

Part 4: “New Advanced Study of Magic Squares and Cubes”

Chapter 7: New Method of Composing High-Dimensional Extra-Cubic Objects and their Developed Forms: Kanji Setsuda

Section 7: New Method of Composing Multiple Type of Magic Squares 9x9 including 9 Little Squares 3x3 within

#1. New Method of Composing Various Types of Magic Things

As I reported in the previous sections, I recently invented a new, unique way of composing special types of magic cubes and squares of order 4, 8, and 9, using all possible ‘view-forms’ of high dimensional Extra-Cubic Objects developed.

Let me report about the case of ECO3⁴ here.

We know in the first section: if we use four-time loops of for(...){...} sentences and produce ‘positional numbers’ of the base 3, we can draw the ‘view-forms’ for ECO3⁴.

If you change the program a little in the order of variables {d0, d1, d2 and d3}, you could have any different view-forms of the same ECO. You could draw different basic diagrams with n1=1 as many as 24 in all. Because $4P_4=4 \times 3 \times 2 \times 1=24$.

If you put any count-down type of conditions in the for(...){...} sentences, you could have another type of different view-forms of the same ECO. How many different pictures could you draw for that type, then?

We use 4 loops of for(...){...} sentences in all. And we have only two cases for each loop: whether we put the count-down condition or we don’t. Therefore we could have different pictures of that type as many as 16 in all, because $2^4=16$.

Look carefully at the next samples of ‘view forms’.

List 1 shows the ‘Basic Diagrams’ for our ECO3⁴ in four forms.

List 2 shows the 2 sets of ‘view-forms’ only in the style of developed MS9².

[BD]

1-----2-----3	4-----5-----6	7-----8-----9
10 11 12	13 14 15	16 17 18
28 19-29--20-30--21	31 22-32--23-33--24	34 25-35--26-36--27
37 38 39	40 41 42	43 44 45
55--46-56--47-57 48	58--49-59--50-60 51	61--52-62--53-63 54
64 65 66	67 68 69	70 71 72
73-----74-----75	76-----77-----78	79-----80-----81

N3i/

0000 0001 0002	0010 0011 0012	0020 0021 0022
0100 0101 0102	0110 0111 0112	0120 0121 0122
0200 0201 0202	0210 0211 0212	0220 0221 0222
1000 1001 1002	1010 1011 1012	1020 1021 1022
1100 1101 1102	1110 1111 1112	1120 1121 1122
1200 1201 1202	1210 1211 1212	1220 1221 1222
2000 2001 2002	2010 2011 2012	2020 2021 2022
2100 2101 2102	2110 2111 2112	2120 2121 2122
2200 2201 2202	2210 2211 2212	2220 2221 2222

ED/ /D3i

1 2 3 4 5 6 7 8 9	00000000 00000000	000111222 012012012
10 11 12 13 14 15 16 17 18	00000000 111111111	000111222 012012012
19 20 21 22 23 24 25 26 27	00000000 222222222	000111222 012012012
28 29 30 31 32 33 34 35 36	111111111 000000000	000111222 012012012
37 38 39 40 41 42 43 44 45	111111111 111111111	000111222 012012012
46 47 48 49 50 51 52 53 54	111111111 222222222	000111222 012012012
55 56 57 58 59 60 61 62 63	222222222 000000000	000111222 012012012
64 65 66 67 68 69 70 71 72	222222222 111111111	000111222 012012012
73 74 75 76 77 78 79 80 81	222222222 222222222	000111222 012012012

22/
1 28 55 4 31 58 7 34 61
10 37 64 13 40 67 16 43 70
19 46 73 22 49 76 25 52 79
2 29 56 5 32 59 8 35 62
11 38 65 14 41 68 17 44 71
20 47 74 23 50 77 26 53 80
3 30 57 6 33 60 9 36 63
12 39 66 15 42 69 18 45 72
21 48 75 24 51 78 27 54 81

23/
1 28 55 10 37 64 19 46 73
2 29 56 11 38 65 20 47 74
3 30 57 12 39 66 21 48 75
4 31 58 13 40 67 22 49 76
5 32 59 14 41 68 23 50 77
6 33 60 15 42 69 24 51 78
7 34 61 16 43 70 25 52 79
8 35 62 17 44 71 26 53 80
9 36 63 18 45 72 27 54 81

24/
1 28 55 10 37 64 19 46 73
4 31 58 13 40 67 22 49 76
7 34 61 16 43 70 25 52 79
2 29 56 11 38 65 20 47 74
5 32 59 14 41 68 23 50 77
8 35 62 17 44 71 26 53 80
3 30 57 12 39 66 21 48 75
6 33 60 15 42 69 24 51 78
9 36 63 18 45 72 27 54 81

Set #2

1/ 1 2 3 4 5 6 7 8 9
10 11 12 13 14 15 16 17 18
19 20 21 22 23 24 25 26 27
28 29 30 31 32 33 34 35 36
37 38 39 40 41 42 43 44 45
46 47 48 49 50 51 52 53 54
55 56 57 58 59 60 61 62 63
64 65 66 67 68 69 70 71 72
73 74 75 76 77 78 79 80 81

2/ 3 2 1 6 5 4 9 8 7
12 11 10 15 14 13 18 17 16
21 20 19 24 23 22 27 26 25
30 29 28 33 32 31 36 35 34
39 38 37 42 41 40 45 44 43
48 47 46 51 50 49 54 53 52
57 56 55 60 59 58 63 62 61
66 65 64 69 68 67 72 71 70
75 74 73 78 77 76 81 80 79

3/ 7 8 9 4 5 6 1 2 3
16 17 18 13 14 15 10 11 12
25 26 27 22 23 24 19 20 21
34 35 36 31 32 33 28 29 30
43 44 45 40 41 42 37 38 39
52 53 54 49 50 51 46 47 48
61 62 63 58 59 60 55 56 57
70 71 72 67 68 69 64 65 66
79 80 81 76 77 78 73 74 75

4/ 9 8 7 6 5 4 3 2 1
18 17 16 15 14 13 12 11 10
27 26 25 24 23 22 21 20 19
36 35 34 33 32 31 30 29 28
45 44 43 42 41 40 39 38 37
54 53 52 51 50 49 48 47 46
63 62 61 60 59 58 57 56 55
72 71 70 69 68 67 66 65 64
81 80 79 78 77 76 75 74 73

5/ 19 20 21 22 23 24 25 26 27
10 11 12 13 14 15 16 17 18
1 2 3 4 5 6 7 8 9
46 47 48 49 50 51 52 53 54
37 38 39 40 41 42 43 44 45
28 29 30 31 32 33 34 35 36
73 74 75 76 77 78 79 80 81
64 65 66 67 68 69 70 71 72
55 56 57 58 59 60 61 62 63

6/ 21 20 19 24 23 22 27 26 25
12 11 10 15 14 13 18 17 16
3 2 1 6 5 4 9 8 7
48 47 46 51 50 49 54 53 52
39 38 37 42 41 40 45 44 43
30 29 28 33 32 31 36 35 34
75 74 73 78 77 76 81 80 79
66 65 64 69 68 67 72 71 70
57 56 55 60 59 58 63 62 61

7/ 25 26 27 22 23 24 19 20 21
16 17 18 13 14 15 10 11 12
7 8 9 4 5 6 1 2 3
52 53 54 49 50 51 46 47 48
43 44 45 40 41 42 37 38 39
34 35 36 31 32 33 28 29 30
79 80 81 76 77 78 73 74 75
70 71 72 67 68 69 64 65 66
61 62 63 58 59 60 55 56 57

8/ 27 26 25 24 23 22 21 20 19
18 17 16 15 14 13 12 11 10
9 8 7 6 5 4 3 2 1
54 53 52 51 50 49 48 47 46
45 44 43 42 41 40 39 38 37
36 35 34 33 32 31 30 29 28
81 80 79 78 77 76 75 74 73
72 71 70 69 68 67 66 65 64
63 62 61 60 59 58 57 56 55

9/ 55 56 57 58 59 60 61 62 63
64 65 66 67 68 69 70 71 72
73 74 75 76 77 78 79 80 81
28 29 30 31 32 33 34 35 36
37 38 39 40 41 42 43 44 45
46 47 48 49 50 51 52 53 54
1 2 3 4 5 6 7 8 9
10 11 12 13 14 15 16 17 18
19 20 21 22 23 24 25 26 27

10/ 57 56 55 60 59 58 63 62 61
66 65 64 69 68 67 72 71 70
75 74 73 78 77 76 81 80 79
30 29 28 33 32 31 36 35 34
39 38 37 42 41 40 45 44 43
48 47 46 51 50 49 54 53 52
3 2 1 6 5 4 9 8 7
12 11 10 15 14 13 18 17 16
21 20 19 24 23 22 27 26 25

11/ 61 62 63 58 59 60 55 56 57
70 71 72 67 68 69 64 65 66
79 80 81 76 77 78 73 74 75
34 35 36 31 32 33 28 29 30
43 44 45 40 41 42 37 38 39
52 53 54 49 50 51 46 47 48
7 8 9 4 5 6 1 2 3
16 17 18 13 14 15 10 11 12
25 26 27 22 23 24 19 20 21

12/ 63 62 61 60 59 58 57 56 55
72 71 70 69 68 67 66 65 64
81 80 79 78 77 76 75 74 73
36 35 34 33 32 31 30 29 28
45 44 43 42 41 40 39 38 37
54 53 52 51 50 49 48 47 46
9 8 7 6 5 4 3 2 1
18 17 16 15 14 13 12 11 10
27 26 25 24 23 22 21 20 19

```

13/
73 74 75 76 77 78 79 80 81 75 74 73 78 77 76 81 80 79
64 65 66 67 68 69 70 71 72 66 65 64 69 68 67 72 71 70
55 56 57 58 59 60 61 62 63 57 56 55 60 59 58 63 62 61
46 47 48 49 50 51 52 53 54 48 47 46 51 50 49 54 53 52
37 38 39 40 41 42 43 44 45 39 38 37 42 41 40 45 44 43
28 29 30 31 32 33 34 35 36 30 29 28 33 32 31 36 35 34
19 20 21 22 23 24 25 26 27 21 20 19 24 23 22 27 26 25
10 11 12 13 14 15 16 17 18 12 11 10 15 14 13 18 17 16
1 2 3 4 5 6 7 8 9 3 2 1 6 5 4 9 8 7

15/
79 80 81 76 77 78 73 74 75 81 80 79 78 77 76 75 74 73
70 71 72 67 68 69 64 65 66 72 71 70 69 68 67 66 65 64
61 62 63 58 59 60 55 56 57 63 62 61 60 59 58 57 56 55
52 53 54 49 50 51 46 47 48 54 53 52 51 50 49 48 47 46
43 44 45 40 41 42 37 38 39 45 44 43 42 41 40 39 38 37
34 35 36 31 32 33 28 29 30 36 35 34 33 32 31 30 29 28
25 26 27 22 23 24 19 20 21 27 26 25 24 23 22 21 20 19
16 17 18 13 14 15 10 11 12 18 17 16 15 14 13 12 11 10
7 8 9 4 5 6 1 2 3 9 8 7 6 5 4 3 2 1

16/

```

^* Set #2 of Basic View-Forms(n1=1~81) for the Developed ECO3^4 *^

All of them are different 'view-forms' of the same ECO3^4.

How many different pictures in all can we draw, then?

As you guess you may combine those 2 sets of view-forms above one by one, we can draw them as many as 384 in all, because 24x16=384.

Therefore, we could make our object solutions directly from these 384 pictures.

But do you know which type of magic squares of order 9 has such a small primitive solution set as counts 384? Or do you know what object has 48 'standard solutions'?

I say, it is the smallest set of solutions for any MS99, theoretically speaking.

I remember I once made that kind of objects: 'Complete Euler Squares' of order 9 including multiple little squares 3x3 within.

#2. How to compose 'CES' 99 Including Multiple Little Squares 3x3

Now let's use this new method and compose our object: 'Complete Euler Squares' of order 9 including multiple little squares 3x3 within.

(1) At first we are going to draw all possible view-forms of developed ECO3^4. We use 4-time loops of for(...){...} sentences and produce positional numbers of the base 3.

For the preparation stage we calculate two types of modifications and save our results into the tables beforehand. We read the data and use them afterward by 'indirect addressing'.

