

**Part 4** : “New Advanced Study of Magic Squares and Cubes”  
**Chapter 4** : Commentary Articles No.2 by **Kanji Setsuda**:  
 “Various Arts and Tools for Studying Magic Squares”

**Section 13**: Make ‘Complete Euler Squares’ of Order 11 for the Simultaneous Type: Self-complementary and Pan-diagonal

**0. Our Purpose in this Section**

I would like to challenge now to build the Simultaneous Type of Magic Squares of Order 11: Both Self-complementary and Pan-diagonal.

Since I know it would be too big and too hard for us to make any ordinary type of this object, I would like to build the ‘Complete Euler Type’ instead here. It should be easier to make all ‘C.E.S.’ under the Positional Number System of Base 11 and count them up to the last by saving our time and energy, I expect.

In the case of Order 5 this object counts only 16 standard solutions in all, while ‘C.E.S.’ of Order 7 counts as many as 3456. But, we have not yet known about how many solutions the ordinary type of Order 7 counts. We have only succeeded in getting all the ‘Complete Euler Type’ of those under the ‘Positional Number System’ of Base 7. Read [the old report of mine about them](#), if you are interested in it.

How many standard solutions of ‘C.E.S.’ type for our new object of Order 11 can we make, then? Now that we could have nothing of Order 9 under the ‘PNS’ of Base 9 ([see this article](#)), we can only hope to have our real objects of Order 11 and 13 next.

**1. Definition of Simultaneous MS11: Both Self-complementary and Pan-diagonal**

What we are going to make for our final object is defined in such the usual style as:

**\*\* Basic Form & Basic Equations: Listed by Kanji Setsuda \*\***

119	120	121	111	112	113	114	115	116	117	118	119	120	121	111	112	113
9	10	11	1	2	3	4	5	6	7	8	9	10	11	1	2	3
20	21	22	12	13	14	15	16	17	18	19	20	21	22	12	13	14
31	32	33	23	24	25	26	27	28	29	30	31	32	33	23	24	25
42	43	44	34	35	36	37	38	39	40	41	42	43	44	34	35	36
53	54	55	45	46	47	48	49	50	51	52	53	54	55	45	46	47
64	65	66	56	57	58	59	60	61	62	63	64	65	66	56	57	58
75	76	77	67	68	69	70	71	72	73	74	75	76	77	67	68	69
86	87	88	78	79	80	81	82	83	84	85	86	87	88	78	79	80
97	98	99	89	90	91	92	93	94	95	96	97	98	99	89	90	91
108	109	110	100	101	102	103	104	105	106	107	108	109	110	100	101	102
119	120	121	111	112	113	114	115	116	117	118	119	120	121	111	112	113
9	10	11	1	2	3	4	5	6	7	8	9	10	11	1	2	3

**\*\* Basic Conditions for Rows and Columns: C=671 \*\***

$n1+n2+n3+n4+n5+n6+n7+n8+n9+n10+n11=C$	... row1;
$n12+n13+n14+n15+n16+n17+n18+n19+n20+n21+n22=C$	... row2;

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n23+n24+n25+n26+n27+n28+n29+n30+n31+n32+n33=C ... row3;
n34+n35+n36+n37+n38+n39+n40+n41+n42+n43+n44=C ... row4;
n45+n46+n47+n48+n49+n50+n51+n52+n53+n54+n55=C ... row5;
n56+n57+n58+n59+n60+n61+n62+n63+n64+n65+n66=C ... row6;
n67+n68+n69+n70+n71+n72+n73+n74+n75+n76+n77=C ... row7;
n78+n79+n80+n81+n82+n83+n84+n85+n86+n87+n88=C ... row8;
n89+n90+n91+n92+n93+n94+n95+n96+n97+n98+n99=C ... row9;
n100+n101+n102+n103+n104+n105+n106+n107+n108+n109+n110=C ... row10;
n111+n112+n113+n114+n115+n116+n117+n118+n119+n120+n121=C ... row11;

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**
n1+n12+n23+n34+n45+n56+n67+n78+n89+n100+n111=C ... c1m1;
n2+n13+n24+n35+n46+n57+n68+n79+n90+n101+n112=C ... c1m2;
n3+n14+n25+n36+n47+n58+n69+n80+n91+n102+n113=C ... c1m3;
n4+n15+n26+n37+n48+n59+n70+n81+n92+n103+n114=C ... c1m4;
n5+n16+n27+n38+n49+n60+n71+n82+n93+n104+n115=C ... c1m5;
n6+n17+n28+n39+n50+n61+n72+n83+n94+n105+n116=C ... c1m6;
n7+n18+n29+n40+n51+n62+n73+n84+n95+n106+n117=C ... c1m7;
n8+n19+n30+n41+n52+n63+n74+n85+n96+n107+n118=C ... c1m8;
n9+n20+n31+n42+n53+n64+n75+n86+n97+n108+n119=C ... c1m9;
n10+n21+n32+n43+n54+n65+n76+n87+n98+n109+n120=C ... c1m10;
n11+n22+n33+n44+n55+n66+n77+n88+n99+n110+n121=C ... c1m11;

```

**\*\* Conditions for Two Types of Pan-diagonals: C=671 \*\***

```

n1+n13+n25+n37+n49+n61+n73+n85+n97+n109+n121=C ... pd1;
n2+n14+n26+n38+n50+n62+n74+n86+n98+n110+n111=C ... pd2;
n3+n15+n27+n39+n51+n63+n75+n87+n99+n100+n112=C ... pd3;
n4+n16+n28+n40+n52+n64+n76+n88+n89+n101+n113=C ... pd4;
n5+n17+n29+n41+n53+n65+n77+n78+n90+n102+n114=C ... pd5;
n6+n18+n30+n42+n54+n66+n67+n79+n91+n103+n115=C ... pd6;
n7+n19+n31+n43+n55+n56+n68+n80+n92+n104+n116=C ... pd7;
n8+n20+n32+n44+n45+n57+n69+n81+n93+n105+n117=C ... pd8;
n9+n21+n33+n34+n46+n58+n70+n82+n94+n106+n118=C ... pd9;
n10+n22+n23+n35+n47+n59+n71+n83+n95+n107+n119=C ... pd10;
n11+n12+n24+n36+n48+n60+n72+n84+n96+n108+n120=C ... pd11;

```

```

**
n1+n22+n32+n42+n52+n62+n72+n82+n92+n102+n112=C ... pb1;
n2+n12+n33+n43+n53+n63+n73+n83+n93+n103+n113=C ... pb2;
n3+n13+n23+n44+n54+n64+n74+n84+n94+n104+n114=C ... pb3;
n4+n14+n24+n34+n55+n65+n75+n85+n95+n105+n115=C ... pb4;
n5+n15+n25+n35+n45+n66+n76+n86+n96+n106+n116=C ... pb5;
n6+n16+n26+n36+n46+n56+n77+n87+n97+n107+n117=C ... pb6;
n7+n17+n27+n37+n47+n57+n67+n88+n98+n108+n118=C ... pb7;
n8+n18+n28+n38+n48+n58+n68+n78+n99+n109+n119=C ... pb8;
n9+n19+n29+n39+n49+n59+n69+n79+n89+n110+n120=C ... pb9;
n10+n20+n30+n40+n50+n60+n70+n80+n90+n100+n121=C ... pb10;
n11+n21+n31+n41+n51+n61+n71+n81+n91+n101+n111=C ... pb11;

```

**\*\* Conditions for Self-complementary Pairs: CS=122 \*\***

```

n1+n121=n2+n120=n3+n119=n4+n118=n5+n117=n6+n116=n7+n115=
n8+n114=n9+n113=n10+n112=n11+n111=n12+n110=n13+n109=n14+n108=
n15+n107=n16+n106=n17+n105=n18+n104=n19+n103=n20+n102=n21+n101=
n22+n100=n23+n99=n24+n98=n25+n97=n26+n96=n27+n95=n28+n94=
n29+n93=n30+n92=n31+n91=n32+n90=n33+n89=n34+n88=n35+n87=
n36+n86=n37+n85=n38+n84=n39+n83=n40+n82=n41+n81=n42+n80=
n43+n79=n44+n78=n45+n77=n46+n76=n47+n75=n48+n74=n49+n73=
n50+n72=n51+n71=n52+n70=n53+n69=n54+n68=n55+n67=n56+n66=
n57+n65=n58+n64=n59+n63=n60+n62=n61+n61=CS ... scc

```

As the last equation shows,  $n_{61}$  always takes the constant value 61, representing

the invariable value placed in the center of any Self-complementary magic square of odd orders. We must also take it again for our Simultaneous object of Order 11.

## 2. Make 'Latin Squares' at first for our 'Complete Euler Squares' of Order 11

Let's have all the possible 'Latin Squares' of Order 11 at first by our "New Euler's Method", so that we should be able to use them as the Decomposed Layer Units to compose the actual Complete Euler Squares of Order 11.

Latin Squares are defined in such the same style as the one above. But, we have to change the constant values into just as C=55 and CS=10 here.

Latin Squares must be composed always under the next strict rules as follows:

- (1) Any Latin Square must be simply made of 11 integers: {0, 1, 2, 3, 4, 5, 6, 7, 8, 9 and A} ('A' means 10<sub>(Dec)</sub>). Each integer should appear as often as 11 times.
- (2) Each row, each column and each pan-diagonal of Latin Squares must be made of {0, 1, 2, 3, 4, 5, 6, 7, 8, 9 and A} using each number strictly once. Neither duplication nor lack of any number must be found.

The constant sum of each row, column and pan-diagonal of our final object should always be realized according to these strict conditions above:

$(0+1+2+3+4+5+6+7+8+9+A) \times 11 + (0+1+2+3+4+5+6+7+8+9+A) = 660$  (Dec) (in Mathematical Expression of Square)

- (3) Only 6 Self-complementary pairs should appear 11 times in our Latin Squares:

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

Constituents of any pair must be placed symmetrically to each other with respect to the geometric center n61. And n61 itself always takes 5.

## 3. Core Program for making such the Latin Squares by our "New Euler's Method"

```

/**/
/* Main Program */
int main(){
    short n;
    printf("\n** 'Latin Squares' of Order 11 for Simultaneous Type: **\n");
    printf(" ** Both Self-Complementary and Pan-diagonal **\n\n");
    printf("*** Samples of 'Latin' Layer Units for Composing CES11Sml **\n");
    printf("*** Calculated and Listed by Kanji Setsuda on Apr.4, 2010 **\n");
    for(n=0;n<122;n++){nm[n]=0;}
    for(n=0;n<12;n++){
        rw1[n]=0;  cl1[n]=0;  pd1[n]=0;  pb1[n]=0;           //Reset all the 'Used' Flags
        rw2[n]=0;  cl2[n]=0;  pd2[n]=0;  pb2[n]=0;
        rw3[n]=0;  cl3[n]=0;  pd3[n]=0;  pb3[n]=0;
        rw4[n]=0;  cl4[n]=0;  pd4[n]=0;  pb4[n]=0;
        rw5[n]=0;  cl5[n]=0;  pd5[n]=0;  pb5[n]=0;
        rw6[n]=0;  cl6[n]=0;  pd6[n]=0;  pb6[n]=0;
        rw7[n]=0;  cl7[n]=0;  pd7[n]=0;  pb7[n]=0;
        rw8[n]=0;  cl8[n]=0;  pd8[n]=0;  pb8[n]=0;
        rw9[n]=0;  cl9[n]=0;  pd9[n]=0;  pb9[n]=0;
        rw10[n]=0; cl10[n]=0; pd10[n]=0; pb10[n]=0;
        rw11[n]=0; cl11[n]=0; pd11[n]=0; pb11[n]=0;
    }
    CC=10; cnt=0; cnt3=0;
    nm[61]=5; rw6[5]=1; cl6[5]=1; pd1[5]=1; pb11[5]=1; //Set n61=5;
    stp01(); // Make the Layer-Units
    return 0;
}
/* Make the Layer-Units */
/* Level 1: */
/* Set N1 & n121=CC-N1 */
void stp01(){
    short a,b;

```

```

for(a=0;a<11;a++){b=CC-a;
  if((rw1[a]==0)&&(cl1[a]==0)&&(pd1[a]==0)&&(pb1[a]==0)){
    if((rw11[b]==0)&&(cl11[b]==0)&&(pd1[b]==0)&&(pb10[b]==0)){
      nm[1]=a; nm[121]=b;
      rw1[a]=1; cl1[a]=1; pd1[a]=1; pb1[a]=1;
      rw11[b]=1; cl11[b]=1; pd1[b]=1; pb10[b]=1;
      stp02C);
      rw11[b]=0; cl11[b]=0; pd1[b]=0; pb10[b]=0;
      rw1[a]=0; cl1[a]=0; pd1[a]=0; pb1[a]=0;}}
}
}
/* Set N13 & n109=CC-N13 */
void stp02C){
  short a,b;
  for(a=0;a<11;a++){b=CC-a;
    if((rw2[a]==0)&&(cl2[a]==0)&&(pd1[a]==0)&&(pb3[a]==0)){
      if((rw10[b]==0)&&(cl10[b]==0)&&(pd1[b]==0)&&(pb8[b]==0)){
        nm[13]=a; nm[109]=b;
        rw2[a]=1; cl2[a]=1; pd1[a]=1; pb3[a]=1;
        rw10[b]=1; cl10[b]=1; pd1[b]=1; pb8[b]=1;
        stp03C);
        rw10[b]=0; cl10[b]=0; pd1[b]=0; pb8[b]=0;
        rw2[a]=0; cl2[a]=0; pd1[a]=0; pb3[a]=0;}}
}
}
/* Set N25 & n97=CC-N25 */
void stp03C){
  short a,b;
  for(a=0;a<11;a++){b=CC-a;
    if((rw3[a]==0)&&(cl3[a]==0)&&(pd1[a]==0)&&(pb5[a]==0)){
      if((rw9[b]==0)&&(cl9[b]==0)&&(pd1[b]==0)&&(pb6[b]==0)){
        nm[25]=a; nm[97]=b;
        rw3[a]=1; cl3[a]=1; pd1[a]=1; pb5[a]=1;
        rw9[b]=1; cl9[b]=1; pd1[b]=1; pb6[b]=1;
        stp04C);
        rw9[b]=0; cl9[b]=0; pd1[b]=0; pb6[b]=0;
        rw3[a]=0; cl3[a]=0; pd1[a]=0; pb5[a]=0;}}
}
}
/* Set N37 & n85=CC-N37 */
void stp04C){
  short a,b;
  for(a=0;a<11;a++){b=CC-a;
    if((rw4[a]==0)&&(cl4[a]==0)&&(pd1[a]==0)&&(pb7[a]==0)){
      if((rw8[b]==0)&&(cl8[b]==0)&&(pd1[b]==0)&&(pb4[b]==0)){
        nm[37]=a; nm[85]=b;
        rw4[a]=1; cl4[a]=1; pd1[a]=1; pb7[a]=1;
        rw8[b]=1; cl8[b]=1; pd1[b]=1; pb4[b]=1;
        stp05C);
        rw8[b]=0; cl8[b]=0; pd1[b]=0; pb4[b]=0;
        rw4[a]=0; cl4[a]=0; pd1[a]=0; pb7[a]=0;}}
}
}
/* Set N49 & n73=CC-N49 */
void stp05C){
  short a,b;
  for(a=0;a<11;a++){b=CC-a;
    if((rw5[a]==0)&&(cl5[a]==0)&&(pd1[a]==0)&&(pb9[a]==0)){
      if((rw7[b]==0)&&(cl7[b]==0)&&(pd1[b]==0)&&(pb2[b]==0)){
        nm[49]=a; nm[73]=b;
        rw5[a]=1; cl5[a]=1; pd1[a]=1; pb9[a]=1;
        rw7[b]=1; cl7[b]=1; pd1[b]=1; pb2[b]=1;
        stp06C);
        rw7[b]=0; cl7[b]=0; pd1[b]=0; pb2[b]=0;
        rw5[a]=0; cl5[a]=0; pd1[a]=0; pb9[a]=0;}}
}
}

```

