```

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                                 2   2   2   2   2   2   2   2   1   0
  1( 1   7)        1( 2   5)      1( 3   3)           2( 2
  1( 1   1)                       1( 4   1)
                                                      1( 1   4)                    1( 2   2)
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                                 2   2   2   2   2   2   1   1
  1( 3   3)        1( 3   6)      1( 2   2)           1( 5
```

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  1(20   3)        1(21   5)      4   4   4   2       0
  3(19   7)        8(20   5)      2(22   4)           1(24   0)
 11(16  10)       19(17   8)      4(21   3)           5(23   1)      1(17  11)      3(18   9)
  2(12  15)        9(15  13)     32(18   6)          32(19   4)     30(20   2)      3(15  12)
 35(15   3)       59( 9   1)     24(14  11)          51(15   9)     30(16   7)      7(21   0)
105(13  10)      182(14   8)      7( 9  13)           6(10  16)     19(14  14)    101(17   5)
  2( 7  19)        9( 8  17)    234(15   5)         260(16   4)    192(17   2)     54(12  12)
768(18   7)      542(14   5)     34( 9  15)          89(10  13)    191(12  11)     83(18   0)
171( 6  18)       51( 7  16)    295(15   3)         297(16   1)                   325(12   9)
297(12   6)      991(13   4)    140( 8  14)         200( 9  12)    932(   )         3( 5  20)
262( 5  17)      166(    15)    774(14   2)         271(15   0)      4(      )     730(11   8)
299(11   5)     1494(12   3)    885(13   1)         712( 9  10)   1139( 9   9)     46( 4  19)
 58( 3  18)      181( 4  16)    419( 5  14)           1( 0  24)                  1518(10   7)
 49( 9   6)     3459(10   4)   1795(11   2)         852( 6  12)                    18( 2  20)
 26( 2  17)      366( 3  15)    801( 4  13)         694(12   0)   1435( 7      )  2055( 8   8)
 13( 8   3)     2901( 9   2)   1695(10   1)        1464( 5  11)      3(   )        30( 1  19)
  4( 3   3)      223( 4  10)   3177( 5   9)          39( 0  18)   2300(   )      5048( 7   7)
  0( 9   0)      264( 0  15)    730( 1  13)        3888( 6   6)    214(       )    51( 2  14)
  5( 5   5)     2518( 6   3)   2133( 7   1)        1569( 2  11)   3768( 7   4)   2455( 8   2)
  3( 6   )      1695( 4   4)   2771( 5   2)          45( 2   )   2678( 5   )    3656( 4   7)
  2( 2   5)     2442( 3   3)   1614( 4   1)         575( 6   )   1537(     )    2696( 2   8)
  3( 3   0)      555( 0   3)    514( 1   1)          32( 0   )    947(     )    2947( 1   7)
                                                                 1590( 1   4)   1474( 2   2)
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 1(21   6)        1(23   2)      4   4   4   4   1   1   0   0   0   0
                                 1(17  11)          2(28   9)
                                                                    4(19   7)      6(20   5)
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6(21 3)	3(22 1)	2(15 12)	6(16 10)	15(17 8)	21(18 6)
7(19 4)	19(20 2)	10(21 0)	1(12 15)	6(13 13)	18(14 11)
1(15 9)	64(16 7)	83(17 5)	79(18 3)	48(19 1)	2(10 16)
3(11 14)	37(12 12)	85(13 10)	145(14 8)	204(15 6)	213(16 4)
4(17 2)	61(18 0)	1(7 19)	6(8 17)	24(9 15)	69(10 13)
7(11 11)	280(12 9)	412(13 7)	483(14 5)	445(15 3)	268(16 1)
2(5 20)	9(6 18)	36(7 16)	102(8 14)	243(9 12)	447(10 10)
3(11 8)	891(12 6)	925(13 4)	695(14 2)	273(15 0)	1(2 23)
3(3 21)	13(4 19)	47(5 17)	136(6 15)	321(7 13)	630(8 11)
4(9 9)	1411(10 7)	1601(11 5)	1422(12 3)	844(13 1)	2(1 22)
0(2 20)	44(3 18)	136(4 16)	353(5 14)	733(6 12)	1295(7 10)
4(8 8)	2346(9 6)	2336(10 4)	1768(11 2)	645(12 0)	6(0 21)
3(1 19)	109(2 17)	313(3 15)	721(4 13)	1372(5 11)	2189(6 9)
0(7 7)	3252(8 5)	2862(9 3)	1679(10 1)	37(0 18)	182(1 16)
1(2 14)	1164(3 12)	2064(4 10)	3079(5 8)	3770(6 6)	3785(7 4)
4(8 2)	1064(9 0)	200(0 15)	673(1 13)	1510(2 11)	2599(3 9)
0(4 7)	4116(5 5)	3657(6 3)	2166(7 1)	544(0 12)	1492(1 10)
0(2 8)	3550(3 6)	3700(4 4)	2859(5 2)	1064(6 0)	976(0 9)
1(1 7)	2799(2 5)	2714(3 3)	1676(4 1)	1028(0 6)	1657(1 4)
1(2 2)	608(3 0)	606(0 3)	533(1 1)	74(0 0)	

4 4 4 3 3 0 0 0 0 0

(21 6)	1(23 2)	2(18 9)	3(19 7)	5(20 5)	5(21 3)
(22 1)	2(15 12)	5(16 10)	13(17 8)	18(18 6)	25(19 4)
(20 2)	10(21 0)	2(12 15)	5(13 13)	17(14 11)	34(15 9)
(16 7)	73(17 5)	74(18 3)	44(19 1)	1(9 18)	3(10 16)
(11 14)	36(12 12)	80(13 10)	130(14 8)	189(15 6)	194(16 4)
(17 2)	55(18 0)	1(7 19)	8(8 17)	25(9 15)	71(10 13)
(11 11)	264(12 9)	375(13 7)	451(14 5)	411(15 3)	251(16 1)
(5 20)	10(6 19)	40(7 16)	105(8 14)	241(9 12)	426(10 10)
(11 8)	828(12 6)	869(13 4)	643(14 2)	262(15 0)	2(3 21)
(4 19)	47(5 17)	143(6 15)	318(7 13)	618(8 11)	934(9 9)
(10 7)	1496(11 5)	1337(12 3)	736(13 1)	1(1 22)	9(2 20)
(3 18)	142(4 16)	362(5 14)	726(6 12)	1264(7 10)	1523(8 6)
(9 6)	2191(10 4)	1672(11 2)	593(12 0)	5(0 21)	27(1 19)
(2 17)	317(3 15)	729(4 13)	1347(5 11)	2133(6 9)	2302(7 7)
(8 5)	2697(9 3)	1355(10 1)	39(0 18)	189(1 16)	528(2 14)
(3 12)	2020(4 10)	2991(5 8)	3607(6 6)	3616(7 4)	2548(8 2)
(9 0)	208(0 15)	671(1 13)	1503(2 11)	2534(3 9)	3517(4 7)
(5 5)	3493(6 3)	2050(7 1)	531(0 12)	1469(1 10)	2534(2 8)
(3 6)	3525(4 4)	2741(5 2)	993(6 0)	967(0 9)	1983(1 7)
(2 5)	2596(3 3)	1602(4 1)	975(0 6)	1591(1 4)	1704(2 2)
(3 3)	593(0 3)	508(1 1)	65(0 0)		

4 4 4 3 2 1 0 0 0 0

(22 4)	1(20 2)	1(18 9)	4(19 7)	7(20 5)	8(21 3)
(20 0)	2(15 12)	0(16 10)	19(17 8)	34(18 6)	43(19 4)
(.. 2)	15(21 0)	1(12 15)	3(13 13)	27(14 11)	33(15 9)
(.. 7)	150(17 5)	151(18 3)	98(19 1)	4(10 10)	21(11 14)
(.. 3)	169(12 10)	257(14 8)	409(15 6)	458(16 4)	557(17 2)
(..)	1(7 19)	9(8 17)	43(9 15)	135(10 13)	317(11 11)
(.. 3)	597(13 7)	1088(14 5)	1015(15 3)	620(16 1)	2(5 20)
(12 6)	49(7 16)	217(8 14)	525(9 12)	1024(10 10)	1633(11 8)
(.. 17)	2226(13 4)	1715(14 2)	645(15 0)	2(3 21)	19(4 19)
(.. 5)	285(6 15)	726(7 13)	1484(8 11)	2502(9 9)	3507(10 7)
(.. 15)	3615(12 3)	2164(11 1)	2(1 22)	16(2 20)	64(3 18)
(.. 4)	823(5 14)	1804(6 12)	3258(7 10)	4898(8 8)	6123(9 6)
(.. 15)	4680(11 2)	1748(12 0)	6(0 21)	52(1 19)	235(2 17)
(.. 3)	1791(4 13)	3534(5 11)	5776(6 9)	7878(7 7)	3848(8 5)
	4634(10 1)	37(0 13)	438(1 16)	1334(2 14)	3053(3 12)

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6608( 4 10)   8462( 5  8)  10547( 6  6)  10643( 7  4)   8001( 8  2)  2977( 9  0)
 495( 0 15)   1785( 1 13)   4113( 2 11)   7255( 3  9)  10292( 4  7) 11804( 5  5)
 562( 6  3)   6284( 7  1)   1512( 0 12)   4213( 1 10)   7566( 2  8) 10309( 3  6)
 920( 4  4)   8426( 5  2)   3173( 6  0)   2785( 0  9)   6049( 1  7)  8292( 2  5)
3306( 3  3)   5042( 4  1)   3058( 0  6)   4992( 1  4)   4541( 2  2)  1822( 3  0)
 812( 0  3)   1646( 1  1)    225( 0  0)
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                          4   4   4   3   1   1   1   0   0   0
    1(19  7)      1(20  5)      2(21  3)      1(22  1)      2(16 10)      5(17  8)
   10(18  6)     12(19  4)     11(20  2)      4(21  0)      1(13 13)      6(14 11)
   20(15  9)     35(16  7)     52(17  5)     51(18  3)     33(19  1)      3(11 14)
   18(12 12)     49(13 10)    101(14  3)    150(15  6)    173(16  4)    138(17  2)
   56(18  0)      1( 3 17)      9( 9 15)     36(10 13)    105(11 11)    214(12  9)
  349(13  7)    433(14  5)    417(15  3)    254(16  1)      3( 6 18)     15( 7 16)
   63( 8 14)    176( 9 12)    383(10 10)    649(11  8)    893(12  6)    950(13  4)
  752(14  2)    280(15  0)      1( 3 21)      4( 4 19)     23( 5 17)     86( 6 15)
  251( 7 13)    561( 8 11)   1025( 9  9)   1497(10  7)   1786(11  5)   1634(12  3)
  990(13  1)      4( 2 20)     22( 3 18)     94( 4 16)    286( 5 14)    695( 6 12)
 1339( 7 10)   2135( 8  3)   2761( 9  6)   2883(10  4)   2198(11  2)    841(12  0)
    2( 0 21)     15( 1 19)     73( 2 17)    262( 3 15)    689( 4 13)   1471( 5 11)
 2521( 6  9)   3605( 7  7)   4164( 8  5)   3773( 9  3)   2251(10  1)     30( 0 18)
  154( 1 16)    522( 2 14)   1273( 3 12)   2477( 4 10)   3892( 5  8)   5035( 6  6)
 5176( 7  4)   3975( 8  2)   1477( 9  0)    189( 0 15)    745( 1 13)   1811( 2 11)
 3358( 3  9)   4916( 4  7)   5807( 5  5)   5286( 6  3)   3181( 7  1)    580( 0 12)
 1948( 1 10)   3647( 2  8)   5093( 3  6)   5522( 4  4)   4300( 5  2)   1654( 6  0)
 1332( 0  9)   2994( 1  7)   4192( 2  5)   4181( 3  3)   2612( 4  1)   1590( 0  6)
 2571( 1  4)   2388( 2  2)    953( 3  0)    947( 0  3)    365( 1  1)    131( 0  0)
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                          4   4   4   2   2   2   0   0   0   0
    1(24  0)      1(20  5)      2(21  3)      1(22  1)      1(16 10)      2(17  8)
    7(18  6)      7(19  4)     11(20  2)      1(21  0)      1(13 13)      4(14 11)
   12(15  9)     22(16  7)     34(17  5)     37(18  3)     23(19  1)      1(11 14)
    4(11 14)     16(12 12)     34(13 10)     72(14  2)    107(15  3)    115(16  4)
   91(17  2)     47(18  1)      1( 3 17)      7( 9 15)     30(10 13)     79(11 11)
  155(13  9)    244(13  7)    304(14  5)    260(15  3)    173(16  1)      5( 6 18)
   14( 7 16)     54( 9 14)    139( 9 12)    293(10 10)    473(11  6)    535(12  6)
  664(13  4)    543(14  2)    186(15  0)      2( 4 19)     19( 5 17)     69( 6 15)
  708( 7 13)    430( 8 11)    763( 9  9)   1194(10  7)   1283(11  5)   1103(12  3)
  703(13  1)      3( 2 20)     17( 3 18)     78( 4 16)    227( 5 14)    549( 6 12)
  116( 7 10)   1606( 8  8)   2016( 9  6)   2107(10  4)   1564(11  2)    622(12  0)
   10( 1 19)     54( 2 17)    205( 3 15)    534( 4 13)   1129( 5 11)    971( 4  9)
   72( 7  7)   3068( 8  5)   2743( 9  3)   1626(10  1)     24( 0 18)    411( 1 16)
  416( 2 14)    985( 3 12)   1909( 4 10)   2927( 5  8)   3771( 5  5)   3790( 7  4)
  973( 3  9)   3256( 9  7)    143( 0 15)    573( 1 13)   1385( 2 11)   2552( 3  9)
  760( 4  7)   4320( 5  5)   3972( 6  3)   2937( 7  1)    583( 0 12)   1405( 1 10)
  783( 2  8)   3315( 3  6)   4143( 4  4)   3773( 5  2)   1249( 6  0)    990( 7  9)
  157( 1  7)   3121( 2  5)   3119( 3  3)   1937( 4  1)   1219( 3  6)   1913( 1  4)
  135( 2  3)    697( 3  0)    697( 0  3)    445( 1  1)    178( 0  0)
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                          4   4   4   2   2   1   1   0   0   0
    1(20  5)      1(21  3)      1(22  1)      3(17  8)      5(18  5)      9(19  4)
    7(20  2)      4(21  0)      4(14 11)     11(15  6)     29(16  7)     37(17  5)
   41(19  3)     26(19  1)      3(11 14)     11(12 10)     38(13 13)     75(14  8)
  124(15  6)    140(16  4)    122(17  2)     43(18  0)      1( 6 17)      6( 9 15)
   90(13 13)     83(11 11)    184(12  9)    293(13  7)    389(14  5)    272(15  3)
  334(16  1)      1( 6 18)     12( 7 16)     49( 8 14)    154( 9 12)    334(10 10)
  192(11  6)    817(12  6)    906(13  4)    701(14  2)    280(15  0)      2( 4 19)
   15( 5 17)     72( 6 15)    218( 7 13)    523( 8 11)    961( 9  9)   1453(10  7)
  735(11  5)   1618(12  3)    978(13  1)      1( 2 20)     15( 3 18)     72( 4 16)
  157( 5 14)    541( 6 12)   1306( 7 10)   2094( 8  8)   2788( 9  6)   2093(10  4)
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2267(11  2)    832(12  0)      1( 0 21)     9( 1 19)     61( 2 17)    229( 3 15)
 662( 4 13)   1441( 5 11)   2570( 6  9)  3691( 7  7)   4340( 8  5)   3935( 9  3)
2373(10  1)     19( 0 18)    138( 1 16)    483( 2 14)  1268( 3 12)  2509( 4 10)
4073( 5  8)   5282( 6  6)   5547( 7  4)  4218( 8  2)   1624( 9  0)    192( 0 15)
 742( 1 13)   1890( 2 11)   3533( 3  9)  5295( 4  7)  6277( 5  5)   5780( 6  3)
3478( 7  1)    675( 0 12)   2073( 1 10)  3898( 2  8)  5588( 3  6)   6046( 4  4)
4806( 5  2)   1789( 6  0)   1481( 0  9)  3296( 1  7)  4701( 2  5)   4680( 3  3)
2957( 4  1)   1729( 0  6)   2917( 1  4)  2664( 2  2)  1114( 3  0)   1107( 0  3)
 992( 1  1)    129( 0  0)
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                            4   4   4   2   1   1   1   1   0   0
  1(18  6)      1(19  4)      2(20  2)      1(15  9)      4(16  7)      7(17  5)
  8(18  3)      6(19  1)      1(12 12)      5(13 10)     15(14  8)     25(15  6)
 36(16  4)     28(17  2)     14(18  0)      3(10 13)     13(11 11)     37(12  9)
 70(13  7)    100(14  5)    102(15  3)     66(16  1)      1( 7 16)      6( 8 14)
 26( 9 12)     74(10 10)    147(11  8)    229(12  6)    260(13  4)    220(14  2)
 79(15  0)      1( 5 17)      9( 6 15)     38( 7 13)    115( 8 11)    245( 9  9)
411(10  7)    527(11  5)    513(12  3)    319(13  1)      1( 3 16)     10( 4 16)
 46( 5 14)    145( 6 12)    336( 7 10)    611( 8  8)    861( 9  6)    961(10  4)
755(11  2)    299(12  0)      1( 1 19)      8( 2 17)     42( 3 15)    148( 4 13)
374( 5 11)    744( 6  9)   1162( 7  7)   1445( 8  5)   1362( 9  3)    843(10  1)
  3( 0 18)     25( 1 16)    111( 2 14)    329( 3 12)    737( 4 10)   1233( 5  8)
1791( 6  6)   1940( 7  4)   1543( 8  2)    577( 9  0)     41( 0 15)    193( 1 13)
545( 2 11)   1117( 3  9)   1785( 4  7)   2225( 5  5)   2114( 6  3)   1299( 7  1)
203( 0 12)    655( 1 10)   1332( 2  8)   1982( 3  6)   2253( 4  4)   1804( 5  2)
704( 6  0)    491( 0  9)   1175( 1  7)   1735( 2  5)   1733( 3  3)   1143( 4  1)
656( 0  6)   1112( 1  4)   1057( 2  2)    426( 3  0)    423( 0  3)    395( 1  1)
 57( 0  0)
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                            4   4   4   1   1   1   1   1   1   0
  1(13  3)      1(15  6)      1(16  4)      2(17  2)      1(18  0)      1(12  9)
  2(13  7)      6(14  5)      6(15  3)      5(16  1)      1( 9 12)      8(13 10)
  7(11  8)     13(12  6)     18(13  4)     16(14  2)      8(15  0)      4( 8 11)
 11( 9  9)     26(10  7)     37(11  5)     43(12  3)     26(13  1)      1( 5 14)
  4( 6 12)     17( 7 10)     27( 8  8)     66( 9  6)     78(10  4)     70(11  2)
 25(12  0)      1( 3 15)      5( 4 13)     17( 5 11)     50( 6  9)     35( 7  7)
126( 8  5)    126( 9  3)     93(10  1)      3( 2 14)     16( 3 12)     43( 4 10)
 98( 5  8)    152( 6  6)    184( 7  4)    149( 8  2)     64( 9  0)      1( 0 15)
  9( 1 13)     36( 2 11)     83( 3  9)    157( 4  7)    213( 5  5)    217( 6  3)
135( 7  1)     11( 0 12)     49( 1 10)    110( 2  8)    193( 3  6)    223( 4  4)
197( 5  2)     73( 0  9)     46( 0  6)    109( 1  7)    187( 2  5)    193( 3  3)
127( 4  1)     63( 0  6)    121( 1  4)    114( 2  2)     54( 3  0)     54( 0  3)
 44( 1  1)      6( 0  0)
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                            4   4   3   3   3   1   0   0   0   0
  1(20  5)      1(21  3)      1(22  1)      1(16 10)      3(17  3)      6(18  6)
  9(17  4)      8(20  2)      1(21  0)      1(13 13)      3(14 11)     15(15  9)
 26(16  7)     37(17  5)      4(18  3)     26(19  0)      1(15 13)      5(11 14)
 17(12 12)     41(18  0)     73(14  8)    179(15  6)    134(16  4)    115(17  2)
 43(18  0)      2( 0 17)     11( 9 15)     38(10 13)     93(11 11)    183(12  9)
234(13  7)    357(14  5)    339(15  8)    211(16  1)      4( 6 13)     20( 7 16)
 66( 8 14)    173( 9 12)    346(10 10)    565(11  8)    753(12  6)    802(13  4)
221(14  2)    241(15  0)      4( 4 19)     26( 5 17)     99( 6 15)    255( 7 13)
537( 8 11)    923( 0  9)   1317(10  7)   1530(11  5)   1391(12  3)    333(12  1)
  4( 2 20)     26( 3 18)    205( 4 16)    305( 5 14)    639( 5 12)   1269( 7 10)
136( 8  8)   2450( 9  6)   2495(10  4)   1900(11  2)    704(12  0)      1( 0 21)
 61( 1 19)     83( 2 17)    280( 3 15)    709( 4 13)   1429( 5 11)   2575( 6  9)
271( 7  7)   3706( 8  5)   3296( 9  3)   1954(10  1)     33( 0 18)    170( 1 16)
243( 2 14)   1275( 3 12)   2376( 4 10)   3633( 5  8)   4561( 6  6)   4628( 7  4)
 83( ?  ?)   1310( 9  6)    203( ? 15)    754( 1 13)   1763( 2 11)   5181( ?  9)
```

...7(4 7)   5259(5 5)   4727(6 3)   2816(7 1)   663(0 12)   1874(1 10)
...4(2 8)   4686(3 6)   4976(4 4)   3863(5 2)   1452(6 0)   1268(0 9)
...1(1 7)   3835(2 5)   3769(3 3)   2345(4 1)   1440(0 6)   2339(1 4)
...3(2 2)   866(3 0)   864(0 3)   779(1 1)   110(0 0)

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                          4   4   3   3   2   2   0   0   0   0
 1(21   3)      1(22   1)      1(17   8)      3(19   6)      6(19   4)      6(20   2)
 3(21   0)      1(13  13)      3(14  11)      9(15   9)     18(16   7)     29(17   5)
 2(18   3)     22(19   1)      3(11  14)     11(12  12)     31(13  10)     61(14   8)
 7(15   6)    114(16   4)     98(17   2)     37(18   0)      1( 8  17)      8( 9  15)
 0(10  13)     79(11  11)    158(12   9)    254(13   7)    322(14   5)    311(15   3)
 3(16   1)      1( 6  18)     14( 7  16)     52( 8  14)    148( 9  12)    308(10  10)
 4(11   8)    707(12   6)    765(13   4)    595(14   2)    231(15   0)      3( 4  19)
 9( 5  17)     79( 6  15)    225( 7  13)    500( 8  11)    890( 9   9)   1294(10   7)
 3(11   5)   1392(12   3)    839(13   1)      1( 2  20)     19( 3  18)     82( 4  16)
 0( 5  14)    640( 6  12)   1240( 7  10)   1935( 8   8)   2498( 9   6)   2565(10   4)
 7(11   2)    730(12   0)      2( 0  21)     12( 1  19)     72( 2  17)    251( 3  15)
 7( 4  13)   1419( 5  11)   2431( 6   9)   3411( 7   7)   3912( 8   5)   3505( 9   3)
 5( 5   8)   4872( 6   6)    152( 1  16)    506( 2  14)   1267( 3  12)   2433( 4  10)
 5( 1  13)   1852( 2  11)   5007( 7   4)   3787( 8   2)   1429( 9   0)    202( 0  15)
 2( 7   1)    672( 0  12)   3383( 3   9)   4943( 4   7)   5773( 5   5)   5235( 6   3)
 3( 5   2)   1635( 6   0)   1998( 1  10)   3692( 2   8)   5179( 3   6)   5855( 4   4)
 3( 4   1)   1615( 0   6)   2671( 1   4)   3085( 1   7)   4330( 2   5)   4283( 3   3)
 5( 1   1)    124( 0   0)              2448( 2   2)   1000( 8   0)   1002( 0   3)
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                          4   4   3   3   2   1   1   0   0   0
(17   8)       3(18   6)      4(19   4)      4(20   2)      2(21   0)      2(14  11)
(15   9)      18(16   7)     28(17   5)     30(18   3)     20(19   1)      1(11  14)
(12  12)      29(13  10)     65(14   8)    105(15   6)    128(16   4)    105(17   2)
(18   0)       4( 8  15)     23(13   3)     75(11  11)    169(12   9)    287(13   7)
(14   5)     369(15   3)    230(16   1)      1( 8  18)      9( 7  16)     47( 8  14)
( 9  12)     342(11  10)    608(11   8)    363(12   6)    946(13   4)    738(14   2)
(15   0)       1( 4  18)     14( 5  17)     48( 6  15)    227( 7  15)    549( 3  11)
( 9   9)    1586(10   7)   1930(11   5)   1797(12   3)   1093(13   1)      2( 2  20)
( 3  18)      82( 4  16)    279( 5  14)    730( 6  12)   1475( 7  10)   2425( 8   9)
( 9   6)    3395(10   4)   2832(11   2)    998( 2   3)     10( 1  19)     63( 2  17)
( 3  15)     756( 4   3)   1698( 5  11)   3031( 6   9)   4410( 7   7)   5192( 8   5)
( 9   3)    2855(10   1)    231( 0  18)    151( 1  16)    593( 2  14)   1528( 3  12)
( 4  10)    4984( 5   8)   6584( 6   6)   6875( 7   4)   5271( 8   2)   1975( 9   0)
( 0  15)     911( 1  13)   2393( 2  11)   4420( 3   9)   6621( 4   7)   7927( 5   5)
( 6   3)    4437( 7   1)    579( 0  12)   2615( 1  10)   5514( 2   8)   7255( 3   6)
( 4   4)    6149( 5   3)   2356( 6   0)   1291( 0   9)   4238( 1   7)   5055( 2   5)
( 3   3)    3837( 4   1)    231( 0   6)   3337( 1   4)   2555( 2   2)   2453( 3   0)
( 0   3)    1313( 1   1)    192( 0   0)
```