** Sample Solutions of Our Object: Multiple Type of 'CE' MS99 **

```

1#/E1      /E2      /E3
1-----80-----42      54-----13-----56      68-----30-----25
|72      31      |20      | 5      75      |43      |46      17      |60
78 50-37--12- 8--61      11 64-63--35-49--24      34 9-23--76-66--38
|29 | 27      |67 |      |79 | 41      | 3 |      |15 | 55      |53 |
44--16- 6--59-73 48      58--33-47--19-18 71      21--74-70--45-32 4
22 | 65      36 |      39 | 7      77 |      62 | 51      10 |
57-----52-----14      26-----69-----28      40----- 2-----81

1#|Rows      |Columns      |Pillars      |the 4-th      \Pd1/Pd2
1 80 42 54 13 56 68 30 25|123 123 123|123 123 123|123 123 123|123 123 123\369/357
78 37 8 11 63 49 34 23 66|123 123 123|123 123 123|123 123 123|123 123 123\423/381
44 6 73 58 47 18 21 70 32|123 123 123|123 123 123|123 123 123|123 123 123\315/369
72 31 20 5 75 43 46 17 60|123 123 123|123 123 123|123 123 123|123 123 123\369/393
29 27 67 79 41 3 15 55 53|123 123 123|123 123 123|123 123 123|123 123 123\261/345
22 65 36 39 7 77 62 51 10|123 123 123|123 123 123|123 123 123|123 123 123\477/369
50 12 61 64 35 24 9 76 38|123 123 123|123 123 123|123 123 123|123 123 123\369/357
16 59 48 33 19 71 74 45 4|123 123 123|123 123 123|123 123 123|123 123 123\423/381
57 52 14 26 69 28 40 2 81|123 123 123|123 123 123|123 123 123|123 123 123\315/369

```

```

      2#/E1          /E2          /E3
1----80-----42    72-----31-----20    50-----12-----61
|54   13   |56    | 5   75   |43    |64   35   |24
78 68-37--30- 8--25  29 46-27--17-67--60  16 9-59--76-48--38
|11 | 63 |49 |    |79 | 41 | 3 |    |33 | 19 |71 |
44--34- 6--23-73 66  22--15-65--55-36 53  57--74-52--45-14 4
58 | 47   18 |    39 | 7   77 |    26 | 69   28 |
21-----70-----32    62-----51-----10    40----- 2-----81

```

```

      2#|Rows      |Columns      |Pillars      |the 4-th      \|Pd1/Pd2
1 80 42 72 31 20 50 12 61|123 123 123|123 123 123|123 123 123|123 123 123\369/357
78 37 8 29 27 67 16 59 48|123 123 123|123 123 123|123 123 123|123 123 123\315/381
44 6 73 22 65 36 57 52 14|123 123 123|123 123 123|123 123 123|123 123 123\423/369
54 13 56 5 75 43 64 35 24|123 123 123|123 123 123|123 123 123|123 123 123\369/393
11 63 49 79 41 3 33 19 71|123 123 123|123 123 123|123 123 123|123 123 123\477/345
58 47 18 39 7 77 26 69 28|123 123 123|123 123 123|123 123 123|123 123 123\261/369
68 30 25 46 17 60 9 76 38|123 123 123|123 123 123|123 123 123|123 123 123\369/357
34 23 66 15 55 53 74 45 4|123 123 123|123 123 123|123 123 123|123 123 123\315/381
21 70 32 62 51 10 40 2 81|123 123 123|123 123 123|123 123 123|123 123 123\423/369

```

```

      3#/E1          /E2          /E3
1----80-----42    53-----15-----55    69-----28-----26
|71   33   |19    | 6   73   |44    |46   17   |60
77 51-39--10- 7--62  12 64-61--35-50--24  34 8-23--78-66--37
|30 | 25 |68 |    |79 | 41 | 3 |    |14 | 57 |52 |
45--16- 4--59-74 48  58--32-47--21-18 70  20--75-72--43-31 5
22 | 65   36 |    38 | 9   76 |    63 | 49   11 |
56-----54-----13    27-----67-----29    40----- 2-----81

```

```

      3#|Rows      |Columns      |Pillars      |the 4-th      \|Pd1/Pd2
1 80 42 53 15 55 69 28 26|123 123 123|123 123 123|123 123 123|123 123 123\369/363
77 39 7 12 61 50 34 23 66|123 123 123|123 123 123|123 123 123|123 123 123\423/375
45 4 74 58 47 18 20 72 31|123 123 123|123 123 123|123 123 123|123 123 123\315/378
71 33 19 6 73 44 46 17 60|123 123 123|123 123 123|123 123 123|123 123 123\369/381
30 25 68 79 41 3 14 57 52|123 123 123|123 123 123|123 123 123|123 123 123\261/357
22 65 36 38 9 76 63 49 11|123 123 123|123 123 123|123 123 123|123 123 123\477/360
51 10 62 64 35 24 8 78 37|123 123 123|123 123 123|123 123 123|123 123 123\369/363
16 59 48 32 21 70 75 43 5|123 123 123|123 123 123|123 123 123|123 123 123\423/375
56 54 13 27 67 29 40 2 81|123 123 123|123 123 123|123 123 123|123 123 123\315/369

```

(2) Next we change each view-form directly into our object by DAM Transformation. We have to find any fine 'model' solutions and select the best one for our purpose.

Take your kind look at the next list of sample solutions above with precise check-sum monitors.

We want to make something like those samples above as many as 48.

The next diagram below illustrates the selected 'model' solution and our concept of 'DAM Transformation'.

**** Concept of 'DAM Transformation' ****

```

[Proto]          1/P          [Mode1]          1#
1 2 3 4 5 6 7 8 9    1 80 42 54 13 56 68 30 25
10 11 12 13 14 15 16 17 18    78 37 8 11 63 49 34 23 66
19 20 21 22 23 24 25 26 27    44 6 73 58 47 18 21 70 32
28 29 30 31 32 33 34 35 36    72 31 20 5 75 43 46 17 60
37 38 39 40 41 42 43 44 45    29 27 67 79 41 3 15 55 53
46 47 48 49 50 51 52 53 54    22 65 36 39 7 77 62 51 10
55 56 57 58 59 60 61 62 63    50 12 61 64 35 24 9 76 38
64 65 66 67 68 69 70 71 72    16 59 48 33 19 71 74 45 4
73 74 75 76 77 78 79 80 81    57 52 14 26 69 28 40 2 81

```

Let's actually compose the object according to our design by this method.

Here you see a sample program of mine only with a few essential components.

```

/** New Method of Composing Special Magic Squares of Order 9: *
/** Complete Euler Type of Super Multiple & Self-Complementary MS99 *
/** Using All View Forms of Extra-Cubic Object of 3^4 *
/** File: 'SNewMS9S.c' Dictated by Kanji Setsuda *
/** on Apr.13, 2005, May 25, 2014 and Recompiled on *
/** Mar. 9, 2015 with MacOSX 10.10.2 and Xcode 6.1.1 *
//
#include <stdio.h>
//
/** Global Variables *
short cnt, cnt1;
short vc, pc, tcnt;
short nm[82], onmb[49], tn[82];
short tv[17][5];
short td[25][5];
short tnm[385][86];
short cs[127];
//
/** Sub-Procedures *
void mkfv(void), prmt(void);
void d34b(short x, short y);
void stnd48(void);
void prsol334();
void mksol34(void);
void solsort(short x), excsol(short x);
void pr1cans(void), chksms(void);
//
/** Main Program *
int main(){
short n;
printf("\n");
printf("*** New Method of Composing Special Magic Squares of Order 9:\n");
printf(" Complete Euler Type of Super Multiple & Self-Complementary MS99;\n");
printf(" Using all View Forms of 4-Dimensional Extra-Cubic Object of Order 3 **\n");
printf("\n");
for(n=0;n<82;n++){nm[n]=n;}
vc=0;
mkfv();
pc=0;
prmt();          /** Permutations *
tcnt=vc*pc;
cnt=0; cnt1=0;
stnd48();        /** Compose Standard 48 Solutions of Special MS99 made from EC03^4 *
solsort(cnt);    /** Sort the Composition Data *
printf("*** List of Standard Solutions with Precise Check-Sums **\n");
pr1cans();
printf("\n");
printf(" [Counts = %d/%d/%d] OK!\n",cnt1,cnt,tcnt);
printf("\n");
printf("*** Recompiled and Listed by Kanji Setsuda on\n");
printf(" Mar. 9, 2015 with Apple OSX 10.10.2 and Xcode 6.1.1 **\n");
printf("\n");
return 0;
}
//
/** Sub-Procedures for EC03^4 *
void mkfv(void){
short d0,d1,d2,d3;
for(d0=0;d0<2;d0++){
for(d1=0;d1<2;d1++){
for(d2=0;d2<2;d2++){
for(d3=0;d3<2;d3++){

```

```

        tv[vc][0]=d0; tv[vc][1]=d1; tv[vc][2]=d2; tv[vc][3]=d3;
        vc++;
    }
}
}
}
}
//
/* Permutations */
void prmt(void){
    short n;
    short d0,d1,d2,d3;
    short uflg[4];
    for(n=0;n<4;n++){uflg[n]=0;}
    for(d0=0;d0<4;d0++){uflg[d0]=1;
        for(d1=0;d1<4;d1++){
            if(uflg[d1]==0){uflg[d1]=1;
                for(d2=0;d2<4;d2++){
                    if(uflg[d2]==0){uflg[d2]=1;
                        for(d3=0;d3<4;d3++){
                            if(uflg[d3]==0){uflg[d3]=1;
                                td[pc][0]=d0; td[pc][1]=d1; td[pc][2]=d2; td[pc][3]=d3;
                                pc++;
                                uflg[d3]=0;
                            }
                        }
                    }
                }
            }
        }
        uflg[d2]=0;
    }
}
    uflg[d1]=0;
}
}
    uflg[d0]=0;
}
}
//
/* Combinations */
void d34b(short x, short y){
    short d0,d1,d2,d3;
    short t0,t1,t2,t3;
    short dc;
    short s[4], cd[2][3];
    cd[0][0]=0; cd[0][1]=1; cd[0][2]=2;
    cd[1][0]=2; cd[1][1]=1; cd[1][2]=0;
    dc=0;
    for(d0=0;d0<3;d0++){
        for(d1=0;d1<3;d1++){
            for(d2=0;d2<3;d2++){
                for(d3=0;d3<3;d3++){dc++;
                    s[0]=cd[tv[x][0]][d0]; s[1]=cd[tv[x][1]][d1];
                    s[2]=cd[tv[x][2]][d2]; s[3]=cd[tv[x][3]][d3];
                    t0=td[y][0]; t1=td[y][1]; t2=td[y][2]; t3=td[y][3];
                    tnm[x*pc+y][dc]=(s[t0]*3+s[t1])*3+s[t2])*3+s[t3]+1;
                }
            }
        }
    }
}
//
/* Compose Standard 48 Solutions of Special MS99 made from EC03^4 */
void stnd48(void){
    short m,n,p;
    for(m=0;m<vc;m++){
        for(n=0;n<pc;n++){d34b(m,n);
            for(p=1;p<82;p++){nm[p]=tnm[m*pc+n][p];}
        }
    }
}