```

}
}
/* Set N11 & n111=CC-N11 */
void stp06(){
short a,b;
for(a=0;a<11;a++){b=CC-a;
if((rw1[a]==0)&&(cl11[a]==0)&&(pd11[a]==0)&&(pb11[a]==0)){
if((rw11[b]==0)&&(cl1[b]==0)&&(pd2[b]==0)&&(pb11[b]==0)){
nm[11]=a; nm[111]=b;
rw1[a]=1; cl11[a]=1; pd11[a]=1; pb11[a]=1;
rw11[b]=1; cl1[b]=1; pd2[b]=1; pb11[b]=1;
stp07();
rw11[b]=0; cl1[b]=0; pd2[b]=0; pb11[b]=0;
rw1[a]=0; cl11[a]=0; pd11[a]=0; pb11[a]=0;}}
}
}
/* Set N21 & n101=CC-N21 */
void stp07(){
short a,b;
for(a=0;a<11;a++){b=CC-a;
if((rw2[a]==0)&&(cl10[a]==0)&&(pd9[a]==0)&&(pb11[a]==0)){
if((rw10[b]==0)&&(cl2[b]==0)&&(pd4[b]==0)&&(pb11[b]==0)){
nm[21]=a; nm[101]=b;
rw2[a]=1; cl10[a]=1; pd9[a]=1; pb11[a]=1;
rw10[b]=1; cl2[b]=1; pd4[b]=1; pb11[b]=1;
stp08();
rw10[b]=0; cl2[b]=0; pd4[b]=0; pb11[b]=0;
rw2[a]=0; cl10[a]=0; pd9[a]=0; pb11[a]=0;}}
}
}
/* Set N31 & n91=CC-N31 */
void stp08(){
short a,b;
for(a=0;a<11;a++){b=CC-a;
if((rw3[a]==0)&&(cl9[a]==0)&&(pd7[a]==0)&&(pb11[a]==0)){
if((rw9[b]==0)&&(cl3[b]==0)&&(pd6[b]==0)&&(pb11[b]==0)){
nm[31]=a; nm[91]=b;
rw3[a]=1; cl9[a]=1; pd7[a]=1; pb11[a]=1;
rw9[b]=1; cl3[b]=1; pd6[b]=1; pb11[b]=1;
stp09();
rw9[b]=0; cl3[b]=0; pd6[b]=0; pb11[b]=0;
rw3[a]=0; cl9[a]=0; pd7[a]=0; pb11[a]=0;}}
}
}
/* Set N41 & n81=CC-N41 */
void stp09(){
short a,b;
for(a=0;a<11;a++){b=CC-a;
if((rw4[a]==0)&&(cl8[a]==0)&&(pd5[a]==0)&&(pb11[a]==0)){
if((rw8[b]==0)&&(cl4[b]==0)&&(pd8[b]==0)&&(pb11[b]==0)){
nm[41]=a; nm[81]=b;
rw4[a]=1; cl8[a]=1; pd5[a]=1; pb11[a]=1;
rw8[b]=1; cl4[b]=1; pd8[b]=1; pb11[b]=1;
stp10();
rw8[b]=0; cl4[b]=0; pd8[b]=0; pb11[b]=0;
rw4[a]=0; cl8[a]=0; pd5[a]=0; pb11[a]=0;}}
}
}
/* Set N51 & n71=CC-N51 */
void stp10(){
short a,b;
for(a=0;a<11;a++){b=CC-a;
if((rw5[a]==0)&&(cl7[a]==0)&&(pd3[a]==0)&&(pb11[a]==0)){
if((rw7[b]==0)&&(cl5[b]==0)&&(pd10[b]==0)&&(pb11[b]==0)){
nm[51]=a; nm[71]=b;

```

```

        rw5[a]=1; c17[a]=1; pd3[a]=1; pb11[a]=1;
        rw7[b]=1; c15[b]=1; pd10[b]=1; pb11[b]=1;
        stp11();
        rw7[b]=0; c15[b]=0; pd10[b]=0; pb11[b]=0;
        rw5[a]=0; c17[a]=0; pd3[a]=0; pb11[a]=0;}}
    }
}
/* Level 2: */
/* Set N2 & n120=CC-N2 */
void stp11(){
    short a,b;
    for(a=0;a<11;a++){b=CC-a;
        if((rw1[a]==0)&&(c12[a]==0)&&(pd2[a]==0)&&(pb2[a]==0)){
            if((rw11[b]==0)&&(c10[b]==0)&&(pd11[b]==0)&&(pb9[b]==0)){
                nm[2]=a; nm[120]=b;
                rw1[a]=1; c12[a]=1; pd2[a]=1; pb2[a]=1;
                rw11[b]=1; c10[b]=1; pd11[b]=1; pb9[b]=1;
                stp12();
                rw11[b]=0; c10[b]=0; pd11[b]=0; pb9[b]=0;
                rw1[a]=0; c12[a]=0; pd2[a]=0; pb2[a]=0;}}
    }
}
/* Set N3 & n119=CC-N3 */
void stp12(){
    short a,b;
    for(a=0;a<11;a++){b=CC-a;
        if((rw1[a]==0)&&(c13[a]==0)&&(pd3[a]==0)&&(pb3[a]==0)){
            if((rw11[b]==0)&&(c19[b]==0)&&(pd10[b]==0)&&(pb8[b]==0)){
                nm[3]=a; nm[119]=b;
                rw1[a]=1; c13[a]=1; pd3[a]=1; pb3[a]=1;
                rw11[b]=1; c19[b]=1; pd10[b]=1; pb8[b]=1;
                stp13();
                rw11[b]=0; c19[b]=0; pd10[b]=0; pb8[b]=0;
                rw1[a]=0; c13[a]=0; pd3[a]=0; pb3[a]=0;}}
    }
}
/* Set N4 & n118=CC-N4 */
void stp13(){
    short a,b;
    for(a=0;a<11;a++){b=CC-a;
        if((rw1[a]==0)&&(c14[a]==0)&&(pd4[a]==0)&&(pb4[a]==0)){
            if((rw11[b]==0)&&(c18[b]==0)&&(pd9[b]==0)&&(pb7[b]==0)){
                nm[4]=a; nm[118]=b;
                rw1[a]=1; c14[a]=1; pd4[a]=1; pb4[a]=1;
                rw11[b]=1; c18[b]=1; pd9[b]=1; pb7[b]=1;
                stp14();
                rw11[b]=0; c18[b]=0; pd9[b]=0; pb7[b]=0;
                rw1[a]=0; c14[a]=0; pd4[a]=0; pb4[a]=0;}}
    }
}
/* Set N5 & n117=CC-N5 */
void stp14(){
    short a,b;
    for(a=0;a<11;a++){b=CC-a;
        if((rw1[a]==0)&&(c15[a]==0)&&(pd5[a]==0)&&(pb5[a]==0)){
            if((rw11[b]==0)&&(c17[b]==0)&&(pd8[b]==0)&&(pb6[b]==0)){
                nm[5]=a; nm[117]=b;
                rw1[a]=1; c15[a]=1; pd5[a]=1; pb5[a]=1;
                rw11[b]=1; c17[b]=1; pd8[b]=1; pb6[b]=1;
                stp15();
                rw11[b]=0; c17[b]=0; pd8[b]=0; pb6[b]=0;
                rw1[a]=0; c15[a]=0; pd5[a]=0; pb5[a]=0;}}
    }
}
/**/

```

```
/* . . .(skip). . . */
```

As it is too long to print all out, let me skip it. It has such the program modules like above at many as 60 to define all the 121 variables.

#### 4. Sample Solutions of 'Latin' Layer Units for Composing CES11Sml

Here you see the sample list of Latin Squares made by our “New Euler’s Method”.

Please, check if each row, column or pan-diagonal consists of {0, 1, 2, 3, 4, 5, 6, 7, 8, 9 and A} using each number strictly once. And also check if no one would sit adjacent next to the same number in all the 8 directions around it.

But, how many solutions in all could we have got for Latin Squares?