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                          4   4   3   3   1   1   1   0   0
(15   9)       2(16   7)      4(17   5)      4(18   3)      3(19   1)      3(13  10)
(14   8)      17(15   6)     22(16   4)     19(17   2)      8(18   0)      1(10  13)
(11  11)      26(12   9)     54(13   7)     75(14   5)     79(15   3)     50(16   1)
( 8  14)      18( 8  12)     55(10   0)    118(11   8)    185(12   6)    217(13   4)
(14   2)      69(15   0)      1( 5  17)      6( 6  15)     31( 7  13)     93( 8  11)
( 9   9)     356(10   7)    469(11   5)    455(12   3)    286(13   1)      1( 3  18)
( 4  16)      39( 5  14)    126( 6  12)    302( 7  10)    554( 8   8)    738( 9   6)
( 9   4)     711(11   2)    276(12   0)      1( 1  19)      7( 2  17)     39( 3  15)
( 3   3)     353( 5  11)    703( 6   9)   1119( 7   7)   1394( 8   5)   1329( 9   3)
( 1   1)       3( 0  18)     24( 1  16)    106( 2  14)    318( 3  12)    719( 4  10)
( 5   6)    1780( 6   6)   1944( 7   4)   1546( 8   2)    586( 9   0)     39( 0  15)
( 1  13)     541( 2  11)   1131( 3   9)    810( 4   7)   2291( 5   5)   2139( 6   3)
( 7   1)     205( 0  12)    469( 1  10)   1374( 2   8)   2062( 3   6)   2351( 4   4)
```

93(5 2)   727(6 0)   508(0 9)   1235(1 7)   1828(2 5)   1895(3 3)
13(4 1)   700(0 6)   1188(1 4)   1134(2 2)   459(3 0)   454(0 3)
26(1 1)   64(0 0)

| | 4 | 4 | 3 | 2 | 2 | 2 | 1 | 0 | 0 | 0 |

1(19 4)   1(20 2)   1(15 9)   4(16 7)   7(17 5)   9(18 3)
6(19 1)   2(12 12)   8(13 10)   20(14 8)   36(15 6)   45(16 4)
39(17 2)   16(18 0)   1(9 15)   7(10 13)   26(11 11)   63(12 9)
114(13 7) 155(14 5)   153(15 3)   99(16 1)   2(7 16)   15(8 14)
56(9 12)   142(10 10)   268(11 8)   391(12 6)   439(13 4)   353(14 2)
136(15 0)   3(5 17)   23(6 15)   91(7 13)   244(8 11)   493(9 9)
776(10 7)   962(11 5)   911(12 3)   557(13 1)   3(3 18)   26(4 16)
113(5 14)   331(6 12)   724(7 10) 1240(8 8) 1690(9 6) 1815(10 4)
419(11 2)   527(12 0)   2(1 19)   21(2 17)   107(3 15)   352(4 13)
854(5 11) 1608(6 9) 2410(7 7) 2906(8 5) 2686(9 3) 1629(10 1)
8(0 18)   65(1 16)   273(2 14)   777(3 12) 1663(4 10) 2800(5 8)
774(6 6) 4009(7 4) 3115(8 2) 1182(9 0)   103(0 15)   457(1 13)
269(2 11) 2525(3 9) 3908(4 7) 4770(5 5) 4447(6 3) 2709(7 1)
477(0 12) 1508(1 10) 2987(2 8) 4371(3 6) 4864(4 4) 3876(5 2)
483(6 0) 1121(0 9) 2634(1 7) 3832(2 5) 2904(3 3) 2479(4 1)
460(0 6) 2465(1 4) 2316(2 2)   946(3 0)   943(0 3)   872(1 1)
126(0 0)

| | 4 | 4 | 3 | 2 | 2 | 1 | 1 | 1 | 0 | 0 |

1(16 7)   2(17 5)   3(18 3)   2(19 1)   2(13 10)   7(14 8)
15(15 6)   20(16 4)   19(17 2)   7(13 0)   1(10 13)   7(11 11)
25(12 9)   51(13 7)   78(14 5)   82(15 3)   54(16 1)   3(8 14)
18(9 12)   58(10 10)   129(11 8)   207(12 6)   251(13 4)   208(14 2)
84(15 0)   5(6 15)   30(7 13)   134(8 11)   241(9 9)   425(10 7)
564(11 5)   561(12 3)   353(13 1)   6(4 16)   39(5 14)   143(6 12)
362(7 13)   685(8 9) 1012(9 6) 1139(10 4)   927(11 2)   355(12 0)
5(2 17)   37(3 15)   154(4 13)   428(5 11)   898(6 9) 1454(7 7)
1352(8 3) 1774(9 3) 1103(10 1)   2(0 18)   23(1 16)   119(2 14)
392(? ?)   928(4 ?) 1694(5 8) 2412(6 6) 2682(7 4) 2152(8 2)
826(? ?)   46(? 15)   235(1 12)   712(2 10) 1527(3 9) 2512(4 7)
330(5 5) 2082(? ?) 1508(7 1)   364(? 12)   913(1 10) 1915(2 8)
944(3 4) 2377(4 4) 2761(5 2) 1259(6 0)   725(0 9) 1775(1 7)
2579(2 6) 2791(3 3) 1972(4 1) 1014(3 6) 1770(2 4) 1635(2 2)
731(3 0)   694(? 3)   645(1 1)   91(0 0)

| | 4 | 4 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 0 |

?(15 6)   ?(?? 4)   ?(17 2)   1(18 0)   1(12 9)   4(13 7)
9(14 5)   11(15 3)   7(16 1)   5(17 10)   12(11 8)   25(12 6)
39(13 4)   35(14 2)   14(15 0)   1(7 13)   6(8 11)   24(9 9)
57(10 7)   70(11 5)   72(12 3)   47(13 1)   1(5 14)   9(6 12)
34(7 10)   93(8 8)   45(9 6)   210(10 4)   183(11 2)   73(12 0)
1(3 15)   16(4 13)   44(5 11)   121(6 9)   239(7 7)   345(8 5)
150(? ?) 235(?? ?)   5(? ?)   9(2 14)   40(5 12)   120(4 10)
276(5 3)   432(? ?)   551(7 4)   464(? 2)   193(9 0)   5(0 15)
24(1 12)   96(2 11)   249(3 9)   457(3 7)   658(5 5)   575(6 3)
436(7 ?)   85(3 12)   147(1 ?)   386(? 8)   632(3 6)   749(4 4)
635(? ?)   257(? 3)   193(0 ?)   264(? 7)   589(2 5)   547(3 3)
431(? 1)   225(0 6)   411(1 ?)   407(2 2)   171(3 0)   165(0 3)
160(? 1)   25(0 0)

| | 4 | 4 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

1(15 ?)   1(13 4)   1(14 ?)   1(15 9)   1(10 7)   4(11 5)
5(12 3)   3(15 1)   1(9 9)   4(5 6)   8(10 4)   9(11 2)
3(12 0)   2(11 6)   6(7 7)   15(8 5)   17(9 3)   13(10 1)
3(4 10)   7(5 8)   15(3 6)   26(7 4)   23(8 2)   12(9 0)

2(2 11)	6(2 9)	19(4 7)	30(5 5)	37(6 3)	250(7 1)
3(1 10)	11(2 8)	27(3 6)	37(4 4)	37(5 2)	13(6 0)
7(0 9)	16(1 7)	32(2 5)	37(3 3)	27(4 1)	9(0 6)
24(1 4)	22(2 2)	12(3 0)	12(0 3)	10(1 1)	1(0 0)

4 4 2 2 2 2 2 0 0 0

1(14 8)	1(15 6)	2(16 4)	1(17 2)	1(18 0)	1(11 11)
3(12 9)	7(13 7)	9(14 5)	9(15 3)	6(16 1)	1(8 14)
2(9 12)	11(10 10)	19(11 8)	33(12 6)	34(13 4)	31(14 2)
8(15 0)	5(7 13)	16(8 11)	41(9 9)	69(10 7)	91(11 5)
86(12 3)	54(13 1)	2(4 16)	6(5 14)	29(6 12)	65(7 10)
30(8 8)	177(9 6)	206(10 4)	153(11 2)	66(12 0)	6(3 15)
26(4 13)	82(5 11)	167(6 9)	277(7 7)	343(8 5)	323(9 3)
201(10 1)	1(0 18)	4(1 16)	27(2 14)	76(3 12)	195(4 10)
336(5 8)	491(6 6)	523(7 4)	430(8 2)	150(9 0)	5(0 15)
48(1 13)	139(2 11)	216(3 9)	511(4 7)	660(5 5)	626(6 3)
292(7 1)	64(0 12)	192(1 10)	422(2 8)	621(3 6)	737(4 4)
678(5 2)	239(6 0)	141(0 9)	386(1 7)	570(2 5)	608(3 3)
690(4 1)	240(0 6)	390(1 4)	391(2 2)	145(3 0)	142(0 3)
147(1 1)	26(0 0)				

4 4 2 2 2 2 1 1 0 0

1(15 6)	1(16 4)	2(17 2)	1(11 11)	3(12 9)	7(13 7)
11(14 5)	12(15 3)	8(15 1)	2(9 12)	8(10 10)	22(11 8)
35(12 6)	47(13 4)	36(14 2)	18(15 0)	4(7 13)	17(8 11)
47(9 9)	87(10 7)	121(11 5)	122(12 3)	78(13 1)	5(5 14)
24(6 12)	75(7 10)	152(8 8)	241(9 6)	273(10 4)	232(11 2)
83(12 0)	5(3 15)	28(4 13)	94(5 11)	215(6 9)	372(7 7)
483(8 5)	480(9 3)	330(10 1)	3(1 16)	21(2 14)	88(3 12)
229(4 10)	454(5 8)	670(5 6)	774(7 4)	617(6 2)	248(9 0)
9(3 15)	54(1 13)	183(2 11)	424(3 9)	732(4 7)	987(5 5)
949(6 3)	596(7 1)	57(0 12)	253(1 10)	569(2 8)	918(3 6)
376(4 4)	902(5 2)	343(6 0)	221(0 9)	564(1 7)	379(2 5)
937(3 0)	512(4 1)	334(0 6)	615(1 4)	582(2 2)	248(3 0)
245(0 3)	33(1 1)	31(0 0)			

4 4 2 2 2 1 1 1 1 0

1(13 7)	2(14 5)	3(15 3)	2(16 1)	1(10 10)	3(11 8)
9(12 6)	12(13 4)	12(14 2)	5(15 0)	4(8 11)	8(9 9)
19(10 7)	35(12 5)	39(12 3)	27(13 1)	3(6 12)	12(7 10)
88(8 8)	68(9 6)	93(10 4)	81(11 2)	34(12 0)	2(4 13)
16(5 10)	49(6 9)	107(7 7)	158(8 5)	174(9 3)	112(10 1)
3(2 14)	15(3 12)	56(4 10)	128(5 8)	225(6 6)	275(7 4)
242(8 2)	94(5 0)	9(1 13)	40(2 11)	120(3 9)	233(4 7)
347(5 5)	359(6 3)	237(7 1)	19(0 12)	72(1 10)	190(2 9)
326(8 6)	419(4 4)	356(5 2)	148(6 0)	66(0 9)	200(1 7)
329(2 5)	377(8 3)	248(4 1)	156(0 6)	240(1 4)	249(2 2)
100(3 0)	97(3)	97(1)	18(0 0)		

4 4 2 2 1 1 1 1 1 1

1(15 4)	1(14 2)	1(15 0)	2(11 5)	3(12 3)	3(13 1)
1(8 8)	4(9 6)	8(10 4)	10(11 2)	3(12 0)	6(7 7)
12(9 5)	18(9 3)	13(10 1)	2(4 10)	7(5 6)	18(6 6)
29(7 4)	27(5 2)	19(9 0)	6(7 9)	16(4 7)	34(5 5)
39(6 3)	29(7 1)	1(0 12)	4(1 10)	15(2 8)	31(3 6)
45(4 4)	64(5 2)	17(5 0)	3(6 9)	13(1 7)	34(2 5)
45(3 3)	31(4 1)	15(0 6)	39(1 4)	31(2 2)	13(3 0)
11(0 3)	13(1 1)	2(0 0)			

4 3 3 3 3 2 1 0 0 0 0

1(20 2)	1(16 7)	2(17 5)	3(18 3)	3(19 1)	1(12 12)
2(13 10)	6(14 8)	10(15 6)	16(16 4)	12(17 2)	7(18 0)
10(9 15)	3(10 13)	10(11 11)	21(12 9)	37(13 7)	50(14 5)
51(15 3)	33(16 1)	2(7 16)	9(8 14)	24(9 12)	55(10 10)
92(11 8)	134(12 6)	144(13 4)	120(14 2)	40(15 0)	3(5 17)
14(6 15)	45(7 13)	100(8 11)	185(9 9)	273(10 7)	328(11 5)
303(12 3)	184(13 1)	3(3 18)	18(4 16)	59(5 14)	149(6 12)
286(7 10)	462(8 8)	589(9 6)	622(10 4)	466(11 2)	185(12 0)
2(1 19)	14(2 17)	59(3 15)	165(4 13)	358(5 11)	616(6 9)
878(7 7)	1008(8 5)	936(9 3)	541(10 1)	6(0 18)	37(1 16)
134(2 14)	336(3 12)	667(4 10)	1040(5 8)	1347(6 6)	1367(7 4)
1054(8 2)	382(9 0)	50(0 15)	208(1 13)	516(2 11)	965(3 9)
412(4 7)	1661(5 5)	1503(6 3)	902(7 1)	200(0 12)	583(1 10)
1104(2 8)	1533(3 6)	1672(4 4)	1286(5 2)	500(6 0)	411(0 9)
937(1 7)	1311(2 5)	1310(3 3)	819(4 1)	511(0 6)	825(1 4)
774(2 2)	302(3 0)	305(0 3)	285(1 1)	45(0 0)	

$$4\ 3\ 3\ 3\ 3\ 1\ 1\ 0\ 0\ 0$$

1(16 7)	1(17 5)	2(18 3)	1(19 1)	2(13 10)	4(14 8)
9(15 6)	11(16 4)	11(17 2)	3(13 0)	2(10 13)	6(11 11)
18(12 9)	31(13 7)	46(14 5)	45(15 3)	30(16 1)	1(7 16)
5(8 14)	19(9 12)	44(10 10)	86(11 8)	123(12 6)	144(13 4)
112(14 2)	48(15 0)	1(5 17)	10(6 15)	33(7 13)	88(8 11)
168(9 9)	268(10 7)	327(11 5)	313(12 3)	191(13 1)	2(3 18)
12(4 16)	49(5 14)	129(6 12)	274(7 10)	450(8 8)	614(9 6)
644(10 4)	513(11 2)	185(12 0)	1(1 19)	11(2 17)	48(3 15)
151(4 13)	339(5 11)	624(6 9)	908(7 7)	1083(8 5)	988(9 3)
599(10 1)	4(0 18)	32(1 16)	120(2 14)	329(3 12)	667(4 10)
1102(5 8)	1441(6 6)	1528(7 4)	1161(8 2)	452(9 0)	49(0 15)
201(1 13)	533(2 11)	1016(3 9)	1546(4 7)	1846(5 5)	1709(6 3)
1030(7 1)	197(0 12)	622(1 10)	1191(2 8)	1730(3 6)	1381(4 4)
1505(5 2)	558(6 0)	463(0 9)	1049(1 7)	1515(2 5)	1518(3 3)
963(4 1)	566(0 6)	969(1 4)	889(2 2)	375(3 0)	375(0 3)
338(1 1)	44(0 0)				

$$4\ 3\ 3\ 3\ 2\ 2\ 1\ 0\ 0\ 0$$

1(17 5)	1(18 3)	1(19 1)	1(13 10)	3(14 8)	7(15 6)
11(16 4)	9(17 2)	4(18 0)	1(10 13)	8(11 11)	16(12 9)
32(13 7)	45(14 5)	48(15 3)	30(16 1)	4(8 14)	27(9 12)
47(10 10)	93(11 8)	140(12 6)	160(13 4)	132(14 2)	50(15 0)
1(5 17)	8(6 15)	33(7 13)	96(8 11)	201(9 9)	325(10 7)
403(11 5)	382(12 3)	237(13 1)	1(3 18)	11(4 16)	49(5 14)
149(6 12)	329(7 10)	570(8 8)	781(9 6)	842(10 4)	657(11 2)
253(12 0)	1(1 19)	10(2 17)	52(3 15)	172(4 13)	424(5 11)
800(6 9)	1209(7 7)	1451(8 5)	1343(9 3)	813(10 1)	4(0 18)
33(1 16)	142(2 14)	407(3 12)	879(4 10)	1421(5 8)	1999(6 6)
2110(7 4)	1648(8 2)	619(9 0)	55(0 15)	254(1 13)	595(2 11)
1394(3 9)	2156(4 7)	2634(5 5)	2452(6 3)	1491(7 1)	267(0 12)
951(1 10)	1698(2 8)	2485(3 6)	2770(4 4)	2201(5 2)	846(6 0)
1643(0 9)	1527(1 7)	2224(2 5)	2269(3 3)	1442(4 1)	360(0 6)
1451(1 4)	1370(2 2)	557(3 0)	558(0 3)	520(1 1)	70(0 0)

$$4\ 3\ 3\ 3\ 2\ 1\ 1\ 1\ 0\ 0$$

1(14 8)	2(15 6)	3(16 4)	3(17 2)	1(18 0)	1(11 11)
5(12 9)	12(13 7)	19(14 5)	21(15 3)	14(16 1)	4(9 12)
16(10 10)	38(11 8)	55(12 6)	60(13 4)	68(14 2)	27(15 0)
1(6 15)	9(7 13)	35(8 11)	86(9 9)	155(10 7)	212(11 5)
212(12 3)	135(13 1)	2(4 16)	15(5 14)	56(6 12)	147(7 10)
284(8 8)	423(9 6)	483(10 4)	392(11 2)	152(12 0)	2(2 17)
16(3 15)	68(4 13)	192(5 11)	406(6 9)	665(7 7)	848(8 5)

9 3)	508(10 1)	1(0 18)	11(1 16)	57(2 14)	189(3 12)
4 10)	825(5 8)	1181(6 6)	1311(7 4)	1049(8 2)	402(9 0)
0 15)	118(1 13)	360(2 11)	778(3 9)	1284(4 7)	1642(5 5)
6 3)	981(7 1)	238(0 12)	479(1 10)	1012(2 8)	1559(3 6)
4 4)	1464(5 2)	568(6 0)	387(0 9)	958(1 7)	1452(2 5)
3 3)	980(4 1)	558(0 6)	975(1 4)	935(2 2)	385(3 0)
0 3)	361(1 1)	52(0 0)			

	4 3 3 3 1 1 1 1 1 0		1(16 1)	2(11 6)	6(12 6)
3 7)	1(14 5)	2(15 3)	1(16 1)	6(9 9)	14(10 7)
13 4)	8(14 2)	3(15 0)	1(3 11)	10(7 10)	28(8 8)
1 5)	27(12 3)	19(13 1)	2(6 12)	1(3 15)	3(4 13)
9 6)	68(10 4)	58(11 2)	25(12 0)	131(9 5)	83(10 1)
5 11)	41(6 3)	84(7 7)	121(8 5)	172(6 6)	209(7 4)
2 14)	14(3 12)	46(4 10)	103(5 8)	36(2 11)	99(3 9)
9 2)	69(9 0)	1(0 15)	10(1 13)	16(0 12)	60(1 10)
4 7)	267(5 5)	274(6 3)	179(7 1)	111(6 0)	54(0 9)
2 8)	253(3 6)	317(4 4)	258(5 2)	101(0 6)	131(1 4)
1 7)	253(2 5)	282(3 3)	187(4 1)	12(0 0)	
2 2)	74(3 0)	74(0 3)	71(1 1)		

	4 3 3 2 2 2 0 0 0		4(13 7)	6(14 5)	5(15 3)
15 6)	1(17 2)	2(12 9)	4(13 7)	23(12 6)	31(13 4)
16 1)	2(9 12)	6(10 10)	17(11 8)	17(8 11)	39(9 9)
14 2)	11(15 0)	1(6 15)	4(7 13)	7(4 15)	7(5 14)
10 7)	87(11 5)	85(12 3)	51(13 1)	205(10 4)	171(11 2)
6 12)	72(7 10)	129(8 8)	194(9 6)	94(5 11)	199(6 9)
12 0)	1(2 17)	7(3 15)	229(10 1)	5(1 18)	16(2 14)
7 7)	397(8 5)	271(9 3)	568(6 6)	636(7 4)	487(8 2)
3 12)	323(4 10)	412(5 8)	185(2 11)	394(5 9)	650(4 7)
9 0)	12(0 15)	59(1 13)	67(1 12)	247(2 10)	522(3 6)
5 5)	783(6 3)	480(7 1)	374(6 0)	276(3 9)	496(1 7)
2 6)	902(4 4)	762(5 2)	283(2 6)	305(0 4)	479(2 2)
1 5)	784(3 3)	509(4 1)	34(1 1)		
3 1)	210(0 3)	191(1 1)			

	4 3 3 2 2 2 1 1 0 0		3(18 7)	5(14 5)	7(15 3)
16 4)	1(19 0)	1(12 9)	3(18 7)	23(12 6)	54(13 4)
16 1)	1(9 12)	5(10 10)	13(11 8)	1(9 9)	79(10 7)
14 2)	10(15 0)	2(7 13)	15(8 11)	28(6 12)	10(7 10)
11 5)	112(12 3)	72(13 1)	5(5 14)	105(12 0)	5(3 15)
8 8)	244(9 6)	291(10 4)	227(11 2)	344(8 5)	258(6 3)
4 13)	104(5 11)	242(6 9)	413(7 7)	277(4 10)	353(5 8)
10 1)	3(1 16)	26(2 14)	103(3 12)	11(0 15)	65(1 13)
6 6)	899(7 4)	739(8 2)	275(9 0)	1154(6 3)	725(7 1)
2 11)	519(3 9)	397(4 7)	1179(5 5)	1363(4 4)	1155(5 2)
0 12)	322(1 10)	725(8 8)	1147(3 6)	1174(3 3)	779(4 1)
6 0)	277(0 9)	773(1 7)	1120(2 5)	313(0 3)	299(1 1)
0 6)	776(1 4)	764(2 2)	310(2 0)		
0 0)					

	4 3 3 2 2 1 1 1 1 0		2(11 3)	5(12 5)	9(13 4)
14 5)	1(15 3)	1(16 1)	2(11 3)	47(10 7)	23(11 5)
14 2)	4(15 0)	2(8 11)	5(9 9)	34(8 8)	67(9 6)
12 3)	23(13 1)	2(6 12)	12(7 10)	16(5 11)	54(6 9)
10 4)	81(11 2)	31(12 0)	3(4 13)	2(2 14)	17(3 12)
7 7)	172(9 5)	183(9 3)	102(10 1)	259(8 2)	141(9 0)
4 10)	147(5 8)	243(5 6)	346(7 4)	283(4 7)	408(5 5)
0 15)	10(1 13)	51(2 11)	140(3 9)	223(2 3)	460(3 6)
6 3)	280(7 1)	16(0 12)	28(1 10)		

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02( 4  4)    441( 5  2)    171( 6  0)     90( 0  9)    248( 1  7)    420( 2  5)
67( 3  3)    316( 4  1)    158( 0  6)    307( 1  4)    303( 2  2)    133( 3  0)
21( 0  3)    124( 1  1)     17( 0  0)
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                          4  3  3  2  1  1  1  1  1  1
1(14  2)     1(11  5)      3(12  3)       2(13  1)      3( 9  6)      7(10  4)
7(11  2)     4(12  0)      1( 6  9)       5( 7  7)     13( 8  5)     17( 9  3)
14(10  1)    1( 4 10)      6( 5  8)      18( 6  6)     28( 7  4)     30( 8  2)
11( 9  0)    1( 2 11)      6( 3  9)      20( 4  7)     36( 5  5)     46( 6  3)
32( 7  1)    4( 1 10)     15( 2  8)      34( 3  6)     52( 4  4)     49( 5  2)
22( 6  0)    6( 0  9)     21( 1  7)      43( 2  5)     52( 3  3)     37( 4  1)
16( 0  6)   33( 1  4)     37( 2  2)      15( 2  0)     15( 0  3)     15( 1  1)
2( 0  0)
```

```
                          4  3  2  2  2  2  2  1  0  0
1(11  8)     2(12  6)      2(13  4)       2(14  2)       1(15  0)      1( 9 11)
4( 9  9)     9(10  7)     13(11  5)      13(12  3)       8(13  1)      2( 6 12)
9( 7 10)    22( 8  8)     37( 9  6)      44(10  4)      36(11  2)     14(12  0)
2( 4 13)    12( 5 11)     37( 6  9)      71( 7  7)      99( 8  5)    100( 9  3)
62(10  1)    2( 2 14)     14( 3 12)      46( 4 10)     102( 5  8)    103( 6  6)
193( 7  4)  160( 8  2)    62( 9  0)       1( 0 15)       9( 1 13)     39( 2 11)
105( 5  9)  197( 4  7)   275( 5  5)      279( 6  3)     178( 7  1)     15( 0 12)
67( 1 10)   166( 2  8)   284( 3  6)      350( 4  4)     298( 5  2)    119( 6  0)
68( 0  9)   183( 1  7)   302( 2  5)      334( 3  3)     223( 4  1)    123( 0  6)
224( 1  4)  225( 2  2)    95( 3  0)       96( 0  3)      92( 1  1)     14( 0  0)
```