```

```

mksol34();
if((nm[1]<nm[81])&&(nm[1]<nm[9])&&(nm[1]<nm[73])&&(nm[2]>nm[10])){
    for(p=1;p<82;p++){tnm[cnt][p]=nm[p];}
    tnm[cnt][0]=cnt+1;
    cnt++; if(nm[1]==1){cnt1++;}
}
}
}
//
/** Make each Baisc Diagram into each Solution of Special MS9^2 *
void mksol34(void){    /** "Do-it-After-the-Model" Transformation *
short n;
short d[82];
for(n=1;n<82;n++){d[n]=nm[n];}
nm[1]=d[1]; nm[2]=d[80]; nm[3]=d[42]; nm[4]=d[54]; nm[5]=d[13];
nm[6]=d[56]; nm[7]=d[68]; nm[8]=d[30]; nm[9]=d[25];
nm[10]=d[78]; nm[11]=d[37]; nm[12]=d[8]; nm[13]=d[11]; nm[14]=d[63];
nm[15]=d[49]; nm[16]=d[34]; nm[17]=d[23]; nm[18]=d[66];
nm[19]=d[44]; nm[20]=d[6]; nm[21]=d[73]; nm[22]=d[58]; nm[23]=d[47];
nm[24]=d[18]; nm[25]=d[21]; nm[26]=d[70]; nm[27]=d[32];
nm[28]=d[72]; nm[29]=d[31]; nm[30]=d[20]; nm[31]=d[5]; nm[32]=d[75];
nm[33]=d[43]; nm[34]=d[46]; nm[35]=d[17]; nm[36]=d[60];
nm[37]=d[29]; nm[38]=d[27]; nm[39]=d[67]; nm[40]=d[79]; nm[41]=d[41];
nm[42]=d[3]; nm[43]=d[15]; nm[44]=d[55]; nm[45]=d[53];
nm[46]=d[22]; nm[47]=d[65]; nm[48]=d[36]; nm[49]=d[39]; nm[50]=d[7];
nm[51]=d[77]; nm[52]=d[62]; nm[53]=d[51]; nm[54]=d[10];
nm[55]=d[50]; nm[56]=d[12]; nm[57]=d[61]; nm[58]=d[64]; nm[59]=d[35];
nm[60]=d[24]; nm[61]=d[9]; nm[62]=d[76]; nm[63]=d[38];
nm[64]=d[16]; nm[65]=d[59]; nm[66]=d[48]; nm[67]=d[33]; nm[68]=d[19];
nm[69]=d[71]; nm[70]=d[74]; nm[71]=d[45]; nm[72]=d[4];
nm[73]=d[57]; nm[74]=d[52]; nm[75]=d[14]; nm[76]=d[26]; nm[77]=d[69];
nm[78]=d[28]; nm[79]=d[40]; nm[80]=d[2]; nm[81]=d[81];
}
//
/** Sort the Solutions *
void solsort(short x){
short mx,n,f;
short d1,d2,d3,d4,d5,d6,d7,d8,d9,d10;
mx=x-1;
do{f=0;
for(n=0;n<mx;n++){
d1=tnm[n][1]; d2=tnm[n+1][1];
d3=tnm[n][2]*82+tnm[n][3]; d4=tnm[n+1][2]*82+tnm[n+1][3];
d5=tnm[n][10]*82-tnm[n][19]; d6=tnm[n+1][10]*82-tnm[n+1][19];
d7=tnm[n][11]*82+tnm[n][21]; d8=tnm[n+1][11]*82+tnm[n+1][21];
d9=tnm[n][4]*82+tnm[n][28]; d10=tnm[n+1][4]*82+tnm[n+1][28];
if(d1>d2){excsol(n); f=1;}
else if((d1==d2)&&(d3<d4)){excsol(n); f=1;}
else if((d1==d2)&&(d3==d4)&&(d5<d6)){excsol(n); f=1;}
else if((d1==d2)&&(d3==d4)&&(d5==d6)&&(d7<d8)){excsol(n); f=1;}
else if((d1==d2)&&(d3==d4)&&(d5==d6)&&(d7==d8)&&(d9>d10)){excsol(n); f=1;}
}
mx--;
}while(f>0);
}
//
void excsol(short x){
short n,d;
for(n=0;n<86;n++){d=tnm[x][n]; tnm[x][n]=tnm[x+1][n]; tnm[x+1][n]=d;}
}
//
/** Print the Answer with Precise Check-Sums *
void pr1cans(void){
short m,n,l,l9,l3;

```



```

short lu1,lu2,lu3,lu4;
for(m=0;m<cnt;m++){
  for(n=0;n<82;n++){tn[n]=tnm[m][n];}
  lu1=tnm[m][82]; lu2=tnm[m][83]; lu3=tnm[m][84]; lu4=tnm[m][85];
  chksms();
  printf("%27d#",m+1);
  printf(" |Rows      |Columns    |Pillars    |the 4-th   \\Pd1/Pd2|\n");
  for(l=0;l<9;l++){l9=l*9; l3=l*3;
    printf(" ");
    for(n=1;n<10;n++){printf("%3d",tn[l9+n]);}
    printf(" |%3d%4d%4d|%3d%4d%4d|%3d%4d%4d|%3d%4d%4d\\%3d%3d|",
      cs[l+1],cs[l+10],cs[l+19],cs[l+82],cs[l+91],cs[l+100],
      cs[l+55],cs[l+64],cs[l+73],cs[l+28],cs[l+37],cs[l+46],
      cs[l+109],cs[l+118]);
    printf("\n");
  }
}
}
//
/** Check Sum Monitor *
void chksms(){
  /** Conditions for 4-Dimensional Extra-Cubes of Order 3 **
  cs[1]=tn[1]+tn[2]+tn[3];      cs[28]=tn[1]+tn[4]+tn[7];      cs[55]=tn[1]+tn[10]+tn[19];
  cs[2]=tn[4]+tn[5]+tn[6];      cs[29]=tn[2]+tn[5]+tn[8];      cs[56]=tn[2]+tn[11]+tn[20];
  cs[3]=tn[7]+tn[8]+tn[9];      cs[30]=tn[3]+tn[6]+tn[9];      cs[57]=tn[3]+tn[12]+tn[21];
  cs[4]=tn[10]+tn[11]+tn[12];   cs[31]=tn[10]+tn[13]+tn[16];   cs[58]=tn[4]+tn[13]+tn[22];
  cs[5]=tn[13]+tn[14]+tn[15];   cs[32]=tn[11]+tn[14]+tn[17];   cs[59]=tn[5]+tn[14]+tn[23];
  cs[6]=tn[16]+tn[17]+tn[18];   cs[33]=tn[12]+tn[15]+tn[18];   cs[60]=tn[6]+tn[15]+tn[24];
  cs[7]=tn[19]+tn[20]+tn[21];   cs[34]=tn[19]+tn[22]+tn[25];   cs[61]=tn[7]+tn[16]+tn[25];
  cs[8]=tn[22]+tn[23]+tn[24];   cs[35]=tn[20]+tn[23]+tn[26];   cs[62]=tn[8]+tn[17]+tn[26];
  cs[9]=tn[25]+tn[26]+tn[27];   cs[36]=tn[21]+tn[24]+tn[27];   cs[63]=tn[9]+tn[18]+tn[27];
  cs[10]=tn[28]+tn[29]+tn[30];  cs[37]=tn[28]+tn[31]+tn[34];   cs[64]=tn[28]+tn[37]+tn[46];
  cs[11]=tn[31]+tn[32]+tn[33];  cs[38]=tn[29]+tn[32]+tn[35];   cs[65]=tn[29]+tn[38]+tn[47];
  cs[12]=tn[34]+tn[35]+tn[36];  cs[39]=tn[30]+tn[33]+tn[36];   cs[66]=tn[30]+tn[39]+tn[48];
  cs[13]=tn[37]+tn[38]+tn[39];  cs[40]=tn[37]+tn[40]+tn[43];   cs[67]=tn[31]+tn[40]+tn[49];
  cs[14]=tn[40]+tn[41]+tn[42];  cs[41]=tn[38]+tn[41]+tn[44];   cs[68]=tn[32]+tn[41]+tn[50];
  cs[15]=tn[43]+tn[44]+tn[45];  cs[42]=tn[39]+tn[42]+tn[45];   cs[69]=tn[33]+tn[42]+tn[51];
  cs[16]=tn[46]+tn[47]+tn[48];  cs[43]=tn[46]+tn[49]+tn[52];   cs[70]=tn[34]+tn[43]+tn[52];
  cs[17]=tn[49]+tn[50]+tn[51];  cs[44]=tn[47]+tn[50]+tn[53];   cs[71]=tn[35]+tn[44]+tn[53];
  cs[18]=tn[52]+tn[53]+tn[54];  cs[45]=tn[48]+tn[51]+tn[54];   cs[72]=tn[36]+tn[45]+tn[54];
  cs[19]=tn[55]+tn[56]+tn[57];  cs[46]=tn[55]+tn[58]+tn[61];   cs[73]=tn[55]+tn[64]+tn[73];
  cs[20]=tn[58]+tn[59]+tn[60];  cs[47]=tn[56]+tn[59]+tn[62];   cs[74]=tn[56]+tn[65]+tn[74];
  cs[21]=tn[61]+tn[62]+tn[63];  cs[48]=tn[57]+tn[60]+tn[63];   cs[75]=tn[57]+tn[66]+tn[75];
  cs[22]=tn[64]+tn[65]+tn[66];  cs[49]=tn[64]+tn[67]+tn[70];   cs[76]=tn[58]+tn[67]+tn[76];
  cs[23]=tn[67]+tn[68]+tn[69];  cs[50]=tn[65]+tn[68]+tn[71];   cs[77]=tn[59]+tn[68]+tn[77];
  cs[24]=tn[70]+tn[71]+tn[72];  cs[51]=tn[66]+tn[69]+tn[72];   cs[78]=tn[60]+tn[69]+tn[78];
  cs[25]=tn[73]+tn[74]+tn[75];  cs[52]=tn[73]+tn[76]+tn[79];   cs[79]=tn[61]+tn[70]+tn[79];
  cs[26]=tn[76]+tn[77]+tn[78];  cs[53]=tn[74]+tn[77]+tn[80];   cs[80]=tn[62]+tn[71]+tn[80];
  cs[27]=tn[79]+tn[80]+tn[81];  cs[54]=tn[75]+tn[78]+tn[81];   cs[81]=tn[63]+tn[72]+tn[81];
  //
  cs[82]=tn[1]+tn[28]+tn[55];   cs[83]=tn[2]+tn[29]+tn[56];   cs[84]=tn[3]+tn[30]+tn[57];
  cs[85]=tn[4]+tn[31]+tn[58];   cs[86]=tn[5]+tn[32]+tn[59];   cs[87]=tn[6]+tn[33]+tn[60];
  cs[88]=tn[7]+tn[34]+tn[61];   cs[89]=tn[8]+tn[35]+tn[62];   cs[90]=tn[9]+tn[36]+tn[63];
  cs[91]=tn[10]+tn[37]+tn[64];  cs[92]=tn[11]+tn[38]+tn[65];  cs[93]=tn[12]+tn[39]+tn[66];
  cs[94]=tn[13]+tn[40]+tn[67];  cs[95]=tn[14]+tn[41]+tn[68];  cs[96]=tn[15]+tn[42]+tn[69];
  cs[97]=tn[16]+tn[43]+tn[70];  cs[98]=tn[17]+tn[44]+tn[71];  cs[99]=tn[18]+tn[45]+tn[72];
  cs[100]=tn[19]+tn[46]+tn[73]; cs[101]=tn[20]+tn[47]+tn[74];  cs[102]=tn[21]+tn[48]+tn[75];
  cs[103]=tn[22]+tn[49]+tn[76]; cs[104]=tn[23]+tn[50]+tn[77];  cs[105]=tn[24]+tn[51]+tn[78];
  cs[106]=tn[25]+tn[52]+tn[79]; cs[107]=tn[26]+tn[53]+tn[80];  cs[108]=tn[27]+tn[54]+tn[81];
  //
  /** Pandiagonal Conditions: **
  cs[109]=tn[ 1]+tn[11]+tn[21]+tn[31]+tn[41]+tn[51]+tn[61]+tn[71]+tn[81];
  cs[110]=tn[ 2]+tn[12]+tn[22]+tn[32]+tn[42]+tn[52]+tn[62]+tn[72]+tn[82];
  cs[111]=tn[ 3]+tn[13]+tn[23]+tn[33]+tn[43]+tn[53]+tn[63]+tn[73]+tn[83];
  cs[112]=tn[ 4]+tn[14]+tn[24]+tn[34]+tn[44]+tn[54]+tn[64]+tn[74]+tn[84];

```

```

cs[113]=tn[ 5]+tn[15]+tn[25]+tn[35]+tn[45]+tn[46]+tn[56]+tn[66]+tn[76];
cs[114]=tn[ 6]+tn[16]+tn[26]+tn[36]+tn[37]+tn[47]+tn[57]+tn[67]+tn[77];
cs[115]=tn[ 7]+tn[17]+tn[27]+tn[28]+tn[38]+tn[48]+tn[58]+tn[68]+tn[78];
cs[116]=tn[ 8]+tn[18]+tn[19]+tn[29]+tn[39]+tn[49]+tn[59]+tn[69]+tn[79];
cs[117]=tn[ 9]+tn[10]+tn[20]+tn[30]+tn[40]+tn[50]+tn[60]+tn[70]+tn[80];
//
cs[118]=tn[ 1]+tn[18]+tn[26]+tn[34]+tn[42]+tn[50]+tn[58]+tn[66]+tn[74];
cs[119]=tn[ 2]+tn[10]+tn[27]+tn[35]+tn[43]+tn[51]+tn[59]+tn[67]+tn[75];
cs[120]=tn[ 3]+tn[11]+tn[19]+tn[36]+tn[44]+tn[52]+tn[60]+tn[68]+tn[76];
cs[121]=tn[ 4]+tn[12]+tn[20]+tn[28]+tn[45]+tn[53]+tn[61]+tn[69]+tn[77];
cs[122]=tn[ 5]+tn[13]+tn[21]+tn[29]+tn[37]+tn[54]+tn[62]+tn[70]+tn[78];
cs[123]=tn[ 6]+tn[14]+tn[22]+tn[30]+tn[38]+tn[46]+tn[63]+tn[71]+tn[79];
cs[124]=tn[ 7]+tn[15]+tn[23]+tn[31]+tn[39]+tn[47]+tn[55]+tn[72]+tn[80];
cs[125]=tn[ 8]+tn[16]+tn[24]+tn[32]+tn[40]+tn[48]+tn[56]+tn[64]+tn[81];
cs[126]=tn[ 9]+tn[17]+tn[25]+tn[33]+tn[41]+tn[49]+tn[57]+tn[65]+tn[73];
}

```

This program is really short, say, shorter than any other old programs. It runs very fast, faster than any other programs I have ever written before for the same object.