```
** Samples of 'Latin Units' for Composing CES11Sml **
** Calculated and Listed by Kanji Setsuda on Apr. 4, 2010 **
```

1/			2/			3/			4/		
0 A 9 8 7 6 5 4 3 2 1	0 9 7 5 3 1 A 8 6 4 2	0 8 5 2 A 7 4 1 9 6 3	0 7 3 A 6 2 9 5 1 8 4								
2 1 0 A 9 8 7 6 5 4 3	3 1 A 8 6 4 2 0 9 7 5	4 1 9 6 3 0 8 5 2 A 7	5 1 8 4 0 7 3 A 6 2 9								
4 3 2 1 0 A 9 8 7 6 5	6 4 2 0 9 7 5 3 1 A 8	8 5 2 A 7 4 1 9 6 3 0	A 6 2 9 5 1 8 4 0 7 3								
6 5 4 3 2 1 0 A 9 8 7	9 7 5 3 1 A 8 6 4 2 0	1 9 6 3 0 8 5 2 A 7 4	4 0 7 3 A 6 2 9 5 1 8								
8 7 6 5 4 3 2 1 0 A 9	1 A 8 6 4 2 0 9 7 5 3	5 2 A 7 4 1 9 6 3 0 8	9 5 1 8 4 0 7 3 A 6 2								
A 9 8 7 6 5 4 3 2 1 0	4 2 0 9 7 5 3 1 A 8 6	9 6 3 0 8 5 2 A 7 4 1	3 A 6 2 9 5 1 8 4 0 7								
1 0 A 9 8 7 6 5 4 3 2	7 5 3 1 A 8 6 4 2 0 9	2 A 7 4 1 9 6 3 0 8 5	8 4 0 7 3 A 6 2 9 5 1								
3 2 1 0 A 9 8 7 6 5 4	A 8 6 4 2 0 9 7 5 3 1	6 3 0 8 5 2 A 7 4 1 9	2 9 5 1 8 4 0 7 3 A 6								
5 4 3 2 1 0 A 9 8 7 6	2 0 9 7 5 3 1 A 8 6 4	A 7 4 1 9 6 3 0 8 5 2	7 3 A 6 2 9 5 1 8 4 0								
7 6 5 4 3 2 1 0 A 9 8	5 3 1 A 8 6 4 2 0 9 7	3 0 8 5 2 A 7 4 1 9 6	1 8 4 0 7 3 A 6 2 9 5								
9 8 7 6 5 4 3 2 1 0 A	8 6 4 2 0 9 7 5 3 1 A	7 4 1 9 6 3 0 8 5 2 A	6 2 9 5 1 8 4 0 7 3 A								

5/			6/			7/			8/		
0 5 A 4 9 3 8 2 7 1 6	0 4 8 1 5 9 2 6 A 3 7	0 3 6 9 1 4 7 A 2 5 8	0 2 4 6 8 A 1 3 5 7 9								
7 1 6 0 5 A 4 9 3 8 2	8 1 5 9 2 6 A 3 7 0 4	9 1 4 7 A 2 5 8 0 3 6	A 1 3 5 7 9 0 2 4 6 8								
3 8 2 7 1 6 0 5 A 4 9	5 9 2 6 A 3 7 0 4 8 1	7 A 2 5 8 0 3 6 9 1 4	9 0 2 4 6 8 A 1 3 5 7								
A 4 9 3 8 2 7 1 6 0 5	2 6 A 3 7 0 4 8 1 5 9	5 8 0 3 6 9 1 4 7 A 2	8 A 1 3 5 7 9 0 2 4 6								
6 0 5 A 4 9 3 8 2 7 1	A 3 7 0 4 8 1 5 9 2 6	3 6 9 1 4 7 A 2 5 8 0	7 9 0 2 4 6 8 A 1 3 5								
2 7 1 6 0 5 A 4 9 3 8	7 0 4 8 1 5 9 2 6 A 3	1 4 7 A 2 5 8 0 3 6 9	6 8 A 1 3 5 7 9 0 2 4								
9 3 8 2 7 1 6 0 5 A 4	4 8 1 5 9 2 6 A 3 7 0	A 2 5 8 0 3 6 9 1 4 7	5 7 9 0 2 4 6 8 A 1 3								
5 A 4 9 3 8 2 7 1 6 0	1 5 9 2 6 A 3 7 0 4 8	8 0 3 6 9 1 4 7 A 2 5	4 6 8 A 1 3 5 7 9 0 2								
1 6 0 5 A 4 9 3 8 2 7	9 2 6 A 3 7 0 4 8 1 5	6 9 1 4 7 A 2 5 8 0 3	3 5 7 9 0 2 4 6 8 A 1								
8 2 7 1 6 0 5 A 4 9 3	6 A 3 7 0 4 8 1 5 9 2	4 7 A 2 5 8 0 3 6 9 1	2 4 6 8 A 1 3 5 7 9 0								
4 9 3 8 2 7 1 6 0 5 A	3 7 0 4 8 1 5 9 2 6 A	2 5 8 0 3 6 9 1 4 7 A	1 3 5 7 9 0 2 4 6 8 A								

9/			10/			11/			12/		
0 A 9 8 7 4 5 6 3 2 1	0 9 7 5 3 1 A 8 4 6 2	0 8 5 2 A 7 6 1 9 4 3	0 5 A 6 9 3 8 2 7 1 4								
2 1 0 A 9 8 7 4 5 6 3	3 1 A 8 4 6 2 0 9 7 5	6 1 9 4 3 0 8 5 2 A 7	7 1 4 0 5 A 6 9 3 8 2								
6 3 2 1 0 A 9 8 7 4 5	4 6 2 0 9 7 5 3 1 A 8	8 5 2 A 7 6 1 9 4 3 0	3 8 2 7 1 4 0 5 A 6 9								
4 5 6 3 2 1 0 A 9 8 7	9 7 5 3 1 A 8 4 6 2 0	1 9 4 3 0 8 5 2 A 7 6	A 6 9 3 8 2 7 1 4 0 5								
8 7 4 5 6 3 2 1 0 A 9	1 A 8 4 6 2 0 9 7 5 3	5 2 A 7 6 1 9 4 3 0 8	4 0 5 A 6 9 3 8 2 7 1								
A 9 8 7 4 5 6 3 2 1 0	6 2 0 9 7 5 3 1 A 8 4	9 4 3 0 8 5 2 A 7 6 1	2 7 1 4 0 5 A 6 9 3 8								
1 0 A 9 8 7 4 5 6 3 2	7 5 3 1 A 8 4 6 2 0 9	2 A 7 6 1 9 4 3 0 8 5	9 3 8 2 7 1 4 0 5 A 6								
3 2 1 0 A 9 8 7 4 5 6	A 8 4 6 2 0 9 7 5 3 1	4 3 0 8 5 2 A 7 6 1 9	5 A 6 9 3 8 2 7 1 4 0								
5 6 3 2 1 0 A 9 8 7 4	2 0 9 7 5 3 1 A 8 4 6	A 7 6 1 9 4 3 0 8 5 2	1 4 0 5 A 6 9 3 8 2 7								
7 4 5 6 3 2 1 0 A 9 8	5 3 1 A 8 4 6 2 0 9 7	3 0 8 5 2 A 7 6 1 9 4	8 2 7 1 4 0 5 A 6 9 3								
9 8 7 4 5 6 3 2 1 0 A	8 4 6 2 0 9 7 5 3 1 A	7 6 1 9 4 3 0 8 5 2 A	6 9 3 8 2 7 1 4 0 5 A								

.....

To my embarrassment, I found our “New Euler’s Method” was too slow to make all the solutions in a reasonably short time. It really took more than several hours to make 90 solutions and it did not seem to come to an end very soon. It seemed hard to check all the conditions whenever each of 121 data was set under the strict rules.

I had to give it up on my way and try to find any other method.

What else effective do we have for the method of composing our Latin Squares fast? How about using the “Knight’s Tour Composition”? Do you remember that [we once succeeded in making our objects of Order 5 and 7 by those unique methods?](#)

Why don’t we find such the methods of transformation that we could make all the Latin Squares of Order 11 only from a Primary Diagonal?

# What regularity can we find among these samples of Latin Squares, then?

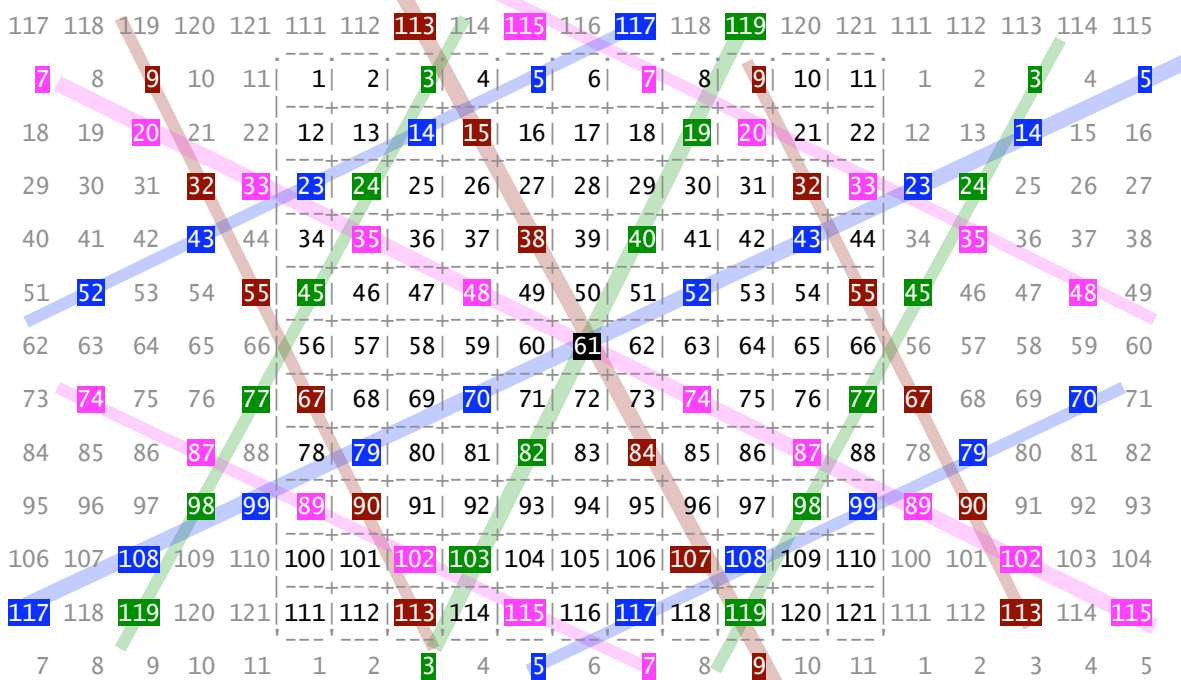
## \*\* Samples of 'Latin Units' for Composing CES11Sm1 \*\*

<p>1/                  0 A 9 8 7 6 5 4 3 2 1                  2 1 0 A 9 8 7 6 5 4 3                  4 3 2 1 0 A 9 8 7 6 5                  6 5 4 3 2 1 0 A 9 8 7                  8 7 6 5 4 3 2 1 0 A 9                  A 9 8 7 6 5 4 3 2 1 0                  1 0 A 9 8 7 6 5 4 3 2                  3 2 1 0 A 9 8 7 6 5 4                  5 4 3 2 1 0 A 9 8 7 6                  7 6 5 4 3 2 1 0 A 9 8                  9 8 7 6 5 4 3 2 1 0 A</p>	<p>2/                  0 9 7 5 3 1 A 8 6 4 2                  3 1 A 8 6 4 2 0 9 7 5                  6 4 2 0 9 7 5 3 1 A 8                  9 7 5 3 1 A 8 6 4 2 0                  1 A 8 6 4 2 0 9 7 5 3                  4 2 0 9 7 5 3 1 A 8 6                  7 5 3 1 A 8 6 4 2 0 9                  A 8 6 4 2 0 9 7 5 3 1                  2 0 9 7 5 3 1 A 8 6 4                  5 3 1 A 8 6 4 2 0 9 7                  8 6 4 2 0 9 7 5 3 1 A</p>	<p>3/                  0 8 5 2 A 7 4 1 9 6 3                  4 1 9 6 3 0 8 5 2 A 7                  8 5 2 A 7 4 1 9 6 3 0                  1 9 6 3 0 8 5 2 A 7 4                  5 2 A 7 4 1 9 6 3 0 8                  9 6 3 0 8 5 2 A 7 4 1                  2 A 7 4 1 9 6 3 0 8 5                  6 3 0 8 5 2 A 7 4 1 9                  A 7 4 1 9 6 3 0 8 5 2                  3 0 8 5 2 A 7 4 1 9 6                  7 4 1 9 6 3 0 8 5 2 A</p>	<p>4/                  0 7 3 A 6 2 9 5 1 8 4                  5 1 8 4 0 7 3 A 6 2 9                  A 6 2 9 5 1 8 4 0 7 3                  4 0 7 3 A 6 2 9 5 1 8                  9 5 1 8 4 0 7 3 A 6 2                  3 A 6 2 9 5 1 8 4 0 7                  8 4 0 7 3 A 6 2 9 5 1                  2 9 5 1 8 4 0 7 3 A 6                  7 3 A 6 2 9 5 1 8 4 0                  1 8 4 0 7 3 A 6 2 9 5                  6 2 9 5 1 8 4 0 7 3 A</p>
<p>5/                  0 5 A 4 9 3 8 2 7 1 6                  7 1 6 0 5 A 4 9 3 8 2                  3 8 2 7 1 6 0 5 A 4 9                  A 4 9 3 8 2 7 1 6 0 5                  6 0 5 A 4 9 3 8 2 7 1                  2 7 1 6 0 5 A 4 9 3 8                  9 3 8 2 7 1 6 0 5 A 4                  5 A 4 9 3 8 2 7 1 6 0                  1 6 0 5 A 4 9 3 8 2 7                  8 2 7 1 6 0 5 A 4 9 3                  4 9 3 8 2 7 1 6 0 5 A</p>	<p>6/                  0 4 8 1 5 9 2 6 A 3 7                  8 1 5 9 2 6 A 3 7 0 4                  5 9 2 6 A 3 7 0 4 8 1                  2 6 A 3 7 0 4 8 1 5 9                  A 3 7 0 4 8 1 5 9 2 6                  7 0 4 8 1 5 9 2 6 A 3                  4 8 1 5 9 2 6 A 3 7 0                  1 5 9 2 6 A 3 7 0 4 8                  9 2 6 A 3 7 0 4 8 1 5                  6 A 3 7 0 4 8 1 5 9 2                  3 7 0 4 8 1 5 9 2 6 A</p>	<p>7/                  0 3 6 9 1 4 7 A 2 5 8                  9 1 4 7 A 2 5 8 0 3 6                  7 A 2 5 8 0 3 6 9 1 4                  5 8 0 3 6 9 1 4 7 A 2                  3 6 9 1 4 7 A 2 5 8 0                  1 4 7 A 2 5 8 0 3 6 9                  A 2 5 8 0 3 6 9 1 4 7                  8 0 3 6 9 1 4 7 A 2 5                  6 9 1 4 7 A 2 5 8 0 3                  4 7 A 2 5 8 0 3 6 9 1                  2 5 8 0 3 6 9 1 4 7 A</p>	<p>8/                  0 2 4 6 8 A 1 3 5 7 9                  A 1 3 5 7 9 0 2 4 6 8                  9 0 2 4 6 8 A 1 3 5 7                  8 A 1 3 5 7 9 0 2 4 6                  7 9 0 2 4 6 8 A 1 3 5                  6 8 A 1 3 5 7 9 0 2 4                  5 7 9 0 2 4 6 8 A 1 3                  4 6 8 A 1 3 5 7 9 0 2                  3 5 7 9 0 2 4 6 8 A 1                  2 4 6 8 A 1 3 5 7 9 0                  1 3 5 7 9 0 2 4 6 8 A</p>
<p>9/                  0 A 9 8 7 4 5 6 3 2 1                  2 1 0 A 9 8 7 4 5 6 3                  6 3 2 1 0 A 9 8 7 4 5                  4 5 6 3 2 1 0 A 9 8 7                  8 7 4 5 6 3 2 1 0 A 9                  A 9 8 7 4 5 6 3 2 1 0                  1 0 A 9 8 7 4 5 6 3 2                  3 2 1 0 A 9 8 7 4 5 6                  5 6 3 2 1 0 A 9 8 7 4                  7 4 5 6 3 2 1 0 A 9 8                  9 8 7 4 5 6 3 2 1 0 A</p>	<p>10/                  0 9 7 5 3 1 A 8 4 6 2                  3 1 A 8 4 6 2 0 9 7 5                  4 6 2 0 9 7 5 3 1 A 8                  9 7 5 3 1 A 8 4 6 2 0                  1 A 8 4 6 2 0 9 7 5 3                  6 2 0 9 7 5 3 1 A 8 4                  7 5 3 1 A 8 4 6 2 0 9                  A 8 4 6 2 0 9 7 5 3 1                  2 0 9 7 5 3 1 A 8 4 6                  5 3 1 A 8 4 6 2 0 9 7                  8 4 6 2 0 9 7 5 3 1 A</p>	<p>11/                  0 8 5 2 A 7 6 1 9 4 3                  6 1 9 4 3 0 8 5 2 A 7                  8 5 2 A 7 6 1 9 4 3 0                  1 9 4 3 0 8 5 2 A 7 6                  5 2 A 7 6 1 9 4 3 0 8                  9 4 3 0 8 5 2 A 7 6 1                  2 A 7 6 1 9 4 3 0 8 5                  4 3 0 8 5 2 A 7 6 1 9                  A 7 6 1 9 4 3 0 8 5 2                  3 0 8 5 2 A 7 6 1 9 4                  7 6 1 9 4 3 0 8 5 2 A</p>	<p>12/                  0 5 A 6 9 3 8 2 7 1 4                  7 1 4 0 5 A 6 9 3 8 2                  3 8 2 7 1 4 0 5 A 6 9                  A 6 9 3 8 2 7 1 4 0 5                  4 0 5 A 6 9 3 8 2 7 1                  2 7 1 4 0 5 A 6 9 3 8                  9 3 8 2 7 1 4 0 5 A 6                  5 A 6 9 3 8 2 7 1 4 0                  1 4 0 5 A 6 9 3 8 2 7                  8 2 7 1 4 0 5 A 6 9 3                  6 9 3 8 2 7 1 4 0 5 A</p>
<p>13/                  0 7 3 A 4 2 9 5 1 8 6                  5 1 8 6 0 7 3 A 4 2 9                  A 4 2 9 5 1 8 6 0 7 3                  6 0 7 3 A 4 2 9 5 1 8                  9 5 1 8 6 0 7 3 A 4 2                  3 A 4 2 9 5 1 8 6 0 7                  8 6 0 7 3 A 4 2 9 5 1                  2 9 5 1 8 6 0 7 3 A 4                  7 3 A 4 2 9 5 1 8 6 0                  1 8 6 0 7 3 A 4 2 9 5                  4 2 9 5 1 8 6 0 7 3 A</p>	<p>14/                  0 6 8 1 5 9 2 4 A 3 7                  8 1 5 9 2 4 A 3 7 0 6                  5 9 2 4 A 3 7 0 6 8 1                  2 4 A 3 7 0 6 8 1 5 9                  A 3 7 0 6 8 1 5 9 2 4                  7 0 6 8 1 5 9 2 4 A 3                  6 8 1 5 9 2 4 A 3 7 0                  1 5 9 2 4 A 3 7 0 6 8                  9 2 4 A 3 7 0 6 8 1 5                  4 A 3 7 0 6 8 1 5 9 2                  3 7 0 6 8 1 5 9 2 4 A</p>	<p>15/                  0 3 4 9 1 6 7 A 2 5 8                  9 1 6 7 A 2 5 8 0 3 4                  7 A 2 5 8 0 3 4 9 1 6                  5 8 0 3 4 9 1 6 7 A 2                  3 4 9 1 6 7 A 2 5 8 0                  1 6 7 A 2 5 8 0 3 4 9                  A 2 5 8 0 3 4 9 1 6 7                  8 0 3 4 9 1 6 7 A 2 5                  4 9 1 6 7 A 2 5 8 0 3                  6 7 A 2 5 8 0 3 4 9 1                  2 5 8 0 3 4 9 1 6 7 A</p>	<p>16/                  0 2 6 4 8 A 1 3 5 7 9                  A 1 3 5 7 9 0 2 6 4 8                  9 0 2 6 4 8 A 1 3 5 7                  8 A 1 3 5 7 9 0 2 6 4                  7 9 0 2 6 4 8 A 1 3 5                  4 8 A 1 3 5 7 9 0 2 6                  5 7 9 0 2 6 4 8 A 1 3                  6 4 8 A 1 3 5 7 9 0 2                  3 5 7 9 0 2 6 4 8 A 1                  2 6 4 8 A 1 3 5 7 9 0                  1 3 5 7 9 0 2 6 4 8 A</p>
<p>17/                  0 A 9 8 6 7 5 3 4 2 1                  2 1 0 A 9 8 6 7 5 3 4                  3 4 2 1 0 A 9 8 6 7 5                  7 5 3 4 2 1 0 A 9 8 6                  8 6 7 5 3 4 2 1 0 A 9                  A 9 8 6 7 5 3 4 2 1 0                  1 0 A 9 8 6 7 5 3 4 2                  4 2 1 0 A 9 8 6 7 5 3                  5 3 4 2 1 0 A 9 8 6 7                  6 7 5 3 4 2 1 0 A 9 8                  9 8 6 7 5 3 4 2 1 0 A</p>	<p>18/                  0 9 6 5 4 1 A 8 7 3 2                  4 1 A 8 7 3 2 0 9 6 5                  7 3 2 0 9 6 5 4 1 A 8                  9 6 5 4 1 A 8 7 3 2 0                  1 A 8 7 3 2 0 9 6 5 4                  3 2 0 9 6 5 4 1 A 8 7                  6 5 4 1 A 8 7 3 2 0 9                  A 8 7 3 2 0 9 6 5 4 1                  2 0 9 6 5 4 1 A 8 7 3                  5 4 1 A 8 7 3 2 0 9 6                  8 7 3 2 0 9 6 5 4 1 A</p>	<p>19/                  0 6 4 A 7 2 9 5 1 8 3                  5 1 8 3 0 6 4 A 7 2 9                  A 7 2 9 5 1 8 3 0 6 4                  3 0 6 4 A 7 2 9 5 1 8                  9 5 1 8 3 0 6 4 A 7 2                  4 A 7 2 9 5 1 8 3 0 6                  8 3 0 6 4 A 7 2 9 5 1                  2 9 5 1 8 3 0 6 4 A 7                  6 4 A 7 2 9 5 1 8 3 0                  1 8 3 0 6 4 A 7 2 9 5                  7 2 9 5 1 8 3 0 6 4 A</p>	<p>20/                  0 8 5 2 A 6 3 1 9 7 4                  3 1 9 7 4 0 8 5 2 A 6                  8 5 2 A 6 3 1 9 7 4 0                  1 9 7 4 0 8 5 2 A 6 3                  5 2 A 6 3 1 9 7 4 0 8                  9 7 4 0 8 5 2 A 6 3 1                  2 A 6 3 1 9 7 4 0 8 5                  7 4 0 8 5 2 A 6 3 1 9                  A 6 3 1 9 7 4 0 8 5 2                  4 0 8 5 2 A 6 3 1 9 7                  6 3 1 9 7 4 0 8 5 2 A</p>

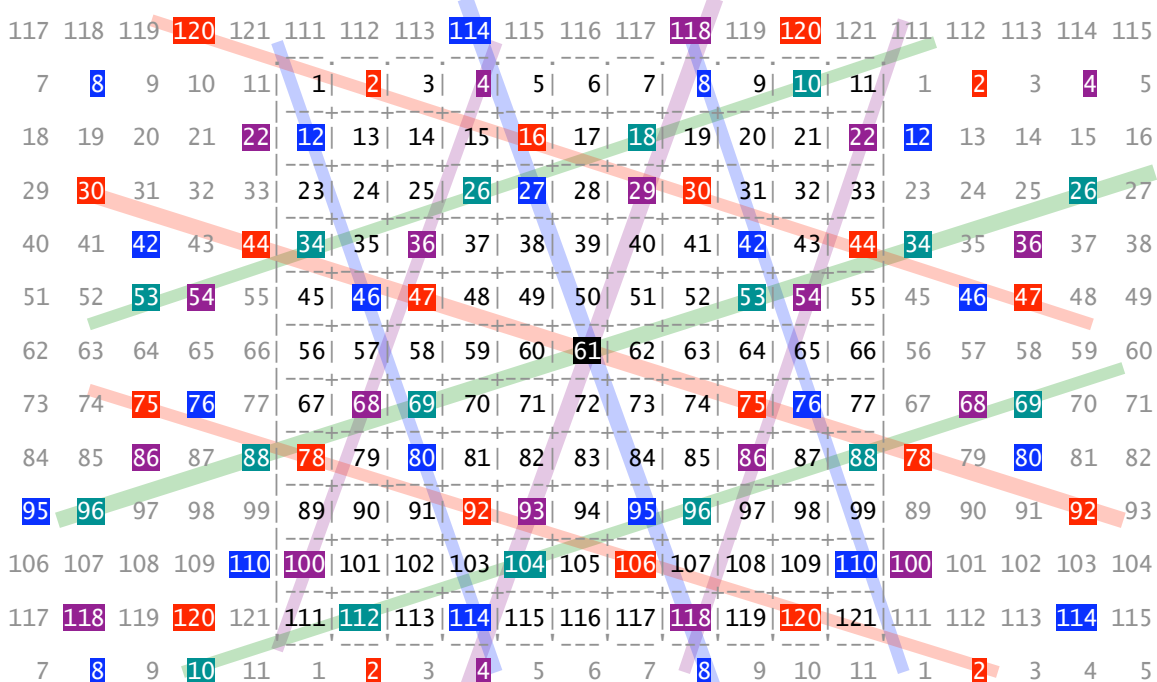


21/	22/	23/	24/
0 3 8 1 5 9 2 7 A 4 6	0 5 A 3 9 4 8 2 6 1 7	0 4 7 9 1 3 6 A 2 5 8	0 2 3 7 8 A 1 4 5 6 9
8 1 5 9 2 7 A 4 6 0 3	6 1 7 0 5 A 3 9 4 8 2	9 1 3 6 A 2 5 8 0 4 7	A 1 4 5 6 9 0 2 3 7 8
5 9 2 7 A 4 6 0 3 8 1	4 8 2 6 1 7 0 5 A 3 9	6 A 2 5 8 0 4 7 9 1 3	9 0 2 3 7 8 A 1 4 5 6
2 7 A 4 6 0 3 8 1 5 9	A 3 9 4 8 2 6 1 7 0 5	5 8 0 4 7 9 1 3 6 A 2	8 A 1 4 5 6 9 0 2 3 7
A 4 6 0 3 8 1 5 9 2 7	7 0 5 A 3 9 4 8 2 6 1	4 7 9 1 3 6 A 2 5 8 0	6 9 0 2 3 7 8 A 1 4 5
6 0 3 8 1 5 9 2 7 A 4	2 6 1 7 0 5 A 3 9 4 8	1 3 6 A 2 5 8 0 4 7 9	7 8 A 1 4 5 6 9 0 2 3
3 8 1 5 9 2 7 A 4 6 0	9 4 8 2 6 1 7 0 5 A 3	A 2 5 8 0 4 7 9 1 3 6	5 6 9 0 2 3 7 8 A 1 4
1 5 9 2 7 A 4 6 0 3 8	5 A 3 9 4 8 2 6 1 7 0	8 0 4 7 9 1 3 6 A 2 5	3 7 8 A 1 4 5 6 9 0 2
9 2 7 A 4 6 0 3 8 1 5	1 7 0 5 A 3 9 4 8 2 6	7 9 1 3 6 A 2 5 8 0 4	4 5 6 9 0 2 3 7 8 A 1
7 A 4 6 0 3 8 1 5 9 2	8 2 6 1 7 0 5 A 3 9 4	3 6 A 2 5 8 0 4 7 9 1	2 3 7 8 A 1 4 5 6 9 0
4 6 0 3 8 1 5 9 2 7 A	3 9 4 8 2 6 1 7 0 5 A	2 5 8 0 4 7 9 1 3 6 A	1 4 5 6 9 0 2 3 7 8 A

\*\* Conceptual Diagram: Where are the Same Values placed in the Square? \*\*



\*\* Conceptual Diagram 2: \*\*



## 5. Define the Transformation System: New “Knight’s Tour Compositions”

Watch those diagrams above carefully, and find eight different Latin Squares could come for every First Primary Diagonal, will you?

It means we can compose eight Latin Units from every single Primary Diagonal.

I extracted the 8 Transformation rules dictated as below.

Put the data of primary diagonal onto the array p[11] and call these Transformation procedures below. And each of them would copy the diagonal data to every regular positions and make all into the Latin Squares. Both single set of diagonal data and the next 8 procedures of transformation should make our 8 Latin Units every time.