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                          4  3  2  2  2  2  1  1  1  0
1(13  4)     1(14  2)      1( 9  9)       3(10  7)       5(11  5)      7(12  3)
5(13  1)     2( 7 10)      8( 8  8)      17( 9  6)      24(10  4)     22(11  2)
9(12  0)     3( 5 11)     13( 6  9)      34( 7  7)      54( 8  5)     50( 9  3)
41(10  1)    3( 3 12)     17( 4 10)      47( 5  8)      99( 6  6)    115( 7  4)
103( 8  2)   41( 9  0)     2( 1 13)      14( 2 11)      48( 5  9)    106( 4  7)
165( 5  5)  178( 6  3)   119( 7  1)       5( 0 12)      31( 1 10)     89( 2  8)
168( 3  6)  225( 4  4)   199( 5  2)       80( 4  0)      35( 0  9)   109( 1  7)
192( 2  5)  224( 3  3)   153( 4  1)       76( 0  6)     150( 2  4)   155( 2  2)
56( 3  0)   65( 1  3)    44( 1  1)
```

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                          4  3  2  2  2  1  1  1  1  1
1(12  3)     1(13  1)      1( 9  6)       3(10  4)       4(11  2)      2(12  0)
2( 7  7)     4( 8  5)     10( 8  3)       3(10  1)       5( 5  3)     10( 6  6)
18( 7  4)   19( 6  2)     9( 6  0)        3( 3  9)      11( 4  7)     24( 5  5)
32( 6  0)   23( 7  0)     1( 1 10)        5( 2  8)      24( 5  6)     33( 4  4)
37( 5  2)   16( 6  7)     4( 0  8)       15( 1  7)      32( 2  5)     41( 3  3)
3?( 4  1)   12( 0  5)    27( 1  4)       31( 2  2)      13( 3  0)     13( 0  3)
13( 2  1)    2( 0  1)
```

```
                          4  3  2  2  2  2  2
1( 5  3)     2(10  4)      1(12  0)       1( 6  9)       2( 7  7)      5( 8  5)
3( 9  3)     2(11  1)      2( 4 10)       3( 5  8)       9( 6  6)      7( 7  4)
13( 7  2)    3( 9  0)      1( 2 11)       4( 3  9)      10( 4  7)     15( 5  5)
16( 5  3)    3( 7  3)      1( 0 13)       3( 1 10)      11( 2  6)     17( 3  6)
27( 4  4)   19( 5  0)      3( 4  3)       3( 0  9)      12( 1  7)     22( 2  5)
27( 3  3)   18( 4  1)     11( 0  6)      13( 1  4)      23( 2  2)      5( 3  0)
5( 0  3)     5( 2  1)      3( 0  0)
```

```
                          4  3  2  2  2  2  2  2
1( 9  6)     1(10  4)      1(11  0)       1( 6  9)       2( 7  7)      4( 8  5)
4( 9  3)     3(10  1)      4( 5  3)       7( 6  6)      12( 7  4)      9( 8  2)
5( 9  0)     1( 2 11)      4( 3  8)      12( 4  7)      19( 5  5)     23( 6  3)
15( 7  1)    3( 1 10)      6( 2  6)      23( 3  6)      30( 4  4)     31( 5  2)
```

82(5 5)	170(6 3)	103(7 1)	220(0 12)	61(1 10)	130(2 8)
192(3 6)	216(4 4)	173(5 2)	68(6 0)	46(0 9)	121(1 7)
179(2 5)	191(3 3)	118(4 1)	79(0 6)	125(1 4)	124(2 2)
51(3 0)	49(0 3)	46(1 1)	10(0 0)		

3	3 3 3 2 2 1 1 0 0				
1(12 6)	1(13 4)	2(14 2)	1(8 11)	3(9 9)	7(10 7)
10(11 5)	11(12 3)	7(13 1)	3(6 12)	9(7 10)	21(8 8)
31(9 6)	39(10 4)	30(11 2)	14(12 0)	1(3 15)	6(4 13)
18(5 11)	42(6 9)	70(7 7)	93(8 5)	89(9 5)	56(10 1)
1(1 16)	6(2 14)	22(3 12)	57(4 10)	107(5 8)	158(6 6)
174(7 4)	143(8 2)	52(9 0)	3(0 15)	16(1 13)	53(2 11)
117(3 9)	199(4 7)	255(5 5)	248(6 3)	153(7 1)	21(0 12)
77(1 10)	170(2 8)	265(3 6)	312(4 4)	251(5 2)	101(6 0)
69(0 9)	173(1 7)	268(2 5)	282(3 3)	184(4 1)	106(0 6)
188(1 4)	184(2 2)	74(3 0)	77(0 3)	73(1 1)	12(0 0)

3	3 3 3 2 1 1 1 1 0				
1(10 7)	2(11 5)	2(12 3)	2(13 1)	1(7 10)	3(8 8)
7(9 6)	10(10 4)	9(11 2)	3(12 0)	2(5 11)	7(6 9)
16(7 7)	24(8 5)	27(9 3)	18(10 1)	1(2 14)	3(3 12)
12(4 10)	26(5 8)	44(6 6)	56(7 4)	48(8 2)	13(9 0)
3(1 13)	10(2 11)	29(3 9)	56(4 7)	81(5 5)	83(5 3)
56(7 1)	5(0 12)	20(1 10)	50(2 8)	85(3 6)	108(4 4)
93(5 2)	37(6 0)	17(0 9)	56(1 7)	91(2 5)	102(3 3)
69(4 1)	38(0 6)	70(1 4)	71(2 2)	28(3 0)	27(0 3)
29(1 1)	3(0 0)				

3	3 3 3 1 1 1 1 1 0				
2(10 4)	1(12 0)	1(8 5)	2(9 3)	1(10 1)	1(5 8)
3(6 6)	2(7 4)	5(8 2)	1(9 0)	1(3 9)	2(4 7)
5(5 5)	7(6 3)	5(7 1)	1(0 12)	4(2 6)	6(3 6)
12(4 4)	7(5 2)	6(6 0)	3(1 7)	6(2 5)	9(3 3)
6(4 1)	5(0 6)	6(1 4)	8(2 2)	2(3 0)	2(0 3)
2(1 1)	2(0 0)				

3	3 3 2 2 2 2 1 0 0				
1(10 7)	1(11 5)	1(12 3)	1(13 1)	2(7 10)	4(8 8)
8(9 6)	9(10 4)	8(11 2)	2(12 0)	1(4 13)	4(5 11)
12(6 9)	21(7 7)	29(8 5)	28(9 3)	18(10 1)	1(2 14)
6(3 12)	17(4 10)	38(5 8)	56(6 6)	68(7 4)	52(8 2)
22(9 0)	4(1 13)	17(2 11)	42(3 9)	79(4 7)	105(5 5)
105(5 3)	66(7 1)	7(0 12)	31(1 10)	70(2 8)	119(3 6)
140(5 4)	121(5 2)	44(6 0)	29(0 9)	79(1 7)	119(2 5)
138(3 3)	93(4 1)	49(0 6)	97(1 4)	93(2 2)	41(3 0)
42(0 9)	40(7 1)	4(0 0)			

3	3 3 2 2 2 1 1 1 0				
1(12 3)	1(8 8)	5(9 6)	4(10 4)	4(11 2)	2(12 0)
1(5 11)	4(6 9)	9(7 7)	15(8 5)	16(9 3)	11(10 1)
1(2 12)	8(4 10)	16(5 8)	30(6 6)	38(7 4)	33(8 2)
14(9 0)	1(1 13)	6(2 11)	20(3 9)	41(4 7)	62(5 5)
57(6 3)	43(7 1)	3(0 12)	13(1 10)	38(2 8)	69(3 6)
59(4 4)	79(5 2)	31(6 0)	15(0 9)	46(1 7)	80(2 5)
93(3 3)	62(4 1)	34(0 6)	63(1 4)	55(2 2)	29(3 0)
28(0 3)	27(1 1)	5(0 0)			

3	3 3 2 2 1 1 1 1 1				
1(11 2)	2(8 5)	2(9 3)	2(10 1)	1(5 8)	2(6 6)
6(7 4)	5(8 2)	4(9 0)	1(3 9)	5(4 7)	8(5 5)

(86) TABLE CONTINUED

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11( 6  0)      5( 0  9)      15( 1  7)     32( 2  5)     37( 3  3)     27( 4  1)
10( 0  6)     27( 1  4)      27( 2  2)     14( 3  0)     15( 0  3)     13( 1  1)
 1( 0  0)
```

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                    4  2  2  2  2  2  1  1  1  1
 1(12  0)      1( 8  5)       1( 9  3)      1(10  1)      1( 6  6)      2( 7  4)
 4( 8  2)      2( 4  7)       4( 5  5)      7( 6  3)      4( 7  1)      1( 2  8)
 4( 3  6)      9( 4  4)       7( 5  2)      5( 6  0)      1( 0  9)      3( 1  7)
 8( 2  5)     10( 3  3)       9( 4  1)      3( 0  6)      7( 1  4)      9( 2  2)
 3( 3  0)      4( 0  3)       4( 1  1)      1( 0  0)
```

```
                    3  3  3  3  3  3  0  0  0  0
 1(18  0)      1(14  5)       1(15  3)      1(10 10)      1(11  8)      3(12  6)
 2(13  4)      4(14  2)       1( 6 15)      1( 7 13)      3( 8 11)      6( 9  9)
 8(10  7)     10(11  5)      11(12  3)      5(13  1)      2( 5 14)      6( 6 12)
 9( 7 10)     18( 8  3)      22( 9  6)     25(10  4)     16(11  2)     10(12  0)
 1( 2 17)      2( 3 15)       8( 4 13)     17( 5 11)     31( 6  9)     41( 7  7)
48( 8  5)     43( 9  3)      26(10  1)     68( 7  4)      6( 2 14)     18( 3 12)
34( 4 10)     53( 5  8)      74( 6  6)     58( 3  9)     57( 8  2)     19( 9  0)
 4( 0 15)     11( 1 13)      32( 2 11)     25( 1 10)     83( 4  7)     97( 5  5)
90( 6  3)     50( 7  1)      11( 0 12)     30( 0  9)     68( 2  8)     94( 3  6)
102( 4  4)    77( 5  2)      34( 6  0)     50( 1  4)     59( 1  7)     67( 2  5)
87( 3  3)     50( 4  1)      34( 0  6)                   52( 2  2)     21( 2  0)
23( 0  3)     17( 1  1)       5( 0  0)
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                    3  3  3  3  3  2  1  0  0  0
 1(14  5)      1(15  3)       1(16  1)      1(10 10)      3(11  8)      5(12  6)
 7(13  4)      6(14  2)       2(15  0)      3( 7 13)      5( 8 11)     11( 9  9)
20(10  7)     25(11  5)      25(12  3)     16(13  1)      1( 4 16)      4( 5 14)
12( 6 12)     27( 7 10)      47( 8  8)     65( 9  6)     71(10  4)     56(11  2)
21(12  0)      1( 2 17)       5( 3 15)     18( 4 13)     44( 5 11)     31( 6  9)
123( 7  7)    147( 8  5)     134( 9  3)     83(10  1)      4( 1 16)     17( 2 14)
48( 3 12)     105( 4 10)     173( 5  8)    230( 6  6)    244( 7  4)    187( 8  2)
76( 9  0)       7( 0 15)      84( 1 13)     91( 2 11)    130( 3  9)    270( 4  7)
332( 5  5)    306( 6  3)     186( 7  1)     36( 0 12)    117( 1 10)    231( 2  8)
333( 3  6)    370( 4  4)     292( 5  2)    109( 6  0)     89( 0  9)    215( 1  7)
309( 2  5)    312( 3  3)     200( 4  1)    121( 0  6)    207( 1  4)    193( 2  2)
78( 3  0)      78( 0  3)      76( 1  1)      9( 0  0)
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                    3  3  3  3  3  1  1  1  0  0
 1(11  9)      1(12  6)       3(13  4)      1(14  2)      2(15  0)      1( 8 11)
 3( 9  9)      6(10  7)       9(11  5)     10(12  3)      6(13  1)      1( 5 14)
 9( 6 12)      9( 7 10)      16( 8  8)     28( 9  6)     28(10  4)     28(11  2)
 7(12  0)      1( 3 15)       5( 4 13)     14( 5 11)     31( 6  9)     50( 7  7)
65( 8  5)     63( 9  3)      39(10  1)      1( 1 16)      5( 2 14)    191( 3 12)
40( 4 10)     77( 5  8)     104( 6  6)    121( 7  4)     89( 8  4)     42( 9  0)
 8( 0 15)     12( 1 18)      38( 2 11)     79( 3  9)    129( 4  7)    163( 5  5)
157( 6  3)    96( 7  1)      14( 0 12)     53( 1 10)    106( 2  8)    170( 3  6)
185( 4  4)   160( 5  2)      54( 6  0)     46( 0  9)    106( 1  7)    163( 2  5)
169( 3  3)   108( 4  1)      60( 0  6)    112( 1  4)    101( 2  2)     49( 3  0)
48( 0  3)     41( 1  1)       5( 0  0)
```

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                    3  3  3  3  2  2  2  0  0  0
 1(11  8)      1(12  4)       2(13  4)      1(14  2)      1(15  0)      1( 8 11)
 4( 9  9)      6(10  7)       9(11  5)      9(12  3)      5(13  1)      1( 5 14)
 4( 6 12)     10( 7 10)      16( 8  8)     29( 9  6)     29(10  4)     25(11  2)
 9(12  0)      2( 3 15)       5( 4 13)     18( 5 11)     35( 6  9)     57( 7  7)
69( 8  5)     66( 9  3)      37(10  1)      1( 0 18)      1( 1 16)      8( 2 14)
22( 3 12)     50( 4 10)      87( 5  8)    121( 6  6)    128( 7  4)    100( 8  2)
39( 9  0)      1( 0 15)      14( 1 13)     40( 2 11)     92( 3  9)    142( 4  7)
```

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12( 5  3)      8( 7  1)      1( 1 10)      3( 2  8)     10( 3  6)     13( 4  4)
16( 5  2)      4( 6  0)      2( 0  9)      6( 1  7)     14( 2  5)     16( 3  3)
13( 4  1)      4( 0  6)     12( 1  4)     10( 2  2)      7( 3  0)      7( 0  3)
 5( 1  1)
```

```
                    3  3  2  2  2  2  2  2  0  0
 1( 6  9)      1( 7  7)      2( 8  5)      2( 9  3)      1(10  1)      1( 4 10)
 3( 5  8)      5( 6  6)      6( 7  4)      5( 8  2)      2( 9  0)      2( 2 11)
 4( 3  9)     10( 4  7)     13( 5  5)     14( 6  3)      9( 7  1)      3( 1 20)
 8( 2  8)     17( 3  6)     20( 4  4)     19( 5  2)      7( 6  0)      6( 0  9)
12( 1  7)     23( 2  5)     25( 3  3)     17( 4  1)      7( 0  6)     13( 1  4)
17( 2  2)      9( 3  0)     10( 0  3)      8( 1  1)      1( 0  0)
```

```
                    3  3  2  2  2  2  2  1  1  0
 1( 7  7)      2( 8  5)      2( 9  3)      1(10  1)      1( 4 10)      3( 5  8)
 6( 6  6)      8( 7  4)      7( 8  2)      3( 9  0)      4( 3  9)      9( 4  7)
16( 5  5)     17( 6  3)     12( 7  1)      1( 0 12)      3( 1 10)     11( 2  8)
21( 3  6)     30( 4  4)     26( 5  2)     11( 6  0)      3( 0  9)     15( 1  7)
26( 2  5)     34( 3  3)     23( 4  1)     14( 0  6)     25( 1  4)     28( 2  2)
11( 3  0)     10( 0  3)     12( 1  1)      3( 0  0)
```

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                    3  3  2  2  2  2  1  1  1  1
 1(10  1)      1( 6  6)      2( 7  4)      2( 8  2)      1( 9  0)      1( 4  7)
 3( 5  5)      5( 6  3)      3( 7  1)      2( 2  8)      4( 3  6)      3( 4  4)
 8( 5  2)      3( 6  0)      3( 1  7)      7( 2  5)      9( 3  3)      7( 4  1)
 3( 0  6)      7( 1  4)      8( 2  2)      4( 3  0)      3( 0  6)      4( 1  1)
```

```
                    3  2  2  2  2  2  2  2  1  0
 1( 4  7)      1( 5  5)      1( 6  3)      1( 7  1)      1( 2  8)      2( 3  6)
 3( 4  4)      3( 5  2)      1( 6  0)      2( 1  7)      4( 2  5)      5( 3  3)
 4( 4  1)      2( 0  6)      5( 1  4)      5( 2  2)      2( 3  0)      2( 0  3)
 3( 1  1)
```

```
                    3  2  2  2  2  2  2  1  1
 1( 6  3)      1( 3  6)      1( 4  4)      2( 5  2)      2( 2  5)      2( 2  3)
 2( 7  0)      1( 0  6)      2( 1  4)      2( 2  2)      2( 3  0)      _( _  3)
 1( 1  1)
```

```
                    2  2  2  2  2  2  2  2  2  0
 1( 0  6)      1( 2  2)
```

```
                    2  2  2  2  2  2  2  2  1  1
 1( 1  4)      1( 3  0)
```

```
                    4  4  4  4  3  0  0  0  0  0
 1(20  8)      1(21  6)      1(22  4)      1(23  2)      1(17 11)      3(18  9)
 5(19  7)      7(20  5)      7(21  3)      4(22  1)      1(14 14)      4(15 12)
 9(16 10)     18(17  8)     26(18  6)     29(19  4)     23(20  2)     10(21  0)
 1(11 17)      3(12 15)     10(13 13)     25(14 11)     46(15  9)      7(16  7)
87(17  5)     82(18  3)     50(19  1)      2( 9 18)      7(10 16)     22(11 14)
52(12 12)    100(13 10)    157(14  8)    208(15  6)    215(16  4)    169(17  2)
63(18  0)      1( 6 21)      3( 7 19)     14( 8 17)     40( 9 15)     94(10 13)
182(11 11)    301(12  9)    409(13  7)    469(14  5)    421(15  3)    250(16  1)
 5( 5 20)     18( 6 18)     58( 7 16)    140( 8 14)    284( 9 12)    479(10 10)
700(11  8)    849(12  6)    853(13  4)    636(14  2)    241(15  0)      _( 2 23)
 5( 3 21)     23( 4 19)     70( 5 17)    182( 6 15)    376( 7 13)    675( 8 11)
1026( 9  9)  1337(10  7)   1454(11  5)   1269(12  3)   740(13  1)      9( 1 22)
16( 2 20)     67( 3 18)    179( 4 16)    418( 5 14)    792( 6 12)   1292( 7 10)
1792( 8  8)  2129( 9  6)   2058(10  4)   1526(11  2)   559(12  0)      9( 0 21)
39( 1 19)    145( 2 17)    367( 3 15)    782( 4 13)   1376( 5 11)   2078( 6  9)
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1( 7  7)    2856( 8  5)    2446( 9  3)   1423(10  1)     49( 0 18)    217( 1 16)
5( 2 14)    1177( 3 12)    1966( 4 10)   2794( 5  8)   3305( 6  6)   3227( 7  4)
0( 8  2)     882( 9  0)     223( 0 15)    679( 1 13)   1448( 2 11)   2367( 3  9)
4( 4  7)    3532( 5  5)    3059( 6  3)   1779( 7  1)    514( 0 12)   1359( 1 10)
7( 2  8)    3018( 3  6)    3076( 4  4)   2343( 5  2)    864( 6  0)    865( 0  9)
2( 1  7)    2332( 2  5)    2218( 3  3)   1357( 4  1)    853( 0  5)   1347( 1  4)
5( 2  2)     491( 3  0)     490( 0  3)    424( 1  1)     59( 0  0)
```

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                        4  4  4  4  2  1  0  0  0  0
                                              1(17 11)      3(18  9)      6(19  7)
  1(21  6)      1(22  4)      1(23  2)        1(14 14)      4(15 12)     12(16 10)
  9(20  5)      9(21  3)      6(22  1)       35(20  2)     15(21  0)      5(12 15)
 25(17  8)     37(18  6)     45(19  4)      116(16  7)    144(17  5)    139(18  3)
 13(13 13)     35(14 11)     72(15  9)       30(11 14)     80(12 12)    167(13 10)
 86(19  1)      1( 9 19)      8(10 16)      312(17  2)    114(18  0)      3( 7 19)
 75(14  8)    372(15  6)    393(16  4)      317(11 11)    546(12  9)    777(13  7)
 16( 8 17)     56( 9 15)    161(10 13)        1( 4 22)      5( 5 20)     25( 6 18)
 04(14  5)    818(15  3)    494(16  1)      914(10 10)   1374(11  8)    712(12  6)
 88( 7 16)    234( 8 14)    510( 9 12)        1( 2 23)      6( 3 21)     31( 4 19)
 46(13  4)   1310(14  2)    498(15  0)     1303( 8 11)   2066( 9  9)   2768(10  7)
 09( 5 17)    305( 6 15)    690( 7 13)        5( 1 22)     26( 2 20)    104( 3 18)
 74(11  5)   2706(12  3)   1595(13  1)     2656( 7 10)   3804( 8  8)   4601( 9  6)
 18( 4 16)    777( 5 14)   1561( 6 12)       11( 0 21)     66( 1 19)    247( 2 17)
 37(10  4)   3385(11  2)   1240(12  0)     4448( 6  9)   5842( 7  7)   6389( 8  5)
 89( 3 15)   1546( 4 13)   2854( 5 11)      409( 1 16)   1142( 2 14)   2455( 3 12)
 50( 9  3)   3251(10  1)     91( 3 18)     7448( 7  4)   5509( 8  2)   2055( 9  0)
 77( 4 10)   6223( 5  9)   7524( 6  6)     5299( 3  9)   7296( 4  7)   8175( 5  5)
 25( 0 15)   1429( 1 13)   3133( 2 11)     3071( 1 10)   5327( 2  8)   7099( 3  6)
 00( 6  3)   4245( 7  1)   2097( 8  0)     1967( 0  9)   4143( 1  7)   5577( 2  5)
 70( 4  4)   5637( 5  2)   2067( 0  6)     3297( 1  4)   2958( 2  2)   1191( 3  0)
 76( 3  3)   3314( 4  1)    143( 0  0)
 87( 0  3)   1064( 1  1)
```