You could find no old calculations already familiar to you, even no definitions with those many simultaneous equations at the first step, either. Nor you could find any kind of check procedures here.

Though it may look peculiar, it will surely give you the most reasonable result.

Let me list out the result below, all the 48 'standard' solutions of 'Complete Euler Squares' 9x9 including multiple little squares 3x3 within in the different three styles of presentation: with Prototypes, /D3i and Check-sum Monitors.

**** Complete Euler Type of Super-Multiple & Self-Complementary MS99:
Made from all View Forms of 4-D Extra-Cubic Object of Order 3 ****

**** List of Standard Solutions with /ProtoT and #Sol ****

									1/P										1#
1	2	3	4	5	6	7	8	9	1	80	42	54	13	56	68	30	25		
10	11	12	13	14	15	16	17	18	78	37	8	11	63	49	34	23	66		
19	20	21	22	23	24	25	26	27	44	6	73	58	47	18	21	70	32		
28	29	30	31	32	33	34	35	36	72	31	20	5	75	43	46	17	60		
37	38	39	40	41	42	43	44	45	29	27	67	79	41	3	15	55	53		
46	47	48	49	50	51	52	53	54	22	65	36	39	7	77	62	51	10		
55	56	57	58	59	60	61	62	63	50	12	61	64	35	24	9	76	38		
64	65	66	67	68	69	70	71	72	16	59	48	33	19	71	74	45	4		
73	74	75	76	77	78	79	80	81	57	52	14	26	69	28	40	2	81		
									7/P										2#
1	2	3	4	5	6	7	8	9	1	80	42	72	31	20	50	12	61		
28	29	30	31	32	33	34	35	36	78	37	8	29	27	67	16	59	48		
55	56	57	58	59	60	61	62	63	44	6	73	22	65	36	57	52	14		
10	11	12	13	14	15	16	17	18	54	13	56	5	75	43	64	35	24		
37	38	39	40	41	42	43	44	45	11	63	49	79	41	3	33	19	71		
64	65	66	67	68	69	70	71	72	58	47	18	39	7	77	26	69	28		
19	20	21	22	23	24	25	26	27	68	30	25	46	17	60	9	76	38		
46	47	48	49	50	51	52	53	54	34	23	66	15	55	53	74	45	4		
73	74	75	76	77	78	79	80	81	21	70	32	62	51	10	40	2	81		
									3/P										3#
1	2	3	10	11	12	19	20	21	1	80	42	54	13	56	68	30	25		
4	5	6	13	14	15	22	23	24	72	31	20	5	75	43	46	17	60		
7	8	9	16	17	18	25	26	27	50	12	61	64	35	24	9	76	38		
28	29	30	37	38	39	46	47	48	78	37	8	11	63	49	34	23	66		
31	32	33	40	41	42	49	50	51	29	27	67	79	41	3	15	55	53		
34	35	36	43	44	45	52	53	54	16	59	48	33	19	71	74	45	4		
55	56	57	64	65	66	73	74	75	44	6	73	58	47	18	21	70	32		
58	59	60	67	68	69	76	77	78	22	65	36	39	7	77	62	51	10		
61	62	63	70	71	72	79	80	81	57	52	14	26	69	28	40	2	81		

9/P 4#

1	2	3	10	11	12	19	20	21	1	80	42	78	37	8	44	6	73
28	29	30	37	38	39	46	47	48	72	31	20	29	27	67	22	65	36
55	56	57	64	65	66	73	74	75	50	12	61	16	59	48	57	52	14
4	5	6	13	14	15	22	23	24	54	13	56	11	63	49	58	47	18
31	32	33	40	41	42	49	50	51	5	75	43	79	41	3	39	7	77
58	59	60	67	68	69	76	77	78	64	35	24	33	19	71	26	69	28
7	8	9	16	17	18	25	26	27	68	30	25	34	23	66	21	70	32
34	35	36	43	44	45	52	53	54	46	17	60	15	55	53	62	51	10
61	62	63	70	71	72	79	80	81	9	76	38	74	45	4	40	2	81

13/P 5#

1	2	3	28	29	30	55	56	57	1	80	42	72	31	20	50	12	61
4	5	6	31	32	33	58	59	60	54	13	56	5	75	43	64	35	24
7	8	9	34	35	36	61	62	63	68	30	25	46	17	60	9	76	38
10	11	12	37	38	39	64	65	66	78	37	8	29	27	67	16	59	48
13	14	15	40	41	42	67	68	69	11	63	49	79	41	3	33	19	71
16	17	18	43	44	45	70	71	72	34	23	66	15	55	53	74	45	4
19	20	21	46	47	48	73	74	75	44	6	73	22	65	36	57	52	14
22	23	24	49	50	51	76	77	78	58	47	18	39	7	77	26	69	28
25	26	27	52	53	54	79	80	81	21	70	32	62	51	10	40	2	81

15/P 6#

1	2	3	28	29	30	55	56	57	1	80	42	78	37	8	44	6	73
10	11	12	37	38	39	64	65	66	54	13	56	11	63	49	58	47	18
19	20	21	46	47	48	73	74	75	68	30	25	34	23	66	21	70	32
4	5	6	31	32	33	58	59	60	72	31	20	29	27	67	22	65	36
13	14	15	40	41	42	67	68	69	5	75	43	79	41	3	39	7	77
22	23	24	49	50	51	76	77	78	46	17	60	15	55	53	62	51	10
7	8	9	34	35	36	61	62	63	50	12	61	16	59	48	57	52	14
16	17	18	43	44	45	70	71	72	64	35	24	33	19	71	26	69	28
25	26	27	52	53	54	79	80	81	9	76	38	74	45	4	40	2	81

4/P 7#

1	4	7	10	13	16	19	22	25	1	78	44	54	11	58	68	34	21
2	5	8	11	14	17	20	23	26	72	29	22	5	79	39	46	15	62
3	6	9	12	15	18	21	24	27	50	16	57	64	33	26	9	74	40
28	31	34	37	40	43	46	49	52	80	37	6	13	63	47	30	23	70
29	32	35	38	41	44	47	50	53	31	27	65	75	41	7	17	55	51
30	33	36	39	42	45	48	51	54	12	59	52	35	19	69	76	45	2
55	58	61	64	67	70	73	76	79	42	8	73	56	49	18	25	66	32
56	59	62	65	68	71	74	77	80	20	67	36	43	3	77	60	53	10
57	60	63	66	69	72	75	78	81	61	48	14	24	71	28	38	4	81

10/P 8#

1	4	7	10	13	16	19	22	25	1	78	44	80	37	6	42	8	73
28	31	34	37	40	43	46	49	52	72	29	22	31	27	65	20	67	36
55	58	61	64	67	70	73	76	79	50	16	57	12	59	52	61	48	14
2	5	8	11	14	17	20	23	26	54	11	58	13	63	47	56	49	18
29	32	35	38	41	44	47	50	53	5	79	39	75	41	7	43	3	77
56	59	62	65	68	71	74	77	80	64	33	26	35	19	69	24	71	28
3	6	9	12	15	18	21	24	27	68	34	21	30	23	70	25	66	32
30	33	36	39	42	45	48	51	54	46	15	62	17	55	51	60	53	10
57	60	63	66	69	72	75	78	81	9	74	40	76	45	2	38	4	81

14/P 9#

1	4	7	28	31	34	55	58	61	1	78	44	72	29	22	50	16	57
2	5	8	29	32	35	56	59	62	54	11	58	5	79	39	64	33	26
3	6	9	30	33	36	57	60	63	68	34	21	46	15	62	9	74	40
10	13	16	37	40	43	64	67	70	80	37	6	31	27	65	12	59	52
11	14	17	38	41	44	65	68	71	13	63	47	75	41	7	35	19	69
12	15	18	39	42	45	66	69	72	30	23	70	17	55	51	76	45	2
19	22	25	46	49	52	73	76	79	42	8	73	20	67	36	61	48	14
20	23	26	47	50	53	74	77	80	56	49	18	43	3	77	24	71	28
21	24	27	48	51	54	75	78	81	25	66	32	60	53	10	38	4	81

16/P 10#

1	4	7	28	31	34	55	58	61	1	78	44	80	37	6	42	8	73
10	13	16	37	40	43	64	67	70	54	11	58	13	63	47	56	49	18

```

19 22 25 46 49 52 73 76 79   68 34 21 30 23 70 25 66 32
 2  5  8 29 32 35 56 59 62   72 29 22 31 27 65 20 67 36
11 14 17 38 41 44 65 68 71   5 79 39 75 41  7 43  3 77
20 23 26 47 50 53 74 77 80   46 15 62 17 55 51 60 53 10
 3  6  9 30 33 36 57 60 63   50 16 57 12 59 52 61 48 14
12 15 18 39 42 45 66 69 72   64 33 26 35 19 69 24 71 28
21 24 27 48 51 54 75 78 81   9 74 40 76 45  2 38  4 81

```

```

                                17/P                                11#
1 10 19 28 37 46 55 64 73   1 72 50 78 29 16 44 22 57
2 11 20 29 38 47 56 65 74   54  5 64 11 79 33 58 39 26
3 12 21 30 39 48 57 66 75   68 46  9 34 15 74 21 62 40
4 13 22 31 40 49 58 67 76   80 31 12 37 27 59  6 65 52
5 14 23 32 41 50 59 68 77   13 75 35 63 41 19 47  7 69
6 15 24 33 42 51 60 69 78   30 17 76 23 55 45 70 51  2
7 16 25 34 43 52 61 70 79   42 20 61  8 67 48 73 36 14
8 17 26 35 44 53 62 71 80   56 43 24 49  3 71 18 77 28
9 18 27 36 45 54 63 72 81   25 60 38 66 53  4 32 10 81

```

```

                                18/P                                12#
1 10 19 28 37 46 55 64 73   1 72 50 80 31 12 42 20 61
4 13 22 31 40 49 58 67 76   54  5 64 13 75 35 56 43 24
7 16 25 34 43 52 61 70 79   68 46  9 30 17 76 25 60 38
2 11 20 29 38 47 56 65 74   78 29 16 37 27 59  8 67 48
5 14 23 32 41 50 59 68 77   11 79 33 63 41 19 49  3 71
8 17 26 35 44 53 62 71 80   34 15 74 23 55 45 66 53  4
3 12 21 30 39 48 57 66 75   44 22 57  6 65 52 73 36 14
6 15 24 33 42 51 60 69 78   58 39 26 47  7 69 18 77 28
9 18 27 36 45 54 63 72 81   21 62 40 70 51  2 32 10 81

```

[Counts = 12/48/384] OK!

The next another list shows the same result with Decompositions by the Base 3.