```
/**/  
/** List of the Eight Transformations: “Knight's Tour Compositions” **/  
void tp1(){  
  short v;  
  v=p[1]; n[1]=v; n[14]=v; n[27]=v; n[40]=v; n[53]=v; n[66]=v; n[68]=v; n[81]=v; n[94]=v; n[107]=v; n[120]=v;  
  v=p[2]; n[11]=v; n[13]=v; n[26]=v; n[39]=v; n[52]=v; n[65]=v; n[67]=v; n[80]=v; n[93]=v; n[106]=v; n[119]=v;  
  v=p[3]; n[10]=v; n[12]=v; n[25]=v; n[38]=v; n[51]=v; n[64]=v; n[77]=v; n[79]=v; n[92]=v; n[105]=v; n[118]=v;  
  v=p[4]; n[9]=v; n[22]=v; n[24]=v; n[37]=v; n[50]=v; n[63]=v; n[76]=v; n[78]=v; n[91]=v; n[104]=v; n[117]=v;  
  v=p[5]; n[8]=v; n[21]=v; n[23]=v; n[36]=v; n[49]=v; n[62]=v; n[75]=v; n[88]=v; n[90]=v; n[103]=v; n[116]=v;  
  v=p[6]; n[7]=v; n[20]=v; n[33]=v; n[35]=v; n[48]=v; n[61]=v; n[74]=v; n[87]=v; n[89]=v; n[102]=v; n[115]=v;  
  v=p[7]; n[6]=v; n[19]=v; n[32]=v; n[34]=v; n[47]=v; n[60]=v; n[73]=v; n[86]=v; n[99]=v; n[101]=v; n[114]=v;  
  v=p[8]; n[5]=v; n[18]=v; n[31]=v; n[44]=v; n[46]=v; n[59]=v; n[72]=v; n[85]=v; n[98]=v; n[100]=v; n[113]=v;  
  v=p[9]; n[4]=v; n[17]=v; n[30]=v; n[43]=v; n[45]=v; n[58]=v; n[71]=v; n[84]=v; n[97]=v; n[110]=v; n[112]=v;  
  v=p[10]; n[3]=v; n[16]=v; n[29]=v; n[42]=v; n[55]=v; n[57]=v; n[70]=v; n[83]=v; n[96]=v; n[109]=v; n[111]=v;  
  v=p[11]; n[2]=v; n[15]=v; n[28]=v; n[41]=v; n[54]=v; n[56]=v; n[69]=v; n[82]=v; n[95]=v; n[108]=v; n[121]=v;  
};  
void tp2(){  
  short v;  
  v=p[1]; n[1]=v; n[19]=v; n[26]=v; n[44]=v; n[51]=v; n[58]=v; n[76]=v; n[83]=v; n[90]=v; n[108]=v; n[115]=v;  
  v=p[2]; n[6]=v; n[13]=v; n[31]=v; n[38]=v; n[45]=v; n[63]=v; n[70]=v; n[88]=v; n[95]=v; n[102]=v; n[120]=v;  
  v=p[3]; n[11]=v; n[18]=v; n[25]=v; n[43]=v; n[50]=v; n[57]=v; n[75]=v; n[82]=v; n[89]=v; n[107]=v; n[114]=v;  
  v=p[4]; n[5]=v; n[12]=v; n[30]=v; n[37]=v; n[55]=v; n[62]=v; n[69]=v; n[87]=v; n[94]=v; n[101]=v; n[119]=v;  
  v=p[5]; n[10]=v; n[17]=v; n[24]=v; n[42]=v; n[49]=v; n[56]=v; n[74]=v; n[81]=v; n[99]=v; n[106]=v; n[113]=v;  
  v=p[6]; n[4]=v; n[22]=v; n[29]=v; n[36]=v; n[54]=v; n[61]=v; n[68]=v; n[86]=v; n[93]=v; n[100]=v; n[118]=v;  
  v=p[7]; n[9]=v; n[16]=v; n[23]=v; n[41]=v; n[48]=v; n[66]=v; n[73]=v; n[80]=v; n[98]=v; n[105]=v; n[112]=v;  
  v=p[8]; n[3]=v; n[21]=v; n[28]=v; n[35]=v; n[53]=v; n[60]=v; n[67]=v; n[85]=v; n[92]=v; n[110]=v; n[117]=v;  
  v=p[9]; n[8]=v; n[15]=v; n[33]=v; n[40]=v; n[47]=v; n[65]=v; n[72]=v; n[79]=v; n[97]=v; n[104]=v; n[111]=v;  
  v=p[10]; n[2]=v; n[20]=v; n[27]=v; n[34]=v; n[52]=v; n[59]=v; n[77]=v; n[84]=v; n[91]=v; n[109]=v; n[116]=v;  
  v=p[11]; n[7]=v; n[14]=v; n[32]=v; n[39]=v; n[46]=v; n[64]=v; n[71]=v; n[78]=v; n[96]=v; n[103]=v; n[121]=v;  
};  
void tp3(){  
  short v;  
  v=p[1]; n[1]=v; n[17]=v; n[33]=v; n[38]=v; n[54]=v; n[59]=v; n[75]=v; n[80]=v; n[96]=v; n[101]=v; n[117]=v;  
  v=p[2]; n[8]=v; n[13]=v; n[29]=v; n[34]=v; n[50]=v; n[66]=v; n[71]=v; n[87]=v; n[92]=v; n[108]=v; n[113]=v;  
  v=p[3]; n[4]=v; n[20]=v; n[25]=v; n[41]=v; n[46]=v; n[62]=v; n[67]=v; n[83]=v; n[99]=v; n[104]=v; n[120]=v;  
  v=p[4]; n[11]=v; n[16]=v; n[32]=v; n[37]=v; n[53]=v; n[58]=v; n[74]=v; n[79]=v; n[95]=v; n[100]=v; n[116]=v;  
  v=p[5]; n[7]=v; n[12]=v; n[28]=v; n[44]=v; n[49]=v; n[65]=v; n[70]=v; n[86]=v; n[91]=v; n[107]=v; n[112]=v;  
  v=p[6]; n[3]=v; n[19]=v; n[24]=v; n[40]=v; n[45]=v; n[61]=v; n[77]=v; n[82]=v; n[98]=v; n[103]=v; n[119]=v;  
  v=p[7]; n[10]=v; n[15]=v; n[31]=v; n[36]=v; n[52]=v; n[57]=v; n[73]=v; n[78]=v; n[94]=v; n[110]=v; n[115]=v;  
  v=p[8]; n[6]=v; n[22]=v; n[27]=v; n[43]=v; n[48]=v; n[64]=v; n[69]=v; n[85]=v; n[90]=v; n[106]=v; n[111]=v;  
  v=p[9]; n[2]=v; n[18]=v; n[23]=v; n[39]=v; n[55]=v; n[60]=v; n[76]=v; n[81]=v; n[97]=v; n[102]=v; n[118]=v;  
  v=p[10]; n[9]=v; n[14]=v; n[30]=v; n[35]=v; n[51]=v; n[56]=v; n[72]=v; n[88]=v; n[93]=v; n[109]=v; n[114]=v;  
  v=p[11]; n[5]=v; n[21]=v; n[26]=v; n[42]=v; n[47]=v; n[63]=v; n[68]=v; n[84]=v; n[89]=v; n[105]=v; n[121]=v;  
};  
void tp4(){  
  short v;  
  v=p[1]; n[1]=v; n[16]=v; n[31]=v; n[35]=v; n[50]=v; n[65]=v; n[69]=v; n[84]=v; n[99]=v; n[103]=v; n[118]=v;  
  v=p[2]; n[9]=v; n[13]=v; n[28]=v; n[43]=v; n[47]=v; n[62]=v; n[77]=v; n[81]=v; n[96]=v; n[100]=v; n[115]=v;  
  v=p[3]; n[6]=v; n[21]=v; n[25]=v; n[40]=v; n[55]=v; n[59]=v; n[74]=v; n[78]=v; n[93]=v; n[108]=v; n[112]=v;  
  v=p[4]; n[3]=v; n[18]=v; n[33]=v; n[37]=v; n[52]=v; n[56]=v; n[71]=v; n[86]=v; n[90]=v; n[105]=v; n[120]=v;  
  v=p[5]; n[11]=v; n[15]=v; n[30]=v; n[34]=v; n[49]=v; n[64]=v; n[68]=v; n[83]=v; n[98]=v; n[102]=v; n[117]=v;  
  v=p[6]; n[8]=v; n[12]=v; n[27]=v; n[42]=v; n[46]=v; n[61]=v; n[76]=v; n[80]=v; n[95]=v; n[110]=v; n[114]=v;  
  v=p[7]; n[5]=v; n[20]=v; n[24]=v; n[39]=v; n[54]=v; n[58]=v; n[73]=v; n[88]=v; n[92]=v; n[107]=v; n[111]=v;  
  v=p[8]; n[2]=v; n[17]=v; n[32]=v; n[36]=v; n[51]=v; n[56]=v; n[70]=v; n[85]=v; n[89]=v; n[104]=v; n[119]=v;  
  v=p[9]; n[10]=v; n[14]=v; n[29]=v; n[44]=v; n[48]=v; n[63]=v; n[67]=v; n[82]=v; n[97]=v; n[101]=v; n[116]=v;  
  v=p[10]; n[7]=v; n[22]=v; n[26]=v; n[41]=v; n[45]=v; n[60]=v; n[75]=v; n[79]=v; n[94]=v; n[109]=v; n[113]=v;  
  v=p[11]; n[4]=v; n[19]=v; n[23]=v; n[38]=v; n[53]=v; n[57]=v; n[72]=v; n[87]=v; n[91]=v; n[106]=v; n[121]=v;  
};
```

```

void tp5(){
short v;
v=p[1]; n[1]=v; n[15]=v; n[29]=v; n[43]=v; n[46]=v; n[60]=v; n[74]=v; n[88]=v; n[91]=v; n[105]=v; n[119]=v;
v=p[2]; n[10]=v; n[13]=v; n[27]=v; n[41]=v; n[55]=v; n[58]=v; n[72]=v; n[86]=v; n[89]=v; n[103]=v; n[117]=v;
v=p[3]; n[8]=v; n[22]=v; n[25]=v; n[39]=v; n[53]=v; n[56]=v; n[70]=v; n[84]=v; n[98]=v; n[101]=v; n[115]=v;
v=p[4]; n[6]=v; n[20]=v; n[23]=v; n[37]=v; n[51]=v; n[65]=v; n[68]=v; n[82]=v; n[96]=v; n[110]=v; n[113]=v;
v=p[5]; n[4]=v; n[18]=v; n[32]=v; n[35]=v; n[49]=v; n[63]=v; n[77]=v; n[80]=v; n[94]=v; n[108]=v; n[111]=v;
v=p[6]; n[2]=v; n[16]=v; n[30]=v; n[44]=v; n[47]=v; n[61]=v; n[75]=v; n[78]=v; n[92]=v; n[106]=v; n[120]=v;
v=p[7]; n[11]=v; n[14]=v; n[28]=v; n[42]=v; n[45]=v; n[59]=v; n[73]=v; n[87]=v; n[90]=v; n[104]=v; n[118]=v;
v=p[8]; n[9]=v; n[12]=v; n[26]=v; n[40]=v; n[54]=v; n[57]=v; n[71]=v; n[85]=v; n[99]=v; n[102]=v; n[116]=v;
v=p[9]; n[7]=v; n[21]=v; n[24]=v; n[38]=v; n[52]=v; n[66]=v; n[69]=v; n[83]=v; n[97]=v; n[100]=v; n[114]=v;
v=p[10]; n[5]=v; n[19]=v; n[33]=v; n[36]=v; n[50]=v; n[64]=v; n[67]=v; n[81]=v; n[95]=v; n[109]=v; n[112]=v;
v=p[11]; n[3]=v; n[17]=v; n[31]=v; n[34]=v; n[48]=v; n[62]=v; n[76]=v; n[79]=v; n[93]=v; n[107]=v; n[121]=v;
};
void tp6(){
short v;
v=p[1]; n[1]=v; n[21]=v; n[30]=v; n[39]=v; n[48]=v; n[57]=v; n[77]=v; n[86]=v; n[95]=v; n[104]=v; n[113]=v;
v=p[2]; n[4]=v; n[13]=v; n[33]=v; n[42]=v; n[51]=v; n[60]=v; n[69]=v; n[78]=v; n[98]=v; n[107]=v; n[116]=v;
v=p[3]; n[7]=v; n[16]=v; n[25]=v; n[34]=v; n[54]=v; n[63]=v; n[72]=v; n[81]=v; n[90]=v; n[110]=v; n[119]=v;
v=p[4]; n[10]=v; n[19]=v; n[28]=v; n[37]=v; n[46]=v; n[66]=v; n[75]=v; n[84]=v; n[93]=v; n[102]=v; n[111]=v;
v=p[5]; n[2]=v; n[22]=v; n[31]=v; n[40]=v; n[49]=v; n[58]=v; n[67]=v; n[87]=v; n[96]=v; n[105]=v; n[114]=v;
v=p[6]; n[5]=v; n[14]=v; n[23]=v; n[43]=v; n[52]=v; n[61]=v; n[70]=v; n[79]=v; n[99]=v; n[108]=v; n[117]=v;
v=p[7]; n[8]=v; n[17]=v; n[26]=v; n[35]=v; n[55]=v; n[64]=v; n[73]=v; n[82]=v; n[91]=v; n[100]=v; n[120]=v;
v=p[8]; n[11]=v; n[20]=v; n[29]=v; n[38]=v; n[47]=v; n[56]=v; n[76]=v; n[85]=v; n[94]=v; n[103]=v; n[112]=v;
v=p[9]; n[3]=v; n[12]=v; n[32]=v; n[41]=v; n[50]=v; n[59]=v; n[68]=v; n[88]=v; n[97]=v; n[106]=v; n[115]=v;
v=p[10]; n[6]=v; n[15]=v; n[24]=v; n[44]=v; n[53]=v; n[62]=v; n[71]=v; n[80]=v; n[89]=v; n[109]=v; n[118]=v;
v=p[11]; n[9]=v; n[18]=v; n[27]=v; n[36]=v; n[45]=v; n[65]=v; n[74]=v; n[83]=v; n[92]=v; n[101]=v; n[121]=v;
};
void tp7(){
short v;
v=p[1]; n[1]=v; n[20]=v; n[28]=v; n[36]=v; n[55]=v; n[63]=v; n[71]=v; n[79]=v; n[98]=v; n[106]=v; n[114]=v;
v=p[2]; n[5]=v; n[13]=v; n[32]=v; n[40]=v; n[48]=v; n[56]=v; n[75]=v; n[83]=v; n[91]=v; n[110]=v; n[118]=v;
v=p[3]; n[9]=v; n[17]=v; n[25]=v; n[44]=v; n[52]=v; n[60]=v; n[68]=v; n[87]=v; n[95]=v; n[103]=v; n[111]=v;
v=p[4]; n[2]=v; n[21]=v; n[29]=v; n[37]=v; n[45]=v; n[64]=v; n[72]=v; n[80]=v; n[99]=v; n[107]=v; n[115]=v;
v=p[5]; n[6]=v; n[14]=v; n[33]=v; n[41]=v; n[49]=v; n[57]=v; n[76]=v; n[84]=v; n[92]=v; n[100]=v; n[119]=v;
v=p[6]; n[10]=v; n[18]=v; n[26]=v; n[34]=v; n[53]=v; n[61]=v; n[69]=v; n[88]=v; n[96]=v; n[104]=v; n[112]=v;
v=p[7]; n[3]=v; n[22]=v; n[30]=v; n[38]=v; n[46]=v; n[65]=v; n[73]=v; n[81]=v; n[89]=v; n[108]=v; n[116]=v;
v=p[8]; n[7]=v; n[15]=v; n[23]=v; n[42]=v; n[50]=v; n[58]=v; n[77]=v; n[85]=v; n[93]=v; n[101]=v; n[120]=v;
v=p[9]; n[11]=v; n[19]=v; n[27]=v; n[35]=v; n[54]=v; n[62]=v; n[70]=v; n[78]=v; n[97]=v; n[105]=v; n[113]=v;
v=p[10]; n[4]=v; n[12]=v; n[31]=v; n[39]=v; n[47]=v; n[66]=v; n[74]=v; n[82]=v; n[90]=v; n[109]=v; n[117]=v;
v=p[11]; n[8]=v; n[16]=v; n[24]=v; n[43]=v; n[51]=v; n[59]=v; n[67]=v; n[86]=v; n[94]=v; n[102]=v; n[121]=v;
};
void tp8(){
short v;
v=p[1]; n[1]=v; n[18]=v; n[24]=v; n[41]=v; n[47]=v; n[64]=v; n[70]=v; n[87]=v; n[93]=v; n[110]=v; n[116]=v;
v=p[2]; n[7]=v; n[13]=v; n[30]=v; n[36]=v; n[53]=v; n[59]=v; n[76]=v; n[82]=v; n[99]=v; n[105]=v; n[111]=v;
v=p[3]; n[2]=v; n[19]=v; n[25]=v; n[42]=v; n[48]=v; n[65]=v; n[71]=v; n[88]=v; n[94]=v; n[100]=v; n[117]=v;
v=p[4]; n[8]=v; n[14]=v; n[31]=v; n[37]=v; n[54]=v; n[60]=v; n[77]=v; n[83]=v; n[89]=v; n[106]=v; n[112]=v;
v=p[5]; n[3]=v; n[20]=v; n[26]=v; n[43]=v; n[49]=v; n[66]=v; n[72]=v; n[78]=v; n[95]=v; n[101]=v; n[118]=v;
v=p[6]; n[9]=v; n[15]=v; n[32]=v; n[38]=v; n[55]=v; n[61]=v; n[67]=v; n[84]=v; n[90]=v; n[107]=v; n[113]=v;
v=p[7]; n[4]=v; n[21]=v; n[27]=v; n[44]=v; n[50]=v; n[56]=v; n[73]=v; n[79]=v; n[96]=v; n[102]=v; n[119]=v;
v=p[8]; n[10]=v; n[16]=v; n[33]=v; n[39]=v; n[45]=v; n[62]=v; n[68]=v; n[85]=v; n[91]=v; n[108]=v; n[114]=v;
v=p[9]; n[5]=v; n[22]=v; n[28]=v; n[34]=v; n[51]=v; n[57]=v; n[74]=v; n[80]=v; n[97]=v; n[103]=v; n[120]=v;
v=p[10]; n[11]=v; n[17]=v; n[23]=v; n[40]=v; n[46]=v; n[63]=v; n[69]=v; n[86]=v; n[92]=v; n[109]=v; n[115]=v;
v=p[11]; n[6]=v; n[12]=v; n[29]=v; n[35]=v; n[52]=v; n[58]=v; n[75]=v; n[81]=v; n[98]=v; n[104]=v; n[121]=v;
};
/**/

```

## 6. Make the Primary Diagonals for our Latin Squares

What and how many First Primary Diagonals do we have to prepare for composing all our Latin Squares of Order 11?

The next list of my program is dictated for making such the first primary diagonals.