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                        4  4  4  4  1  1  0  0  0  0
                                 2(20  5)      2(21  3)      1(22  1)      1(15 12)
  1(18  9)      1(19  7)         1(18  6)     12(19  4)     10(20  2)      4(21  0)
  3(16 10)      7(17  8)        21(15  9)     36(16  7)     46(17  5)     45(18  3)
  2(13 13)      9(14 11)         6(11 14)     23(12 12)     51(13 10)     93(14  8)
 27(19  1)      1(10 16)       110(17  2)     43(18  0)      2( 8 17)     13( 9 15)
130(15  6)    139(16  4)       188(12  9)    280(13  7)    337(14  5)    211(15  3)
 40(10 13)    100(11 11)         6( 6 18)     21( 7 16)     70( 8 14)    166( 9 12)
167(16  1)      1( 5 20)       668(12  6)    690(13  4)    530(14  2)    200(15  0)
325(10 10)    513(11  8)        29( 5 17)     90( 6 15)    228( 7 13)    468( 8 11)
  2( 3 21)      6( 4 19)      1253(11  5)   1125(12  3)    667(15  1)      1( 0 24)
787( 9  9)   1092(10  7)        11( 3 18)    102( 4 16)    263( 5 14)    577( 6 12)
  1( 1 23)      9( 2 20)      1915( 9  6)   1936(10  4)   1458(11  2)    548(12  0)
1021( 7 10)   1540( 8  8)        73( 2 17)    235( 3 15)    556( 4 13)   1185( 5 11)
  1( 0 21)     18( 1 19)      2750( 8  5)   2440( 9  3)   1439(10  1)     36( 0 19)
1797( 6  9)   2452( 7  7)       961( 3 12)   1759( 4 10)   2636( 5  8)   3299( 6  6)
141( 1 16)    431( 2 14)       932( 9  0)    149( 0 15)    555( 1 13)   1269( 2 11)
3309( 7  4)   2498( 8  2)      3668( 5  5)   3279( 6  3)   1949( 7  1)    437( 0 12)
2257( 3  9)   3179( 4  7)      3201( 3  6)   3397( 4  4)   2614( 5  2)    997( 6  0)
305( 1 10)   2363( 2  8)      2555( 2  5)   2519( 3  3)   1551( 4  1)    980( 0  6)
852( 0  9)   1369( 1  7)       566( 3  0)    556( 0  3)    503( 1  1)    211( 0  0)
1538( 1  4)   1417( 2  2)
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                        4  4  4  3  3  1  0  0  0  0
                                 1(18  9)      3(19  7)      5(20  5)      6(21  3)
  1(22  4)      1(24  0)         7(16 10)     14(17  8)     16(18  6)     29(19  4)
  4(22  1)      2(15 12)         2(12 15)      8(18 18)     23(14 11)     50(15  9)
 29(20  2)      8(21  0)       109(18  3)     69(19  1)      1( 9 18)      6(10 16)
 84(16  7)    110(17  5)       127(13 10)    221(14  8)    298(15  6)    334(16  4)
 22(11 14)     63(12 12)
```

1889(0 3)   1720(1 1)   241(0 0)

4 4 4 3 1 1 1 1 0 0

1(17 8)	1(18 6)	3(19 4)	1(20 2)	2(21 0)	1(14 11)
4(15 9)	9(16 7)	13(17 5)	14(18 3)	9(19 1)	3(12 12)
13(13 10)	28(14 8)	49(15 6)	54(16 4)	50(17 2)	15(18 0)
1(9 15)	8(10 13)	30(11 11)	71(12 9)	124(13 7)	163(14 5)
160(15)	100(16 1)	3(7 16)	16(8 14)	56(9 12)	135(10 10)
255(11 8)	359(12)	409(13 4)	315(14 2)	131(15 0)	1(4 19)
5(5 17)	25(6 15)	85(7 13)	214(8 11)	421(9 9)	653(10 7)
806(11 5)	757(12 3)	464(13 1)	1(2 20)	6(3 18)	29(4 16)
104(5 14)	274(6 12)	579(7 10)	964(8 8)	1317(9 6)	1391(10 4)
1104(11 2)	403(12 0)	4(1 19)	24(2 17)	96(3 15)	284(4 13)
650(5 11)	1188(6 9)	1766(7 7)	2107(8 5)	1946(9 3)	1178(10 1)
10(0 18)	60(1 16)	216(2 14)	578(3 12)	1181(4 10)	1960(5 8)
2598(6 6)	2770(7 4)	2126(8 2)	825(9 0)	82(0 15)	340(1 13)
884(2 11)	1730(3 9)	2604(4 7)	3154(5 5)	2929(6 3)	1781(7 1)
324(0 12)	1005(1 10)	1935(2 8)	2813(3 6)	3088(4 4)	2474(5 2)
926(6 0)	726(0 9)	1864(1 7)	2394(2 5)	2419(3 3)	1532(4 1)
892(0 6)	1507(1 4)	1392(2 2)	581(3 0)	571(0 3)	520(1 1)
70(0 0)					

4 4 4 2 2 2 1 0 0 0

1(21 3)	1(17 8)	3(18 6)	4(19 4)	4(20 2)	2(21 0)
2(14 11)	7(15 9)	14(16 7)	23(17 5)	23(18 3)	16(19 1)
2(11 14)	9(12 12)	25(13 10)	52(14 8)	81(15 6)	93(16 4)
77(17 2)	31(18 0)	1(9 17)	6(9 15)	24(10 13)	66(11 11)
136(12 9)	219(13 7)	274(14 5)	265(15 3)	161(16 1)	1(6 18)
10(7 16)	43(8 14)	125(9 12)	269(10 10)	460(11 8)	626(12 6)
671(13 4)	526(14 2)	159(15 0)	2(4 19)	14(5 17)	64(6 15)
189(7 13)	435(8 11)	790(9 9)	1155(10 7)	1370(11 5)	1254(12 3)
755(13 1)	1(2 20)	24(3 18)	66(4 16)	225(5 14)	559(6 12)
1099(7 10)	1748(8 8)	2271(9 6)	2352(10 4)	1801(11 2)	631(12 0)
1(0 21)	8(1 19)	55(2 17)	207(3 15)	580(4 13)	1255(5 11)
190(6 9)	3116(7 7)	3607(8 5)	3255(9 3)	1944(10 1)	19(0 18)
124(1 16)	437(2 14)	1118(3 12)	2193(4 10)	3502(5 8)	4527(6 6)
674(7 4)	3571(8 2)	1342(9 0)	1701(0 15)	662(1 13)	1861(2 11)
100(3 9)	4584(4 7)	5437(5 5)	4950(6 3)	2971(7 1)	612(0 12)
826(1 10)	3442(2 8)	4871(3 6)	5280(4 4)	4144(5 2)	1577(6 0)
295(0 9)	2902(1 7)	4112(2 5)	4105(3 3)	2576(4 1)	1549(0 6)
658(1 4)	2369(3 2)	956(3 0)	967(0 3)	874(1 1)	128(0 0)

4 4 4 2 2 1 1 1 0 0

1(18 6)	1(19 4)	2(20 2)	2(15 9)	5(16 7)	9(17 5)
10(18 3)	7(19 1)	2(12 12)	2(13 10)	22(14 8)	35(15 6)
48(16 4)	37(17 2)	18(18 0)	1(9 15)	6(10 13)	24(11 11)
57(12 9)	106(13 7)	142(14 5)	144(15 3)	91(16 1)	2(7 16)
18(8 24)	27(9 12)	123(10 10)	228(11 8)	344(12 6)	379(13 4)
317(14 2)	118(15 0)	8(5 17)	19(6 15)	75(7 13)	197(8 11)
403(9 9)	637(10 7)	602(11 5)	760(12 3)	471(13 1)	5(3 18)
221(4 16)	90(5 14)	262(6 12)	566(7 10)	986(8 6)	1341(9 6)
470(10 4)	1136(11 2)	45(12 0)	2(7 19)	17(2 17)	84(3 15)
269(4 13)	652(5 11)	1227(6 9)	1865(7 7)	2252(8 5)	2101(9 3)
277(10 1)	7(0 18)	51(1 16)	209(2 14)	580(3 12)	1250(4 10)
296(5 8)	2861(6 6)	3034(7 4)	2396(8 2)	884(9 0)	75(0 15)
346(1 13)	930(2 11)	1860(3 9)	2883(4 7)	3543(5 5)	3311(6 3)
927(7 1)	354(0 12)	1097(1 10)	2183(2 8)	3184(3 6)	3582(4 4)
930(5 2)	1111(6 0)	802(0 9)	1906(1 7)	2765(2 5)	2828(3 3)
896(4 1)	1063(0 6)	1766(1 4)	1681(2 2)	665(3 0)	664(0 3)
824(1 1)	85(0 0)				

4	4	4	2	1	1	1	1	1	0

1(17 5)	1(13 3)	1(19 1)	1(14 8)	3(15 6)	5(16 4)
5(17 2)	2(18 0)	1(11 11)	4(12 9)	11(13 7)	18(14 5)
21(15 3)	14(16 1)	2(9 12)	9(10 10)	25(11 8)	45(12 6)
58(13 4)	51(14 2)	20(15 0)	1(6 15)	4(7 13)	17(8 11)
47(9 9)	90(13 7)	129(11 5)	132(12 3)	86(13 1)	5(5 14)
21(6 12)	65(7 10)	137(8 8)	218(9 6)	259(10 4)	215(11 2)
85(12 0)	1(2 17)	5(3 15)	25(4 13)	76(5 11)	176(6 9)
306(7 7)	409(8 5)	406(9 3)	256(10 1)	3(1 16)	17(2 14)
68(3 12)	173(4 10)	342(5 8)	514(6 6)	592(7 4)	485(8 2)
187(9 0)	8(0 15)	40(1 13)	134(2 11)	302(3 9)	524(4 7)
93(5 5)	685(6 3)	431(7 1)	46(0 12)	178(1 10)	383(2 8)
22(3 6)	735(4 4)	610(5 2)	239(6 0)	150(3 9)	371(1 7)
77(2 5)	611(3 3)	400(4 1)	213(0 6)	382(1 4)	359(2 2)
52(3 0)	153(0 3)	142(1 1)	20(0 0)		

4	4	4	1	1	1	1	1	1

1(18 0)	1(15 3)	1(12 6)	1(13 4)	3(14 2)	1(9 9)
1(10 7)	4(11 5)	5(12 3)	3(13 1)	3(6 8)	6(9 6)
11(13 4)	7(11 2)	7(12 0)	1(5 11)	3(6 9)	9(7 7)
14(8 5)	18(9 3)	11(10 1)	1(6 12)	3(4 10)	9(5 8)
22(6 6)	22(7 4)	26(8 2)	7(9 0)	2(2 11)	9(3 9)
16(4 7)	29(5 5)	32(6 3)	20(7 1)	2(0 12)	4(1 10)
16(2 8)	25(3 6)	37(4 4)	27(5 2)	18(5 3)	4(0 9)
14(1 7)	24(2 5)	22(3 3)	18(4 1)	14(3 6)	10(1 4)
23(2 2)	7(3 0)	7(0 3)	5(1 1)	5(0 3)	

4	4	3	3	3	2	0	0	0

1(21 3)	1(22 1)	1(17 3)	3(18 6)	5(19 4)	6(20 2)
2(21 0)	1(13 13)	3(14 11)	8(15 9)	16(16 7)	25(17 5)
27(18 3)	19(19 1)	1(10 16)	4(11 14)	13(12 12)	35(13 10)
57(14 8)	84(15 6)	100(16 4)	80(17 2)	34(18 0)	2(8 17)
11(9 15)	23(10 13)	79(11 11)	146(12 9)	225(13 7)	276(14 5)
62(15 3)	160(16 1)	4(6 18)	19(7 16)	64(8 14)	152(9 12)
99(10 10)	472(11 8)	622(12 6)	646(13 4)	505(14 2)	184(15 0)
4(4 19)	26(5 17)	99(6 15)	237(7 13)	482(8 11)	818(9 9)
28(10 7)	1305(11 5)	1168(12 3)	697(13 1)	4(2 20)	25(3 18)
23(4 16)	297(5 14)	644(6 12)	1156(7 10)	1745(8 3)	2160(9 6)
88(10 4)	1623(11 2)	620(12 0)	1(0 21)	16(1 19)	79(2 17)
70(3 15)	669(4 13)	1343(5 11)	2190(6 9)	2986(7 7)	3333(8 5)
41(9 3)	1734(10 1)	33(0 18)	164(1 16)	525(2 14)	1210(3 12)
47(4 10)	3377(6 8)	4217(6 6)	4219(7 4)	3180(8 2)	1169(9 0)
91(0 15)	726(1 13)	1688(2 11)	3012(3 9)	4264(4 7)	4399(5 5)
71(6 3)	2597(7 1)	645(0 12)	1785(1 10)	3245(2 8)	4409(3 6)
72(2 4)	3599(5 2)	1372(6 0)	1194(0 9)	2637(1 7)	3620(2 5)
62(3 3)	2209(4 1)	1889(0 6)	2218(1 4)	2043(2 2)	819(3 0)
49(0 3)	743(2 1)	111(0 0)			

4	4	3	3	3	1	1	0	0	0

1(17 8)	2(18 6)	3(19 4)	3(20 2)	1(21 0)	2(14 11)
6(15 9)	15(16 7)	19(17 5)	21(18 3)	13(19 1)	2(11 14)
8(12 12)	24(13 10)	47(14 8)	75(15 6)	86(16 4)	72(17 2)
23(18 0)	1(8 17)	61(9 15)	24(10 13)	62(11 11)	129(12 9)
94(13 7)	261(14 5)	248(15 3)	155(16 1)	1(6 18)	12(7 16)
44(8 14)	126(9 12)	260(10 10)	444(11 8)	597(12 6)	645(13 4)
81(14 2)	194(15 0)	3(4 19)	17(5 17)	72(6 15)	198(7 13)
11(9 11)	776(9 9)	1134(10 7)	1323(11 5)	1215(12 3)	728(13 1)
11(2 20)	18(3 18)	76(4 16)	248(15 14)	580(6 12)	1116(7 10)
11(8 8)	2232(9 6)	2287(10 4)	1756(11 2)	651(12 0)	2(0 21)

```
...11( 1 19)      69( 2 17)     235( 3 15)     631( 4 13)    1303( 5 11)    2227( 6  9)
...02( 7  7)    3563( 8  5)    3183( 9  3)    1900(10  1)      21( 0 18)    1450( 1 16)
...76( 2 14)    1187( 3 12)    2258( 4 10)    3541( 5  8)    4495( 6  6)    4620( 7  4)
...28( 8  2)    1323( 9  0)     195( 0 15)     712( 1 13)    1746( 2 11)    3165( 3  9)
...23( 4  7)    5391( 5  5)    4887( 6  3)    2917( 7  1)     631( 0 12)    1883( 1 10)
...69( 2  8)    4873( 3  6)    5212( 4  4)    4091( 5  2)    1530( 6  0)    1331( 0  9)
...3( 1  7)     4100( 2  5)    4048( 3  3)    2539( 4  1)    1522( 0  6)    2534( 1  4)
...3( 2  2)      956( 3  0)     961( 0  3)     859( 1  1)     116( 0  0)
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                          4  4  3  3  2  2  1  0  0  0

...1(18  6)       2(19  4)       2(23  2)       1(21  0)       1(14 11)       4(15  9)
...0(16  7)      16(17  5)      18(18  3)      12(19  1)       1(11 14)       7(12 12)
...1(13 10)      45(14  8)      72(15  6)      86(16  4)      72(17  2)      28(18  0)
...4( 9 15)      20(10 13)      61(11 11)     132(12  9)     218(13  7)     280(14  5)
...1(15  3)     169(16  1)       1( 6 18)       9( 7 16)      44( 8 14)     130( 9 12)
...1(10 10)     504(11  8)     695(12  6)     751(13  4)     591(14  2)     225(15  0)
...1( 4 19)      14( 5 17)      65( 6 15)     210( 7 13)     494( 8 11)     915( 9  9)
...7(10  7)    1618(11  5)    1489(12  3)     900(13  1)       2( 2 20)      15( 3 18)
...0( 4 16)     267( 5 14)     680( 6 12)    1348( 7 10)    2166( 8  8)    2821( 9  6)
...6(10  4)    2250(11  2)     848(12  0)      10( 1 19)      62( 2 17)     255( 3 15)
...2( 4 13)    1593( 5 11)    2798( 6  9)    4013( 7  7)    4656( 8  5)    4209( 9  3)
...7(10  1)      28( 0 18)     158( 1 16)     574( 2 14)    1461( 3 12)    2914( 4 10)
...7( 5  8)    6034( 6  6)    6239( 7  4)    4771( 8  2)    1788( 9  0)     210( 0 15)
...0( 1 13)    2215( 2 11)    4188( 3  9)    6219( 4  7)    7381( 5  5)    6744( 6  3)
...1( 7  1)     846( 0 12)    2505( 1 10)    4766( 2  8)    6747( 3  6)    7351( 4  4)
...5( 5  2)    2197( 6  0)    1773( 0  9)    4058( 1  7)    5755( 2  5)    5773( 3  3)
...0( 4  1)    2204( 0  6)    3634( 1  4)    3383( 2  2)    1367( 3  0)    1363( 0  3)
...7( 1  1)     183( 0  0)
```

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                          4  4  3  3  2  1  1  1  0  0

...1(15  9)       3(16  7)       5(17  5)       6(13  9)       4(19  1)       1(12 12)
...6(13 10)      16(14  8)      29(15  6)      36(16  4)      32(17  2)      12(18  0)
...4(10 13)      19(11 11)      51(12  9)      95(13  7)     133(14  5)     134(15  3)
...6(16  1)       1( 7 16)      10( 8 14)      45( 9 12)     116(10 10)     229(11  8)
...3(12  6)     395(13  4)     319(14  2)     126(15  0)       2( 5 17)      48( 6 15)
...3( 7 13)     206( 8 11)     427( 9  9)     693(10  7)     876(11  5)     841(12  3)
...0(13  1)       3( 3 18)      22( 4 16)      97( 5 14)     286( 6 12)     640( 7 10)
...4( 8  8)    1555( 9  6)    1689(10  4)    1339(11  2)     506(12  0)       2( 1 19)
...0( 2 17)      95( 3 15)     215( 4 13)     765( 5 11)    1446( 6  9)    2234( 7  7)
...3( 8  5)    1542( 9  3)    1552(10  1)       7( 0 18)      60( 1 16)     246( 2 14)
...7( 3 12)    1523( 4 10)    2602( 5  8)    3540( 6  6)    3808( 7  4)    2971( 8  2)
...7( 9  0)      97( 0 15)     428( 1 13)    1175( 2 11)    2353( 3  9)    3682( 4  7)
...( 5  5)     4257( 6  3)    2602( 7  1)     437( 0 13)    2409( 1 10)    2808( 2  8)
...( 3  6)     46+6( 4  4)    3720( 5  2)    1423( 6  0)    1062( 0  9)    2503( 1  7)
...0( 2  5)    3751( 3  3)    2293( 4  1)    1389( 0  6)    2373( 1  4)    2226( 2  2)
...8( 3  0)     915( 0  3)     842( 1  1)     119( 0  0)
```

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                          4  4  3  3  1  1  1  1  1  0

...1(14  8)       2(15  6)       3(16  4)       3(17  2)       1(18  0)       2(12  9)
...7(13  7)      12(14  5)      14(15  3)       9(16  1)       1( 9 12)       7(10 10)
...9(11  8)      37(12  6)      47(13  4)      47(14  2)      17(15  0)       2( 7 13)
...1( 8 11)      36( 9  0)      75(10  7)     109(11  5)     113(12  8)      74(13  3)
...( 4 16)       4( 5 14)      20( 6 12)      57( 7 10)       4( 8 15)     200( 9  6)
...2(10  4)     202(11  2)      79(12  0)       4( 3 15)      19( 4 13)      68( 5 11)
...9( 6  9)     288( 7  7)     388( 8  5)     393( 9  3)     248(10  1)       1( 0 18)
...3( 1 16)      20( 2 14)      65( 3 12)     175( 4 10)     339( 5  8)     519( 6  6)
...( 7  4)      494( 8  2)     191( 9  0)       4( 0 15)      39( 1 13)     126( 2 11)
...( 3  9)      527( 4  7)     713( 5  5)     705( 6  3)     449( 7  1)      55( 0 12)
...( 1 10)      415( 2  8)     656( 3  6)     786( 4  4)     650( 5  2)     258( 6  0)
...( 0  9)      394( 1  7)     608( 2  5)     658( 3  3)     428( 4  1)     242( 0  6)
```

7(1 4)　410(2 2)　166(3 0)　160(0 3)　156(1 1)　25(0 0)

4 4 3 2 2 2 2 0 0 0					
1(16 7)	1(17 5)	1(18 3)	1(19 1)	2(13 10)	5(14 8)
9(15 6)	10(16 4)	9(17 2)	3(18 0)	2(10 13)	7(11 11)
0(12 9)	34(13 7)	46(14 5)	44(15 3)	27(16 1)	1(7 16)
4(8 14)	19(9 12)	48(10 10)	93(11 8)	130(12 6)	148(13 4)
3(14 2)	45(15 0)	1(5 17)	8(6 15)	32(7 13)	91(8 11)
1(9 9)	288(10 7)	351(11 5)	329(12 3)	200(13 1)	1(3 18)
9(4 16)	42(5 14)	126(6 12)	285(7 10)	482(8 8)	663(9 6)
0(10 4)	551(11 2)	203(12 0)	1(1 19)	8(2 17)	41(3 15)
3(4 13)	345(5 11)	660(6 9)	989(7 7)	1190(8 5)	1393(9 3)
5(10 1)	2(0 18)	26(1 16)	1096(2 14)	324(3 12)	694(4 10)
8(5 8)	1591(6 6)	1706(7 4)	1313(8 2)	506(9 0)	44(0 15)
7(1 13)	549(2 11)	1090(3 9)	1707(4 7)	2080(5 5)	1949(6 3)
5(7 1)	200(0 12)	663(1 10)	1311(2 8)	1948(3 6)	2164(4 4)
3(5 2)	655(6 0)	508(0 9)	1185(1 7)	1746(2 5)	1775(3 3)
7(4 1)	653(0 6)	1137(1 4)	1059(2 2)	444(3 0)	445(0 3)
8(1 1)	53(0 0)				

4 4 3 2 2 2 1 1 0 0					
1(17 5)	1(18 3)	1(19 1)	1(13 10)	4(14 8)	3(15 6)
2(16 4)	10(17 2)	5(18 0)	1(10 13)	6(11 11)	18(12 9)
7(13 7)	53(14 5)	56(15 3)	36(16 1)	3(8 14)	15(9 12)
9(10 10)	102(11 8)	161(12 6)	186(13 4)	157(14 2)	58(15 0)
5(6 15)	29(7 13)	93(8 11)	210(9 9)	354(10 7)	461(11 5)
8(12 3)	280(13 1)	6(4 16)	38(5 14)	135(6 12)	329(7 10)
9(8 8)	871(9 6)	972(10 4)	770(11 2)	301(12 0)	5(2 17)
7(3 15)	148(4 13)	405(5 11)	826(6 9)	1315(7 7)	1542(8 5)
8(9 2)	958(10 1)	2(0 18)	23(1 16)	118(2 14)	378(3 12)
3(4 10)	1576(5 8)	2223(6 6)	2427(7 4)	1933(8 2)	730(9 0)
4(0 15)	230(1 13)	683(2 11)	1454(3 9)	2339(4 7)	2982(5 5)
5(6 3)	1756(7 1)	261(0 12)	879(1 10)	1838(2 8)	2788(3 6)
6(4 4)	2582(5 2)	1005(6 0)	691(1 9)	1731(2 7)	2550(2 5)
6(3 3)	1708(4 1)	985(0 6)	1495(1 4)	1626(2 2)	663(3 0)
0(0 3)	622(1 1)	93(0 0)			

4 4 3 2 2 1 1 1 1 0					
1(15 6)	2(16 4)	2(17 2)	1(18 0)	2(12 9)	6(13 7)
12(14 5)	14(15 3)	10(16 1)	1(9 12)	5(10 10)	19(11 8)
37(12 6)	51(13 4)	46(14 2)	19(15 0)	2(7 13)	13(8 11)
40(9 9)	87(10 7)	130(11 5)	141(12 3)	92(13 2)	3(5 14)
19(6 12)	65(7 10)	148(8 8)	350(9 6)	306(10 4)	262(11 2)
23(12 0)	3(3 15)	22(4 13)	81(5 11)	206(6 9)	370(7 7)
26(8 5)	532(9 3)	343(10 1)	2(1 16)	161(2 24)	70(3 12)
15(4 10)	451(5 8)	703(6 6)	835(7 4)	691(8 2)	273(9 0)
9(0 15)	46(1 13)	171(2 11)	414(3 9)	732(4 7)	1021(5 5)
33(6 3)	655(7 1)	61(0 12)	549(1 10)	575(2 6)	954(3 6)
49(4 4)	973(5 2)	379(6 0)	223(0 9)	580(1 7)	726(2 5)
99(3 3)	661(4 1)	349(0 6)	643(1 4)	623(2 2)	255(3 0)
62(0 3)	245(1 1)	34(0 0)			

4 4 3 2 1 1 1 1 1 1					
1(15 3)	1(16 1)	1(12 6)	3(13 4)	4(14 2)	1(15 0)
3(10 7)	8(11 5)	11(12 3)	9(9 1)	1(7 10)	5(8 8)
15(9 6)	25(10 4)	24(11 2)	11(12 0)	1(5 11)	7(6 9)
22(7 7)	41(8 5)	49(9 3)	35(10 1)	1(3 12)	8(4 10)
36(5 8)	53(6 6)	76(7 4)	71(8 2)	27(9 0)	1(1 13)
6(2 11)	23(3 9)	56(4 7)	90(5 5)	102(6 3)	70(7 1)
2(0 12)	14(1 10)	42(2 8)	38(3 6)	114(4 4)	102(5 2)

(93) TABLE CONTINUED

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  42( 6  0)     15( 0  9)     50( 1  7)     89( 2  5)    103( 3  3)     73( 4  1)
  34( 0  6)     67( 1  4)     69( 2  2)     28( 3  0)     27( 0  3)     28( 1  1)
   3( 0  0)
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                          4  4  2  2  2  2  2  1  0  0
    1(12  9)     2(13  7)     3(14  5)     3(15  3)     2(16  1)     1( 9 12)
    3(10 10)     9(11  8)    14(12  6)    17(13  4)    13(14  2)     8(15  0)
    1( 7 13)     8( 8 11)    20( 9  9)    39(10  7)    52(11  5)    52(12  3)
   32(13  1)     2( 5 14)    11( 6 12)    36( 7 10)    73( 8  8)   115( 9  6)
  130(10  4)   108(11  2)    39(12  0)     2( 3 15)    14( 4 13)    46( 5 11)
  111( 6  9)   188( 7  7)   250( 8  5)   243( 9  3)   152(10  1)     1( 1 16)
   10( 2 14)    45( 3 12)   120( 4 10)   242( 5  8)   358( 6  6)   415( 7  4)
  331( 8  2)   133( 9  0)     5( 0 15)    28( 1 13)   100( 2 11)   231( 3  9)
  408( 4  7)   537( 5  5)   532( 6  3)   334( 7  1)    36( 0 12)   144( 1 10)
  321( 2  8)   526( 3  6)   618( 4  4)   523( 5  2)   198( 5  0)   128( 0  9)
  326( 1  7)   518( 2  5)   552( 3  3)   364( 4  1)   195( 0  3)   303( 1  4)
  348( 2  2)   151( 3  0)   151( 0  3)   140( 1  1)    18( 0  0)
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                          4  4  2  2  2  2  1  1  1  0
    1(14  5)     1(15  3)     1(16  1)     1(10 10)     3(11  8)     6(12  6)
    9(13  4)     8(14  2)     3(15  0)     1( 8 11)     6( 9  9)    16(10  7)
   25(11  5)    29(12  3)    19(13  1)     3( 6 12)    12( 7 10)    33( 8  8)
   59( 9  6)    75(10  4)    66(11  2)    26(12  0)     2( 4 13)    15( 5 11)
   45( 6  9)    94( 7  7)   139( 8  5)   145( 9  3)    96(10  1)     3( 2 14)
   15( 3 12)    54( 4 10)   121( 5  8)   204( 6  6)   250( 7  4)   212( 8  2)
   85( 5  0)     9( 1 13)    39( 2 11)   114( 3  9)   221( 4  7)   320( 5  5)
  333( 6  3)   215( 7  1)    18( 0 12)    71( 1 10)   132( 2  8)   312( 3  6)
  394( 4  4)   339( 5  2)   133( 6  0)    55( 0  9)   193( 1  7)   319( 2  5)
  359( 3  3)   240( 4  1)   129( 0  6)   235( 1  4)   237( 2  2)   101( 3  0)
   96( 0  3)    95( 1  1)    15( 0  0)
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                          4  4  2  2  2  1  1  1  1  1
    1(10  4)     1(14  2)     1(15  0)     1(10  7)     2(11  5)     5(12  3)
    3(13  1)     1( 8  8)     6( 9  6)     9(10  4)    12(14  2)     4(12  0)
    3( 5  9)     6( 7  7)    20( 8  5)    23( 9  3)    18(10  1)     2( 4 10)
   11( 7  3)    24( 6  6)    39( 7  4)    34( 8  2)    18( 9  0)     5( 2 11)
   10( 3  9)    29( 4  7)    47( 5  5)    59( 6  3)    38( 7  1)     6( 1 10)
   19( 2  3)    46( 8  6)    60( 4  4)    62( 5  2)    21( 6  0)    10( 0  9)
   27( 1  7)    55( 2  5)    63( 3  3)    45( 4  1)    17( 0  6)    41( 1  4)
   39( 2  2)    22( 3  0)    21( 0  3)    77( 1  1)     2( 0  0)
```