** List of Standard Solutions: Sol_Number#|D3i **

```

                                1#|D3i
1 80 42 54 13 56 68 30 25|021102210|021210102|021210102|012201120|
78 37  8 11 63 49 34 23 66|210021102|210102021|102021210|201120012|
44  6 73 58 47 18 21 70 32|102210021|102021210|210102021|120012201|
72 31 20  5 75 43 46 17 60|210021102|102021210|210102021|201120012|
29 27 67 79 41  3 15 55 53|102210021|021210102|021210102|120012201|
22 65 36 39  7 77 62 51 10|021102210|210102021|102021210|012201120|
50 12 61 64 35 24  9 76 38|102210021|210102021|102021210|120012201|
16 59 48 33 19 71 74 45  4|021102210|102021210|210102021|012201120|
57 52 14 26 69 28 40  2 81|210021102|021210102|021210102|201120012|

```

```

                                2#|D3i
1 80 42 72 31 20 50 12 61|021210102|021102210|021210102|012201120|
78 37  8 29 27 67 16 59 48|210102021|210021102|102021210|201120012|
44  6 73 22 65 36 57 52 14|102021210|102210021|210102021|120012201|
54 13 56  5 75 43 64 35 24|102021210|210021102|210102021|201120012|
11 63 49 79 41  3 33 19 71|021210102|102210021|021210102|120012201|
58 47 18 39  7 77 26 69 28|210102021|021102210|102021210|012201120|
68 30 25 46 17 60  9 76 38|210102021|102210021|102021210|120012201|
34 23 66 15 55 53 74 45  4|102021210|021102210|210102021|012201120|
21 70 32 62 51 10 40  2 81|021210102|210021102|021210102|201120012|

```

```

                                3#|D3i
1 80 42 54 13 56 68 30 25|021102210|021210102|021210102|012201120|
72 31 20  5 75 43 46 17 60|210021102|102021210|210102021|201120012|
50 12 61 64 35 24  9 76 38|102210021|210102021|102021210|120012201|
78 37  8 11 63 49 34 23 66|210021102|210102021|102021210|201120012|
29 27 67 79 41  3 15 55 53|102210021|021210102|021210102|120012201|
16 59 48 33 19 71 74 45  4|021102210|102021210|210102021|012201120|
44  6 73 58 47 18 21 70 32|102210021|102021210|210102021|120012201|
22 65 36 39  7 77 62 51 10|021102210|210102021|102021210|012201120|
57 52 14 26 69 28 40  2 81|210021102|021210102|021210102|201120012|

```

										4# D3i			
1	80	42	78	37	8	44	6	73	021210102	021210102	021102210	012201120	
72	31	20	29	27	67	22	65	36	210102021	102021210	210021102	201120012	
50	12	61	16	59	48	57	52	14	102021210	210102021	102210021	120012201	
54	13	56	11	63	49	58	47	18	102021210	210102021	210021102	201120012	
5	75	43	79	41	3	39	7	77	021210102	021210102	102210021	120012201	
64	35	24	33	19	71	26	69	28	210102021	102021210	021102210	012201120	
68	30	25	34	23	66	21	70	32	210102021	102021210	102210021	120012201	
46	17	60	15	55	53	62	51	10	102021210	210102021	021102210	012201120	
9	76	38	74	45	4	40	2	81	021210102	021210102	210021102	201120012	

										5# D3i			
1	80	42	72	31	20	50	12	61	021210102	021102210	021210102	012201120	
54	13	56	5	75	43	64	35	24	102021210	210021102	210102021	201120012	
68	30	25	46	17	60	9	76	38	210102021	102210021	102021210	120012201	
78	37	8	29	27	67	16	59	48	210102021	210021102	102021210	201120012	
11	63	49	79	41	3	33	19	71	021210102	102210021	021210102	120012201	
34	23	66	15	55	53	74	45	4	102021210	021102210	210102021	012201120	
44	6	73	22	65	36	57	52	14	102021210	102210021	210102021	120012201	
58	47	18	39	7	77	26	69	28	210102021	021102210	102021210	012201120	
21	70	32	62	51	10	40	2	81	021210102	210021102	021210102	201120012	

										6# D3i			
1	80	42	78	37	8	44	6	73	021210102	021210102	021102210	012201120	
54	13	56	11	63	49	58	47	18	102021210	210102021	210021102	201120012	
68	30	25	34	23	66	21	70	32	210102021	102021210	102210021	120012201	
72	31	20	29	27	67	22	65	36	210102021	102021210	210021102	201120012	
5	75	43	79	41	3	39	7	77	021210102	021210102	102210021	120012201	
46	17	60	15	55	53	62	51	10	102021210	210102021	021102210	012201120	
50	12	61	16	59	48	57	52	14	102021210	210102021	102210021	120012201	
64	35	24	33	19	71	26	69	28	210102021	102021210	021102210	012201120	
9	76	38	74	45	4	40	2	81	021210102	021210102	210021102	201120012	

										7# D3i			
1	78	44	54	11	58	68	34	21	021102210	021210102	012201120	021210102	
72	29	22	5	79	39	46	15	62	210021102	102021210	201120012	210102021	
50	16	57	64	33	26	9	74	40	102210021	210102021	120012201	102021210	
80	37	6	13	63	47	30	23	70	210021102	210102021	201120012	102021210	
31	27	65	75	41	7	17	55	51	102210021	021210102	120012201	021210102	
12	59	52	35	19	69	76	45	2	021102210	102021210	012201120	210102021	
42	8	73	56	49	18	25	66	32	102210021	102021210	120012201	210102021	
20	67	36	43	3	77	60	53	10	021102210	210102021	012201120	102021210	
61	48	14	24	71	28	38	4	81	210021102	021210102	201120012	021210102	

										8# D3i			
1	78	44	80	37	6	42	8	73	021210102	021210102	012201120	021102210	
72	29	22	31	27	65	20	67	36	210102021	102021210	201120012	210021102	
50	16	57	12	59	52	61	48	14	102021210	210102021	120012201	102210021	
54	11	58	13	63	47	56	49	18	102021210	210102021	201120012	210021102	
5	79	39	75	41	7	43	3	77	021210102	021210102	120012201	102210021	
64	33	26	35	19	69	24	71	28	210102021	102021210	012201120	021102210	
68	34	21	30	23	70	25	66	32	210102021	102021210	120012201	102210021	
46	15	62	17	55	51	60	53	10	102021210	210102021	012201120	021102210	
9	74	40	76	45	2	38	4	81	021210102	021210102	201120012	210021102	

										9# D3i			
1	78	44	72	29	22	50	16	57	021210102	021102210	012201120	021210102	
54	11	58	5	79	39	64	33	26	102021210	210021102	201120012	210102021	
68	34	21	46	15	62	9	74	40	210102021	102210021	120012201	102021210	
80	37	6	31	27	65	12	59	52	210102021	210021102	201120012	102021210	
13	63	47	75	41	7	35	19	69	021210102	102210021	120012201	021210102	
30	23	70	17	55	51	76	45	2	102021210	021102210	012201120	210102021	
42	8	73	20	67	36	61	48	14	102021210	102210021	120012201	210102021	
56	49	18	43	3	77	24	71	28	210102021	021102210	012201120	102021210	
25	66	32	60	53	10	38	4	81	021210102	210021102	201120012	021210102	

										10# D3i			
1	78	44	80	37	6	42	8	73	021210102	021210102	012201120	021102210	
54	11	58	13	63	47	56	49	18	102021210	210102021	201120012	210021102	

68	34	21	30	23	70	25	66	32	210102021	102021210	120012201	102210021
72	29	22	31	27	65	20	67	36	210102021	102021210	201120012	210021102
5	79	39	75	41	7	43	3	77	021210102	021210102	120012201	102210021
46	15	62	17	55	51	60	53	10	102021210	210102021	012201120	021102210
50	16	57	12	59	52	61	48	14	102021210	210102021	120012201	102210021
64	33	26	35	19	69	24	71	28	210102021	102021210	012201120	021102210
9	74	40	76	45	2	38	4	81	021210102	021210102	201120012	210021102

11#|D3i

1	72	50	78	29	16	44	22	57	021210102	012201120	021102210	021210102
54	5	64	11	79	33	58	39	26	102021210	201120012	210021102	210102021
68	46	9	34	15	74	21	62	40	210102021	120012201	102210021	102021210
80	31	12	37	27	59	6	65	52	210102021	201120012	210021102	102021210
13	75	35	63	41	19	47	7	69	021210102	120012201	102210021	021210102
30	17	76	23	55	45	70	51	2	102021210	012201120	021102210	210102021
42	20	61	8	67	48	73	36	14	102021210	120012201	102210021	210102021
56	43	24	49	3	71	18	77	28	210102021	012201120	021102210	102021210
25	60	38	66	53	4	32	10	81	021210102	201120012	210021102	021210102

12#|D3i

1	72	50	80	31	12	42	20	61	021210102	012201120	021210102	021102210
54	5	64	13	75	35	56	43	24	102021210	201120012	210102021	210021102
68	46	9	30	17	76	25	60	38	210102021	120012201	102021210	102210021
78	29	16	37	27	59	8	67	48	210102021	201120012	102021210	210021102
11	79	33	63	41	19	49	3	71	021210102	120012201	021210102	102210021
34	15	74	23	55	45	66	53	4	102021210	012201120	210102021	021102210
44	22	57	6	65	52	73	36	14	102021210	120012201	210102021	102210021
58	39	26	47	7	69	18	77	28	210102021	012201120	102021210	021102210
21	62	40	70	51	2	32	10	81	021210102	201120012	021210102	210021102

**** New Method of Composing Special Magic Squares of Order 9:
Complete Euler Type of Super-Multiple & Self-Complementary MS99;
Using View Forms of 4-Dimensional Extra-Cubic Object of Order 3 ****

**** List of Standard Solutions with Precise Check-Sums ****

1#	Rows	Columns	Pillars	the 4-th	\Pd1/Pd2
1 80 42 54 13 56 68 30 25	123 123 123	123 123 123	123 123 123	123 123 123	123\369/357
78 37 8 11 63 49 34 23 66	123 123 123	123 123 123	123 123 123	123 123 123	123\423/381
44 6 73 58 47 18 21 70 32	123 123 123	123 123 123	123 123 123	123 123 123	123\315/369
72 31 20 5 75 43 46 17 60	123 123 123	123 123 123	123 123 123	123 123 123	123\369/393
29 27 67 79 41 3 15 55 53	123 123 123	123 123 123	123 123 123	123 123 123	123\261/345
22 65 36 39 7 77 62 51 10	123 123 123	123 123 123	123 123 123	123 123 123	123\477/369
50 12 61 64 35 24 9 76 38	123 123 123	123 123 123	123 123 123	123 123 123	123\369/357
16 59 48 33 19 71 74 45 4	123 123 123	123 123 123	123 123 123	123 123 123	123\423/381
57 52 14 26 69 28 40 2 81	123 123 123	123 123 123	123 123 123	123 123 123	123\315/369

2#	Rows	Columns	Pillars	the 4-th	\Pd1/Pd2
1 80 42 72 31 20 50 12 61	123 123 123	123 123 123	123 123 123	123 123 123	123\369/357
78 37 8 29 27 67 16 59 48	123 123 123	123 123 123	123 123 123	123 123 123	123\315/381
44 6 73 22 65 36 57 52 14	123 123 123	123 123 123	123 123 123	123 123 123	123\423/369
54 13 56 5 75 43 64 35 24	123 123 123	123 123 123	123 123 123	123 123 123	123\369/393
11 63 49 79 41 3 33 19 71	123 123 123	123 123 123	123 123 123	123 123 123	123\477/345
58 47 18 39 7 77 26 69 28	123 123 123	123 123 123	123 123 123	123 123 123	123\261/369
68 30 25 46 17 60 9 76 38	123 123 123	123 123 123	123 123 123	123 123 123	123\369/357
34 23 66 15 55 53 74 45 4	123 123 123	123 123 123	123 123 123	123 123 123	123\315/381
21 70 32 62 51 10 40 2 81	123 123 123	123 123 123	123 123 123	123 123 123	123\423/369

3#	Rows	Columns	Pillars	the 4-th	\Pd1/Pd2
1 80 42 54 13 56 68 30 25	123 123 123	123 123 123	123 123 123	123 123 123	123\369/339
72 31 20 5 75 43 46 17 60	123 123 123	123 123 123	123 123 123	123 123 123	123\441/399
50 12 61 64 35 24 9 76 38	123 123 123	123 123 123	123 123 123	123 123 123	123\297/369
78 37 8 11 63 49 34 23 66	123 123 123	123 123 123	123 123 123	123 123 123	123\369/429
29 27 67 79 41 3 15 55 53	123 123 123	123 123 123	123 123 123	123 123 123	123\225/309
16 59 48 33 19 71 74 45 4	123 123 123	123 123 123	123 123 123	123 123 123	123\513/369
44 6 73 58 47 18 21 70 32	123 123 123	123 123 123	123 123 123	123 123 123	123\369/339
22 65 36 39 7 77 62 51 10	123 123 123	123 123 123	123 123 123	123 123 123	123\441/399
57 52 14 26 69 28 40 2 81	123 123 123	123 123 123	123 123 123	123 123 123	123\297/369