```

/* Make the First Primary Diagonals */
/* Set N1 & n121=CC-N1: CC=10 */
void stp01(){
short a,b;
for(a=0;a<11;a++){b=CC-a;
if((pdf[a]==0)&&(pdf[b]==0)){

```

```

        nm[1]=a; nm[121]=b;
        pdf[a]=1; pdf[b]=1;
        stp02();
        pdf[b]=0; pdf[a]=0;}
    }
}
/* Set N13 & n109=CC-N13 */
void stp02(){
    short a,b;
    for(a=0;a<11;a++){b=CC-a;
        if((pdf[a]==0)&&(pdf[b]==0)){
            nm[13]=a; nm[109]=b;
            pdf[a]=1; pdf[b]=1;
            stp03();
            pdf[b]=0; pdf[a]=0;}
        }
}
/* Set N25 & n97=CC-N25 */
void stp03(){
    short a,b;
    for(a=0;a<11;a++){b=CC-a;
        if((pdf[a]==0)&&(pdf[b]==0)){
            nm[25]=a; nm[97]=b;
            pdf[a]=1; pdf[b]=1;
            stp04();
            pdf[b]=0; pdf[a]=0;}
        }
}
/* Set N37 & n85=CC-N37 */
void stp04(){
    short a,b;
    for(a=0;a<11;a++){b=CC-a;
        if((pdf[a]==0)&&(pdf[b]==0)){
            nm[37]=a; nm[85]=b;
            pdf[a]=1; pdf[b]=1;
            stp05();
            pdf[b]=0; pdf[a]=0;}
        }
}
/* Set N49 & n73=CC-N49 */
void stp05(){
    short a,b;
    for(a=0;a<11;a++){b=CC-a;
        if((pdf[a]==0)&&(pdf[b]==0)){
            nm[49]=a; nm[73]=b;
            pdf[a]=1; pdf[b]=1;
            recpd();
            pdf[b]=0; pdf[a]=0;}
        }
}
/* Record the Data of Primary Diagonal onto p[11] */
void recpd(){
    short n,n12;
    p[0]=cnt+1;
    for(n=0;n<11;n++){n12=n*12;
        p[n+1]=nm[n12+1];
    }
    cnt++;
}
/**/

```

The following list demonstrates the variety of primary diagonals. They count 384 when  $n_1=0$ ; and 3840 for all:  $4P_4 \times 2^4 = 24 \times 16 = 384$ ;  $5P_5 \times 2^5 = 120 \times 32 = 3840$ ;

**\*\* Making the First Primary Diagonals of Latin Squares of Order 11 \*\***

1: {0,1,2,3,4,5,6,7,8,9,A}; 2: {0,1,2,3,6,5,4,7,8,9,A}; 3: {0,1,2,4,3,5,7,6,8,9,A};  
 4: {0,1,2,4,7,5,3,6,8,9,A}; 5: {0,1,2,6,3,5,7,4,8,9,A}; 6: {0,1,2,6,7,5,3,4,8,9,A};  
 7: {0,1,2,7,4,5,6,3,8,9,A}; 8: {0,1,2,7,6,5,4,3,8,9,A}; 9: {0,1,3,2,4,5,6,8,7,9,A};  
 10: {0,1,3,2,6,5,4,8,7,9,A}; 11: {0,1,3,4,2,5,8,6,7,9,A}; 12: {0,1,3,4,8,5,2,6,7,9,A};  
 13: {0,1,3,6,2,5,8,4,7,9,A}; 14: {0,1,3,6,8,5,2,4,7,9,A}; 15: {0,1,3,8,4,5,6,2,7,9,A};  
 16: {0,1,3,8,6,5,4,2,7,9,A}; 17: {0,1,4,2,3,5,7,8,6,9,A}; 18: {0,1,4,2,7,5,3,8,6,9,A};  
 19: {0,1,4,3,2,5,8,7,6,9,A}; 20: {0,1,4,3,8,5,2,7,6,9,A}; 21: {0,1,4,7,2,5,8,3,6,9,A};  
 22: {0,1,4,7,8,5,2,3,6,9,A}; 23: {0,1,4,8,3,5,7,2,6,9,A}; 24: {0,1,4,8,7,5,3,2,6,9,A};  
 25: {0,1,6,2,3,5,7,8,4,9,A}; 26: {0,1,6,2,7,5,3,8,4,9,A}; 27: {0,1,6,3,2,5,8,7,4,9,A};  
 28: {0,1,6,3,8,5,2,7,4,9,A}; 29: {0,1,6,7,2,5,8,3,4,9,A}; 30: {0,1,6,7,8,5,2,3,4,9,A};  
 31: {0,1,6,8,3,5,7,2,4,9,A}; 32: {0,1,6,8,7,5,3,2,4,9,A}; 33: {0,1,7,2,4,5,6,8,3,9,A};  
 34: {0,1,7,2,6,5,4,8,3,9,A}; 35: {0,1,7,4,2,5,8,6,3,9,A}; 36: {0,1,7,4,8,5,2,6,3,9,A};  
 37: {0,1,7,6,2,5,8,4,3,9,A}; 38: {0,1,7,6,8,5,2,4,3,9,A}; 39: {0,1,7,8,4,5,6,2,3,9,A};  
 40: {0,1,7,8,6,5,4,2,3,9,A}; 41: {0,1,8,3,4,5,6,7,2,9,A}; 42: {0,1,8,3,6,5,4,7,2,9,A};  
 43: {0,1,8,4,3,5,7,6,2,9,A}; 44: {0,1,8,4,7,5,3,6,2,9,A}; 45: {0,1,8,6,3,5,7,4,2,9,A};  
 46: {0,1,8,6,7,5,3,4,2,9,A}; 47: {0,1,8,7,4,5,6,3,2,9,A}; 48: {0,1,8,7,6,5,4,3,2,9,A};  
 49: {0,2,1,3,4,5,6,7,9,8,A}; 50: {0,2,1,3,6,5,4,7,9,8,A}; 51: {0,2,1,4,3,5,7,6,9,8,A};  
 . . . . .  
 97: {0,3,1,2,4,5,6,8,9,7,A}; 98: {0,3,1,2,6,5,4,8,9,7,A}; 99: {0,3,1,4,2,5,8,6,9,7,A};  
 . . . . .  
 145: {0,4,1,2,3,5,7,8,9,6,A}; 146: {0,4,1,2,7,5,3,8,9,6,A}; 147: {0,4,1,3,2,5,8,7,9,6,A};  
 . . . . .  
 193: {0,6,1,2,3,5,7,8,9,4,A}; 194: {0,6,1,2,7,5,3,8,9,4,A}; 195: {0,6,1,3,2,5,8,7,9,4,A};  
 . . . . .  
 241: {0,7,1,2,4,5,6,8,9,3,A}; 242: {0,7,1,2,6,5,4,8,9,3,A}; 243: {0,7,1,4,2,5,8,6,9,3,A};  
 . . . . .  
 289: {0,8,1,3,4,5,6,7,9,2,A}; 290: {0,8,1,3,6,5,4,7,9,2,A}; 291: {0,8,1,4,3,5,7,6,9,2,A};  
 . . . . .  
 337: {0,9,2,3,4,5,6,7,8,1,A}; 338: {0,9,2,3,6,5,4,7,8,1,A}; 339: {0,9,2,4,3,5,7,6,8,1,A};  
 . . . . .  
 385: {1,0,2,3,4,5,6,7,8,A,9}; 386: {1,0,2,3,6,5,4,7,8,A,9}; 387: {1,0,2,4,3,5,7,6,8,A,9};  
 . . . . .  
 3838: {A,9,8,6,7,5,3,4,2,1,0}; 3839: {A,9,8,7,4,5,6,3,2,1,0}; 3840: {A,9,8,7,6,5,4,3,2,1,0};

[Count(n1==0/All) = 384/3840]

Let's have the complete set of Latin Squares by these data of primary diagonals and our eight Transformation methods of "Knight's Tour Compositions".

How many Latin Units? 384 x 8 = 3072 when n1==0; 3840 x 8 = 30720 for all.

**\*\* List of the Latin Units for Composing CES11SmI \*\***

1/	2/	3/	4/	5/	6/	7/	8/
0A987654321	097531A8642	0852A741963	073A6295184	05A49382716	04815926A37	0369147A258	02468A13579
210A9876543	31A86420975	419630852A7	5184073A629	71605A49382	815926A3704	9147A258036	A1357902468
43210A98765	642097531A8	852A7419630	A6295184073	38271605A49	5926A370481	7A258036914	902468A1357
6543210A987	97531A86420	19630852A74	4073A629518	A4938271605	26A37048159	580369147A2	8A135790246
876543210A9	1A864209753	52A74196308	95184073A62	605A4938271	A3704815926	369147A2580	7902468A135
A9876543210	42097531A86	9630852A741	3A629518407	271605A4938	704815926A3	147A2580369	68A13579024
10A98765432	7531A864209	2A741963085	84073A62951	938271605A4	4815926A370	A2580369147	57902468A13
3210A987654	A8642097531	630852A7419	295184073A6	5A493827160	15926A37048	80369147A25	468A1357902
543210A9876	2097531A864	A7419630852	73A62951840	1605A493827	926A3704815	69147A25803	357902468A1
76543210A98	531A8642097	30852A74196	184073A6295	8271605A493	6A370481592	47A25803691	2468A135790
9876543210A	8642097531A	7419630852A	6295184073A	4938271605A	3704815926A	2580369147A	1357902468A
3073/	3074/	3075/	3076/	3077/	3078/	3079/	3080/
19A87654320	1A753098642	18529740A63	173962A5084	1594A382706	14805A26937	136A0479258	1246890357A
2019A876543	30986421A75	40A63185297	5084173962A	7061594A382	805A2693714	A0479258136	90357A12468
432019A8765	6421A753098	8529740A631	962A5084173	3827061594A	5A269371480	79258136A04	A1246890357
65432019A87	A7530986421	0A631852974	4173962A508	94A38270615	2693714805A	58136A04792	890357A1246
8765432019A	0986421A753	529740A6318	A5084173962	61594A38270	93714805A26	36A04792581	7A124689035
9A876543201	421A7530986	A6318529740	3962A508417	27061594A38	714805A2693	0479258136A	6890357A124
019A8765432	7530986421A	29740A63185	84173962A50	A3827061594	4805A269371	9258136A047	57A12468903
32019A87654	986421A7530	6318529740A	2A508417396	594A3827061	05A26937148	8136A047925	46890357A12
5432019A876	21A75309864	9740A631852	73962A50841	061594A3827	A2693714805	6A047925813	357A1246890
765432019A8	530986421A7	318529740A6	084173962A5	827061594A3	693714805A2	479258136A0	246890357A1
A8765432019	86421A75309	740A6318529	62A50841739	4A382706159	3714805A269	258136A0479	0357A124689
6145/	6146/	6147/	6148/	6149/	6150/	6151/	6152/
28A97654310	2A753089641	29518740A63	273861A5094	2584A391706	24905A16837	236A0478159	2146980357A
1028A976543	30896412A75	40A63295187	5094273861A	7062584A391	905A1683724	A0478159236	80357A21469

431028A9765	6412A753089	9518740A632	861A5094273	3917062584A	5A168372490	78159236A04	A2146980357
65431028A97	A7530896412	0A632951874	4273861A509	84A39170625	1683724905A	59236A04781	980357A2146
9765431028A	0896412A753	518740A6329	A5094273861	62584A39170	83724905A16	36A04781592	7A214698035
8A976543102	412A7530896	A6329518740	3861A509427	17062584A39	724905A1683	0478159236A	6980357A214
028A9765431	7530896412A	18740A63295	94273861A50	A3917062584	4905A168372	8159236A047	57A21469803
31028A97654	896412A7530	6329518740A	1A509427386	584A3917062	05A16837249	9236A047815	46980357A21
5431028A976	12A75308964	8740A632951	73861A50942	062584A3917	A1683724905	6A047815923	357A2146980
765431028A9	530896412A7	329518740A6	094273861A5	917062584A3	683724905A1	478159236A0	146980357A2
A9765431028	96412A75308	740A6329518	61A50942738	4A391706258	3724905A168	159236A0478	0357A214698
9217/	9218/	9219/	9220/	9221/	9222/	9223/	9224/
37A98654210	3A852079641	39517840A62	382761A5094	3574A291806	34905A16728	326A0487159	3146970258A
1037A986542	20796413A85	40A62395178	5094382761A	8063574A291	905A1672834	A0487159326	70258A31469
421037A9865	6413A852079	9517840A623	761A5094382	2918063574A	5A167283490	87159326A04	A3146970258
65421037A98	A8520796413	0A623951784	4382761A509	74A29180635	1672834905A	59326A04871	970258A3146
9865421037A	0796413A852	517840A6239	A5094382761	63574A29180	72834905A16	26A04871593	8A314697025
7A986542103	413A8520796	A6239517840	6239517840A	18063574A29	834905A1672	0487159326A	0487159326A
037A9865421	8520796413A	17840A62395	94382761A50	A2918063574	4905A167283	7159326A048	58A31469702
21037A98654	796413A8520	6239517840A	1A509438276	574A2918063	05A16728349	9326A048715	46970258A31
5421037A986	13A85207964	7840A623951	82761A50943	063574A2918	A1672834905	6A048715932	258A3146970
865421037A9	520796413A8	239517840A6	094382761A5	918063574A2	672834905A1	487159326A0	146970258A3
A9865421037	96413A85207	840A6239517	61A50943827	4A291806357	2834905A167	159326A0487	0258A314697
12289/	12290/	12291/	12292/	12293/	12294/	12295/	12296/
46A98753210	4A852069731	49516830A72	482671A5093	4563A291807	43905A17628	427A0386159	4137960258A
1046A987532	20697314A85	30A72495168	5093482671A	8074563A291	905A1762843	A0386159427	60258A41379
321046A9875	7314A852069	9516830A724	671A5093482	2918074563A	5A176284390	86159427A03	A4137960258
75321046A98	A8520697314	0A724951683	3482671A509	63A29180745	1762843905A	59427A03861	960258A4137
9875321046A	0697314A852	516830A7249	A5093482671	74563A29180	62843905A17	27A03861594	8A413796025
6A987532104	314A8520697	A7249516830	2671A509348	18074563A29	843905A1762	0386159427A	7960258A413
046A9875321	8520697314A	16830A72495	93482671A50	A2918074563	3905A176284	6159427A038	58A41379602
21046A98753	697314A8520	7249516830A	1A509348267	563A2918074	05A17628439	9427A038615	37960258A41
5321046A987	14A85206973	6830A724951	82671A50934	074563A2918	A1762843905	7A038615942	258A4137960
875321046A9	520697314A8	249516830A7	093482671A5	918074563A2	762843905A1	386159427A0	137960258A4
A9875321046	97314A85206	830A7249516	71A50934826	3A291807456	2843905A176	159427A0386	0258A413796
15361/	15362/	15363/	15364/	15365/	15366/	15367/	15368/
64A98753210	6A852049731	69514830A72	682471A5093	6543A291807	63905A17428	627A0384159	6137940258A
1064A987532	20497316A85	30A72695148	5093682471A	8076543A291	905A1742863	A0384159627	40258A61379
321064A9875	7316A852049	9514830A726	471A5093682	2918076543A	5A174286390	84159627A03	A6137940258
75321064A98	A8520497316	0A726951483	3682471A509	43A29180765	1742863905A	59627A03841	940258A6137
9875321064A	0497316A852	514830A7269	A5093682471	76543A29180	42863905A17	27A03841596	8A613794025
4A987532106	316A8520497	A7269514830	2471A509368	18076543A29	863905A1742	0384159627A	7940258A613
064A9875321	8520497316A	14830A72695	93682471A50	A2918076543	3905A174286	4159627A038	58A61379402
21064A98753	497316A8520	7269514830A	1A509368247	543A2918076	05A17428639	9627A038415	37940258A61
5321064A987	16A85204973	4830A726951	82471A50936	076543A2918	A1742863905	7A038415962	258A6137940
875321064A9	520497316A8	269514830A7	093682471A5	918076543A2	742863905A1	384159627A0	137940258A6
A9875321064	97316A85204	830A7269514	71A50936824	3A291807654	2863905A174	159627A0384	0258A613794
18433/	18434/	18435/	18436/	18437/	18438/	18439/	18440/
73A98654210	7A852039641	79513840A62	782361A5094	7534A291806	74905A16328	726A0483159	7146930258A
1073A986542	20396417A85	40A62795138	5094782361A	8067534A291	905A1632874	A0483159726	30258A71469
421073A9865	6417A852039	9513840A627	361A5094782	2918067534A	5A163287490	83159726A04	A7146930258
65421073A98	A8520396417	0A627951384	4782361A509	34A29180675	1632874905A	59726A04831	930258A7146
9865421073A	0396417A852	513840A6279	A5094782361	67534A29180	32874905A16	26A04831597	8A714693025
3A986542107	417A8520396	A6279513840	2361A509478	18067534A29	874905A1632	0483159726A	6930258A714
073A9865421	8520396417A	13840A62795	94782361A50	A2918067534	4905A163287	3159726A048	58A71469302
21073A98654	396417A8520	6279513840A	1A509478236	534A2918067	05A16328749	9726A048315	46930258A71
5421073A986	17A85203964	3840A627951	82361A50947	067534A2918	A1632874905	6A048315972	258A7146930
865421073A9	520396417A8	279513840A6	094782361A5	918067534A2	632874905A1	483159726A0	146930258A7
A9865421073	96417A85203	840A6279513	61A50947823	4A291806753	2874905A163	159726A0483	0258A714693
21505/	21506/	21507/	21508/	21509/	21510/	21511/	21512/
82A97654310	8A753029641	89512740A63	873261A5094	8524A391706	84905A16237	836A0472159	8146920357A
1082A976543	30296418A75	40A63895127	5094873261A	7068524A391	905A1623784	A0472159836	20357A81469