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                          4  3  3  3  3  3  0  0  0  0
    1(21  0)     1(17  5)     1(18  3)     1(19  1)     1(13 10)     1(14  8)
    4(15  6)     4(16  4)     4(17  2)     4( 9 15)     1(10 13)     4(11 11)
    8(12  9)    13(18  7)    17(14  5)    19(15  3)    10(16  1)     1( 7 16)
    4( 8 14)    11( 9 12)    20(10 10)    37(11  8)    46(12  6)    55(13  4)
   38(14  2)    19(15  0)     2( 5 17)     7( 6 15)    21( 7 13)    42( 8 11)
   75( 9  9)   105(16  7)    24(11  5)   110(12  3)    68(13  1)     2( 3 13)
    8( 4 15)    28( 5 14)    64( 6 12)   121( 7 10)   180( 8  8)   236( 9  6)
  227(10  4)   182(11  2)    62(12  0)     1( 1 19)     7( 2 17)    28( 3 15)
   72( 4  9)   154( 5 11)   253( 6  9)   351( 7  7)   392( 8  5)   349( 9  3)
  204(10  1)     3( 0 18)    17( 1 16)    59( 2 14)   147( 3 12)   278( 4 10)
  429( 5  9)   539( 6  8)   544( 7  4)   397( 8  2)   157( 9  0)    23( 0 15)
   90( 1 13)   218( 2 17)   402( 3  9)   569( 4  7)   561( 5  5)   592( 6  3)
  349( 7  1)    84( 0 12)   244( 1 10)   447( 2  8)   624( 3  6)   653( 4  4)
  516( 5  9)   185( 6  0)   171( 0  9)   392( 1  7)   526( 2  5)   580( 3  3)
  323( 4  1)   203( 0  6)   331( 1  4)   299( 2  2)   129( 3  0)   125( 0  3)
  111( 1  1)    16( 0  0)
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                          4  3  3  3  3  2  1  0  0  0
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Block 1

1(17 5)	1(18 3)	1(19 1)	1(13 10)	3(14 8)	6(15 6)
9(16 4)	8(17 2)	3(18 0)	2(10 13)	6(11 11)	15(12 9)
29(13 7)	39(14 5)	40(15 3)	26(16 1)	1(7 16)	6(8 14)
20(9 12)	47(10 10)	86(11 8)	123(12 6)	137(13 4)	110(14 2)
42(15 0)	2(5 17)	12(6 15)	41(7 13)	100(8 11)	189(9 9)
287(10 7)	347(11 5)	321(12 3)	197(13 1)	2(3 18)	16(4 16)
59(5 14)	156(6 12)	320(7 10)	518(8 8)	681(9 6)	714(10 4)
548(11 2)	206(12 0)	2(1 19)	14(2 17)	62(3 15)	186(4 13)
417(5 11)	742(6 9)	1069(7 7)	1243(8 5)	1124(9 3)	673(10 1)
5(0 18)	40(1 16)	153(2 14)	406(3 12)	824(4 10)	1327(5 8)
1724(6 6)	1788(7 4)	1365(8 2)	510(9 0)	59(0 15)	256(1 13)
660(2 11)	1257(3 9)	1883(4 7)	2233(5 5)	2040(6 3)	1230(7 1)
253(0 12)	776(1 10)	1487(2 8)	2120(3 6)	2313(4 4)	1816(5 2)
690(6 0)	567(0 9)	1307(1 7)	1866(2 5)	1870(3 3)	1182(4 1)
716(0 6)	1202(1 4)	1117(2 2)	452(3 0)	457(0 3)	424(1 1)
58(0 0)					

Block 2   4 3 3 3 3 1 1 1 0 0

1(14 8)	1(15 6)	3(16 4)	1(17 2)	2(18 0)	1(11 11)
4(12 9)	8(13 7)	13(14 5)	14(15 3)	9(16 1)	1(8 14)
4(9 12)	14(10 10)	27(11 8)	47(12 6)	51(13 4)	48(14 2)
14(15 0)	2(6 15)	10(7 13)	30(8 11)	65(9 9)	110(10 7)
142(11 5)	140(12 3)	87(13 1)	3(4 16)	15(5 14)	51(6 12)
112(7 10)	208(8 8)	286(9 6)	324(10 4)	248(11 2)	105(12 0)
3(2 17)	17(3 15)	61(4 13)	154(5 11)	300(6 9)	462(7 7)
569(8 5)	533(9 3)	327(10 1)	1(0 18)	11(1 16)	52(2 14)
152(3 12)	341(4 10)	578(5 8)	806(6 5)	854(7 4)	685(8 2)
248(9 0)	21(0 15)	97(1 13)	274(2 11)	559(3 9)	879(4 7)
1088(5 5)	1026(6 3)	626(7 1)	107(0 12)	343(1 10)	704(2 8)
1034(3 6)	1178(4 4)	930(5 2)	371(6 0)	267(0 9)	643(1 7)
847(2 5)	976(3 3)	622(4 1)	373(0 6)	622(1 4)	602(2 2)
238(3 0)	241(0 3)	227(1 1)	37(0 0)		

Block 3   4 3 3 3 2 2 2 0 0 0

1(14 8)	1(15 6)	2(16 4)	1(17 2)	1(18 0)	1(11 11)
5(12 9)	8(13 7)	12(14 5)	12(15 3)	7(16 1)	1(8 14)
5(9 12)	16(10 10)	30(11 8)	47(12 6)	49(13 4)	42(14 2)
14(15 0)	3(6 15)	11(7 13)	36(8 11)	73(9 9)	119(10 7)
145(11 5)	127(12 3)	93(13 1)	1(3 18)	4(4 15)	19(5 14)
60(6 12)	131(7 10)	230(8 3)	310(9 6)	333(10 4)	254(11 2)
301(12 0)	2(5 17)	20(3 15)	72(4 13)	176(5 11)	341(6 9)
208(7 7)	612(8 5)	561(9 3)	333(10 1)	2(0 18)	14(1 16)
61(2 14)	178(3 12)	387(4 10)	653(5 8)	884(6 5)	930(7 4)
126(? ?)	289(9 ?)	25(0 15)	111(1 13)	315(2 11)	631(3 9)
84(4 7)	1199(5 5)	1221(6 3)	678(7 1)	121(0 12)	391(1 10)
89(2 9)	1160(3 6)	1297(4 4)	1030(5 2)	401(6 0)	308(0 9)
21(1 7)	1063(2 5)	1086(3 3)	692(4 1)	412(0 6)	700(1 4)
66(2 2)	272(0 3)	277(0 3)	254(1 1)	39(0 0)	

Block 4   4 3 3 3 2 2 1 1 0 0

1(15 6)	1(16 4)	2(17 2)	1(11 11)	3(12 9)	8(13 7)
12(14 5)	14(15 3)	9(16 1)	4(9 12)	13(10 10)	32(11 8)
49(12 6)	63(13 4)	49(14 2)	23(15 0)	1(6 15)	10(7 13)
33(8 11)	80(9 9)	136(10 7)	192(11 5)	177(12 3)	112(13 1)
2(4 16)	16(5 14)	57(6 12)	144(7 10)	269(8 8)	395(9 6)
33(10 4)	354(11 2)	129(12 0)	2(2 17)	18(3 15)	71(4 13)
00(5 11)	407(6 9)	654(7 7)	813(8 5)	774(9 3)	474(10 1)
1(0 18)	12(1 16)	61(2 14)	201(3 12)	467(4 10)	844(5 8)
79(5 6)	1299(7 4)	1016(3 2)	397(9 0)	24(0 15)	128(1 13)
21(2 11)	817(3 9)	1323(4 7)	1675(5 5)	1592(6 3)	983(7 1)

148(0 12)	509(1 10)	1063(2 8)	1626(3 6)	1851(4 4)	1509(5 2)	
574(6 0)	409(0 9)	1012(1 7)	1521(2 5)	1587(3 3)	1020(4 1)	
590(0 6)	1031(1 4)	982(2 2)	410(3 0)	408(0 3)	383(1 1)	
55(0 0)						

4 3 3 3 2 1 1 1 1 0						
1(13 7)	2(14 5)	2(15 3)	2(16 1)	1(10 10)	4(11 8)	
10(12 6)	14(13 4)	13(14 2)	5(15 0)	3(8 11)	12(9 9)	
28(10 7)	44(11 5)	49(12 3)	32(13 1)	1(5 14)	6(6 12)	
24(7 10)	58(8 8)	98(9 6)	125(10 4)	107(11 2)	42(12 0)	
1(3 15)	9(4 13)	34(5 11)	89(6 9)	167(7 7)	235(8 5)	
241(9 3)	156(10 1)	1(1 16)	8(2 14)	36(3 12)	104(4 10)	
217(5 8)	344(6 6)	407(7 4)	341(8 2)	134(9 0)	3(0 15)	
23(1 13)	86(2 11)	211(3 9)	386(4 7)	529(5 5)	534(6 3)	
342(7 1)	33(0 12)	123(1 10)	310(2 8)	513(3 6)	625(4 4)	
526(5 2)	207(6 0)	120(0 9)	320(1 7)	513(2 5)	558(3 3)	
368(4 1)	198(0 6)	362(1 4)	357(2 2)	148(3 0)	148(0 3)	
142(1 1)	21(0 0)					

4 3 3 3 1 1 1 1 1 1						
1(13 4)	1(15 0)	2(11 5)	3(12 3)	2(13 1)	1(8 8)	
5(9 6)	6(10 4)	9(11 2)	2(12 0)	2(6 9)	7(7 7)	
13(8 5)	18(9 3)	12(10 1)	1(3 12)	2(4 10)	10(5 8)	
19(6 6)	30(7 4)	25(8 2)	15(9 0)	2(2 11)	9(3 9)	
21(4 7)	37(5 5)	42(6 3)	29(7 1)	1(0 12)	6(1 10)	
16(2 8)	37(3 6)	46(4 4)	47(5 2)	16(6 0)	8(0 9)	
21(1 7)	40(2 5)	48(3 3)	31(4 1)	14(0 6)	30(1 4)	
29(2 2)	16(3 0)	15(0 3)	12(1 1)	2(0 0)		

4 3 3 2 2 2 2 1 0 0						
1(13 7)	1(14 5)	1(15 3)	1(16 1)	2(10 10)	5(11 8)	
10(12 6)	11(13 4)	10(14 2)	3(15 0)	1(7 13)	6(8 11)	
18(9 9)	33(10 7)	46(11 5)	45(12 3)	28(13 1)	2(5 14)	
12(6 12)	34(7 10)	77(8 8)	115(9 6)	135(10 4)	106(11 2)	
43(13 0)	2(3 15)	15(4 13)	53(5 11)	123(6 9)	213(7 7)	
277(9 5)	270(9 3)	167(10 1)	1(1 16)	13(2 14)	3+(8 12)	
145(4 10)	289(5 8)	435(6 6)	487(7 4)	399(8 2)	149(9 0)	
5(0 15)	35(1 13)	123(2 11)	292(3 9)	507(4 7)	671(5 5)	
558(5 3)	413(7 1)	49(0 12)	185(1 10)	421(2 8)	672(3 6)	
603(4 4)	659(5 2)	263(6 0)	162(0 9)	429(1 7)	672(2 5)	
724(3 3)	473(4 1)	268(0 6)	477(1 4)	473(2 2)	191(3 0)	
594(2 2)	198(1 0)	31(0 3)				

4 3 3 2 2 2 1 1 1 0						
2(15 3)	1(13 3)	3(12 6)	5(13 4)	5(14 2)	2(15 0)	
1(8 11)	5(9 9)	13(10 7)	72(11 5)	24(12 3)	17(13 1)	
2(6 12)	11(7 11)	30(8 8)	56(9 6)	72(10 4)	63(11 2)	
26(12 0)	3(4 13)	17(5 11)	51(6 9)	104(7 7)	152(8 5)	
60(9 3)	104(10 1)	2(2 14)	17(3 12)	60(4 10)	141(5 8)	
35(6 6)	299(7 4)	245(8 2)	96(9 0)	1(0 15)	11(1 13)	
51(2 11)	142(3 9)	276(4 7)	395(5 5)	410(6 3)	254(7 1)	
19(0 12)	89(1 10)	226(2 8)	395(3 6)	496(4 4)	426(5 2)	
70(6 0)	89(0 9)	251(1 7)	419(2 5)	466(3 3)	313(4 1)	
64(0 3)	308(1 4)	310(2 2)	131(3 0)	131(0 3)	125(1 1)	
19(0 0)						

4 3 3 2 2 1 1 1 1 1						
1(14 2)	2(11 5)	3(12 3)	3(13 1)	1(8 8)	4(9 6)	
10(10 4)	9(11 2)	6(12 0)	2(6 9)	9(7 7)	18(8 5)	
25(9 3)	18(10 1)	3(4 10)	11(5 8)	29(6 6)	41(7 4)	

```
 44( 8  2)    15( 9  0)     2( 2 11)    12( 3  9)    31( 4  7)    57( 5  5)
 66( 6  3)    47( 7  1)     1( 0 12)     7( 1 10)    27( 2  8)    54( 3  6)
 82( 4  4)    71( 5  2)    34( 6  0)     9( 0  9)    35( 1  7)    64( 2  5)
 80( 3  3)    55( 4  1)    28( 0  6)    51( 1  4)    58( 2  2)    21( 3  0)
 21( 0  3)    23( 1  1)     5( 0  0)
```

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                         4  3  2  2  2  2  2  0  0
  1( 9  9)     1(10  7)     2(11  5)     2(12  3)    1(13  1)     2( 7 10)
  4( 8  8)     8( 9  6)     8(10  4)     8(11  2)    2(12  0)     3( 5 11)
  8( 6  9)    17( 7  7)    23( 8  5)    24( 9  3)   15(10  1)     3( 3 12)
 10( 4 10)    26( 5  8)    42( 6  6)    52( 7  4)   42( 8  2)    19( 9  0)
  2( 1 13)     9( 2 11)    29( 3  9)    54( 4  7)   80( 5  5)    82( 6  3)
 53( 7  1)     4( 0 12)    18( 1 10)    48( 2  8)   86( 6  6)   108( 4  4)
 95( 5  2)    37( 6  0)    19( 0  9)    57( 1  7)   96( 6  5)   111( 3  3)
 73( 4  1)    40( 0  6)    75( 1  4)    77( 2  2)   34( 3  0)    33( 0  3)
 32( 1  1)     6( 0  0)
```

```
                         4  3  2  2  2  2  2  1  1  0
  1(10  7)     2(11  5)     2(12  3)     1(13  1)    1( 7 10)     4( 9  8)
  8( 9  6)    11(10  4)     9(11  2)     4(12  0)    1( 5 11)     7( 6  9)
 17( 7  7)    28( 8  5)    30( 9  3)    20(10  1)    1( 3 12)     9( 4 10)
 26( 5  8)    50( 6  6)    65( 7  4)    58( 8  2)   23( 9  0)     1( 1 13)
  8( 2 11)    28( 3  9)    64( 4  7)    99( 5  5)  109( 6  3)    72( 7  1)
  3( 0 12)    18( 1 10)    55( 2  8)   106( 3  6)  143( 4  4)   128( 5  2)
 52( 6  0)    22( 0  9)    70( 1  7)   127( 2  5)  149( 3  3)   103( 4  1)
 51( 0  6)   102( 1  4)   107( 2  2)    46( 3  0)   46( 0  3)    46( 1  1)
  7( 0  0)
```

```
                         4  3  2  2  2  1  1  1  1
  1(13  1)     1( 9  6)     2(10  4)     3(11  2)    1(12  0)     2( 7  7)
  5( 8  3)     8( 9  3)     6(10  1)     3( 5  8)    8( 6  6)    17( 7  4)
 15( 8  2)     7( 9  0)     3( 3  9)    11( 4  7)   23( 5  5)    23( 6  3)
 21( 7  1)     2( 1 10)     9( 2  8)    23( 3  6)   36( 4  4)    36( 5  2)
 14( 6  0)     3( 0  9)    16( 1  7)    31( 2  5)   40( 3  3)    50( 4  1)
 12( 0  6)    28( 1  4)    30( 2  2)    13( 3  0)   12( 0  3)    14( 1  1)
  1( 0  0)
```

```
                         4  2  2  2  2  2  2  2  1  0
  1( 7  7)     1( 8  5)     1( 9  3)     1(10  1)    1( 5  3)     2( 6  6)
  3( 7  4)     3( 8  2)     1( 9  0)     1( 3  9)    4( 4  7)     7( 5  5)
  9( 6  3)     6( 7  1)     1( 1 10)     3( 2  8)    8( 3  5)    13( 4  4)
 12( 5  2)     5( 6  0)     2( 0  9)     6( 1  7)   13( 2  5)    17( 3  3)
 12( 4  1)     5( 1  4)    12( 1  4)    14( 2  2)    6( 0  3)     6( 0  3)
  7( 1  1)     1( 0  0)
```

```
                         4  2  2  2  2  2  2  1
  1( 9  3)     1( 6  6)     1( 7  4)     2( 3  2)    3( 5  5)     5( 6  3)
  3( 7  1)     1( 2  8)     3( 3  6)     6( 4  4)    5( 5  2)     4( 6  0)
  2( 1  7)     4( 2  5)     8( 3  3)     5( 4  1)    3( 2  6)     5( 1  4)
  8( 2  2)     2( 3  0)     2( 0  3)     3( 2  1)    2( 0  0)
```

```
                         3  3  3  3  3  3  3  0  0
  1(15  3)     1(13  5)     2(12  6)     2(13  4)    2(14  2)     1(15  0)
  1( 7 13)     2( 8 11)     5( 9  9)     7(10  7)   13(11  5)     9(12  3)
  6(13  1)     1( 4 15)     2( 5 14)     7( 6 12)   12( 7 10)    21( 8  8)
 27( 9  6)    29(10  4)    21(11  2)    10(12  0)    3( 6 15)     6( 4 13)
 21( 5 11)    36( 6  9)    53( 7  7)    60( 8  5)   56( 9  3)    32(10  1)
  1( 0 18)     2( 1 16)    10( 2 14)    24( 3 12)   51( 4 10)    78( 5  8)
 03( 6  6)   102( 7  4)    81( 8  2)    27( 2  0)    2( 0 15)    15( 1 13)
 40( 2 11)    83( 3  9)   119( 4  7)   144( 5  5)  129( 6  3)    77( 7  1)
```

21(0 12)	54(1 10)	109(2 8)	148(3 6)	164(4 4)	123(5 2)
52(6 0)	37(0 9)	95(1 7)	132(2 5)	136(3 3)	83(4 1)
60(0 6)	88(1 4)	88(2 2)	32(3 0)	32(0 3)	31(1 1)
7(0 0)					

3 3 3 3 3 2 2 0 0 0

1(11 8)	1(12 6)	2(13 4)	1(14 2)	1(15 0)	2(8 11)
3(9 9)	7(10 7)	8(11 5)	8(12 3)	5(13 1)	2(5 14)
4(6 12)	12(7 10)	18(8 8)	28(9 6)	26(10 4)	24(11 2)
6(12 0)	1(2 17)	2(3 15)	9(4 13)	19(5 11)	39(6 9)
54(7 7)	67(8 5)	59(9 3)	36(10 1)	2(1 16)	7(2 14)
25(3 12)	48(4 10)	87(5 8)	107(6 6)	120(7 4)	84(8 2)
38(9 0)	5(0 15)	16(1 13)	49(2 11)	90(3 9)	143(4 7)
166(5 5)	156(6 3)	92(7 1)	15(0 12)	62(1 10)	114(2 8)
178(3 6)	185(4 4)	157(5 2)	51(6 0)	54(0 9)	113(1 7)
171(2 5)	167(3 3)	109(4 1)	58(0 6)	114(1 4)	98(2 2)
48(3 0)	50(0 3)	41(1 1)	3(0 0)		

3 3 3 3 3 2 1 1 0 0

1(12 6)	1(13 4)	2(14 2)	1(8 11)	3(9 9)	6(10 7)
9(11 5)	9(12 3)	6(13 1)	1(5 14)	4(6 12)	10(7 10)
20(8 8)	28(9 6)	34(10 4)	25(11 2)	12(12 0)	2(3 15)
7(4 13)	20(5 11)	40(6 9)	64(7 7)	79(8 5)	75(9 3)
46(10 1)	1(1 16)	8(2 14)	24(3 12)	57(4 10)	98(5 8)
139(6 6)	146(7 4)	119(8 2)	41(9 0)	3(0 15)	18(1 13)
52(2 11)	110(3 9)	174(4 7)	217(5 5)	204(6 3)	125(7 1)
23(0 12)	73(1 10)	154(2 8)	227(3 6)	261(4 4)	204(5 2)
83(5 0)	59(0 9)	149(1 7)	221(2 5)	230(3 3)	147(4 1)
91(0 6)	153(1 4)	150(2 2)	58(3 0)	60(0 3)	58(1 1)
10(0 0)					

3 2 3 3 3 1 1 1 1 0

1(10 7)	1(11 5)	2(12 3)	1(13 1)	1(7 13)	2(8 8)
5(9 6)	6(10 4)	6(11 2)	2(12 0)	1(4 13)	2(5 11)
7(6 9)	11(7 7)	18(8 5)	17(9 3)	12(10 1)	3(1 12)
8(4 10)	19(5 3)	29(6 6)	36(7 4)	29(0 2)	13(6 0)
1(0 15)	3(1 13)	11(2 11)	33(5 9)	42(4 7)	53(5 5)
56(6 3)	34(7 7)	2(0 12)	15(1 10)	32(2 3)	57(3 6)
65(4 4)	59(5 3)	20(6 3)	17(0 6)	37(1 7)	63(2 5)
64(3 3)	44(4 1)	20(0 6)	44(1 4)	39(2 1)	20(3 0)
21(0 3)	17(1 1)	1(0 0)			

3 3 3 3 2 2 0 1 0 0

1(9 9)	2(10 7)	3(11 5)	2(12 3)	2(13 1)	1(6 12)
4(7 10)	9(8 8)	9(5 11)	16(9 4)	13(10 2)	5(12 0)
3(4 13)	9(5 11)		35(7 7)	46(8 5)	44(6 3)
27(10 1)	1(1 16)	8(2 14)	13(8 2)	32(4 10)	30(5 8)
82(5 6)	98(7 4)	77(5 2)	23(9 0)	2(0 15)	9(1 13)
32(2 11)	70(3 9)	129(4 7)	152(5 5)	146(6 3)	90(7 1)
11(0 12)	48(1 10)	104(2 8)	165(3 6)	191(4 4)	156(5 2)
60(5 0)	45(0 9)	111(1 7)	172(2 5)	132(3 3)	113(4 1)
67(0 6)	123(1 4)	119(2 2)	51(3 0)	52(0 3)	49(1 1)
7(0 0)					

3 3 3 3 2 2 1 1 1 0

1(11 5)	1(12 3)	1(13 1)	1(7 10)	3(8 8)	6(9 6)
8(10 4)	7(11 2)	3(12 0)	2(5 11)	7(6 9)	15(7 7)
22(6 5)	24(9 3)	15(10 1)	1(2 14)	4(3 12)	13(4 10)
28(6 8)	46(6 6)	55(7 4)	47(8 2)	18(9 0)	3(1 13)
11(2 11)	32(3 9)	60(4 7)	85(5 5)	96(6 3)	56(7 1)

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   7( 0 12)     23( 1 10)      57( 2  8)      95( 3  6)     118( 4  4)      99( 5  2)
  40( 6  0)     20( 0  9)      62( 1  7)     101( 2  5)     113( 3  3)      75( 4  1)
  44( 0  6)     78( 1  4)      79( 2  2)      32( 3  0)      32( 0  3)      32( 1  1)
   5( 0  0)
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                              3  3  3  3  2  1  1  1  1  1
   1(10  4)      1(11  2)      1( 7  7)       2( 8  5)
   2( 5  8)      4( 6  6)      7( 7  4)       7( 8  2)       3( 9  3)       3(10  1)
   2( 3  9)      7( 4  7)     11( 5  5)      13( 6  3)       3( 9  0)       1( 2 11)
   5( 2  8)     12( 3  6)     17( 4  4)      16( 5  2)      10( 7  1)       2( 1 10)
   8( 1  7)     16( 2  5)     13( 3  3)      13( 4  1)       6( 6  0)       3( 0  9)
  12( 2  2)      5( 3  0)      6( 0  3)       6( 1  1)       4( 0  6)      13( 1  4)
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                              3  3  3  2  2  2  2  2  0  0
   1( 8  8)      2(10  4)      1(12  0)       1( 5 11)
   6( 8  5)      6( 9  2)      4(10  1)       1( 3 12)       2( 6  9)       5( 7  7)
  16( 6  6)     15( 7  4)     16( 8  2)       3( 9  0)       5( 4 10)       8( 5  8)
  12( 3  9)     22( 4  7)     31( 5  5)      30( 6  3)       1( 1 13)       4( 2 11)
   8( 1 10)     23( 2  8)     34( 3  6)      48( 4  4)      20( 7  1)       2( 0 12)
   8( 0  9)     26( 1  7)     41( 2  5)      47( 3  3)      35( 5  2)      18( 6  0)
  32( 1  4)     37( 2  2)     11( 3  0)      12( 0  3)      31( 4  1)      20( 0  6)
                                                           15( 1  1)       3( 0  0)
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                              3  3  3  2  2  2  2  1  1  0
   1( 9  6)      1(10  4)      1(11  2)       2( 6  9)
   7( 9  3)      5(10  1)      1( 3 12)       3( 4 10)       4( 7  7)       7( 8  5)
  22( 7  4)     17( 8  2)      8( 9  0)       4( 2 11)      10( 5  8)      16( 6  6)
  37( 5  5)     41( 6  3)     26( 7  1)       1( 0 12)      11( 3  9)      25( 4  7)
  46( 3  6)     57( 4  4)     53( 5  2)      19( 6  0)       9( 1 10)      23( 2  8)
  57( 2  5)     63( 3  3)     44( 4  1)      20( 0  6)      12( 0  9)      31( 1  7)
  22( 3  0)     22( 0  3)     20( 1  1)       2( 0  0)      46( 1  4)      44( 2  2)
```

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                              3  3  3  2  2  2  1  1  1  0
   1(12  0)      1( 8  5)      2( 9  3)       1(10  1)       1( 5  8)       3( 6  6)
   4( 7  4)      6( 6  3)      1( 9  0)       1( 8  2)       4( 4  7)       8( 5  5)
  11( 6  3)      7( 7  1)      1( 1 10)       4( 2  5)      10( 3  6)      25( 4  4)
  13( 7  0)      9( 4  5)      2( 0  6)       4( 1  7)      14( 2  5)      17( 3  3)
  12( 4  1)      6( 0  6)     11( 1  4)      14( 2  2)       8( 3  0)       5( 0  3)
   5( 1  1)      2( 0  0)
```