		4#	Rows	Columns	Pillars	the 4-th	Pd1/Pd2
1	80 42 78 37 8 44 6 73	123	123	123	123	123	123\369/339
72	31 20 29 27 67 22 65 36	123	123	123	123	123	123\297/399
50	12 61 16 59 48 57 52 14	123	123	123	123	123	123\441/369
54	13 56 11 63 49 58 47 18	123	123	123	123	123	123\369/429
5	75 43 79 41 3 39 7 77	123	123	123	123	123	123\513/309
64	35 24 33 19 71 26 69 28	123	123	123	123	123	123\225/369
46	30 25 34 23 66 21 70 32	123	123	123	123	123	123\369/339
48	17 60 15 55 53 62 51 10	123	123	123	123	123	123\297/399
9	76 38 74 45 4 40 2 81	123	123	123	123	123	123\441/369

		5#	Rows	Columns	Pillars	the 4-th	Pd1/Pd2
1	80 42 72 31 20 50 12 61	123	123	123	123	123	123\369/285
54	13 56 5 75 43 64 35 24	123	123	123	123	123	123\387/453
68	30 25 46 17 60 9 76 38	123	123	123	123	123	123\351/369
78	37 8 29 27 67 16 59 48	123	123	123	123	123	123\369/537
11	63 49 79 41 3 33 19 71	123	123	123	123	123	123\333/201
34	23 66 15 55 53 74 45 4	123	123	123	123	123	123\405/369
44	6 73 22 65 36 57 52 14	123	123	123	123	123	123\369/285
58	47 18 39 7 77 26 69 28	123	123	123	123	123	123\387/453
21	70 32 62 51 10 40 2 81	123	123	123	123	123	123\351/369

		6#	Rows	Columns	Pillars	the 4-th	Pd1/Pd2
1	80 42 78 37 8 44 6 73	123	123	123	123	123	123\369/285
54	13 56 11 63 49 58 47 18	123	123	123	123	123	123\351/453
68	30 25 34 23 66 21 70 32	123	123	123	123	123	123\387/369
72	31 20 29 27 67 22 65 36	123	123	123	123	123	123\369/537
5	75 43 79 41 3 39 7 77	123	123	123	123	123	123\405/201
46	17 60 15 55 53 62 51 10	123	123	123	123	123	123\333/369
50	12 61 16 59 48 57 52 14	123	123	123	123	123	123\369/285
64	35 24 33 19 71 26 69 28	123	123	123	123	123	123\351/453
9	76 38 74 45 4 40 2 81	123	123	123	123	123	123\387/369

		7#	Rows	Columns	Pillars	the 4-th	Pd1/Pd2
1	78 44 54 11 58 68 34 21	123	123	123	123	123	123\369/333
72	29 22 5 79 39 46 15 62	123	123	123	123	123	123\447/405
50	16 57 64 33 26 9 74 40	123	123	123	123	123	123\291/369
80	37 6 13 63 47 30 23 70	123	123	123	123	123	123\369/441
31	27 65 75 41 7 17 55 51	123	123	123	123	123	123\213/297
12	59 52 35 19 69 76 45 2	123	123	123	123	123	123\525/369
42	8 73 56 49 18 25 66 32	123	123	123	123	123	123\369/333
20	67 36 43 3 77 60 53 10	123	123	123	123	123	123\447/405
61	48 14 24 71 28 38 4 81	123	123	123	123	123	123\291/369

		8#	Rows	Columns	Pillars	the 4-th	Pd1/Pd2
1	78 44 80 37 6 42 8 73	123	123	123	123	123	123\369/333
72	29 22 31 27 65 20 67 36	123	123	123	123	123	123\291/405
50	16 57 12 59 52 61 48 14	123	123	123	123	123	123\447/369
54	11 58 13 63 47 56 49 18	123	123	123	123	123	123\369/441
5	79 39 75 41 7 43 3 77	123	123	123	123	123	123\525/297
64	33 26 35 19 69 24 71 28	123	123	123	123	123	123\213/369
68	34 21 30 23 70 25 66 32	123	123	123	123	123	123\369/333
46	15 62 17 55 51 60 53 10	123	123	123	123	123	123\291/405
9	74 40 76 45 2 38 4 81	123	123	123	123	123	123\447/369

		9#	Rows	Columns	Pillars	the 4-th	Pd1/Pd2
1	78 44 72 29 22 50 16 57	123	123	123	123	123	123\369/279
54	11 58 5 79 39 64 33 26	123	123	123	123	123	123\393/459
68	34 21 46 15 62 9 74 40	123	123	123	123	123	123\345/369
80	37 6 31 27 65 12 59 52	123	123	123	123	123	123\369/549
13	63 47 75 41 7 35 19 69	123	123	123	123	123	123\321/189
30	23 70 17 55 51 76 45 2	123	123	123	123	123	123\417/369
42	8 73 20 67 36 61 48 14	123	123	123	123	123	123\369/279
56	49 18 43 3 77 24 71 28	123	123	123	123	123	123\393/459
25	66 32 60 53 10 38 4 81	123	123	123	123	123	123\345/369

		10#	Rows	Columns	Pillars	the 4-th	Pd1/Pd2
1	78 44 80 37 6 42 8 73	123	123	123	123	123	123\369/279

54 11 58 13 63 47 56 49 18|123 123 123|123 123 123|123 123 123|123 123 123|123 123 123\345/459|
68 34 21 30 23 70 25 66 32|123 123 123|123 123 123|123 123 123|123 123 123|123 123 123\393/369|
72 29 22 31 27 65 20 67 36|123 123 123|123 123 123|123 123 123|123 123 123|123 123 123\369/549|
5 79 39 75 41 7 43 3 77|123 123 123|123 123 123|123 123 123|123 123 123|123 123 123\417/189|
46 15 62 17 55 51 60 53 10|123 123 123|123 123 123|123 123 123|123 123 123|123 123 123\321/369|
50 16 57 12 59 52 61 48 14|123 123 123|123 123 123|123 123 123|123 123 123|123 123 123\369/279|
64 33 26 35 19 69 24 71 28|123 123 123|123 123 123|123 123 123|123 123 123|123 123 123\345/459|
9 74 40 76 45 2 38 4 81|123 123 123|123 123 123|123 123 123|123 123 123|123 123 123\393/369|

11#|Rows |Columns |Pillars |the 4-th |Pd1/Pd2|
1 72 50 78 29 16 44 22 57|123 123 123|123 123 123|123 123 123|123 123 123|123 123 123\369/261|
54 5 64 11 79 33 58 39 26|123 123 123|123 123 123|123 123 123|123 123 123|123 123 123\375/477|
68 46 9 34 15 74 21 62 40|123 123 123|123 123 123|123 123 123|123 123 123|123 123 123\363/369|
80 31 12 37 27 59 6 65 52|123 123 123|123 123 123|123 123 123|123 123 123|123 123 123\369/585|
13 75 35 63 41 19 47 7 69|123 123 123|123 123 123|123 123 123|123 123 123|123 123 123\357/153|
30 17 76 23 55 45 70 51 2|123 123 123|123 123 123|123 123 123|123 123 123|123 123 123\381/369|
42 20 61 8 67 48 73 36 14|123 123 123|123 123 123|123 123 123|123 123 123|123 123 123\369/261|
56 43 24 49 3 71 18 77 28|123 123 123|123 123 123|123 123 123|123 123 123|123 123 123\375/477|
25 60 38 66 53 4 32 10 81|123 123 123|123 123 123|123 123 123|123 123 123|123 123 123\363/369|

12#|Rows |Columns |Pillars |the 4-th |Pd1/Pd2|
1 72 50 80 31 12 42 20 61|123 123 123|123 123 123|123 123 123|123 123 123|123 123 123\369/261|
54 5 64 13 75 35 56 43 24|123 123 123|123 123 123|123 123 123|123 123 123|123 123 123\363/477|
68 46 9 30 17 76 25 60 38|123 123 123|123 123 123|123 123 123|123 123 123|123 123 123\375/369|
78 29 16 37 27 59 8 67 48|123 123 123|123 123 123|123 123 123|123 123 123|123 123 123\369/585|
11 79 33 63 41 19 49 3 71|123 123 123|123 123 123|123 123 123|123 123 123|123 123 123\381/153|
34 15 74 23 55 45 66 53 4|123 123 123|123 123 123|123 123 123|123 123 123|123 123 123\357/369|
44 22 57 6 65 52 73 36 14|123 123 123|123 123 123|123 123 123|123 123 123|123 123 123\369/261|
58 39 26 47 7 69 18 77 28|123 123 123|123 123 123|123 123 123|123 123 123|123 123 123\363/477|
21 62 40 70 51 2 32 10 81|123 123 123|123 123 123|123 123 123|123 123 123|123 123 123\375/369|

25/P 13# 31/P 14# 27/P 15#
3 80 40 52 15 56 68 28 27 3 80 40 70 33 20 50 10 63 3 80 40 52 15 56 68 28 27
76 39 8 11 61 51 36 23 64 76 39 8 29 25 69 18 59 46 70 33 20 5 73 45 48 17 58
44 4 75 60 47 16 19 72 32 44 4 75 24 65 34 55 54 14 50 10 63 66 35 22 7 78 38
70 33 20 5 73 45 48 17 58 52 15 56 5 73 45 66 35 22 76 39 8 11 61 51 36 23 64
29 25 69 81 41 1 13 57 53 11 61 51 81 41 1 31 21 71 29 25 69 81 41 1 13 57 53
24 65 34 37 9 77 62 49 12 60 47 16 37 9 77 26 67 30 18 59 46 31 21 71 74 43 6
50 10 63 66 35 22 7 78 38 68 28 27 48 17 58 7 78 38 44 4 75 60 47 16 19 72 32
18 59 46 31 21 71 74 43 6 36 23 64 13 57 53 74 43 6 24 65 34 37 9 77 62 49 12
55 54 14 26 67 30 42 2 79 19 72 32 62 49 12 42 2 79 55 54 14 26 67 30 42 2 79

33/P 16# 37/P 17# 39/P 18#
3 80 40 76 39 8 44 4 75 3 80 40 70 33 20 50 10 63 3 80 40 76 39 8 44 4 75
70 33 20 29 25 69 24 65 34 52 15 56 5 73 45 66 35 22 52 15 56 11 61 51 60 47 16
50 10 63 18 59 46 55 54 14 68 28 27 48 17 58 7 78 38 68 28 27 36 23 64 19 72 32
52 15 56 11 61 51 60 47 16 76 39 8 29 25 69 18 59 46 70 33 20 29 25 69 24 65 34
5 73 45 81 41 1 37 9 77 11 61 51 81 41 1 31 21 71 5 73 45 81 41 1 37 9 77
66 35 22 31 21 71 26 67 30 36 23 64 13 57 53 74 43 6 48 17 58 13 57 53 62 49 12
68 28 27 36 23 64 19 72 32 44 4 75 24 65 34 55 54 14 50 10 63 18 59 46 55 54 14
48 17 58 13 57 53 62 49 12 60 47 16 37 9 77 26 67 30 66 35 22 31 21 71 26 67 30
7 78 38 74 43 6 42 2 79 19 72 32 62 49 12 42 2 79 7 78 38 74 43 6 42 2 79

100/P 19# 202/P 20# 110/P 21#
3 76 44 52 11 60 68 36 19 3 76 44 80 39 4 40 8 75 3 76 44 70 29 24 50 18 55
70 29 24 5 81 37 48 13 62 70 29 24 33 25 65 20 69 34 52 11 60 5 81 37 66 31 26
50 18 55 66 31 26 7 74 42 50 18 55 10 59 54 63 46 14 68 36 19 48 13 62 7 74 42
80 39 4 15 61 47 28 23 72 52 11 60 15 61 47 56 51 16 80 39 4 33 25 65 10 59 54
33 25 65 73 41 9 17 57 49 5 81 37 73 41 9 45 1 77 15 61 47 73 41 9 35 21 67
10 59 54 35 21 67 78 43 2 66 31 26 35 21 67 22 71 30 28 23 72 17 57 49 78 43 2
40 8 75 56 51 16 27 64 32 68 36 19 28 23 72 27 64 32 40 8 75 20 69 34 63 46 14
20 69 34 45 1 77 58 53 12 48 13 62 17 57 49 58 53 12 56 51 16 45 1 77 22 71 30
63 46 14 22 71 30 38 6 79 7 74 42 78 43 2 38 6 79 27 64 32 58 53 12 38 6 79