431082A9765	6418A753029	9512740A638	261A5094873	3917068524A	5A162378490	72159836A04	A8146920357
65431082A97	A7530296418	0A638951274	4873261A509	24A39170685	1623784905A	59836A04721	920357A8146
9765431082A	0296418A753	512740A6389	A5094873261	68524A39170	23784905A16	36A04721598	7A814692035
2A976543108	418A7530296	A6389512740	3261A509487	17068524A39	784905A1623	0472159836A	6920357A814
082A9765431	7530296418A	12740A63895	94873261A50	A3917068524	4905A162378	2159836A047	57A81469203
31082A97654	296418A7530	6389512740A	1A509487326	524A3917068	05A16237849	9836A047215	46920357A81
5431082A976	18A75302964	2740A638951	73261A50948	068524A3917	A1623784905	6A047215983	357A8146920
765431082A9	530296418A7	389512740A6	094873261A5	917068524A3	623784905A1	472159836A0	146920357A8
A9765431082	96418A75302	740A6389512	61A50948732	4A391706852	3784905A162	159836A0472	0357A814692

24577/ 91A87654320 2091A876543 432091A8765 65432091A87 8765432091A 1A876543209 091A8765432 32091A87654 5432091A876 765432091A8 A8765432091	24578/ 9A753018642 30186429A75 6429A753018 A7530186429 0186429A753 429A7530186 7530186429A 186429A7530 29A75301864 530186429A7 86429A75301	24579/ 98521740A63 40A63985217 8521740A639 0A639852174 521740A6398 A6398521740 21740A63985 6398521740A 1740A639852 398521740A6 740A6398521	24580/ 973162A5084 5084973162A 162A5084973 4973162A508 A5084973162 3162A508497 84973162A50 2A508497316 73162A50849 084973162A5 62A50849731	24581/ 9514A382706 7069514A382 3827069514A 14A38270695 69514A38270 27069514A38 A3827069514 514A3827069 069514A3827 827069514A3 4A382706951	24582/ 94805A26137 805A2613794 5A261379480 2613794805A 13794805A26 794805A2613 4805A261379 05A26137948 A2613794805 613794805A2 3794805A261	24583/ 936A0471258 A0471258936 71258936A04 58936A04712 36A04712589 0471258936A 1258936A047 8936A047125 6A047125893 471258936A0 258936A0471	24584/ 9246810357A 10357A92468 A9246810357 810357A9246 7A924681035 6810357A924 57A92468103 46810357A92 357A9246810 246810357A9 0357A924681
27649/ A0987654321 21A09876543 4321A098765 654321A0987 87654321A09 0987654321A 1A098765432 321A0987654 54321A09876 7654321A098 987654321A0	27650/ A9753108642 3108642A975 642A9753108 9753108642A 108642A9753 42A97531086 753108642A9 08642A97531 2A975310864 53108642A97 8642A975310	27651/ A8520741963 41963A85207 8520741963A 1963A852074 520741963A8 963A8520741 20741963A85 63A85207419 0741963A852 3A852074196 741963A8520	27652/ A7306295184 5184A730629 06295184A73 4A730629518 95184A73062 306295184A7 84A73062951 295184A7306 7306295184A 184A7306295 6295184A730	27653/ A5049382716 716A5049382 382716A5049 049382716A5 6A504938271 2716A504938 9382716A504 5049382716A 16A50493827 82716A50493 49382716A50	27654/ A4815926037 815926037A4 5926037A481 26037A48159 037A4815926 7A481592603 4815926037A 15926037A48 926037A4815 6037A481592 37A48159260	27655/ A3691470258 91470258A36 70258A36914 58A36914702 3691470258A 1470258A369 0258A369147 8A369147025 691470258A3 470258A3691 258A3691470	27656/ A2468013579 013579A2468 9A246801357 8013579A246 79A24680135 68013579A24 579A2468013 468013579A2 3579A246801 2468013579A 13579A24680

[Count of Latin Units = 30720]

### 7. Combine Latin Units and Compose Complete Euler Squares of Order 11

The next job we have to do is composing the final objects of 'C.E.S.' of Order 11 by combining every two pieces of Latin Units picked up out of those results above.

**\*\* Combine and Compose the 'Complete Euler Squares' of Order 11 \*\***  
**\*\* Simultaneous Type: Self-Complementary and Pan-diagonal \*\***

1/H	28/L	24/																				
0A987654321	064A3295187	1	117	104	99	81	69	65	50	35	31	19										
210A9876543	5187064A329	28	13	9	118	100	95	82	77	59	47	43										
43210A98765	A3295187064	55	37	25	21	6	112	108	96	78	73	60										
6543210A987	7064A329518	74	56	51	38	33	15	3	120	105	90	86										
876543210A9	95187064A32	98	83	68	64	52	34	29	16	11	114	102										
A9876543210	4A329518706	115	110	92	80	76	61	46	42	30	12	7										
10A98765432	87064A32951	20	8	111	106	93	88	70	58	54	39	24										
3210A987654	295187064A3	36	32	17	2	119	107	89	84	71	66	48										
543210A9876	64A32951870	62	49	44	26	14	10	116	101	97	85	67										
76543210A98	187064A3295	79	75	63	45	40	27	22	4	113	109	94										
9876543210A	3295187064A	103	91	87	72	57	53	41	23	18	5	121										

Suppose you pick up No.1 solution for high Layer Unit and No.28 for low Layer one as shown above. Combine those positional data of the two units one after another and calculate the values of corresponding pairs under the next equation and put the result in the corresponding positions of our object in the classical expression:

$$Vh[n] \times 11 + Vl[n] + 1 = Vc[n] \quad (n=1, 2, 3, 4, \dots, 119, 120, 121)$$

Vh[1] x 11 + Vl[1] + 1 =	Vc[1]:	0	x 11 +	0	+ 1 =	1
Vh[2] x 11 + Vl[2] + 1 =	Vc[2]:	A	x 11 +	6	+ 1 =	117
Vh[3] x 11 + Vl[3] + 1 =	Vc[3]:	9	x 11 +	4	+ 1 =	104
...						
Vh[61] x 11 + Vl[61] + 1 =	Vc[61]:	5	x 11 +	5	+ 1 =	61
...						
Vh[121] x 11 + Vl[121] + 1 =	Vc[121]:	A	x 11 +	A	+ 1 =	121

You must finally apply some examination process to every result to check if neither duplication nor lack of any number should be found there. You must also select the only correct standard solutions under the list-forming inequality conditions such as

$n1 < n11$ ;  $n1 < n111$ ;  $n1 < n121$ ; and  $N2 > n12$ , eliminating reflected patterns or rotated ones out of the result.

8. Let me come to my conclusion now: the compact list of sample solutions as below.

\* 'Complete Euler Square' Type of Simultaneous Magic Squares of Order 11:  
Self-Complementary and Pan-diagonal: Sample List of Standard Solutions \*

1/H	2/L												1 =Row C1m\PD1/PD2
0A987654321	097531A8642	1	120	107	94	81	68	66	53	40	27	14	14 =671 671\671/671
210A9876543	31A86420975	26	13	11	119	106	93	80	67	65	52	39	39 =671 671\671/671
43210A98765	642097531A8	51	38	25	12	10	118	105	92	79	77	64	64 =671 671\671/671
6543210A987	97531A86420	76	63	50	37	24	22	9	117	104	91	78	78 =671 671\671/671
876543210A9	1A864209753	90	88	75	62	49	36	23	21	8	116	103	103 =671 671\671/671
A9876543210	42097531A86	115	102	89	87	74	61	48	35	33	20	7	7 =671 671\671/671
10A98765432	7531A864209	19	6	114	101	99	86	73	60	47	34	32	32 =671 671\671/671
3210A987654	A8642097531	44	31	18	5	113	100	98	85	72	59	46	46 =671 671\671/671
543210A9876	2097531A864	58	45	43	30	17	4	112	110	97	84	71	71 =671 671\671/671
76543210A98	531A8642097	83	70	57	55	42	29	16	3	111	109	96	96 =671 671\671/671
9876543210A	8642097531A	108	95	82	69	56	54	41	28	15	2	121	121 =671 671\671/671
1/H	3/L												2 =Row C1m\PD1/PD2
0A987654321	0852A741963	1	119	105	91	88	74	60	46	43	29	15	15 =671 671\671/671
210A9876543	419630852A7	27	13	10	117	103	89	86	72	58	55	41	41 =671 671\671/671
43210A98765	852A7419630	53	39	25	22	8	115	101	98	84	70	56	56 =671 671\671/671
6543210A987	19630852A74	68	65	51	37	23	20	6	113	110	96	82	82 =671 671\671/671
876543210A9	52A74196308	94	80	77	63	49	35	32	18	4	111	108	108 =671 671\671/671
A9876543210	9630852A741	120	106	92	78	75	61	47	44	30	16	2	2 =671 671\671/671
10A98765432	2A741963085	14	11	118	104	90	87	73	59	45	42	28	28 =671 671\671/671
3210A987654	630852A7419	40	26	12	9	116	102	99	85	71	57	54	54 =671 671\671/671
543210A9876	A7419630852	66	52	38	24	21	7	114	100	97	83	69	69 =671 671\671/671
76543210A98	30852A74196	81	67	64	50	36	33	19	5	112	109	95	95 =671 671\671/671
9876543210A	7419630852A	107	93	79	76	62	48	34	31	17	3	121	121 =671 671\671/671
1/H	4/L												3 =Row C1m\PD1/PD2
0A987654321	073A6295184	1	118	103	99	84	69	65	50	35	31	16	16 =671 671\671/671
210A9876543	5184073A629	28	13	9	115	100	96	81	77	62	47	43	43 =671 671\671/671
43210A98765	A6295184073	55	40	25	21	6	112	108	93	78	74	59	59 =671 671\671/671
6543210A987	4073A629518	71	56	52	37	33	18	3	120	105	90	86	86 =671 671\671/671
876543210A9	95184073A62	98	83	68	64	49	34	30	15	11	117	102	102 =671 671\671/671
A9876543210	3A629518407	114	110	95	80	76	61	46	42	27	12	8	8 =671 671\671/671
10A98765432	84073A62951	20	5	111	107	92	88	73	58	54	39	24	24 =671 671\671/671
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543210A9876	73A62951840	63	48	44	29	14	10	116	101	97	82	67	67 =671 671\671/671
76543210A98	184073A6295	79	75	60	45	41	26	22	7	113	109	94	94 =671 671\671/671
9876543210A	6295184073A	106	91	87	72	57	53	38	23	19	4	121	121 =671 671\671/671
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6543210A987	A4938271605	77	60	54	37	31	14	8	112	106	89	83	83 =671 671\671/671
876543210A9	605A4938271	95	78	72	66	49	43	26	20	3	118	101	101 =671 671\671/671
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6543210A987	8A135790246	75	66	46	37	28	19	10	111	102	93	84	=671 671\671/671	
876543210A9	7902468A135	96	87	67	58	49	40	31	22	2	114	105	=671 671\671/671	
A9876543210	68A13579024	117	108	99	79	70	61	52	43	23	14	5	=671 671\671/671	
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543210A9876	357902468A1	59	50	41	32	12	3	115	106	97	88	68	=671 671\671/671	
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1/H 10/L		8 =Row C1m\PD1/PD2												
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3210A987654	A8462097531	44	31	16	7	113	100	98	85	72	59	46	=671 671\671/671	
543210A9876	2097531A846	58	45	43	30	17	4	112	110	97	82	73	=671 671\671/671	
76543210A98	531A8462097	83	70	57	55	42	27	18	3	111	109	96	=671 671\671/671	
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43210A98765	852A7619430	53	39	25	22	8	117	101	98	82	70	56	=671 671\671/671	
6543210A987	19430852A76	68	65	49	37	23	20	6	113	110	96	84	=671 671\671/671	
876543210A9	52A76194308	94	80	77	63	51	35	32	16	4	111	108	=671 671\671/671	
A9876543210	9430852A761	120	104	92	78	75	61	47	44	30	18	2	=671 671\671/671	
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3210A987654	430852A7619	38	26	12	9	116	102	99	85	73	57	54	=671 671\671/671	
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3210A987654	295186073A4	36	32	17	2	119	106	89	85	70	66	49	=671 671\671/671	
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76543210A98	186073A4295	79	75	62	45	41	26	22	5	113	109	94	=671 671\671/671	
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1 116 110 95 87 70 64 47 41 24 16	1 117 108 90 83 76 58 49 44 26 19
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1/H 13/L 11/	1/H 14/L 12/
1 114 104 98 79 73 63 55 36 28 20	1 113 106 93 86 77 57 48 39 30 21
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1/H 15/L 13/	1/H 16/L 14/
1 120 106 94 82 68 66 53 41 26 14	1 119 105 91 88 73 59 46 43 30 16
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90 88 75 63 48 36 23 21 7 116 104	94 80 77 62 48 35 32 19 5 111 108
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1 117 104 99 85 69 65 50 35 31 15	1 116 110 92 87 71 64 47 40 24 19
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36 32 17 2 119 103 89 84 71 66 52	39 33 15 10 115 108 91 84 68 63 45
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1/H 20/L 17/	1/H 21/L 18/
1 114 108 90 83 76 58 52 44 27 18	1 115 107 98 79 70 62 55 36 28 20
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1/H 22/L 19/	1/H 23/L 20/
1 110 87 64 41 18 116 93 70 47 24	1 99 65 31 118 84 50 16 103 69 35
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58	34	32	19	50	4	112	77	108	95	82	58	34	32	19	72	4	112	55	108	95	82
94	81	57	44	31	18	49	3	111	76	107	94	81	57	44	31	18	71	3	111	54	107
75	106	93	80	56	43	30	17	48	2	121	53	106	93	80	56	43	30	17	70	2	121
		1921/H		2/L				25804801/				2305/H		2/L				30965761/			
1	120	41	105	92	68	66	53	29	16	80	1	120	30	105	81	68	66	53	40	16	91
15	79	11	119	40	104	91	67	65	52	28	15	90	11	119	29	104	80	67	65	52	39
51	27	14	78	10	118	39	103	90	77	64	51	38	14	89	10	118	28	103	79	77	64
76	63	50	26	13	88	9	117	38	102	89	76	63	50	37	13	99	9	117	27	102	78
101	99	75	62	49	25	12	87	8	116	37	101	88	75	62	49	36	12	98	8	116	26
115	36	100	98	74	61	48	24	22	86	7	115	25	100	87	74	61	48	35	22	97	7

85	6	114	35	110	97	73	60	47	23	21	96	6	114	24	110	86	73	60	47	34	21			
33	20	84	5	113	34	109	96	72	59	46	44	20	95	5	113	23	109	85	72	59	46			
58	45	32	19	83	4	112	44	108	95	71	58	45	43	19	94	4	112	33	108	84	71			
94	70	57	55	31	18	82	3	111	43	107	83	70	57	55	42	18	93	3	111	32	107			
42	106	93	69	56	54	30	17	81	2	121	31	106	82	69	56	54	41	17	92	2	121			
	<b>2689/H</b>				<b>2/L</b>				<b>36126721/</b>				<b>3457/H</b>				<b>2/L</b>				<b>45158401/</b>			
1	120	19	94	81	68	66	53	40	27	102	12	109	96	116	81	68	66	53	40	5	25			
26	101	11	119	18	93	80	67	65	52	39	4	24	22	108	95	115	80	67	65	52	39			
51	38	25	100	10	118	17	92	79	77	64	51	38	3	23	21	107	94	114	79	77	64			