```
   1( 5  6)      2( 6  6)      1( 7  4)       2( 2  2)       1( 9  0)       1( 3  9)
   3( 4  7)      5( 5  5)      5( 5  3)       4( 1  0)       1( 1 10)       4( 2  8)
   9( 3  6)     12( 4  4)     11( 3  2)       4( 0  0)       1( 0  9)       5( 1  7)
  12( 2  5)     15( 2  3)      3( 4  1)       4( 0  6)      12( 1  4)      13( 2  2)
   6( 3  0)      6( 0  3)      5( 1  1)       1( 0  0)
```

```
   1( 7  4)      1( 5  2)      1( 4  7)       2( 3  5)       7( 5  3)       2( 7  1)
   3( 3  4)      4( 2  4)      5( 5  3)       2( 6  1)       1( 2  4)       2( 1  7)
   6( 2  5)      7( 1  3)      6( 4  1)       1( 2  2)       5( 1  4)       5( 2  2)
   3( 3  1)      7( 0  3)      3( 1  1)
```

```
                              3  3  2  2  2  2  2  2  2  1
   1( 3  6)      1( 5  2)      1( 2  5)       1( 3  3)       1( 4  1)       2( 1  4)
   1( 2  2)      1( 3  0)      1( 0  3)       1( 1  1)
```

```
                              3  2  2  2  2  2  2  2  1  1
   1( 4  4)      1( 6  0)      1( 2  5)       1( 3  3)       1( 4  1)       1( 1  4)
   2( 2  2)      1( 0  3)      1( 1  1)
```

				2 2 2 2 2 2 2 2 2 1	
1(0 3)					

4 4 4 4 4 0 0 0 0 0

1(20 8)	1(22 4)	1(24 0)	1(17 11)	1(18 9)	3(19 7)
4(20 5)	3(21 3)	2(22 1)	1(14 14)	2(15 12)	6(16 10)
8(17 8)	14(18 6)	12(19 4)	14(20 2)	2(21 0)	1(11 17)
2(12 15)	6(13 13)	13(14 11)	24(15 9)	33(16 7)	42(17 5)
37(18 3)	23(19 1)	1(8 20)	1(9 18)	6(10 16)	13(11 14)
30(12 12)	48(13 10)	80(14 8)	91(15 6)	105(16 4)	69(17 2)
34(18 0)	3(7 19)	8(8 17)	24(9 15)	48(10 13)	92(11 11)
140(12 9)	190(13 7)	206(14 5)	186(15 3)	109(16 1)	1(4 22)
41(5 20)	14(6 18)	33(7 16)	80(8 14)	140(9 12)	236(10 10)
314(11 8)	390(12 6)	362(13 4)	287(14 2)	91(15 0)	3(3 21)
12(4 19)	42(5 17)	91(6 15)	190(7 13)	314(8 11)	469(9 9)
587(0 7)	633(11 5)	535(12 3)	315(13 1)	1(0 24)	2(1 22)
14(2 20)	37(3 18)	105(4 16)	206(5 14)	390(6 12)	587(7 10)
813(8 8)	908(9 6)	898(10 4)	623(11 2)	256(12 0)	2(0 21)
23(1 19)	69(2 17)	186(3 15)	362(4 13)	633(5 11)	908(6 9)
148(7 7)	1201(8 5)	1026(9 3)	584(10 1)	34(0 18)	109(1 16)
287(2 14)	535(3 12)	898(4 10)	1201(5 8)	1426(6 6)	1331(7 4)
1005(8 2)	326(9 0)	91(0 15)	315(1 13)	623(2 11)	1026(3 9)
1321(4 7)	1461(5 5)	1246(6 3)	730(7 1)	256(0 12)	584(1 10)
1005(2 8)	1246(3 6)	1299(4 4)	934(5 2)	381(6 0)	336(0 9)
730(1 7)	934(2 5)	899(3 3)	543(4 1)	381(0 6)	543(1 4)
508(2 2)	178(3 0)	178(0 3)	170(1 1)	35(0 0)	

4 4 4 4 3 1 0 0 0 0

1(21 6)	1(22 4)	1(23 2)	1(17 11)	3(18 9)	6(19 7)
8(20 5)	9(21 3)	6(22 1)	1(14 14)	5(15 12)	12(16 10)
24(17 8)	36(18 6)	42(19 4)	34(20 2)	14(21 0)	1(11 17)
5(12 15)	16(13 12)	38(14 11)	74(15 9)	112(16 7)	140(17 5)
132(18 3)	82(19 1)	3(9 18)	12(10 16)	38(11 14)	89(12 12)
174(13 11)	274(14 9)	360(15 6)	376(16 4)	294(17 2)	110(18 0)
1(5 21)	4(7 19)	24(8 17)	74(9 15)	174(10 13)	341(11 11)
556(12 9)	767(13 7)	870(14 5)	781(15 3)	463(16 1)	1(4 22)
8(5 20)	39(6 18)	112(7 16)	274(8 14)	556(9 12)	946(10 10)
371(11 8)	1668(12 6)	1663(13 4)	1243(14 2)	464(15 0)	1(2 23)
9(3 21)	42(4 19)	140(5 17)	360(6 15)	767(7 13)	1371(8 11)
697(9 9)	2722(10 7)	2966(11 5)	2569(12 3)	1504(13 1)	6(1 22)
34(2 20)	132(3 18)	376(4 16)	870(5 14)	1668(6 12)	2722(7 10)
783(8 8)	4473(9 6)	4741(10 4)	3194(11 2)	1176(12 0)	14(0 21)
821(1 19)	294(2 17)	781(3 15)	1663(4 13)	2966(5 11)	4473(6 9)
734(7 7)	6151(8 5)	5241(9 3)	3065(10 1)	110(0 18)	463(1 16)
1243(2 14)	2569(3 12)	4741(4 10)	6151(5 8)	7314(6 6)	7111(7 4)
3024(8 2)	1926(9 0)	464(0 15)	1504(1 13)	3194(2 11)	5241(3 9)
3111(4 7)	7854(5 5)	6842(6 3)	4004(7 1)	1176(0 12)	3065(1 10)
3224(2 8)	6842(3 6)	7025(4 4)	5323(5 2)	1987(6 0)	1926(0 9)
3024(1 7)	5323(2 5)	5092(3 3)	3117(4 1)	1987(0 6)	3117(1 4)
735(2 2)	1117(3 0)	1117(0 3)	995(1 1)	138(0 0)	

4 4 4 4 2 2 0 0 0 0

1(22 4)	1(24 0)	1(18 9)	2(19 7)	4(20 5)	5(21 3)
3(22 1)	1(14 14)	2(15 12)	7(16 10)	12(17 8)	22(18 6)
22(19 4)	24(20 2)	5(21 0)	2(12 15)	8(13 13)	21(14 11)
42(15 9)	68(16 7)	85(17 5)	83(18 3)	52(19 1)	1(9 18)
7(10 16)	21(11 14)	53(12 12)	108(13 10)	183(14 8)	234(15 6)
259(16 4)	189(17 2)	84(18 0)	2(7 19)	12(8 17)	42(9 15)
178(10 13)	223(11 11)	376(12 9)	526(13 7)	606(14 5)	545(15 3)
327(16 1)	1(4 22)	4(5 20)	22(6 18)	68(7 16)	183(8 14)

TABLE. IRREDUCIBLE REPRESENTATIONS OF SU(3) CONTAINED IN A PARTITION OF U(10

```
 376( 9 12)    674(10 10)    974(11  8)   1222(12  6)  1203(13  4)   927(14  2)
 323(15  0)      5( 3 21)     22( 4 19)     85( 5 17)   234( 6 15)   526( 7 13)
 974( 8 11)   1530( 9  9)   2017(10  7)   2218(11  5)  1937(12  3)  1134(13  1)
   1( 0 24)      3( 1 22)     24( 2 20)     83( 3 18)   259( 4 16)   606( 5 14)
1222( 6 12)   2017( 7 10)   2890( 8  8)   3412( 9  6)  3380(10  4)  2457(11  2)
 941(12  0)      5( 0 21)     52( 1 19)    189( 2 17)   545( 3 15)  1203( 4 13)
2218( 5 11)   3412( 6  9)   4452( 7  7)   4822( 8  5)  4166( 9  3)  2429(10  1)
  84( 0 18)    327( 1 16)    927( 2 14)   1937( 3 12)  3380( 4 10)  4822( 5  8)
5844( 6  6)   5681( 7  4)   4246( 8  2)   1529( 9  0)   323( 0 15)  1134( 1 13)
2457( 2 11)   4166( 3  9)   5681( 4  7)   6355( 5  5)  5566( 6  3)  3276( 7  1)
 941( 0 12)   2429( 1 10)   4246( 2  8)   5566( 3  6)  5822( 4  4)  4377( 5  2)
1679( 6  0)   1529( 0  9)   3276( 1  7)   4377( 2  5)  4239( 3  3)  2599( 4  1)
1679( 0  6)   2599( 1  4)   2380( 2  2)    919( 3  0)   919( 0  3)   845( 1  1)
 130( 0  0)
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                                  4 4 4 4 2    1 1 0 0 0
   1(18  9)      2(19  7)      3(20  5)      3(21  3)
   5(16 10)     13(17  8)     18(18  6)     23(19  4)      2(22  1)     2(15 12)
   1(12 15)      6(13 13)     20(14 11)     42(15  9)     17(20  2)     8(21  0)
  86(18  3)     53(19  1)      3(10 16)     17(11 14)     71(16  7)    89(17  5)
 187(14  8)    262(15  6)    276(16  4)    221(17  2)     49(12 12)   112(13 10)
   9( 8 17)     35( 9 15)    104(10 13)    229(11 11)     80(18  0)     1( 7 19)
 701(14  5)    637(15  3)    385(16  1)      3( 5 20)    412(12  9)   593(13  7)
 169( 8 14)    395( 9 12)    724(10 10)   1125(11  8)     14( 6 18)    60( 7 16)
1095(14  2)    421(15  0)      1( 2 23)      4( 3 21)   1412(12  6)  1460(13  4)
 239( 6 15)    559( 7 13)   1096( 8 11)   1772( 9  9)     22( 4 19)    79( 5 17)
2402(12  3)   1418(13  1)      3( 1 22)     17( 2 20)   2418(10  7)  2705(11  5)
 653( 5 14)   1349( 6 12)   2365( 7 10)   3436( 8  8)     80( 3 18)   251( 4 16)
3151(11  2)   1152(12  0)     10( 0 21)     51( 1 19)   4225( 9  6)  4185(10  4)
1384( 4 13)   2610( 5 11)   4157( 6  9)   5523( 7  7)    208( 2 17)   593( 3 15)
2143(10  1)     71( 0 18)    358( 1 16)   1023( 2 14)   6115( 8  5)  5338( 9  3)
6024( 5  8)   7353( 6  6)   7363( 7  4)   5458( 8  2)   2289( 3 12)  4056( 4 10)
1344( 1 13)   3036( 2 11)   5209( 3  9)   7285( 4  7)   2057( 9  0)   400( 0 15)
4321( 7  1)   1095( 0 12)   3043( 1 10)   5251( 2  8)   8233( 5  5)  7320( 6  3)
5851( 5  2)   2167( 6  0)   2016( 0  9)   4263( 1  7)   7252( 5  6)  7573( 4  4)
 490( 4  1)   2145( 0  6)   3484( 1  4)   3129( 2  2)   5821( 2  3)  5640( 3  3)
 130( 1  1)    151( 0  0)                               1284( 3  0)  1282( 0  3)
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                                  4 4 4 4    3 3 3 0 0 0
   1(16 10)      1(17  8)      3(19  4)      2(19  4)
   5(16  9)     13(16  7)     13(17  5)     13(18  3)      3(20  2)     2(14 11)
   5(12 12)     15(13 10)     31(14  8)     43(15  6)      8(19  1)     1(11 14)
  17(13  3)      2( 9 15)     12(13 12)     32(11 11)     51(16  4)    58(17  2)
 134(14  5)    125(15  3)     77( 8  1)      1( 6 18)     68(12  9)   205(13  7)
  57( 9 12)    125(10 13)    203(11  2)    288(12  6)      5( 7 15)    21( 8 14)
  86(15  2)      2( 4 19)      3( 5 17)     30( 6 15)    301(13  4)   241(14  2)
 837( 9  9)    499(10  7)    535(11  5)    538(12  3)     84( 7 13)   191( 3 11)
   1( 2 23)     10( 3 13)     36( 4 16)    103( 5 14)    323(13  1)     1( 1 22)
 727( 8  8)    935( 9  6)    974(10  4)    738(11  2)    243( 6 12)   451( 7 10)
   5( 1 19)     30( 2 17)     95( 3 15)    248( 4 13)    284(12  0)     1( 0 21)
 235( 7  7)   1435( 8  5)   1289( 9  3)    773(10  1)    513( 5 11)   883( 6  9)
  89( 2 14)    452( 3 12)    573( 4 10)    361( 5  8)     10( 0 18)    58( 1 16)
  90( 6  2)    510( 5  0)     73( 0 15)    269( 1 13)   1752( 6  6)  1799( 7  4)
  38( 4  7)   2034( 5  5)   1858( 6  3)   1113( 7  1)    649( 2 11)  1185( 3  9)
  88( 2  8)   1799( 3  6)   1944( 4  4)   1518( 5  2)    239( 0 12)   692( 1 10)
  61( 1  7)   1492( 2  5)   1477( 3  3)    928( 4  1)    581( 6  0)   470( 0  9)
  45( 2  2)    340( 3  0)    340( 0  3)    307( 1  1)    561( 0  6)   914( 1  4)
                                                          43( 0  0)
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                                  4 4 4 3 3 3 0 0 0
   1(23  2)      1(19  7)      3(20  5)      4(21  3)      3(22  1)     1(15 12)
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3(16 10)	9(17 8)	14(18 6)	22(19 4)	17(20 2)	10(21 0)
2(12 15)	6(13 13)	17(14 11)	35(15 9)	60(16 7)	79(17 5)
80(18 3)	51(19 1)	1(9 18)	5(10 16)	20(11 14)	49(12 12)
104(13 10)	169(14 8)	239(15 6)	251(16 4)	208(17 2)	71(18 0)
2(7 19)	13(8 17)	42(9 15)	112(10 13)	229(11 11)	395(12 9)
559(13 7)	653(14 5)	593(15 3)	358(16 1)	3(5 20)	18(6 18)
71(7 16)	187(8 14)	412(9 12)	724(10 10)	1096(11 8)	1349(12 6)
384(13 4)	1023(14 2)	400(15 0)	3(3 21)	23(4 19)	89(5 17)
262(6 15)	593(7 13)	1125(8 11)	1772(9 9)	2365(10 7)	2610(11 5)
289(12 3)	1344(13 1)	2(1 22)	17(2 20)	86(3 18)	276(4 16)
701(5 14)	1412(6 12)	2418(7 10)	3436(8 8)	4157(9 6)	4056(10 4)
1036(11 2)	1095(12 0)	8(0 21)	53(1 19)	221(2 17)	637(3 15)
1460(4 13)	2705(5 11)	4225(6 9)	5523(7 7)	6024(8 5)	5209(9 3)
1043(10 1)	80(0 18)	385(1 16)	1095(2 14)	2402(3 12)	4135(4 10)
5115(5 8)	7353(6 6)	7285(7 4)	5351(8 2)	2016(9 0)	421(0 15)
2418(1 13)	3151(2 11)	5333(3 9)	7363(4 7)	8233(5 5)	7252(6 3)
6263(7 1)	1152(0 12)	3143(1 10)	5458(2 8)	7320(3 6)	7573(4 4)
7821(5 2)	2145(6 0)	2057(0 9)	4321(1 7)	5851(2 5)	5640(3 3)
5484(4 1)	2167(0 6)	3499(1 4)	3128(2 2)	1282(3 0)	1284(0 3)
3139(1 1)	151(0 0)				

4 4 4 3 3 1 1 0 0 0

1(19 7)	1(20 5)	2(21 3)	1(22 1)	3(16 10)	6(17 8)
12(18 6)	14(19 4)	13(20 2)	4(21 0)	4(13 13)	11(14 11)
29(15 9)	48(16 7)	67(17 5)	64(18 3)	42(19 1)	3(10 16)
11(11 14)	38(12 12)	82(13 10)	151(14 8)	207(15 6)	234(16 4)
180(17 2)	74(18 0)	1(7 19)	6(8 17)	29(9 15)	82(10 13)
193(11 11)	344(12 9)	518(13 7)	611(14 5)	570(15 3)	343(16 1)
1(5 20)	12(6 18)	48(7 16)	151(8 14)	344(9 12)	562(10 10)
1018(11 8)	1321(12 6)	1348(13 4)	1046(14 2)	379(15 0)	2(3 21)
14(4 19)	67(5 17)	207(6 15)	518(7 13)	1018(8 11)	1695(9 9)
2312(10 7)	2630(11 5)	2331(12 3)	1390(13 1)	1(1 22)	13(2 20)
64(3 18)	234(4 16)	611(5 14)	1321(6 12)	2312(7 10)	3436(8 8)
4205(9 6)	4243(10 4)	3149(11 2)	1197(12 0)	4(0 21)	42(1 19)
180(2 17)	570(3 15)	1348(4 13)	2630(5 11)	4205(6 9)	5675(7 7)
6284(8 5)	5533(9 3)	3251(10 1)	74(0 18)	343(1 16)	1546(2 14)
2331(3 12)	4243(4 10)	6284(5 8)	7793(6 6)	7752(7 4)	5841(8 2)
2134(9 0)	379(0 15)	1390(1 13)	3149(2 11)	5533(3 9)	7752(4 7)
3858(5 5)	7867(6 3)	4675(7 1)	1197(0 12)	3251(1 10)	5841(2 8)
7867(3 5)	8342(4 4)	6370(5 2)	2437(6 0)	2134(0 9)	4675(1 7)
6370(2 5)	6245(3 3)	3863(4 1)	2437(0 6)	3863(1 4)	3554(2 2)
1395(? ?)	1395(0 3)	1383(1 1)	191(0 0)		

4 4 4 3 2 2 1 0 1 0

1(20 5)	1(21 3)	1(22 1)	1(16 10)	4(17 9)	3(18 6)
11(19 4)	10(20 2)	4(21 0)	2(13 13)	9(14 11)	22(15 9)
42(16 7)	57(17 5)	59(18 3)	37(19 1)	1(10 16)	9(11 14)
31(12 12)	76(13 10)	140(14 8)	202(15 6)	224(16 4)	181(17 2)
69(18 0)	4(9 17)	22(9 15)	76(10 13)	135(11 11)	352(12 9)
570(13 7)	344(14 5)	596(15 3)	364(16 1)	1(5 20)	8(6 18)
42(7 15)	140(8 14)	352(9 12)	694(10 10)	1120(11 8)	1443(12 6)
1504(13 4)	1152(14 2)	436(15 0)	1(3 21)	11(4 19)	57(5 17)
202(6 15)	530(7 13)	1110(8 11)	1884(9 9)	2643(10 7)	3021(11 5)
2710(12 3)	1612(13 1)	1(1 22)	10(2 20)	59(3 18)	224(4 16)
644(5 14)	1443(6 12)	2643(7 10)	3992(8 8)	4996(9 6)	5044(10 4)
3806(11 2)	1414(12 0)	4(0 21)	37(1 19)	181(2 17)	596(3 15)
1504(4 13)	3021(5 11)	4996(6 9)	6834(7 7)	7691(8 5)	6801(9 3)
4023(10 1)	69(0 18)	364(1 16)	1152(2 14)	2710(3 12)	5044(4 10)
7691(5 8)	9630(6 6)	9739(7 4)	7321(6 2)	2737(9 0)	430(0 15)
1612(1 13)	3806(2 11)	6801(3 9)	9739(4 7)	11230(5 5)	10085(6 3)

TABLE. IRREDUCIBLE REPRESENTATIONS OF SU(3) CONTAINED IN A PARTITION OF U(10)

```
6004( 7  1)   1414( 0 12)   4023( 1 10)   7321( 2  8)  10085( 3  6)  10734( 4  4)
8326( 5  2)   3136( 6  0)   2737( 0  9)   6004( 1  7)   8326( 2  5)   8195( 3  3)
5109( 4  1)   3136( 0  6)   5109( 1  4)   4677( 2  2)   1893( 3  0)   1893( 0  3)
1717( 1  1)    241( 0  0)
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                          4   4   4   3   2   1   1   1   0   0
    1(17  8)      2(18  6)      3(19  4)      3(20  2)      1(21  0)      2(14 11)
    7(15  9)     15(16  7)     22(17  5)     23(18  3)     15(19  1)      1(11 14)
    8(12 12)     26(13 10)     55(14  8)     87(15  6)    102(16  4)     84(17  2)
   33(18  0)      4( 9 15)     21(10 13)     66(11 11)    145(12  9)    241(13  7)
  311(14  5)    300(15  3)    187(16  1)      1( 6 18)      9( 7 16)     43( 8 14)
  131( 9 12)    296(10 10)    520(11  8)    724(12  6)    789(13  4)    623(14  2)
  238(15  0)      2( 4 19)     15( 5 17)     66( 6 15)    206( 7 13)    484( 8 11)
  902( 9  9)   1353(10  7)   1626(11  5)   1508(12  3)    915(13  1)      2( 2 20)
   16( 3 18)     77( 4 16)    255( 5 14)    642( 6 12)   1280( 7 10)   2071( 8  8)
 2726( 9  6)   2860(10  4)   2208(11  2)    833(12  0)      1( 0 21)     11( 1 19)
   64( 2 17)    243( 3 15)    677( 4 13)   1480( 5 11)   2611( 6  9)   3765( 7  7)
 4406( 8  5)   4007( 9  3)   2409(10  1)     25( 0 18)    149( 1 16)    524( 2 14)
 1333( 3 12)   2652( 4 10)   4255( 5  8)   5555( 6  6)   5786( 7  4)   4442( 8  2)
 1674( 9  0)    198( 0 15)    797( 1 13)   2003( 2 11)   3776( 3  9)   5633( 4  7)
 6710( 5  5)   6162( 6  3)   3720( 7  1)    749( 0 12)   2235( 1 10)   4248( 2  8)
 6041( 3  6)   6596( 4  4)   5195( 5  2)   1977( 6  0)   1584( 0  9)   3603( 1  7)
 5123( 2  5)   5139( 3  3)   3238( 4  1)   1938( 0  6)   3211( 1  4)   2982( 2  2)
 1211( 3  0)   1205( 0  3)   1105( 1  1)    158( 0  0)
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                          4   4   4   3   1   1   1   1   1   0
    1(16  7)      1(17  5)      2(18  3)      1(19  1)      1(13 10)      3(14  8)
    7(15  6)      9(16  4)      8(17  2)      3(18  0)      2(11 11)     10(12  9)
   20(13  7)     32(14  5)     32(15  3)     22(16  1)      1( 8 14)      6( 9 12)
   20(10 10)     48(11  8)     77(12  6)     94(13  4)     77(14  2)     31(15  0)
    2( 6 15)     10( 7 13)     26( 8 11)     83( 9  9)    151(10  7)    199(11  5)
  201(12  3)    125(13  1)      1( 3 18)      3( 4 16)     15( 5 14)     79( 6 12)
  123( 7 10)    232( 8  8)    346( 9  6)    389(10  4)    319(11  2)    123(12  0)
    3( 2 17)     14( 3 15)     54( 4 13)    147( 5 11)    297( 6  9)    477( 7  7)
  614( 3  5)    597( 3  3)    367(11  1)      1( 0 18)     10( 1 16)     41( 2 14)
  131( 3 12)    300( 4 10)    545( 5  8)    772( 6  6)    864( 7  4)    585( 8  2)
  269( 9  0)     18( 0 15)     78( 1 13)    287( 2 11)    482( 3  9)    791( 4  7)
 1001( 5  5)    969( 6  3)    599( 7  1)     82( 0 12)    295( 1 10)    539( 2  8)
  905( 3  6)   1033( 4  4)    849( 5  2)    322( 6  0)    226( 0  9)    539( 1  7)
  811( 2  5)    840( 3  3)    544( 4  1)    301( 0  6)    528( 1  4)    460( 2  2)
  210( 3  0)    206( 0  3)    137( 1  1)     25( 0  0)
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                          4   4   4   3   1   1   2   2   2   0
    1(18  6)      1(20  2)      1(13  9)      5(15  7)      5(17  5)      5(19  3)
    3(19  1)      3(12 11)      6(13 10)     17(14  9)     21(15  6)     29(16  4)
   13(17  2)     11(18  0)      2( 9 15)      6(10 13)     22(11 11)     44(12  9)
   72(13  7)     88(14  5)     35(15  3)      5(16  1)      1( 6 15)      5( 7 16)
   17( 3 14)     44( 9 12)    103(10 10)    154(11  9)    235(12  5)    254(13  4)
  195(14  2)     63(15  0)      5( 5 17)     21( 6 15)     72( 7 13)    164( 8 11)
  207( 9  9)    444(10  7)    592(11  5)    479(12  3)    289(13  1)      1( 2 20)
    5( 3 18)     29( 4 16)     85( 5 14)    205( 6 12)    444( 7 10)    730( 8  8)
  919( 9  6)    975(10  4)    713(11  2)    284(12  0)      3( 1 19)     18( 2 17)
   85( 3 15)    234( 4 13)    529( 5 11)    919( 6  9)   1325( 7  7)   1524( 8  5)
 1384( 9  3)    820(10  1)     11( 0 18)     50( 1 16)    195( 2 14)    478( 3 12)
  975( 4 10)   1524( 5  8)   2012( 6  6)   2208( 7  4)   1597( 8  2)    567( 9  0)
   63( 0 15)    289( 1 13)    716( 2 11)   1384( 3  9)   2038( 4  7)   2441( 5  5)
 2222( 6  3)   1342( 7  1)    264( 0 12)    820( 1 10)   1597( 2  8)   2222( 3  6)
 2463( 4  4)   1890( 5  2)    761( 6  0)    567( 0  9)   1342( 1  7)   1890( 2  5)
 1921( 3  3)   1198( 4  1)    761( 0  6)   1198( 1  4)   1153( 2  2)    439( 3  0)
  439( 0  3)    417( 1  1)     75( 0  0)
```