208/P 22# 113/P 23# 210/P 24#
3 76 44 80 39 4 40 8 75 3 70 50 76 29 18 44 24 55 3 70 50 80 33 10 40 20 63
52 11 60 15 61 47 56 51 16 52 5 66 11 81 31 60 37 26 52 5 66 15 73 35 56 45 22
68 36 19 28 23 72 27 64 32 68 48 7 36 13 74 19 62 42 68 48 7 28 17 78 27 58 38
70 29 24 33 25 65 20 69 34 80 33 10 39 25 59 4 65 54 76 29 18 39 25 59 8 69 46

5 81 37 73 41 9 45 1 77	15 73 35 61 41 21 47 9 67	11 81 31 61 41 21 51 1 71
48 13 62 17 57 49 58 53 12	28 17 78 23 57 43 72 49 2	36 13 74 23 57 43 64 53 6
50 18 55 10 59 54 63 46 14	40 20 63 8 69 46 75 34 14	44 24 55 4 65 54 75 34 14
66 31 26 35 21 67 22 71 30	56 45 22 51 1 71 16 77 30	60 37 26 47 9 67 16 77 30
7 74 42 78 43 2 38 6 79	27 58 38 64 53 6 32 12 79	19 62 42 72 49 2 32 12 79
	26/P 25#	32/P 26#
7 78 38 48 17 58 68 28 27	7 78 38 66 35 22 50 10 63	7 78 38 48 17 58 68 28 27
74 43 6 13 57 53 36 23 64	74 43 6 31 21 71 18 59 46	66 35 22 5 73 45 52 15 56
42 2 79 62 49 12 19 72 32	42 2 79 26 67 30 55 54 14	50 10 63 70 33 20 3 80 40
66 35 22 5 73 45 52 15 56	48 17 58 5 73 45 70 33 20	74 43 6 13 57 53 36 23 64
31 21 71 81 41 1 11 61 51	13 57 53 81 41 1 29 25 69	31 21 71 81 41 1 11 61 51
26 67 30 37 9 77 60 47 16	62 49 12 37 9 77 24 65 34	18 59 46 29 25 69 76 39 8
50 10 63 70 33 20 3 80 40	68 28 27 52 15 56 3 80 40	42 2 79 62 49 12 19 72 32
18 59 46 29 25 69 76 39 8	36 23 64 11 61 51 76 39 8	26 67 30 37 9 77 60 47 16
55 54 14 24 65 34 44 4 75	19 72 32 60 47 16 44 4 75	55 54 14 24 65 34 44 4 75
	38/P 28#	99/P 29#
7 78 38 66 35 22 50 10 63	7 74 42 48 13 62 68 36 19	7 74 42 66 31 26 50 18 55
48 17 58 5 73 45 70 33 20	66 31 26 5 81 37 52 11 60	48 13 62 5 81 37 70 29 24
68 28 27 52 15 56 3 80 40	50 18 55 70 29 24 3 76 44	68 36 19 52 11 60 3 76 44
74 43 6 31 21 71 18 59 46	78 43 2 17 57 49 28 23 72	78 43 2 35 21 67 10 59 54
13 57 53 81 41 1 29 25 69	35 21 67 73 41 9 15 61 47	17 57 49 73 41 9 33 25 65
36 23 64 11 61 51 76 39 8	10 59 54 33 25 65 80 39 4	28 23 72 15 61 47 80 39 4
42 2 79 26 67 30 55 54 14	38 6 79 58 53 12 27 64 32	38 6 79 22 71 30 63 46 14
62 49 12 37 9 77 24 65 34	22 71 30 45 1 77 56 51 16	58 53 12 45 1 77 20 69 34
19 72 32 60 47 17 44 4 75	63 46 14 20 69 34 40 8 75	27 64 32 56 51 16 40 8 75
	114/P 31#	209/P 32#
7 66 50 74 31 18 42 26 55	7 66 50 78 35 10 38 22 63	9 76 38 46 17 60 68 30 25
48 5 70 13 81 29 62 37 24	48 5 70 17 73 33 58 45 20	74 45 4 15 55 53 34 23 66
68 52 3 36 11 76 19 60 44	68 52 3 28 15 80 27 56 40	40 2 81 62 51 10 21 70 32
78 35 10 43 21 59 2 67 54	74 31 18 43 21 59 6 71 46	64 35 24 5 75 43 54 13 56
17 73 33 57 41 25 49 9 65	13 81 29 57 41 25 53 1 69	33 19 71 79 41 3 11 63 49
28 15 80 23 61 39 72 47 4	36 11 76 23 61 39 64 51 8	26 69 28 39 7 77 58 47 18
38 22 63 6 71 46 79 30 14	42 26 55 2 67 54 79 30 14	50 12 61 72 31 20 1 80 42
58 45 20 53 1 69 12 77 34	62 37 24 49 9 65 12 77 34	16 59 48 29 27 67 78 37 8
27 56 40 64 51 8 32 16 75	19 60 44 72 47 4 32 16 75	57 52 14 22 65 36 44 6 73
	80/P 34#	124/P 35#
9 76 38 64 35 24 50 12 61	9 76 38 46 17 60 68 30 25	9 76 38 64 35 24 50 12 61
74 45 4 33 19 71 16 59 48	64 35 24 5 75 43 54 13 56	46 17 60 5 75 43 72 31 20
40 2 81 26 69 28 57 52 14	50 12 61 72 31 20 1 80 42	68 30 25 54 13 56 1 80 42
46 17 60 5 75 43 72 31 20	74 45 4 15 55 53 34 23 66	74 45 4 33 19 71 16 59 48
15 55 53 79 41 3 29 27 67	33 19 71 79 41 3 11 63 49	15 55 53 79 41 3 29 27 67
62 51 10 39 7 77 22 65 36	16 59 48 29 27 67 78 37 8	34 23 66 11 63 49 78 37 8
68 30 25 54 13 56 1 80 42	40 2 81 62 51 10 21 70 32	40 2 81 26 69 28 57 52 14
34 23 66 11 63 49 78 37 8	26 69 28 39 7 77 58 47 18	62 51 10 39 7 77 22 65 36
21 70 32 58 47 18 44 6 73	57 52 14 22 65 36 44 6 73	21 70 32 58 47 18 44 6 73
	123/P 37#	133/P 38#
9 74 40 46 15 62 68 34 21	9 74 40 64 33 26 50 16 57	9 64 50 74 33 16 40 26 57
64 33 26 5 79 39 54 11 58	46 15 62 5 79 39 72 29 22	46 5 72 15 79 29 62 39 22
50 16 57 72 29 22 1 78 44	68 34 21 54 11 58 1 78 44	68 54 1 34 11 78 21 58 44
76 45 2 17 55 51 30 23 70	76 45 2 35 19 69 12 59 52	76 35 12 45 19 59 2 69 52
35 19 69 75 41 7 13 63 47	17 55 51 75 41 7 31 27 65	17 75 31 55 41 27 51 7 65
12 59 52 31 27 65 80 37 6	30 23 70 13 63 47 80 37 6	30 13 80 23 63 37 70 47 6
38 4 81 60 53 10 25 66 32	38 4 81 24 71 28 61 48 14	38 24 61 4 71 48 81 28 14
24 71 28 43 3 77 56 49 18	60 53 10 43 3 77 20 67 36	60 43 20 53 3 67 10 77 36
61 48 14 20 67 36 42 8 73	25 66 32 56 49 18 42 8 73	25 56 42 66 49 8 32 18 73
	305/P 40#	29/P 41#
9 64 50 76 35 12 38 24 61	19 72 32 36 23 64 68 28 27	19 72 32 36 23 64 68 28 27
46 5 72 17 75 31 60 43 20	62 49 12 13 57 53 48 17 58	60 47 16 11 61 51 52 15 56
68 54 1 30 13 80 25 56 42	42 2 79 74 43 6 7 78 38	44 4 75 76 39 8 3 80 40
74 33 16 45 19 59 4 71 48	60 47 16 11 61 51 52 15 56	62 49 12 13 57 53 48 17 58
15 79 29 55 41 27 53 3 67	37 9 77 81 41 1 5 73 45	37 9 77 81 41 1 5 73 45
34 11 78 23 63 37 66 49 8	26 67 30 31 21 71 66 35 22	24 65 34 29 25 69 70 33 20
40 26 57 2 69 52 81 28 14	44 4 75 76 39 8 3 80 40	42 2 79 74 43 6 7 78 38

62 39 22 51 7 65 10 77 36	24 65 34 29 25 69 70 33 20	26 67 30 31 21 71 66 35 22
21 58 44 70 47 6 32 18 73	55 54 14 18 59 46 50 10 63	55 54 14 18 59 46 50 10 63
111/P 43#	112/P 44#	77/P 45#
19 62 42 60 37 26 44 24 55	19 60 44 62 37 24 42 26 55	21 70 32 34 23 66 68 30 25
36 13 74 11 81 31 76 29 18	36 11 76 13 81 29 74 31 18	62 51 10 15 55 53 46 17 60
68 48 7 52 5 66 3 70 50	68 52 3 48 5 70 7 66 50	40 2 81 74 45 4 9 76 38
72 49 2 47 9 67 4 65 54	72 47 4 49 9 65 2 67 54	58 47 18 11 63 49 54 13 56
23 57 43 61 41 21 39 25 59	23 61 39 57 41 25 43 21 59	39 7 77 79 41 3 5 75 43
28 17 78 15 73 35 80 33 10	28 15 80 17 73 33 78 35 10	26 69 28 33 19 71 64 35 24
32 12 79 16 77 30 75 34 14	32 16 75 12 77 34 79 30 14	44 6 73 78 37 8 1 80 42
64 53 6 51 1 71 8 69 46	64 51 8 53 1 69 6 71 46	22 65 36 29 27 67 72 31 20
27 58 38 56 45 22 40 20 63	27 56 40 58 45 20 38 22 63	57 52 14 16 59 48 50 12 61
126/P 46#	135/P 47#	304/P 48#
21 70 32 34 23 66 68 30 25	21 62 40 58 39 26 44 22 57	21 58 44 62 39 22 40 26 57
58 47 18 11 63 49 54 13 56	34 15 74 11 79 33 78 29 16	34 11 78 15 79 29 74 33 16
44 6 73 78 37 8 1 80 42	68 46 9 54 5 64 1 72 50	68 54 1 46 5 72 9 64 50
62 51 10 15 55 53 46 17 60	70 51 2 47 7 69 6 65 52	70 47 6 51 7 65 2 69 52
39 7 77 79 41 3 5 75 43	23 55 45 63 41 19 37 27 59	23 63 37 55 41 27 45 19 59
22 65 36 29 27 67 72 31 20	30 17 76 13 75 35 80 31 12	30 13 80 17 75 31 76 35 12
40 2 81 74 45 4 9 76 38	32 10 81 18 77 28 73 36 14	32 18 73 10 77 36 81 28 14
26 69 28 33 19 71 64 35 24	66 53 4 49 3 71 8 67 48	66 49 8 53 3 67 4 71 48
57 52 14 16 59 48 50 12 61	25 60 38 56 43 24 42 20 61	25 56 42 60 43 20 38 24 61

[Counts = 12/48/384] OK!

* Monitor List of Solution Correspondence between Old and New *

??: 0

1: 1 1 1 1 1 1 1 1 1 1 1 1
 13: 1 1 1 1 1 1 1 1 1 1 1 1
 25: 1 1 1 1 1 1 1 1 1 1 1 1
 37: 1 1 1 1 1 1 1 1 1 1 1 1

** Recompiled and Listed by Kanji Setsuda on
 Mar.10, 2015 with Apple OSX 10.10.2 and Xcode 6.2 **

The result means our success. The count 48 of 'standard' solutions here is logically equivalent to the count 384 of 'primitive' ones, because $384 = 48 \times 8$.