76	63	50	37	24	110	9	117	16	91	78	76	63	50	37	2	33	20	106	93	113	78			
90	88	75	62	49	36	23	109	8	116	15	112	88	75	62	49	36	1	32	19	105	92			
115	14	89	87	74	61	48	35	33	108	7	104	91	111	87	74	61	48	35	11	31	18			
107	6	114	13	99	86	73	60	47	34	32	30	17	103	90	121	86	73	60	47	34	10			
44	31	106	5	113	12	98	85	72	59	46	44	9	29	16	102	89	120	85	72	59	46			
58	45	43	30	105	4	112	22	97	84	71	58	45	43	8	28	15	101	99	119	84	71			
83	70	57	55	42	29	104	3	111	21	96	83	70	57	55	42	7	27	14	100	98	118			
20	95	82	69	56	54	41	28	103	2	121	97	117	82	69	56	54	41	6	26	13	110			
	<b>3841/H</b>				<b>2/L</b>				<b>49029121/</b>				<b>4225/H</b>				<b>2/L</b>				<b>52899841/</b>			
12	109	85	116	92	68	66	53	29	5	36	12	109	74	116	92	79	66	42	29	5	47			
4	35	22	108	84	115	91	67	65	52	28	4	46	22	108	73	115	91	78	65	41	28			
51	27	3	34	21	107	83	114	90	77	64	40	27	3	45	21	107	72	114	90	88	64			
76	63	50	26	2	44	20	106	82	113	89	87	63	39	26	2	55	20	106	71	113	89			
112	99	75	62	49	25	1	43	19	105	81	112	99	86	62	38	25	1	54	19	105	70			
104	80	111	98	74	61	48	24	11	42	18	104	69	111	98	85	61	37	24	11	53	18			
41	17	103	79	121	97	73	60	47	23	10	52	17	103	68	121	97	84	60	36	23	10			
33	9	40	16	102	78	120	96	72	59	46	33	9	51	16	102	67	120	96	83	59	35			
58	45	32	8	39	15	101	88	119	95	71	58	34	32	8	50	15	101	77	119	95	82			
94	70	57	55	31	7	38	14	100	87	118	94	81	57	44	31	7	49	14	100	76	118			
86	117	93	69	56	54	30	6	37	13	110	75	117	93	80	56	43	30	6	48	13	110			
	<b>4609/H</b>				<b>2/L</b>				<b>56770561/</b>				<b>4993/H</b>				<b>2/L</b>				<b>60641281/</b>			
12	109	52	116	92	79	66	42	29	5	69	12	109	41	116	92	68	66	53	29	5	80			
4	68	22	108	51	115	91	78	65	41	28	4	79	22	108	40	115	91	67	65	52	28			
40	27	3	67	21	107	50	114	90	88	64	51	27	3	78	21	107	39	114	90	77	64			
87	63	39	26	2	77	20	106	49	113	89	76	63	50	26	2	88	20	106	38	113	89			
112	99	86	62	38	25	1	76	19	105	48	112	99	75	62	49	25	1	87	19	105	37			
104	47	111	98	85	61	37	24	11	75	18	104	36	111	98	74	61	48	24	11	86	18			
74	17	103	46	121	97	84	60	36	23	10	85	17	103	35	121	97	73	60	47	23	10			
33	9	73	16	102	45	120	96	83	59	35	33	9	84	16	102	34	120	96	72	59	46			
58	34	32	8	72	15	101	55	119	95	82	58	45	32	8	83	15	101	44	119	95	71			
94	81	57	44	31	7	71	14	100	54	118	94	70	57	55	31	7	82	14	100	43	118			
53	117	93	80	56	43	30	6	70	13	110	42	117	93	69	56	54	30	6	81	13	110			
	<b>5377/H</b>				<b>2/L</b>				<b>64512001/</b>				<b>6913/H</b>				<b>2/L</b>				<b>77414401/</b>			
12	109	30	116	81	68	66	53	40	5	91	23	98	85	116	103	68	66	53	18	5	36			
4	90	22	108	29	115	80	67	65	52	39	4	35	33	97	84	115	102	67	65	52	17			
51	38	3	89	21	107	28	114	79	77	64	51	16	3	34	32	96	83	114	101	77	64			
76	63	50	37	2	99	20	106	27	113	78	76	63	50	15	2	44	31	95	82	113	100			
112	88	75	62	49	36	1	98	19	105	26	112	110	75	62	49	14	1	43	30	94	81			
104	25	111	87	74	61	48	35	11	97	18	93	80	111	109	74	61	48	13	11	42	29			
96	17	103	24	121	86	73	60	47	34	10	41	28	92	79	121	108	73	60	47	12	10			
44	9	95	16	102	23	120	85	72	59	46	22	9	40	27	91	78	120	107	72	59	46			
58	45	43	8	94	15	101	33	119	84	71	58	45	21	8	39	26	90	88	119	106	71			
83	70	57	55	42	7	93	14	100	32	118	105	70	57	55	20	7	38	25	89	87	118			
31	117	82	69	56	54	41	6	92	13	110	86	117	104	69	56	54	19	6	37	24	99			
	<b>7297/H</b>				<b>2/L</b>				<b>79994881/</b>				<b>7681/H</b>				<b>2/L</b>				<b>82575361/</b>			
23	98	74	116	103	79	66	42	18	5	47	23	98	52	116	103	79	66	42	18	5	69			
4	46	33	97	73	115	102	78	65	41	17	4	68	33	97	51	115	102	78	65	41	17			
40	16	3	45	32	96	72	114	101	88	64	40	16	3	67	32	96	50	114	101	88	64			
87	63	39	15	2	55	31	95	71	113	100	87	63	39	15	2	77	31	95	49	113	100			
112	110	86	62	38	14	1	54	30	94	70	112	110	86	62	38	14	1	76	30	94	48			
93	69	111	109	85	61	37	13	11	53	29	93	47	111	109	85	61	37	13	11	75	29			
52	28	92	68	121	108	84	60	36	12	10	74	28	92	46	121	108	84	60	36	12	10			
22	9	51	27	91	67	120	107	83	59	35	22	9	73	27	91	45	120	107	83	59	35			
58	34	21	8	50	26	90	77	119	106	82	58	34	21	8	72	26	90	55	119	106	82			
105	81	57	44	20	7	49	25	89	76	118	105	81	57	44	20	7	71	25	89	76	118			

75	117	104	80	56	43	19	6	48	24	99	53	117	104	80	56	43	19	6	70	24	99
8065/H			2/L			85155841/			10369/H			2/L			96768001/						
23	98	41	116	103	68	66	53	18	5	80	34	87	74	116	103	90	66	31	18	5	47
4	79	33	97	40	115	102	67	65	52	17	4	46	44	86	73	115	102	89	65	30	17
51	16	3	78	32	96	39	114	101	77	64	29	16	3	45	43	85	72	114	101	99	64
76	63	50	15	2	88	31	95	38	113	100	98	63	28	15	2	55	42	84	71	113	100
112	110	75	62	49	14	1	87	30	94	37	112	110	97	62	27	14	1	54	41	83	70
93	36	111	109	74	61	48	13	11	86	29	82	69	111	109	96	61	26	13	11	53	40
85	28	92	35	121	108	73	60	47	12	10	52	39	81	68	121	108	95	60	25	12	10
22	9	84	27	91	34	120	107	72	59	46	22	9	51	38	80	67	120	107	94	59	24
58	45	21	8	83	26	90	44	119	106	71	58	23	21	8	50	37	79	77	119	106	93
105	70	57	55	20	7	82	25	89	43	118	105	92	57	33	20	7	49	36	78	76	118
42	117	104	69	56	54	19	6	81	24	99	75	117	104	91	56	32	19	6	48	35	88
12285/H			1/L			103192321 =Row C1m\PD1/PD2															
357608192A4	0A987654321					34	66	87	75	8	95	17	104	26	113	46	=671 671\671/671				
2A435760819	210A9876543					25	112	45	44	65	86	74	7	94	16	103	=671 671\671/671				
8192A435760	43210A98765					93	15	102	24	111	55	43	64	85	73	6	=671 671\671/671				
7608192A435	6543210A987					84	72	5	92	14	101	23	121	54	42	63	=671 671\671/671				
4357608192A	876543210A9					53	41	62	83	71	4	91	13	100	33	120	=671 671\671/671				
92A43576081	A9876543210					110	32	119	52	40	61	82	70	3	90	12	=671 671\671/671				
08192A43576	10A98765432					2	89	22	109	31	118	51	39	60	81	69	=671 671\671/671				
57608192A43	3210A987654					59	80	68	1	99	21	108	30	117	50	38	=671 671\671/671				
A4357608192	543210A9876					116	49	37	58	79	67	11	98	20	107	29	=671 671\671/671				
192A4357608	76543210A98					19	106	28	115	48	36	57	78	77	10	97	=671 671\671/671				
608192A4357	9876543210A					76	9	96	18	105	27	114	47	35	56	88	=671 671\671/671				

[Count(n1==1/All) = 4128768/103219200] OK!  
 (Calculated and Listed by Kanji Setsuda on May 10, 2010)

I am happy I could count all the standard solutions through shown as above.

$$4128768 = 3072 \times 3072 \times (1/2) \times (7/8);$$

'3072' means the count of Latin Units, '1/2' means elimination of reflected patterns. '7/8' is the ratio of correct answers to all the combinations.

The total count of all the standard solutions should be analyzed as follows:

$$103219200 = 30720 \times 30720 \times (1/8) \times (7/8);$$

'30720' means the full count of Latin Units, '1/8' means a ratio of standard solutions to all primitive ones. '7/8' stands for the ratio of correct answers to all the combinations.

What a big count of solutions it is! It is so even when we counted 'C.E.S.' type. It was beyond my imagination indeed. I cannot imagine how many solutions there should be in all for the ordinary type of our object including "Non-Euler Type".

(English version written by Kanji Setsuda on April 25, 2010 with MacOSX and Xcode3)

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### 9. Additional Report about the case of Order 13

Let me report briefly about the 'Complete Euler Type' of Simultaneous Magic Squares of Order 13: Both Self-complementary and Pan-diagonal.

It is extremely hard for us to compose all the standard solutions even when  $n1==1$ . It would take too much time to go on our jobs. I really had to give it up on my way. For I could not practically take the slow "New Euler's Method" at all, but I had to use only our fast "Knight's Tour Compositions" all the way.

We must have the data of First Primary Diagonals as many as  $46080 = 6P_6 \times 2^6$ , then.

Since we could probably have 10 different Latin Squares from every single primary diagonal, we should finally have  $46080 \times 10 = 460800$  Latin Units in all.

Then we could compose the standard solutions of 'C.E.S.' type as many as about 23.9 billion pieces:  $460800 \times 460800 \times (1/8) \times (9/10)$ ; I predict.

What a big count it is! I must confess I could not really make so many solutions by my old computer with poor memories.

And it is really terrible to have 10 different forms of Latin Units only hand-made from the first primary diagonal and extract all the 10 transformation methods.

I am now making 8 pieces of Latin Squares only by my hand for the first primary diagonal and taking the 8 temporary transformational methods out of them.

\* 'Complete Euler Square' Type of Simultaneous Magic Squares of Order 13:  
Self-Complementary and Pan-diagonal: Sample List of Standard Solutions \*

1/H	2/L														1 =RowS C1mS\PD1S/PD2S
0CBA987654321	02468AC13579B	1	159	148	137	126	115	104	80	69	58	47	36	25	11 =1105 1105\1105/1105
210CBA9876543	C13579B02468A	39	15	4	162	151	140	129	105	94	83	72	61	50	12 =1105 1105\1105/1105
43210CBA98765	B02468AC13579	64	40	29	18	7	165	154	143	119	108	97	86	75	13 =1105 1105\1105/1105
6543210CBA987	AC13579B02468	89	78	54	43	32	21	10	168	144	133	122	111	100	14 =1105 1105\1105/1105
876543210CBA9	9B02468AC1357	114	103	79	68	57	46	35	24	13	158	147	136	125	15 =1105 1105\1105/1105
A9876543210CB	8AC13579B0246	139	128	117	93	82	71	60	49	38	14	3	161	150	16 =1105 1105\1105/1105
CBA9876543210	79B02468AC135	164	153	142	118	107	96	85	74	63	52	28	17	6	17 =1105 1105\1105/1105
10CBA98765432	68AC13579B024	20	9	167	156	132	121	110	99	88	77	53	42	31	18 =1105 1105\1105/1105
3210CBA987654	579B02468AC13	45	34	23	12	157	146	135	124	113	102	91	67	56	19 =1105 1105\1105/1105
543210CBA9876	468AC13579B02	70	59	48	37	26	2	160	149	138	127	116	92	81	20 =1105 1105\1105/1105
76543210CBA98	3579B02468AC1	95	84	73	62	51	27	16	5	163	152	141	130	106	21 =1105 1105\1105/1105
9876543210CBA	2468AC13579B0	120	109	98	87	76	65	41	30	19	8	166	155	131	22 =1105 1105\1105/1105
BA9876543210C	13579B02468AC	145	134	123	112	101	90	66	55	44	33	22	11	169	23 =1105 1105\1105/1105
1/H	3/L														2 =RowS C1mS\PD1S/PD2S
0CBA987654321	0951A62B73C84	1	166	149	132	128	111	94	90	73	56	52	35	18	11 =1105 1105\1105/1105
210CBA9876543	51A62B73C8409	32	15	11	163	146	142	125	108	104	87	70	53	49	12 =1105 1105\1105/1105
43210CBA98765	A62B73C840951	63	46	29	25	8	160	156	139	122	105	101	84	67	13 =1105 1105\1105/1105
6543210CBA987	2B73C840951A6	81	77	60	43	39	22	5	157	153	136	119	115	98	14 =1105 1105\1105/1105
876543210CBA9	73C840951A62B	112	95	91	74	57	40	36	19	2	167	150	133	129	15 =1105 1105\1105/1105
A9876543210CB	C840951A62B73	143	126	109	92	88	71	54	50	33	16	12	164	147	16 =1105 1105\1105/1105
CBA9876543210	40951A62B73C8	161	144	140	123	106	102	85	68	64	47	30	26	9	17 =1105 1105\1105/1105
10CBA98765432	951A62B73C840	23	6	158	154	137	120	116	99	82	78	61	44	27	18 =1105 1105\1105/1105
3210CBA987654	1A62B73C84095	41	37	20	3	168	151	134	130	113	96	79	75	58	19 =1105 1105\1105/1105
543210CBA9876	62B73C840951A	72	55	51	34	17	13	165	148	131	127	110	93	89	20 =1105 1105\1105/1105
76543210CBA98	B73C840951A62	103	86	69	65	48	31	14	10	162	145	141	124	107	21 =1105 1105\1105/1105
9876543210CBA	3C840951A62B7	121	117	100	83	66	62	45	28	24	7	159	155	138	22 =1105 1105\1105/1105
BA9876543210C	840951A62B73C	152	135	118	114	97	80	76	59	42	38	21	4	169	23 =1105 1105\1105/1105
1/H	4/L														3 =RowS C1mS\PD1S/PD2S
0CBA987654321	05A27C4916B38	1	162	154	133	125	117	96	88	67	59	51	30	22	11 =1105 1105\1105/1105
210CBA9876543	916B3805A27C4	36	15	7	168	147	139	118	110	102	81	73	65	44	12 =1105 1105\1105/1105
43210CBA98765	5A27C4916B380	58	50	29	21	13	161	153	132	124	116	95	87	66	13 =1105 1105\1105/1105
6543210CBA987	16B3805A27C49	80	72	64	43	35	14	6	167	146	138	130	109	101	14 =1105 1105\1105/1105
876543210CBA9	A27C4916B3805	115	94	86	78	57	49	28	20	12	160	152	131	123	15 =1105 1105\1105/1105
A9876543210CB	6B3805A27C491	137	129	108	100	79	71	63	42	34	26	5	166	145	16 =1105 1105\1105/1105
CBA9876543210	27C4916B3805A	159	151	143	122	114	93	85	77	56	48	27	19	11	17 =1105 1105\1105/1105
10CBA98765432	B3805A27C4916	25	4	165	144	136	128	107	99	91	70	62	41	33	18 =1105 1105\1105/1105
3210CBA987654	7C4916B3805A2	47	39	18	10	158	150	142	121	113	92	84	76	55	19 =1105 1105\1105/1105
543210CBA9876	805A27C4916B	69	61	40	32	24	3	164	156	135	127	106	98	90	20 =1105 1105\1105/1105
76543210CBA98	C4916B3805A27	104	83	75	54	46	38	17	9	157	149	141	120	112	21 =1105 1105\1105/1105
9876543210CBA	805A27C4916B3	126	105	97	89	68	60	52	31	23	2	163	155	134	22 =1105 1105\1105/1105
BA9876543210C	4916B3805A27C	148	140	119	111	103	82	74	53	45	37	16	8	169	23 =1105 1105\1105/1105
1/H	5/L														4 =RowS C1mS\PD1S/PD2S