Partition: 4 4 4 2 2 2 2 1 1 0 0

1(19 4)	1(21 0)	1(15 9)	3(16 7)	5(17 5)	6(18 3)
4(19 1)	1(12 12)	6(13 10)	13(14 8)	26(15 6)	28(16 4)
29(17 2)	7(18 0)	1(9 15)	6(10 13)	20(11 11)	47(12 9)
82(13 7)	109(14 5)	108(15 3)	68(16 1)	2(7 16)	12(8 14)
44(9 12)	104(10 10)	198(11 8)	276(12 6)	318(13 4)	242(14 2)
104(15 0)	3(5 17)	19(6 15)	72(7 13)	185(8 11)	365(9 9)
565(10 7)	696(11 5)	653(12 3)	400(13 1)	3(3 18)	22(4 16)
90(5 14)	250(6 12)	541(7 10)	902(8 8)	1236(9 6)	1300(10 4)
...4(11 2)	374(12 0)	2(1 19)	18(2 17)	85(3 15)	269(4 13)
637(5 11)	1182(6 9)	1764(7 7)	2107(8 5)	1944(9 3)	1176(10 1)
8(0 18)	52(1 16)	206(2 14)	581(3 12)	1216(4 10)	2048(5 8)
2725(6 6)	2914(7 4)	2234(8 2)	869(9 0)	81(0 15)	349(1 13)
936(2 11)	1843(3 9)	2838(4 7)	3453(5 5)	3215(6 3)	1956(7 1)
345(0 12)	1101(1 10)	2154(2 8)	3167(3 6)	3494(4 4)	2809(5 2)
...52(6 0)	819(0 9)	1904(1 7)	2769(2 5)	2813(3 3)	1788(4 1)
1041(0 6)	1780(1 4)	1653(2 2)	692(3 0)	685(0 3)	627(1 1)
85(0 0)					

Partition: 4 4 4 2 2 1 1 1 1 0

7(17 5)	1(18 3)	1(19 1)	2(14 3)	4(15 6)	7(16 4)
6(17 2)	3(18 0)	2(11 11)	6(12 9)	17(13 7)	25(14 5)
29(15 3)	19(16 1)	1(8 14)	4(9 12)	18(10 10)	40(11 8)
71(12 6)	86(13 4)	76(14 2)	28(15 0)	1(6 15)	9(7 13)
30(8 11)	80(9 9)	142(10 7)	200(11 5)	199(12 3)	129(13 1)
2(4 16)	11(5 14)	46(6 12)	1(2 17)	11(3 15)	46(4 13)
414(10 4)	333(11 2)	134(12 0)	667(8 5)	647(9 3)	402(10 1)
142(5 11)	300(6 9)	512(7 7)	128(3 12)	321(4 10)	537(5 8)
1(0 18)	7(1 16)	40(2 14)	295(9 0)	12(0 15)	78(1 13)
867(6 6)	964(7 4)	889(8 2)	1153(5 5)	1113(6 3)	731(7 1)
235(2 11)	531(3 9)	880(4 7)	1047(3 6)	1235(4 4)	998(5 2)
95(0 12)	315(1 10)	634(1 7)	953(2 5)	1014(3 3)	655(4 1)
399(6 0)	244(0 9)	625(2 2)	246(3 0)	241(0 3)	236(1 1)
377(0 6)	637(1 4)				
38(0 0)					

Partition: 4 4 4 2 . 1 1 1 1

1(17 2)	1(14 5)	2(15 3)	1(15 1)	1(11 8)	3(12 6)
6(13 4)	5(14 2)	4(15 0)	2(9 9)	5(10 7)	13(11 5)
15(12 3)	11(13 1)	1(8 12)	5(7 10)	11(8 6)	24(9 6)
31(11 4)	31(11 2)	10(12 0)	4(5 11)	13(6 9)	32(7 7)
49(8 5)	57(9 3)	37(10 1)	1(2 14)	4(3 12)	15(4 10)
37(5 8)	65(6 6)	35(7 4)	71(5 2)	32(0 0)	2(1 13)
10(2 11)	33(3 3)	43(4 7)	83(5 5)	103(6 5)	83(7 1)
5(0 12)	19(2 10)	51(2 8)	89(3 5)	110(4 4)	130(5 2)
38(6 0)	17(0 9)	52(1 7)	86(2 5)	99(3 3)	54(4 1)
34(0 6)	61(1 4)	41(2 2)	23(3 0)	25(0 3)	23(1 1)
4(0 0)					

Partition: 4 4 3 3 3 3 0 0 0 0

1(22 1)	1(18 6)	2(19 4)	2(20 2)	1(21 0)	1(14 11)
2(15 9)	5(16 7)	8(17 5)	10(18 3)	6(19 1)	1(10 16)
2(11 14)	5(12 12)	12(13 10)	21(14 8)	30(15 6)	36(16 4)
30(17 2)	10(18 0)	1(8 17)	5(9 15)	15(10 13)	31(11 11)
57(12 9)	84(13 7)	103(14 5)	95(15 3)	58(16 1)	3(6 18)
10(7 16)	31(8 14)	68(9 12)	125(10 10)	191(11 8)	243(12 6)
248(13 4)	189(14 2)	73(15 0)	2(4 19)	13(5 17)	43(6 15)
106(7 13)	209(8 11)	337(9 9)	461(10 7)	513(11 5)	452(12 3)
269(13 1)	3(2 20)	13(3 13)	51(4 16)	134(5 14)	283(6 12)

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 499( 7 10)    727( 8  8)    883( 9  6)    873(10  4)    649(11  2)    239(12  0)
   8( 1 19)     38( 2 17)    125( 3 15)    301( 4 13)    585( 5 11)    935( 6  9)
1238( 7  7)   1361( 8  5)   1185( 9  3)    692(10  1)     17( 0 18)     77( 1 16)
 241( 2 14)    538( 3 12)    974( 4 10)   1435( 5  8)   1752( 6  6)   1738( 7  4)
1288( 8  2)    476( 9  0)     86( 0 15)    323( 1 13)    738( 2 11)   1289( 3  9)
1799( 4  7)   2034( 5  5)   1799( 6  3)   1061( 7  1)    284( 0 12)    773( 1 10)
1380( 2  8)   1858( 3  6)   1944( 4  4)   1492( 5  2)    561( 6  0)    510( 0  9)
1113( 1  7)   1518( 2  5)   1477( 3  3)    914( 4  1)    581( 0  6)    928( 1  4)
 845( 2  2)    340( 3  0)    340( 0  3)    307( 1  1)     43( 0  0)
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                        4  4  3  3  3  2  1  0  0  0
   1(18  6)      2(19  4)      2(20  2)      1(21  0)      1(14 11)      4(15  9)
   9(16  7)     15(17  5)     16(18  3)     11(19  1)      2(11 14)      8(12 12)
  21(13 10)     43(14  8)     66(15  6)     77(16  4)     64(17  2)     25(18  0)
   1( 8 17)      7( 9 15)     26(10 13)     66(11 11)    131(12  9)    206(13  7)
 255(14  5)    243(15  3)    149(16  1)      2( 6 18)     15( 7 16)     55( 8 14)
 145( 9 12)    296(10 10)    484(11  8)    642(12  6)    677(13  4)    524(14  2)
 198(15  0)      3( 4 19)     22( 5 17)     87( 6 15)    241( 7 13)    520( 8 11)
 902( 9  9)   1280(10  7)   1480(11  5)   1333(12  3)    797(13  1)      3( 2 20)
  23( 3 18)    102( 4 16)    311( 5 14)    724( 6 12)   1353( 7 10)   2071( 8  8)
2611( 9  6)   2652(10  4)   2003(11  2)    749(12  0)      1( 0 21)     15( 1 19)
  84( 2 17)    300( 3 15)    789( 4 13)   1626( 5 11)   2726( 6  9)   3765( 7  7)
4255( 8  5)   3776( 9  3)   2235(10  1)     33( 0 18)    187( 1 16)    623( 2 14)
1508( 3 12)   2860( 4 10)   4406( 5  8)   5555( 6  6)   5633( 7  4)   4248( 8  2)
1584( 9  0)    238( 0 15)    915( 1 13)   2208( 2 11)   4007( 3  9)   5786( 4  7)
6710( 5  5)   6041( 6  3)   3603( 7  1)    832( 0 12)   2409( 1 10)   4442( 2  8)
6152( 3  6)   6596( 4  4)   5123( 5  2)   1538( 6  0)   1674( 0  9)   3720( 1  7)
5195( 2  5)   5139( 3  3)   3211( 4  1)   1977( 0  6)   3238( 1  4)   2982( 2  2)
1205( 3  0)   1211( 0  3)   1105( 1  1)    158( 0  0)
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                        4  4  3  3  3  1  1  1  0  0
   1(15  9)      2(16  7)      4(17  5)      4(18  3)      3(19  1)      1(12 12)
   5(13 10)     12(14  8)     20(15  6)     26(16  4)     21(17  2)      9(18  0)
   1( 9 15)      5(10 13)     15(11 11)     40(12  9)     72(13  7)     94(14  5)
  95(15  3)     59(16  1)      2( 7 16)     12( 8 14)     40( 9 12)     95(10 10)
 173(11  8)    250(12  6)    275(13  4)    224(14  2)     83(15  0)      4( 6 17)
  20( 5 15)     72( 7 13)    173( 8 11)    336( 9  9)    511(10  7)    628(11  5)
 585(12  3)    360(13  1)      4( 3 18)     25( 4 16)     94( 5 14)    250( 6 12)
 511( 7 10)    845( 8  8)   1123( 9  6)   1196(10  4)    921(11  2)    356(12  0)
   3( 1 19)     21( 2 17)     95( 3 15)    275( 4 13)    628( 5 11)   1123( 6  9)
1647( 7  7)   1939( 8  5)   1770( 9  3)   1069(10  1)      9( 0 16)     59( 1 16)
 224( 2 14)    595( 3 12)   1196( 4 10)   1938( 5  8)   2562( 6  6)   2674( 7  4)
2173( 8  2)    771( 9  0)     83( 0 15)    350( 1 13)    921( 2 11)   1776( 3  9)
2674( 4  7)   3217( 5  5)   2963( 6  3)   1796( 7  1)    356( 0 12)   1059( 1 10)
2073( 2  8)   2963( 3  6)   3239( 4  4)   2569( 5  2)    994( 6  0)    771( 0  9)
1796( 1  7)   2569( 2  5)   2600( 3  3)   1641( 4  1)    994( 0  6)   1641( 1  4)
 545( 2  2)    618( 3  0)    618( 0  3)    575( 1  1)     87( 0  0)
```

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                        4  4  3  3  2  2  2  0  0  0
   1(15  9)      2(16  7)      3(17  5)      3(18  3)      2(19  1)      1(12 12)
   5(13 10)     12(14  8)     18(15  6)     22(16  4)     18(17  2)      9(18  0)
   1( 9 15)      6(10 13)     20(11 11)     44(12  9)     72(13  7)     90(14  5)
  25(15  3)     52(16  1)      3( 7 16)     13( 8 14)     47( 9 12)    104(10 10)
 185(11  8)    250(12  6)    269(13  4)    206(14  2)     81(15  0)      1( 4 19)
   5( 5 17)     26( 6 15)     82( 7 13)    198( 8 11)    365( 9  9)    541(10  7)
 627(11  5)    581(12  3)    349(13  1)      6( 3 18)     28( 4 16)    109( 5 14)
 276( 6 12)    565( 7 10)    902( 8  8)   1182( 9  6)   1216(10  4)    936(11  2)
 345(12  0)      1( 0 21)      4( 1 19)     29( 2 17)    108( 3 15)    318( 4 13)
 696( 5 11)   1236( 6  9)   1764( 7  7)   2048( 8  5)   1843( 9  3)   1101(10  1)
   7( 0 18)     68( 1 16)    242( 2 14)    653( 3 12)   1300( 4 10)   2107( 5  8)
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25(6 6) 2838(7 4) 2154(8 2) 819(9 0) 104(0 15) 400(1 13)
84(2 11) 1944(3 9) 2914(4 7) 3453(5 5) 3167(6 3) 1904(7 1)
74(0 12) 1176(1 10) 2234(2 8) 3215(3 6) 3494(4 4) 2769(5 2)
41(6 0)   869(0 9) 1956(1 7) 2809(2 5) 2813(3 3) 1780(4 1)
52(0 6) 1788(1 4) 1653(2 2)   685(3 0)   692(0 3)   627(1 1)
85(0 0)

	4 4 3 3 2 2 1 1 0 0		1(12 12)	4(13 10)
1(16 7)	2(17 5)	3(18 3)	2(19 1)	9(18 0)	4(10 13)
11(14 8)	19(15 6)	25(16 4)	21(17 2)	103(15 3)	66(16 1)
16(11 11)	42(12 9)	75(13 7)	103(14 5)	205(11 8)	301(12 6)
1(7 16)	11(8 14)	42(9 12)	109(10 10)	19(6 15)	75(7 13)
336(13 4)	272(14 2)	103(15 0)	2(5 17)	762(12 3)	467(13 1)
205(8 11)	412(9 9)	651(10 7)	806(11 5)	651(7 10)	1115(8 8)
3(3 18)	25(4 16)	103(5 14)	301(6 12)	2(1 19)	21(2 17)
515(9 6)	1627(10 4)	1267(11 2)	484(12 0)	2273(7 7)	2730(8 5)
103(3 15)	336(4 13)	806(5 11)	1515(6 9)	272(2 14)	762(3 12)
520(9 3)	1527(10 1)	3679(6 6)	3903(7 4)	3035(8 2)	1146(9 0)
627(4 10)	2730(5 8)	3679(6 6)	2520(3 9)	3903(4 7)	4765(5 5)
103(0 15)	467(1 13)	1267(2 11)	1527(1 10)	3035(2 8)	4447(3 6)
447(6 3)	2707(7 1)	484(0 12)	1146(0 9)	2707(1 7)	3952(2 5)
960(4 4)	3952(5 2)	1516(6 0)	2569(1 4)	2421(2 2)	990(3 0)
035(3 3)	2569(4 1)	1516(0 6)			
990(0 3)	918(1 1)	133(0 0)			

	4 4 3 3 2 1 1 1 1 0		2(18 0)	1(11 11)
1(14 8)	3(15 6)	4(16 4)	4(17 2)	16(16 1)	3(9 12)
5(12 9)	13(13 7)	22(14 5)	24(15 3)	73(14 2)	29(15 0)
14(10 10)	38(11 8)	66(12 6)	85(13 4)	150(10 7)	210(11 5)
1(6 15)	7(7 13)	30(8 11)	79(9 9)	45(6 12)	123(7 10)
217(12 3)	138(13 1)	1(4 16)	11(5 14)	150(12 0)	2(2 17)
258(8 6)	401(9 6)	467(10 4)	387(11 2)	505(7 7)	796(8 5)
12(3 15)	55(4 13)	362(5 11)	359(6 9)	155(3 12)	362(4 10)
779(9 3)	492(10 1)	8(1 16)	43(2 14)	382(9 0)	19(0 15)
728(5 6)	1069(6 6)	1214(7 4)	981(8 2)	1484(5 5)	1454(6 3)
96(1 13)	305(2 11)	673(3 9)	1142(4 7)	1384(3 6)	1613(4 4)
908(7 1)	111(0 12)	408(1 10)	878(2 8)	1298(2 5)	1366(3 3)
1336(5 2)	516(6 0)	339(0 9)	842(1 7)	350(3 0)	348(0 3)
889(4 1)	439(0 6)	571(1 4)	836(2 2)		
924(3 3)	45(2 0)				

	4 4 3 3 2 1 1 1 0		4(13 4)	4(14 2)
1(14 5)	1(15 3)	1(16 1)	2(12 6)	14(12 5)	9(13 1)
2(12 6)	1(5 9)	6(13 7)	10(11 5)	27(11 2)	11(12 0)
2(7 11)	2(6 8)	10(0 6)	28(10 4)	50(8 5)	54(9 3)
1(4 13)	3(5 11)	14(6 9)	29(7 7)	52(6 6)	83(7 4)
38(10 3)	3(3 12)	12(4 13)	34(5 8)	13(2 11)	52(3 9)
73(8 2)	21(9 0)	1(0 15)	2(1 13)	2(0 12)	19(1 10)
70(4 7)	101(6 5)	111(5 3)	72(7 1)	40(6 0)	23(0 9)
48(2 8)	92(3 4)	117(4 4)	106(5 2)	32(0 6)	68(1 4)
56(1 7)	99(2 5)	107(3 3)	74(4 1)	3(0 0)	
65(2 2)	30(3 0)	31(0 3)	27(1 1)		

	4 4 3 2 2 2 1 0 0		1(18 0)	2(11 11)
1(14 8)	2(15 6)	2(16 4)	2(17 2)	11(16 1)	1(8 14)
6(12 9)	13(12 7)	19(14 5)	18(15 3)	76(13 4)	62(14 2)
6(9 12)	21(10 10)	43(11 8)	67(12 6)	100(9 9)	166(10 7)
23(15 0)	2(6 15)	13(7 13)	43(8 11)	18(5 14)	67(6 12)
215(11 5)	206(12 3)	127(13 1)	2(4 16)	387(11 2)	149(12 0)
166(7 10)	313(8 8)	442(9 6)	490(10 4)		

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   2( 2 17)      18( 3 15)      76( 4 13)     215( 5 11)     442( 6  9)     709( 7  7)
 882( 8  5)     837( 9  3)     514(10  1)       1( 0 18)      11( 1 16)      62( 2 14)
 206( 3 12)     490( 4 10)     882( 5  8)     1253( 6  6)   1368( 7  4)    1089( 8  2)
 413( 9  0)      23( 0 15)     127( 1 13)      387( 2 11)     837( 3  9)    1368( 4  7)
1742( 5  5)    1665( 6  3)    1031( 7  1)      149( 0 12)     514( 1 10)    1089( 2  8)
1665( 3  6)    1923( 4  4)    1559( 5  2)      607( 6  0)     413( 0  9)    1031( 1  7)
1559( 2  5)    1636( 3  3)    1054( 4  1)      607( 0  6)    1054( 1  4)    1019( 2  2)
 416( 3  0)     416( 0  3)     395( 1  1)       59( 0  0)
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                            4  4  3  2  2  2  1  1  1  0
   1(16  4)       1(17  2)       1(12  9)       4(13  7)       7(14  5)       9(15  3)
   6(16  1)       1( 9 12)       5(10 10)      15(11  8)      29(12  6)      38(13  4)
  34(14  2)      14(15  0)       2( 7 13)      12( 8 11)      36( 9  9)      74(10  7)
 109(11  5)     113(12  3)      75(13  1)       3( 5 14)      19( 6 12)      63( 7 10)
 139( 8  8)     226( 9  6)     272(10  4)     228(11  2)      90(12  0)       3( 3 15)
  22( 4 13)      81( 5 11)     200( 6  9)     360( 7  7)     490( 8  5)     493( 9  3)
 312(10  1)       2( 1 16)      18( 2 14)      78( 3 12)     220( 4 10)     449( 5  8)
 690( 6  6)     806( 7  4)     664( 8  2)     257( 9  0)       7( 0 15)      48( 1 13)
 174( 2 11)     422( 3  9)     754( 4  7)    1019( 5  5)    1018( 6  3)     645( 7  1)
  66( 0 12)     258( 1 10)     594( 2  8)     973( 3  6)    1169( 4  4)     979( 5  2)
 386( 6  0)     227( 0  9)     599( 1  7)     951( 2  5)    1026( 3  3)     676( 4  1)
 367( 0  6)     663( 1  4)     651( 2  2)     271( 3  0)     270( 0  3)     256( 1  1)
  38( 0  0)
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                            4  4  3  2  2  1  1  1  1  1
   1(15  3)       1(16  1)       2(12  6)       4(13  4)       5(14  2)       2(15  0)
   1( 9  9)       4(10  7)      12(11  5)      15(12  3)      12(13  1)       2( 7 10)
  10( 8  8)      23( 9  6)      37(10  4)      35(11  2)      16(12  0)       3( 5 11)
  13( 6  9)      37( 7  7)      62( 8  5)      75( 9  3)      50(10  1)       3( 3 12)
  16( 4 10)      45( 5  8)      88( 6  6)     117( 7  4)     109( 8  2)      42( 9  0)
   2( 1 13)      11( 2 11)      42( 3  9)      91( 4  7)     146( 5  5)     158( 6  3)
 108( 7  1)       6( 0 12)      25( 1 10)      74( 2  8)     136( 3  6)     184( 4  4)
 159( 5  2)      68( 6  0)      25( 0  9)      83( 1  7)     142( 2  5)     167( 3  3)
 113( 4  1)      59( 0  6)     107( 1  4)     112( 2  2)      44( 3  0)      43( 0  3)
  44( 1  1)       8( 0  0)
```

```
                            4  4  2  2  2  2  2  2  0  0
   1(10 10)       1(11  8)       3(12  6)       2(13  4)       3(14  2)       1( 8 11)
   4( 9  9)       7(10  7)      10(11  5)      10(12  3)       6(13  1)       3( 6 12)
   7( 7 10)      19( 8  2)      25( 9  6)      34(10  4)      23(11  2)      13(12  0)
   2( 4 13)      10( 5 11)      25( 6  9)      47( 7  7)      53( 8  0)      53( 9  3)
  40(10  1)       3( 2 14)      10( 3 12)      34( 4 10)      63( 5  0)     115( 5  6)
 114( 7  4)     102( 8  2)      33( 9  0)       6( 1 13)      23( 2 11)      63( 3  9)
 154( 4  7)     159( 5  5)     159( 6  3)     102( 7  1)      19( 0  2)      49( 1 10)
 190( 2  8)     159( 3  6)     224( 4  4)     162( 5  2)      72( 6  0)      33( 0  9)
 102( 1  7)     162( 2  5)     182( 3  3)     119( 4  1)      72( 0  0)     119( 1  4)
 127( 2  2)      46( 3  0)      46( 0  3)      49( 1  1)      10( 0  0)
```