Each solution is really a 'Complete Euler' type of magic square of order 9 including 9 little squares 3x3 within. It is always found in the old list of solutions I got before.

We could make no other types of solutions. We could make neither duplications nor drop-offs of any solution at all.

It is amazing we could make all directly from the basic view-forms of $ECO3^4$ by this simple method. But why? What makes it always possible?

#3. Discussion

(1) Why could we make all objects directly from all the possible view-forms of $ECO3^4$ developed by this unique, simplest method?

It is the 'Prototype Squares' of order 9 that we really made unconsciously, under the name of composing all the possible 'view forms' of developed $ECO3^4$. I think it is the true reason why we could successfully use and apply 'DAM Transformation' to those compositions.

(2) What does it mean by the counts 48? We could draw 48 different view forms in all for the developed ECO , and we could also make the 'standard' solutions of 'Complete Euler' type of $MS99$ including multiple little squares 3x3 within as many as 48. Does this mean only an accidental agreement? No, it doesn't.

Imagine there exists essentially the only one solution in the 4-dimensional world, where Divine Being enjoys the original form of ECO as it is. But it appears here in our world in different images as many as 48, and we could only enjoy them as they

are. That is implied by the existence of 48 different view forms for the same developed ECO. Every object solution must be the ‘phenomena’ of the original One, I think.

(3) We did not yet define any simultaneous equations in advance, either. We did only make possible ‘view-forms’ of developed ECO and transform them directly into objects. Why did we need no definitions at all at the beginning?

Does it really mean any definitions are of no use or totally meaningless?

But, think. Did we really start our composition without any kinds of premises at all?

It isn’t true. In fact we used the four-time loops of for(...){...} sentences to produce positional numbers of the base 3 by calculations, didn’t we?

Yes. The secret key is the positional number system of the base N.

Remember our solutions are all ‘Complete Euler Squares’ of order 9. Every row and column of every solution has the same number pattern of {0, 0, 0, 1, 1, 1, 2, 2, 2} in any layer of decompositions. Each primary diagonal has also the same combination of numbers. Every little square of 3 by 3 has the same {0, 1, 2} in any layer, too.

It means they are the mathematical basis of the same ‘magic constant’.

$$(0+1+2) \times 3^3 + (0+1+2) \times 3^2 + (0+1+2) \times 3^1 + (0+1+2) \times 3^0$$

$$= (0+1+2) \times (27+9+3+1) = 3 \times 40 = 120$$

$$(0+0+0+1+1+1+2+2+2) \times (3^3+3^2+3^1+3^0) = 9 \times (27+9+3+1) = 9 \times 40 = 360$$

The sum 120 here is logically equivalent to 123 in our classical notation. The sum 360 here is also equivalent to 369 in our classical notation.

Yes. We have prepared everything to compose ‘Complete Euler Squares’ of order 9 for our objects. Under the premise of using generator program of positional numbers of the base 3 we actually made the ‘Complete Euler Squares’ by drawing all possible view-forms of ECO, and by making them into our objects by ‘DAM Transformation’.

Positional Number System of the Base N is the true reason for our success.

As you guess, you can only make your objects by this method of composition as far as they are ‘Complete Euler’ type of magic squares. You can make no other than ‘CES’. On top of that you can only make what are essentially any developed forms of Extra-Cubic Object. In other words what you can make here by this method is only ‘Complete Euler Squares’ of order 9 including multiple little squares 3x3 within.

Though it may only look as a limited application, it can surely make special, important magic squares, the ‘most precious 48 jewels’.

I am so excited to know that there is a great relationship among those ‘Positional Number System of the Base N’, ‘Complete Euler Squares’, ‘High Dimensional Extra-Cubic Objects’, ‘Prototype Squares’ and ‘DAM Transformation’. All of them are the special topics that I have long studied about very hard. Say, everything points at the same thing. This ‘great relationship’ might be one of the ‘great puzzles’ or ‘great mysteries’ revealed to us by our Creator God.

My philosophical mind is getting more active and would hardly sleep.

#4. How about Magic Squares 16²

Let’s think a little about the case of ECO₂⁸ here. Because 2⁸ = 16².

When we use the 8-time loops of for(...){...} sentences and produce binary numbers, we can draw 40320 different view-forms of the developed ECO with n₁=1, because ${}_8P_8 = 40320$. With a little modifications we can also draw another type of 256 pictures, because 2⁸ = 256.

If you combine these two sets of view-forms one by one, you can draw all the

possible view-forms as many as 10321920, because $40320 \times 256 = 10321920$.

It means we can get the same counts of object solutions, directly from those view-forms by 'DAM Transformation', or get the 1290240 standard solutions of them.

But what type of object solutions can we get? What is the 'model solution' like?

Now I know nothing yet, but I can only guess it must be a special type of magic squares 16x16. It must have the smallest solution set, theoretically speaking.

**** Basic View-Diagram for Extra-Cubic Object of Order 2^8 ****

```

1---2   3---4   5   6   7   8   9 10  11 12  13 14  15 16
|17--+18 |19--+20  21 22  23 24  25 26  27 28  29 30  31 32
33-|34 | 35-|36 | 37 38  39 40  41 42  43 44  45 46  47 48
 49--50  51--52  53 54  55 56  57 58  59 60  61 62  63 64

65--66  67 68  69 70  71 72  73 74  75 76  77 78  79 80
|81--+82  83 84  85 86  87 88  89 90  91 92  93 94  95 96
97-|98 | 99 100 101 102 103 104 105 106 107 108 109 110 111 112
113-114 115 116 117 118 119 120 121 122 123 124 125 126 127 128

129-130 131 132 133 134 135 136 137 138 139 140 141 142 143 144
|145+146 147 148 149 150 151 152 153 154 155 156 157 158 159 160
161|162| 163 164 165 166 167 168 169 170 171 172 173 174 175 176
 177-178 179 180 181 182 183 184 185 186 187 188 189 190 191 192

193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208
209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224
225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240
241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256

```

**** Basic Diagram for Magic Squares of Order 16^2 ****

```

1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64
65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80
81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96
97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112
113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128
129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144
145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160
161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176
177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192
193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208
209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224
225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240
241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256

```

#5. Additional Report of the Case of Magic Cubes 4³

We now know how effective the multiple loops of for(...){...} sentences are and how powerful the positional number system of the base N is.

How about the case of any ordinary cubes and squares in 2- or 3-dimensions?

Can you guess what pictures you can draw for them by those multiple loops?

As I could not imagine it exactly, I made some experiments and examined them. Let me report of the result here.

I wrote a test program for magic cubes of order 4³, and made my computer draw all the possible 'view-forms' of them.

I used triple loops of for(...){...} sentences and produced positional numbers of the Base 4 with a little modifications on the controller variables {d0, d1, d2} and using count-down type of condition controller.

The next lists show the two sets of 'view-forms' of the MC444.

You can combine these two sets one by one.

We could draw 48 pictures in all, because $6 \times 8 = 48$.

But each of them demonstrates only a simple 'reflection' or 'rotation' of the same pattern. They express the same solution and must be classified and counted as one.

What we could draw here is only what we already know well, and it tells us nothing new, though it might be useful for us to illustrate 48 'primitive' solutions for the same 'standard' one.

**** Set #1 of Basic View-Diagrams for Magic Cube $4 \wedge 3$ ****

1/

1	2	3	4
17	18	19	20
33	43	35	36
5	49	6	50
21	22	23	24
37	38	39	40
9	53	10	54
25	26	27	28
41	42	43	44
13	57	14	58
29	30	31	32
45	46	47	48
61	62	63	64

2/

1	5	9	13
17	21	25	29
33	43	41	45
2	49	6	53
18	22	26	30
34	38	42	46
3	50	7	54
19	23	27	31
35	39	43	47
4	51	8	55
20	24	28	32
36	40	44	48
52	56	60	64

3/

1	2	3	4
5	6	7	8
9	43	11	12
17	13	18	14
21	22	23	24
25	26	27	28
33	29	34	30
35	31	36	32
37	38	39	40
41	42	43	44
49	45	50	46
51	47	52	48
53	54	55	56
57	58	59	60
61	62	63	64

4/

1	5	9	13
2	6	10	14
3	43	11	15
17	4	21	8
18	22	26	30
19	23	27	31
33	20	37	24
41	28	45	32
34	38	42	46
35	39	43	47
49	36	53	40
57	44	61	48
50	54	58	62
51	55	59	63
52	56	60	64

5/

1	17	33	49
5	21	37	53
9	43	41	57
2	13	18	29
34	45	50	61
6	22	38	54
10	26	42	58
3	14	19	30
35	46	51	62
7	23	39	55
11	27	43	59
4	15	20	31
36	47	52	63
8	24	40	56
12	28	44	60
16	32	48	64

6/

1	17	33	49
2	18	34	50
3	43	35	51
5	4	21	20
37	20	37	36
53	36	53	52
6	22	38	54
7	23	39	55
9	8	25	24
41	40	57	56
10	26	42	58
11	27	43	59
13	12	29	28
45	44	61	60
14	30	46	62
15	31	47	63
16	32	48	64

**** Set #2 of Basic View-Diagrams for Magic Cube $4 \wedge 3$ ****

1/

1	2	3	4
17	18	19	20
33	43	35	36
5	49	6	50
21	22	23	24
37	38	39	40
9	53	10	54
25	26	27	28
41	42	43	44
13	57	14	58
29	30	31	32
45	46	47	48
61	62	63	64

2/

4	3	2	1
20	19	18	17
36	42	34	33
8	52	7	51
6	50	5	49
24	23	22	21
40	39	38	37
12	56	11	55
10	54	9	53
28	27	26	25
44	43	42	41
16	60	15	59
14	58	13	57
32	31	30	29
48	47	46	45
64	63	62	61

3/
 13-----14-----15-----16
 | 29 30 31 32
 | 45 39 47 48
 9 61--10--62--11--63--12--64
 | 25 26 27 28
 | 41 42 43 44
 5 57 6 58 7 59 8 60
 | 21 22 23 24
 | 37 38 39 40
 1-----53-- 2-----54-- 3-----55-- 4 56
 | 17 18 19 20
 | 33 34 35 36
 49-----50-----51-----52

4/
 16-----15-----14-----13
 | 32 31 30 29
 | 48 38 46 45
 12 64--11--63--10--62-- 9-----61
 | 28 27 26 25
 | 44 43 42 41
 8 60 7 59 6 58 5 57
 | 24 23 22 21
 | 40 39 38 37
 4-----56-- 3-----55-- 2-----54-- 1 53
 | 20 19 18 17
 | 36 35 34 33
 52-----51-----50-----49

5/
 49-----50-----51-----52
 | 33 34 35 36
 | 17 27 19 20
 53 1--54-- 2--55-- 3--56-- 4
 | 37 38 39 40
 | 21 22 23 24
 57 5 58 6 59 7 60 8
 | 41 42 43 44
 | 25 26 27 28
 61-----9--62-----10--63-----11--64 12
 | 45 46 47 48
 | 29 30 31 32
 13-----14-----15-----16

6/
 52-----51-----50-----49
 | 36 35 34 33
 | 20 26 18 17
 56 4--55-- 3--54-- 2--53-- 1
 | 40 39 38 37
 | 24 23 22 21
 60 8 59 7 58 6 57 5
 | 44 43 42 41
 | 28 27 26 25
 64-----12--63-----11--62-----10--61 9
 | 48 47 46 45
 | 32 31 30 29
 16-----15-----14-----13

7/
 61-----62-----63-----64
 | 45 46 47 48
 | 29 23 31 32
 57 13--58--14--59--15--60--16
 | 41 42 43 44
 | 25 26 27 28
 53 9 54 10 55 11 56 12
 | 37 38 39 40
 | 21 22 23 24
 49-----5--50-----6--51-----7--52 8
 | 33 34 35 36
 | 17 18 19 20
 1----- 2----- 3----- 4

8/
 64-----63-----62-----61
 | 48 47 46 45
 | 32 22 30 29
 60 16--59--15--58--14--57--13
 | 44 43 42 41
 | 28 27 26 25
 56 12 55 11 54 10 53 9
 | 40 39 38 37
 | 24 23 22 21
 52-----8--51-----7--50-----6--49 5
 | 36 35 34 33
 | 20 19 18 17
 4----- 3----- 2----- 1

(Written in English by Kanji Setsuda on May 19, 2005;
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