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                            4  4  2  2  2  2  2  1  1  0
   1(11  8)       2(12  6)       3(13  4)       2(14  2)       1(15  0)       1( 8 11)
   3( 9  9)       8(10  7)      12(11  5)      13(12  3)       3(13  1)       6( 7 10)
  15( 7  8)      30( 9  6)      36(10  4)      33(11  2)      12(12  0)       2( 4 13)
   8( 5 11)      27( 6  9)      53( 7  7)      80( 8  5)      82( 9  3)      54(10  1)
   3( 3 12)      27( 4 10)      71( 5  8)     116( 6  6)     149( 7  4)     124( 8  2)
  52( 9  0)       1( 0 15)       5( 1 13)      26( 2 11)      69( 3  9)     142( 4  7)
 201( 5  5)     214( 6  3)     137( 7  1)       7( 0 12)      44( 1 10)     108( 2  8)
 202( 3  6)     251( 4  4)     224( 5  2)      85( 6  0)      49( 0  9)     127( 1  7)
 221( 2  5)     243( 3  3)     167( 4  1)      78( 0  6)     162( 1  4)     158( 2  2)
  72( 3  0)      74( 0  3)      67( 1  1)       8( 0  0)
```

4 4 2 2 2 2 1 1 1 1

1(14 2)	1(10 7)	2(11 5)	3(12 3)	3(13 1)	1(8 8)
4(9 6)	9(10 4)	7(11 2)	5(12 0)	3(6 9)	8(7 7)
17(8 5)	21(9 3)	15(10 1)	2(4 10)	10(5 8)	24(6 6)
34(7 4)	35(8 2)	11(9 0)	3(2 11)	10(3 9)	28(4 7)
46(5 5)	55(6 3)	37(7 1)	6(1 10)	21(2 8)	44(3 6)
64(4 4)	57(5 2)	27(6 0)	9(0 9)	28(1 7)	54(2 5)
63(3 3)	45(4 1)	20(0 6)	41(1 4)	45(2 2)	18(3 0)
19(0 3)	18(1 1)	3(0 0)			

4 3 3 3 3 3 1 0 0 0

1(18 3)	1(14 8)	2(15 6)	3(16 4)	3(17 2)	1(18 0)
1(10 13)	2(11 11)	6(12 9)	10(13 7)	15(14 5)	14(15 3)
10(16 1)	1(7 16)	3(8 14)	10(9 12)	20(10 10)	36(11 8)
49(12 6)	54(13 4)	41(14 2)	18(15 0)	1(5 17)	7(6 15)
20(7 12)	48(8 11)	83(9 9)	123(10 7)	142(11 5)	131(12 3)
78(13 1)	2(3 18)	9(4 16)	32(5 14)	77(6 12)	151(7 10)
232(8 8)	297(9 6)	300(10 4)	231(11 2)	82(12 0)	1(1 19)
8(2 17)	32(3 15)	94(4 13)	199(5 11)	346(6 9)	477(7 7)
545(8 5)	482(9 3)	285(10 1)	3(0 18)	22(1 16)	77(2 14)
201(3 12)	389(4 10)	614(5 8)	772(6 6)	791(7 4)	589(8 2)
226(9 0)	31(0 15)	125(1 13)	319(2 11)	587(3 9)	884(4 7)
1001(5 5)	905(6 3)	539(7 1)	120(0 12)	367(1 10)	685(2 8)
969(3 6)	1033(4 4)	811(5 2)	301(6 0)	269(0 9)	599(1 7)
849(2 5)	840(3 3)	528(4 1)	322(0 6)	544(1 4)	496(2 2)
206(3 0)	210(0 3)	189(1 1)	25(0 0)		

4 3 3 3 3 2 2 0 0 0 0

1(14 8)	1(15 6)	2(16 4)	1(17 2)	1(18 0)	2(11 11)
4(12 9)	9(13 7)	11(14 5)	11(15 3)	7(16 1)	2(8 14)
6(9 12)	18(10 10)	30(11 9)	46(12 6)	46(13 4)	40(14 2)
12(15 0)	1(5 17)	4(6 15)	17(7 12)	40(8 11)	80(9 9)
117(10 7)	142(11 5)	128(12 3)	78(13 1)	1(3 18)	7(4 16)
25(5 14)	71(6 12)	142(7 10)	237(8 9)	300(9 5)	321(10 4)
235(11 2)	95(12 0)	1(1 19)	6(2 17)	29(3 15)	55(4 13)
200(5 11)	352(6 9)	512(7 7)	587(8 5)	531(9 3)	315(10 1)
3(0 18)	19(1 16)	76(2 14)	199(3 12)	414(4 10)	657(5 8)
367(5 6)	880(7 4)	685(8 2)	244(5 0)	28(0 15)	129(1 13)
833(2 11)	647(3 9)	964(4 7)	1153(5 5)	1047(5 3)	634(7 1)
134(0 12)	402(1 10)	789(2 8)	1113(3 5)	1235(4 4)	955(5 2)
377(6 0)	295(0 9)	701(1 7)	998(2 5)	1014(3 3)	557(4 1)
399(0 6)	653(1 4)	625(2 2)	241(5 0)	246(0 3)	230(1 1)
33(0 0)					

4 3 3 3 3 2 1 1 0 0

1(15 6)	1(16 4)	2(17 2)	1(11 11)	3(12 9)	7(13 7)
11(14 5)	12(15 3)	3(16 1)	1(3 14)	5(9 12)	44(10 10)
70(11 8)	45(12 6)	55(13 4)	43(14 2)	19(15 0)	5(6 15)
13(7 13)	38(8 11)	79(9 9)	123(10 7)	162(11 5)	155(12 3)
96(13 1)	4(4 15)	30(5 14)	66(6 12)	150(7 10)	253(8 8)
350(9 6)	382(10 4)	305(11 2)	111(12 0)	4(2 17)	24(3 15)
85(4 13)	210(5 11)	401(6 9)	405(7 7)	728(8 5)	573(9 3)
108(10 1)	2(0 18)	16(1 16)	73(2 14)	217(3 12)	457(4 10)
796(5 8)	1068(6 6)	1142(7 4)	878(8 2)	339(9 0)	29(0 15)
38(1 13)	337(2 11)	779(3 9)	1214(4 7)	1484(5 5)	1384(6 3)
342(7 1)	150(0 12)	492(1 10)	981(2 9)	1454(3 6)	1615(4 4)
298(5 2)	489(6 0)	382(0 9)	908(1 7)	1336(2 5)	1366(3 3)
71(4 1)	516(0 6)	889(1 4)	836(2 2)	348(3 0)	350(0 3)
24(1 1)	45(0 0)				

BLE. IRREDUCIBLE REPRESENTATIONS OF SU(3) CONTAINED IN A PARTITION OF U(10)

4 3 3 3 3 1 1 1 1 0					
1(13 7)	1(14 5)	2(15 3)	1(16 1)	1(10 10)	3(11 8)
7(12 6)	9(13 4)	9(14 2)	3(15 0)	1(7 13)	3(8 11)
11(9 9)	20(10 7)	32(11 5)	32(12 3)	22(13 1)	1(5 14)
7(6 12)	20(7 10)	44(8 8)	69(9 6)	85(10 4)	69(11 2)
30(12 0)	2(3 15)	9(4 13)	32(5 11)	69(6 9)	123(7 7)
161(8 5)	163(9 3)	101(10 1)	1(1 16)	-9(2 14)	32(3 12)
85(4 10)	161(5 8)	243(6 6)	273(7 4)	228(8 2)	84(9 0)
3(0 15)	22(1 13)	69(2 11)	163(3 9)	273(4 7)	364(5 5)
355(6 3)	224(7 1)	30(0 12)	101(1 10)	228(2 8)	355(3 6)
423(4 4)	343(5 2)	140(6 0)	84(0 9)	224(1 7)	343(2 5)
369(3 3)	239(4 1)	140(0 6)	239(1 4)	237(2 2)	94(3 0)
94(0 3)	91(1 1)	16(0 0)			

4 3 3 3 2 2 2 1 0 0					
1(12 9)	2(13 7)	3(14 5)	3(15 3)	2(16 1)	1(9 12)
5(10 10)	12(11 8)	19(12 6)	22(13 4)	18(14 2)	7(15 0)
4(7 13)	15(8 11)	36(9 9)	63(10 7)	81(11 5)	78(12 3)
48(13 1)	1(4 16)	7(5 14)	29(6 12)	74(7 10)	139(8 8)
200(9 6)	220(10 4)	174(11 2)	66(12 0)	1(2 17)	9(3 15)
38(4 13)	109(5 11)	226(6 9)	360(7 7)	449(8 5)	422(9 3)
258(10 1)	6(1 16)	34(2 14)	113(3 12)	272(4 10)	490(5 8)
690(6 6)	754(7 4)	594(8 2)	227(9 0)	14(0 15)	75(1 13)
228(2 11)	493(3 9)	306(4 7)	1019(5 5)	973(6 3)	599(7 1)
90(0 12)	312(1 10)	664(2 8)	1018(3 6)	1169(4 4)	951(5 2)
367(6 0)	257(0 9)	645(1 7)	979(2 5)	1026(3 3)	663(4 1)
386(0 6)	676(1 4)	651(2 2)	270(3 0)	271(0 3)	256(1 1)
38(0 0)					

4 3 3 3 2 2 1 1 1 0					
1(14 5)	1(15 3)	1(16 1)	1(10 10)	3(11 8)	7(12 6)
10(13 4)	9(14 2)	4(15 0)	3(8 11)	11(9 9)	25(10 7)
27(11 5)	41(12 3)	24(13 1)	1(5 14)	7(6 12)	25(7 10)
57(8 8)	95(9 6)	115(10 4)	98(11 2)	33(12 0)	1(3 15)
10(4 13)	37(5 11)	95(6 9)	172(7 7)	237(8 5)	237(9 3)
152(10 1)	1(1 16)	9(2 14)	41(3 12)	115(4 10)	237(5 8)
365(6 6)	427(7 4)	350(8 2)	138(9 0)	4(0 15)	25(1 13)
98(2 11)	237(3 9)	427(4 7)	576(5 5)	576(6 3)	504(7 1)
38(0 12)	152(1 10)	350(2 8)	576(3 6)	692(4 4)	582(5 2)
226(6 0)	138(0 9)	344(1 7)	592(2 5)	528(3 3)	414(4 1)
226(0 6)	414(1 4)	415(2 2)	171(3 0)	171(0 3)	155(1 1)
24(0 0)					

4 3 3 3 2 1 1 1 1 1					
1(13 4)	1(14 2)	1(15 0)	3(11 5)	5(12 3)	4(13 1)
3(8 8)	8(9 6)	13(10 4)	14(11 2)	6(12 0)	1(5 11)
5(6 9)	15(7 7)	27(8 5)	32(9 3)	24(10 1)	1(3 12)
7(4 10)	20(5 8)	41(6 6)	57(7 4)	52(8 2)	22(9 0)
1(1 13)	6(2 11)	21(3 9)	47(4 7)	75(5 5)	85(6 3)
56(7 1)	2(0 12)	13(1 10)	39(2 8)	74(3 6)	100(4 4)
89(5 2)	35(6 0)	15(0 9)	47(1 7)	82(2 5)	96(3 3)
65(4 1)	33(0 6)	62(1 4)	64(2 2)	28(3 0)	26(0 3)
26(1 1)	4(0 0)				

4 3 3 2 2 2 2 2 0 0					
1(11 8)	2(13 4)	1(15 0)	1(9 11)	3(9 9)	6(10 7)
8(11 5)	8(12 3)	5(13 1)	2(6 12)	8(7 10)	15(8 8)
27(9 6)	27(10 4)	36(11 2)	7(12 0)	3(4 13)	12(5 11)
30(6 9)	53(7 7)	71(8 5)	69(9 3)	44(10 1)	2(2 14)
13(3 12)	36(4 10)	30(5 8)	116(6 6)	143(7 4)	108(8 2)

9(5 0)   1(0 15)   8(1 13)   33(2 11)   82(3 9)   149(4 7)
(5 5)   202(6 3)   127(7 1)   12(0 12)   54(1 10)   124(2 8)
4(3 6)   251(4 4)   221(5 2)   78(6 0)   52(0 9)   137(1 7)
(2 5)   243(3 3)   162(4 1)   85(0 6)   167(1 4)   158(2 2)
(3 0)   72(0 3)   67(1 1)   8(0 0)

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              4   3   3   2   2   2   2   1   1   0
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1(12 6)   1(13 4)   1(14 2)   2(9 9)   5(10 7)   9(11 5)
9(12 3)   6(13 1)   1(6 12)   5(7 10)   16(8 8)   27(9 6)
6(10 4) 29(11 2) 13(12 0)   1(4 13)   9(5 11)   27(6 9)
3(7 7) 83(8 5) 88(9 3) 56(10 1)   1(2 14)   9(3 12)
6(4 10) 83(5 8) 143(6 6) 172(7 4) 150(8 2)   56(9 0)
6(1 13) 29(2 11) 88(3 9) 172(4 7) 252(5 5) 260(6 3)
0(7 1) 13(0 12) 56(1 10) 150(2 8) 260(3 6) 335(4 4)
4(5 2) 118(6 0) 56(0 9) 170(1 7) 284(2 5) 324(3 3)
7(4 1) 118(0 6) 217(1 4) 225(2 2)   91(3 0)   91(0 3)
2(1 1) 16(0 0)

```
              4   3   3   2   2   2   1   1   1   1
```

1(15 0)   1(11 5)   2(12 3)   2(13 1)   1(8 8)   4(9 6)
7(10 4)   9(11 2)   2(12 0)   2(6 9)   8(7 7)   16(8 5)
2(9 3) 15(10 1)   3(4 10) 12(5 8)   27(6 6)   42(7 4)
7(8 2) 18(9 0)   2(2 11) 12(3 9)   32(4 7)   57(5 5)
5(6 3) 46(7 1)   1(0 12)   8(1 10)   27(2 8)   59(3 6)
0(4 4) 78(5 2) 29(6 0) 10(0 9)   37(1 7)   69(2 5)
4(3 3) 58(4 1) 27(0 6) 57(1 4)   58(2 2)   27(3 0)
5(0 3) 25(1 1)   3(0 0)

```
              4   3   2   2   2   2   2   2   1   0
```

1(9 8)   2(9 6)   2(10 4)   2(11 2)   1(12 0)   2(6 9)
5(7 7)   8(8 5)   9(9 3)   6(10 1)   2(4 10)   8(5 8)
6(6 6) 22(7 4) 20(8 2)   8(9 0)   2(2 11)   9(3 9)
2(4 7) 37(5 5) 43(6 3) 28(7 1)   1(0 12)   0(1 10)
7(2 9) 43(3 6) 59(4 4) 55(5 2)   23(6 0)   3(0 9)
8(1 7) 55(2 5) 57(3 3) 47(4 1)   23(0 6)   47(1 4)
1(2 2) 23(3 0) 29(0 3) 22(1 1)   4(0 0)

```
              4   3   2   2   2   2   1   1   1
```

1(10 4)   1(11 2)   1(7 7)   2(8 5)   4(9 3)   3(10 1)
1(5 3)   5(6 3)   9(7 4)   9(8 2)   4(9 0)   1(3 9)
7(4 7) 14(5 5) 18(6 3) 14(7 1)   1(1 10)   6(2 8)
5(3 6) 26(4 4) 25(5 2) 19(5 0)   2(0 9)   0(1 7)
2(2 5) 29(3 3) 22(4 1)   9(0 6)   21(1 4)   23(2 2)
0(3 0)   9(0 3) 11(1 1)   1(0 0)

```
              4   2   2   2   2   2   2   2   0
```

1(5 5)   1(3 2)   1(5 5)   1(6 3)   1(7 1)   1(2 8)
1(3 6)   4(4 4)   2(5 2)   2(6 0)   1(1 7)   2(2 5)
4(3 3)   3(4 1)   2(0 6)   3(1 4)   5(2 2)   1(3 0)
1(0 3)   2(1 1)   2(0 0)

```
              4   2   2   2   2   2   2   1   1
```

1(7 4)   1(9 0)   1(5 5)   1(6 3)   1(7 1)   1(3 6)
2(4 4)   4(5 2)   1(1 7)   2(2 5)   4(3 3)   3(4 1)
1(0 6)   3(1 4)   2(2 2)   3(3 0)   2(0 3)   2(1 1)

```
              3   3   3   3   3   3   2   0   0   0
```

1(12 6)   1(14 2)   1(8 11)   2(7 9)   3(10 7)   4(11 5)
4(12 3)   2(13 1)   1(5 14)   3(6 12)   6(7 10)   11(8 8)
3(9 6) 15(10 4) 10(11 2)   5(12 0)   1(2 17)   2(3 15)

6(4 13)	13(5 11)	24(6 9)	32(7 7)	37(8 5)	33(9 3)
19(10 1)	1(1 16)	5(2 14)	15(3 12)	31(4 10)	49(5 8)
65(6 6)	63(7 4)	90(8 2)	17(9 0)	4(0 15)	11(1 13)
31(2 11)	57(3 9)	85(4 7)	98(5 5)	89(6 3)	52(7 1)
10(0 12)	37(1 10)	71(2 8)	103(3 6)	110(4 4)	86(5 2)
34(6 0)	32(0 9)	68(1 7)	100(2 5)	99(3 3)	61(4 1)
38(0 6)	64(1 4)	61(2 2)	25(3 0)	28(0 3)	23(1 1)
4(0 0)					

3 3 3 3 3 3 1 1 0 0

1(13 4)	1(15 0)	1(9 9)	2(10 7)	3(11 5)	3(12 3)
2(13 1)	1(5 14)	2(6 12)	6(7 10)	8(8 5)	14(9 6)
12(10 4)	13(11 2)	2(12 0)	1(3 15)	4(4 13)	10(5 11)
19(6 9)	29(7 7)	34(8 5)	32(9 3)	19(10 1)	1(1 16)
4(2 14)	14(3 12)	28(4 10)	50(5 8)	62(6 6)	70(7 4)
48(8 2)	23(9 0)	2(0 15)	9(1 13)	27(2 11)	54(3 9)
83(4 7)	101(5 5)	92(6 3)	56(7 1)	11(0 12)	38(1 10)
73(2 8)	111(3 6)	117(4 4)	99(5 2)	32(6 0)	31(0 9)
72(1 7)	106(2 5)	107(3 3)	68(4 1)	40(0 6)	74(1 4)
65(2 2)	31(3 0)	30(0 3)	27(1 1)	3(0 0)	

3 3 3 3 3 2 2 1 0 0

1(9 9)	2(10 7)	3(11 5)	3(12 3)	2(13 1)	2(6 12)
4(7 10)	10(8 8)	13(9 6)	16(10 4)	11(11 2)	6(12 0)
1(3 15)	4(4 13)	12(5 11)	23(6 9)	37(7 7)	45(8 5)
42(9 3)	25(10 1)	1(1 16)	5(2 14)	15(3 12)	37(4 10)
62(5 8)	88(6 6)	91(7 4)	74(8 2)	25(9 0)	2(0 15)
12(1 13)	35(2 11)	75(3 9)	117(4 7)	146(5 5)	136(6 3)
83(7 1)	16(0 12)	50(1 10)	109(2 9)	158(3 6)	184(4 4)
142(5 2)	59(6 0)	42(0 9)	108(1 7)	159(2 5)	167(3 3)
107(4 1)	68(0 6)	113(1 4)	112(2 2)	43(3 0)	44(0 3)
44(1 1)	8(0 0)				

3 3 3 3 3 2 1 1 1 0

1(11 5)	1(12 2)	1(13 1)	1(7 10)	3(6 8)	5(9 6)
7(10 4)	6(11 2)	2(12 0)	1(4 13)	3(5 11)	3(6 9)
15(7 7)	20(8 5)	21(9 3)	13(10 1)	1(2 14)	5(3 12)
13(4 10)	27(5 8)	41(5 6)	47(7 4)	39(8 2)	15(9 0)
(1 13)	14(2 11)	32(3 9)	57(4 7)	75(5 5)	74(6 3)
47(7 1)	6(0 12)	24(1 10)	52(2 8)	85(3 6)	100(4 4)
(5 2)	33(6 0)	22(0 9)	56(1 7)	89(2 5)	96(3 3)
(4 1)	35(0 6)	65(1 4)	64(2 2)	26(3 0)	28(0 3)
26(1 1)	4(0 0)				

3 3 3 3 3 1 1 1 1 1

1(13 4)	1(12 0)	1(7 7)	1(8 5)	2(9 3)	2(10 1)
1(4 13)	1(5 3)	4(6 6)	4(7 4)	6(8 2)	2(3 9)
(4 7)	8(5 5)	7(6 3)	6(7 1)	1(0 12)	2(1 10)
6(2 8)	7(3 6)	14(4 4)	9(5 2)	6(6 0)	6(1 7)
(2 5)	11(3 3)	7(4 1)	6(0 0)	7(1 4)	11(2 2)
(3 0)	1(2 3)	4(1 1)	1(0 0)		

3 3 3 3 2 2 2 2 0 0

1(7 10)	2(8 9)	3(9 6)	2(10 4)	3(11 2)	2(5 11)
4(6 9)	8(7 7)	10(8 5)	10(9 3)	6(10 2)	1(2 14)
3(3 12)	9(4 10)	17(5 8)	24(6 6)	28(7 4)	21(8 2)
9(9 0)	3(1 13)	7(2 11)	21(3 9)	34(4 7)	46(5 5)
44(6 3)	28(7 1)	5(0 12)	15(1 10)	35(2 8)	55(3 6)
64(4 4)	54(5 2)	20(6 0)	11(0 9)	37(1 7)	57(2 5)
63(3 3)	41(4 1)	27(0 6)	45(1 4)	45(2 2)	19(3 0)

(0 3)   18(1 1)   3(0 0)

		3	3	3	3	2	2	2	1	1	0		
(8 8)	2(9 6)	3(10 4)	2(11 2)	1(12 0)	1(5 11)
(6 9)	8(7 7)	12(8 5)	12(9 3)	8(10 1)	2(3 12)
(4 10)	16(5 8)	27(6 6)	32(7 4)	27(8 2)	10(9 0)
(0 15)	2(1 13)	9(2 11)	22(3 9)	42(4 7)	57(5 5)
(6 3)	37(7 1)	2(0 12)	15(1 10)	37(2 8)	65(3 6)
(4 4)	69(5 2)	27(6 0)	18(0 9)	46(1 7)	78(2 5)
(3 3)	57(4 1)	29(0 6)	58(1 4)	58(2 2)	25(3 0)
(0 3)	25(1 1)	3(0 0)			

		3	3	3	3	2	2	1	1	1	1		
(11 2)	1(7 7)	2(8 5)	3(9 3)	2(10 1)	2(5 8)
(6 6)	7(7 4)	6(8 2)	4(9 0)	1(2 11)	3(3 9)
(4 7)	13(5 5)	14(6 3)	10(7 1)	2(1 10)	6(2 8)
(3 6)	19(4 4)	18(5 2)	6(6 0)	4(0 9)	10(1 7)
(2 5)	22(3 3)	15(4 1)	6(0 6)	15(1 4)	14(2 2)
(3 0)	7(0 3)	7(1 1)	1(0 0)		

		3	3	3	2	2	2	2	2	1	0		
(7 7)	1(8 5)	1(9 3)	1(10 1)	1(4 10)	3(5 8)
(6 6)	7(7 4)	6(8 2)	2(9 0)	1(2 11)	4(3 9)
(4 7)	14(5 5)	15(6 3)	10(7 1)	3(1 10)	9(2 8)
(3 6)	25(4 4)	22(5 2)	9(6 0)	4(0 9)	14(1 7)
(2 5)	29(3 3)	21(4 1)	10(0 6)	22(1 4)	23(2 2)
(3 0)	10(0 3)	11(1 1)	1(0 0)		

		3	3	3	2	2	2	2	1	1	1		
(9 3)	2(6 6)	2(7 4)	3(8 2)	1(9 0)	1(2 9)
(4 7)	6(5 5)	6(6 3)	5(7 1)	3(2 8)	6(3 6)
(4 4)	9(5 2)	6(6 0)	1(0 9)	5(1 7)	9(2 5)
(3 3)	8(4 1)	6(0 6)	8(1 4)	12(2 2)	4(3 0)
(0 3)	4(1 1)	2(0 0)			

		3	3	2	2	2	2	2	2	1	0		
(4 7)	1(5 5)	1(6 3)	1(7 1)	1(3 6)	2(4 4)
(5 2)	1(6 0)	1(0 9)	1(1 7)	4(2 5)	4(3 3)
(4 1)	3(1 4)	3(2 2)	2(3 0)	3(0 3)	2(1 1)

		3	3	2	2	2	2	2	2	1	1		
(5 5)	1(6 3)	1(7 1)	1(3 6)	2(4 4)	2(5 2)
(6 0)	1(1 7)	2(2 5)	4(3 3)	3(4 1)	1(1 6)
(1 4)	4(2 2)	1(3 0)	1(0 3)	2(1 1)	1(0 0)

		3	2	2	2	2	2	2	2	2	1		
(3 3)	1(2 2)	1(1 1)			

		2	2	2	2	2	2	2	2	2	2		
(0 0)					

APPENDIX-C

SU(3) TENSOR DECOMPOSITION OF 1-BODY AND 2-BODY OPERATORS

The SU(3) tensor character of a given interaction in a given shell can be known by writing down the operator corresponding to the given interaction in terms of the creation (a^+) and anhilation (a) operators. For a given U(S) (i.e. for a given shell) a^+ and a transform as

$$a^+ \longrightarrow [1] \quad \text{of} \quad U(S)$$

$$\text{and} \quad a \longrightarrow [1^{S-1}] \quad \text{of} \quad U(S)$$

As any one body operator consists of terms of the type $a^+ a$, the U(S) tensor character of any 1-body operator is obtained by coupling the partition [1] and $[1^{S-1}]$, according to which a^+ and a transform under $\bar{U}(S)$ respectively. Then we will get

$$[1] \times [1^{S-1}] \longrightarrow [0] + [21^{S-2}]$$

$$(1)$$

A two-body operator consists of terms of the type $a^+ a^+$, a a. By coupling two creation operators, we get

$$a^+ a^+ \longrightarrow [1] \times [1] = [2] + [1^2]$$

$$(ii)$$

and coupling the two anihilation operators, we get

$$aa \longrightarrow [1^{S-1}] \times [1^{S-1}] = [2^{S-1}]_s + [1^{S-2}]_a$$

$$(iii)$$

Now the total U(S) tensor cha. ـer of a 2-body operator is obtained by coupling the U(S) partitions in eqn.(ii) and eqn.(iii). Then we get[36)

$$[2] \times [2^{s-1}] = [0] + [21^{s-2}] + [42^{s-2}]$$

$$[2] \times [1^{s-2}] = [31^{s-2}] + [21^{s-2}]$$

$$[1^2] \times [2^{s-1}] = [3^2 2^{s-3}] + [21^{s-2}]$$

$$[1^2] \times [1^{s-2}] = [0] + [21^{s-2}] + [2^2 1^{s-4}]$$

(iv)

To know the SU(3) irreducible tensor character of a given one-body or two-body interaction, simply we have to know the reductions of U(S) partitions appearing in eqn.(i) and eqn.(iv) to IR of SU(3). They can be read out for $\eta = 3$ shell from the tabulations given in Appendix-B. We will give here the reductions for $\eta = 4$ shell.

TABLE — **REDUCTION OF TWO-BODY INTERACTIONS IN $\eta = 4$ SHELL TO IR OF SU(3)**

U(15) PARTITION	IR. OF SU(3)
$[0]$	(00)
$[2 \, 1^{13}]$	(11) (22) (33) (44)
$[2^2 \, 1^{11}]$	(77) (85) (93) (10 1)
	(58) $(66)^2$ $(74)^2$ $(82)^2$ (90)
	(39) $(47)^2$ $(55)^5$ $(63)^5$ $(71)^3$
	(1 10) $(28)^2$ $(36)^5$ $(44)^7$ $(52)^6$
	$(60)^2$ (09) $(17)^3$ $(25)^6$
	$(33)^8$ $(41)^5$ $(06)^2$ $(14)^5$ $(22)^6$
	$(30)^2$ $(03)^2$ $(11)^3$ (00)
$[3 \, 1^{12}]$	(96) (11 2) (77) (85) (93) (10 1) (58) $(662)^2$ $(74$
	$(82)^2 (90)^2 (39) (47)^2 (55)^5$ $(63)^5$ $(71)^3$ (1 10)
	$(28)^2 (36)^5$ $(44)^7$ $(52)^8 (60)$ (09) $(17)^3$ $(25)^6$
	$(33)^8 (41)^5$ $(06)^2$ $(14)^5 (22)^5$ $(30)^4 (03)^3$ $(11)^3$
$[3^2 \, 2^{12}]$	(69) (77) (85) (93) (10 1) (58) $(66)^2$ $(74)^2$
	$(82)^2$ (90) (2 11) (39) $(47)^4$ $(55)^5$ $(63)^5$
	$(71)^3$ (1 10) $(28)^2$ $(36)^5 (44)^7$ $(52)^6$ $(60)^2$
	$(09)^2$ $(17)^3$ $(25)^8$ $(33)^8$ $(41)^5$ (06) $(14)^5$
	$(22)^5$ $(30)^3$ $(03)^4$ $(11)^3$

. . . . .

$4\ 2^{13}\Big]$

$--(88)\ (10\ 4)\ (12\ 0)\ (77)\ (85)\ (93)\ 10\ 1)$

$(4\ 10)\ (58)\ (66)^4\ (74)^2\ (82)^4\ (39)\ (47)^2$

$(55)^2\ (63)^5\ (71)^3\ (0\ 12)\ (1\ 10)\ (28)^4\ (36)^5$

$(44)^{10}\ (52)^5\ (60)^4(17)^3\ (25)^5\ (33)^8\ (41)^5$

$(06)^4\ (14)^5\ (22)^8\ (30)\ (03)\ (11)^2\ (00)^2$

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