0CBA987654321	048C37B26A159	1	161	152	143	121	112	103	81	72	63	41	32	23	11 =1105 1105\1105/1105
210CBA9876543	A159048C37B26	37	15	6	166	144	135	126	117	95	86	77	55	46	12 =1105 1105\1105/1105
43210CBA98765	7B26A159048C3	60	51	29	20	11	158	149	140	118	109	100	91	69	13 =1105 1105\1105/1105
6543210CBA987	48C37B26A1590	83	74	65	43	34	25	3	163	154	132	123	114	92	14 =1105 1105\1105/1105
876543210CBA9	159048C37B26A	106	97	88	66	57	48	39	17	8	168	146	137	128	15 =1105 1105\1105/1105
A9876543210CB	B26A159048C37	142	120	111	102	80	71	62	40	31	22	13	160	151	16 =1105 1105\1105/1105
CBA9876543210	8C37B26A15904	165	156	134	125	116	94	85	76	54	45	36	14	5	17 =1105 1105\1105/1105
10CBA98765432	59048C37B26A1	19	10	157	148	139	130	108	99	90	68	59	50	28	18 =1105 1105\1105/1105
3210CBA987654	26A159048C37B	42	33	24	2	162	153	131	122	113	104	82	73	64	19 =1105 1105\1105/1105
543210CBA9876	C37B26A159048	78	56	47	38	16	7	167	145	136	127	105	96	87	20 =1105 1105\1105/1105
76543210CBA98	9048C37B26A15	101	79	70	61	52	30	21	12	159	150	141	119	110	21 =1105 1105\1105/1105
9876543210CBA	6A159048C37B2	124	115	93	84	75	53	44	35	26	4	164	155	133	22 =1105 1105\1105/1105
BA9876543210C	37B26A159048C	147	138	129	107	98	89	67	58	49	27	18	9	169	23 =1105 1105\1105/1105

	1/H	6/L	5 =RowS C1mS\PD1S/PD2S																				
OCBA987654321	083B6194C72A5		1	165	147	142	124	106	101	83	78	60	42	37	19	=1105	1105\	1105/1105					
210CBA9876543	6194C72A5083B		33	15	10	161	156	138	120	115	97	79	74	56	51	=1105	1105\	1105/1105					
43210CBA98765	C72A5083B6194		65	47	29	24	6	157	152	134	129	111	93	88	70	=1105	1105\	1105/1105					
6543210CBA987	5083B6194C72A		84	66	61	43	38	20	2	166	148	143	125	107	102	=1105	1105\	1105/1105					
876543210CBA9	B6194C72A5083		116	98	80	75	57	52	34	16	11	162	144	139	121	=1105	1105\	1105/1105					
A9876543210CB	4C72A5083B619		135	130	112	94	89	71	53	48	30	25	7	158	153	=1105	1105\	1105/1105					
CBA9876543210	A5083B6194C72		167	149	131	126	108	103	85	67	62	44	39	21	3	=1105	1105\	1105/1105					
10CBA98765432	3B6194C72A508		17	12	163	145	140	122	117	99	81	76	58	40	35	=1105	1105\	1105/1105					
3210CBA987654	94C72A5083B61		49	31	26	8	159	154	136	118	113	95	90	72	54	=1105	1105\	1105/1105					
543210CBA9876	2A5083B6194C7		68	63	45	27	22	4	168	150	132	127	109	104	86	=1105	1105\	1105/1105					
76543210CBA98	83B6194C72A50		100	82	77	59	41	36	18	13	164	146	141	123	105	=1105	1105\	1105/1105					
9876543210CBA	194C72A5083B6		119	114	96	91	73	55	50	32	14	9	160	155	137	=1105	1105\	1105/1105					
BA9876543210C	72A5083B6194C		151	133	128	110	92	87	69	64	46	28	23	5	169	=1105	1105\	1105/1105					
	1/H	7/L	6 =RowS C1mS\PD1S/PD2S																				
OCBA987654321	06C5B4A392817		1	163	156	136	129	109	102	82	75	55	48	28	21	=1105	1105\	1105/1105					
210CBA9876543	81706C5B4A392		35	15	8	157	150	143	123	116	96	89	69	62	42	=1105	1105\	1105/1105					
43210CBA98765	39281706C5B4A		56	49	29	22	2	164	144	137	130	110	103	83	76	=1105	1105\	1105/1105					
6543210CBA987	B4A39281706C5		90	70	63	43	36	16	9	158	151	131	124	117	97	=1105	1105\	1105/1105					
876543210CBA9	6C5B4A3928170		111	104	84	77	57	50	30	23	3	165	145	138	118	=1105	1105\	1105/1105					
A9876543210CB	1706C5B4A3928		132	125	105	98	91	71	64	44	37	17	10	159	152	=1105	1105\	1105/1105					
CBA9876543210	9281706C5B4A3		166	146	139	119	112	92	85	78	58	51	31	24	4	=1105	1105\	1105/1105					
10CBA98765432	4A39281706C5B		18	11	160	153	133	126	106	99	79	72	65	45	38	=1105	1105\	1105/1105					
3210CBA987654	C5B4A39281706		52	32	25	5	167	147	140	120	113	93	86	66	59	=1105	1105\	1105/1105					
543210CBA9876	706C5B4A39281		73	53	46	39	19	12	161	154	134	127	107	100	80	=1105	1105\	1105/1105					
76543210CBA98	281706C5B4A39		94	87	67	60	40	33	26	6	168	148	141	121	114	=1105	1105\	1105/1105					
9876543210CBA	A39281706C5B4		128	108	101	81	74	54	47	27	20	13	162	155	135	=1105	1105\	1105/1105					
BA9876543210C	5B4A39281706C		149	142	122	115	95	88	68	61	41	34	14	7	169	=1105	1105\	1105/1105					
	1/H	8/L	7 =RowS C1mS\PD1S/PD2S																				
OCBA987654321	0A741B852C963		1	167	151	135	119	116	100	84	68	65	49	33	17	=1105	1105\	1105/1105					
210CBA9876543	41B852C9630A7		31	15	12	165	149	133	130	114	98	82	66	63	47	=1105	1105\	1105/1105					
43210CBA98765	852C9630A741B		61	45	29	26	10	163	147	131	128	112	96	80	77	=1105	1105\	1105/1105					
6543210CBA987	C9630A741B852		91	75	59	43	27	24	8	161	145	142	126	110	94	=1105	1105\	1105/1105					
876543210CBA9	30A741B852C96		108	92	89	73	57	41	38	22	6	159	156	140	124	=1105	1105\	1105/1105					
A9876543210CB	741B852C9630A		138	122	106	103	87	71	55	52	36	20	4	157	154	=1105	1105\	1105/1105					
CBA9876543210	B852C9630A741		168	152	136	120	117	101	85	69	53	50	34	18	2	=1105	1105\	1105/1105					
10CBA98765432	2C9630A741B85		16	13	166	150	134	118	115	99	83	67	64	48	32	=1105	1105\	1105/1105					
3210CBA987654	630A741B852C9		46	30	14	11	164	148	132	129	113	97	81	78	62	=1105	1105\	1105/1105					
543210CBA9876	A741B852C9630		76	60	44	28	25	9	162	146	143	127	111	95	79	=1105	1105\	1105/1105					
76543210CBA98	1B852C9630A74		93	90	74	58	42	39	23	7	160	144	141	125	109	=1105	1105\	1105/1105					
9876543210CBA	52C9630A741B8		123	107	104	88	72	56	40	37	21	5	158	155	139	=1105	1105\	1105/1105					
BA9876543210C	9630A741B852C		153	137	121	105	102	86	70	54	51	35	19	3	169	=1105	1105\	1105/1105					
	1/H	10/L	8 =RowS C1mS\PD1S/PD2S																				
OCBA987654321	02468AC13759B		1	159	148	137	126	115	104	80	69	60	45	36	25	=1105	1105\	1105/1105					
210CBA9876543	C13759B02468A		39	15	4	164	149	140	129	105	94	83	72	61	50	=1105	1105\	1105/1105					
43210CBA98765	B02468AC13759		64	40	29	18	7	165	154	143	119	108	99	84	75	=1105	1105\	1105/1105					
6543210CBA987	AC13759B02468		89	78	54	43	34	19	10	168	144	133	122	111	100	=1105	1105\	1105/1105					
876543210CBA9	9B02468AC1375		114	103	79	68	57	46	35	24	13	158	147	138	123	=1105	1105\	1105/1105					
A9876543210CB	8AC13759B0246		139	128	117	93	82	73	58	49	38	14	3	161	150	=1105	1105\	1105/1105					
CBA9876543210	59B02468AC137		162	153	142	118	107	96	85	74	63	52	28	17	8	=1105	1105\	1105/1105					
10CBA98765432	68AC13759B024		20	9	167	156	132	121	112	97	88	77	53	42	31	=1105	1105\	1105/1105					
3210CBA987654	759B02468AC13		47	32	23	12	157	146	135	124	113	102	91	67	56	=1105	1105\	1105/1105					
543210CBA9876	468AC13759B02		70	59	48	37	26	2	160	151	136	127	116	92	81	=1105	1105\	1105/1105					
76543210CBA98	3759B02468AC1		95	86	71	62	51	27	16	5	163	152	141	130	106	=1105	1105\	1105/1105					
9876543210CBA	2468AC13759B0		120	109	98	87	76	65	41	30	21	6	166	155	131	=1105	1105\	1105/1105					
BA9876543210C	13759B02468AC		145	134	125	110	101	90	66	55	44	33	22	11	169	=1105	1105\	1105/1105					
	1/H	11/L	9 =RowS C1mS\PD1S/PD2S																				
OCBA987654321	0971A62B53C84		1	166	151	132	128	111	94	90	71	56	52	35	18	=1105	1105\	1105/1105					
210CBA9876543	71A62B53C8409		34	15	11	163	146	142	123	108	104	87	70	53	49	=1105	1105\	1105/1105					
43210CBA98765	A62B53C840971		63	46	29	25	6	160	156	139	122	105	101	86	67	=1105	1105\	1105/1105					
6543210CBA987	2B53C840971A6		81	77	58	43	39	22	5	157	153	138	119	115	98	=1105	1105\	1105/1105					
876543210CBA9	53C840971A62B		110	95	91	74	57	40	36	21	2	167	150	133	129	=1105	1105\	1105/1105					
A9876543210CB	C840971A62B53		143	126	109	92	88	73	54	50	33	16	12	162	147	=1105	1105\	1105/1105					
CBA9876543210	40971A62B53C8		161	144	140	125	106	102	85	68	64	45	30	26	9	=1105	1105\	1105/1105					
10CBA98765432	971A62B53C840		23	8	158	154	137	120	116	97	82	78	61	44	27	=1105	1105\	1105/1105					
3210CBA987654	1A62B53C84097		41	37	20	3	168	149	134	130	113	96	79	75	60	=1105	1105\	1105/1105					
543210CBA9876	62B53C840971A		72	55	51	32	17	13	165	148	131	127	112	93	89	=1105	1105\	1105/1105					
76543210CBA98	B53C840971A62		103	84	69	65	48	31	14	10	164	145	141	124	107	=1105	1105\						

1/H	12/L	10 =RowS C1mS\PD1S/PD2S																		
0CBA987654321	07A25C4916B38	1	164	154	133	123	117	96	88	67	59	51	30	22	=1105 1105\1105/1105					
210CBA9876543	916B3807A25C4	36	15	7	168	147	139	118	112	102	81	71	65	44	=1105 1105\1105/1105					
43210CBA98765	7A25C4916B380	60	50	29	19	13	161	153	132	124	116	95	87	66	=1105 1105\1105/1105					
6543210CBA987	16B3807A25C49	80	72	64	43	35	14	8	167	146	136	130	109	101	=1105 1105\1105/1105					
876543210CBA9	A25C4916B3807	115	94	84	78	57	49	28	20	12	160	152	131	125	=1105 1105\1105/1105					
A9876543210CB	6B3807A25C491	137	129	108	100	79	73	63	42	32	26	5	166	145	=1105 1105\1105/1105					
CBA9876543210	25C4916B3807A	159	149	143	122	114	93	85	77	56	48	27	21	11	=1105 1105\1105/1105					
10CBA98765432	B3807A25C4916	25	4	165	144	138	128	107	97	91	70	62	41	33	=1105 1105\1105/1105					
3210CBA987654	5C4916B3807A2	45	39	18	10	158	150	142	121	113	92	86	76	55	=1105 1105\1105/1105					
543210CBA9876	3807A25C4916B	69	61	40	34	24	3	162	156	135	127	106	98	90	=1105 1105\1105/1105					
76543210CBA98	C4916B3807A25	104	83	75	54	46	38	17	9	157	151	141	120	110	=1105 1105\1105/1105					
9876543210CBA	807A25C4916B3	126	105	99	89	68	58	52	31	23	2	163	155	134	=1105 1105\1105/1105					
BA9876543210C	4916B3807A25C	148	140	119	111	103	82	74	53	47	37	16	6	169	=1105 1105\1105/1105					

1/H	13/L	11/	1/H	14/L	12/																				
1	161	152	143	121	110	103	81	72	63	41	34	23	1	165	147	142	124	106	101	83	78	58	42	37	21
37	15	8	166	144	135	126	117	95	84	77	55	46	33	15	10	161	156	136	120	115	99	79	74	56	51
58	51	29	20	11	158	151	140	118	109	100	91	69	65	45	29	24	8	157	152	134	129	111	93	88	70
83	74	65	43	32	25	3	163	154	132	125	114	92	86	66	61	43	38	20	2	166	148	143	123	107	102
106	99	88	66	57	48	39	17	6	168	146	137	128	116	98	80	75	57	52	32	16	11	164	144	139	121
142	120	111	102	80	73	62	40	31	22	13	160	149	135	130	110	94	89	73	53	48	30	25	7	158	153
165	156	134	123	116	94	85	76	54	47	36	14	5	167	151	131	126	108	103	85	67	62	44	39	19	3
21	10	157	148	139	130	108	97	90	68	59	50	28	17	12	163	145	140	122	117	97	81	76	60	40	35
42	33	24	2	164	153	131	122	113	104	82	71	64	49	31	26	6	159	154	138	118	113	95	90	72	54
78	56	45	38	16	7	167	145	138	127	105	96	87	68	63	47	27	22	4	168	150	132	127	109	104	84
101	79	70	61	52	30	19	12	159	150	141	119	112	100	82	77	59	41	36	18	13	162	146	141	125	105
124	115	93	86	75	53	44	35	26	4	162	155	133	119	114	96	91	71	55	50	34	14	9	160	155	137
147	136	129	107	98	89	67	60	49	27	18	9	169	149	133	128	112	92	87	69	64	46	28	23	5	169

1/H	15/L	13/	1/H	16/L	14/																				
1	163	156	138	129	109	102	82	75	55	48	28	19	1	167	149	135	119	116	100	86	68	65	49	33	17
35	15	6	157	150	143	125	116	96	89	69	62	42	31	15	12	165	151	133	130	114	98	82	66	63	45
56	49	29	22	2	162	144	137	130	112	103	83	76	61	47	29	26	10	163	147	131	128	110	96	80	77
90	70	63	43	36	16	9	158	149	131	124	117	99	91	75	59	43	27	24	6	161	145	142	126	112	94
111	104	86	77	57	50	30	23	3	165	145	136	118	108	92	89	71	57	41	38	22	8	159	156	140	124
132	123	105	98	91	73	64	44	37	17	10	159	152	136	122	106	103	87	73	55	52	36	20	4	157	154
166	146	139	119	110	92	85	78	60	51	31	24	4	168	152	138	120	117	101	85	69	53	50	32	18	2
18	11	160	153	133	126	106	97	79	72	65	47	38	16	13	166	150	134	118	115	97	83	67	64	48	34
52	34	25	5	167	147	140	120	113	93	84	66	59	46	30	14	11	162	148	132	129	113	99	81	78	62
71	53	46	39	21	12	161	154	134	127	107	100	80	76	58	44	28	25	9	164	146	143	127	111	95	79
94	87	67	58	40	33	26	8	168	148	141	121	114	93	90	74	60	42	39	23	7	160	144	141	123	109
128	108	101	81	74	54	45	27	20	13	164	155	135	125	107	104	88	72	56	40	37	19	5	158	155	139
151	142	122	115	95	88	68	61	41	32	14	7	169	153	137	121	105	102	84	70	54	51	35	21	3	169

1/H	18/L	15/	1/H	19/L	16/																				
1	159	149	137	125	115	104	80	69	57	48	36	25	1	166	148	132	128	111	94	90	74	56	52	34	19
39	15	4	161	152	140	129	105	94	84	72	60	50	31	15	11	163	146	142	126	108	104	86	71	53	49
64	40	29	19	7	164	154	143	119	108	96	87	75	63	46	29	25	9	160	156	138	123	105	101	83	67
89	78	54	43	31	22	10	168	144	133	123	111	99	81	77	61	43	39	21	6	157	153	135	119	115	98
114	103	79	68	58	46	34	24	13	158	147	135	126	113	95	91	73	58	40	36	18	2	167	150	133	129
138	128	117	93	82	70	61	49	38	14	3	162	150	143	125	110	92	88	70	54	50	33	16	12	165	147
165	153	142	118	107	97	85	73	63	52	28	17	5	162	144	140	122	106	102	85	68	64	48	30	26	8
20	8	167	156	132	121	109	100	88	77	53	42	32	23	5	158	154	137	120	116	100	82	78	60	45	27
44	35	23	12	157	146	136	124	112	102	91	67	56	41	37	20	3	168	152	134	130	112	97	79	75	57
71	59	47	37	26	2	160	148	139	127	116	92	81	72	55	51	35	17	13	164	149	131	127	109	93	89
95	83	74	62	51	27	16	6	163	151	141	130	106	103	87	69	65	47	32	14	10	161	145	141	124	107
120	110	98	86	76	65	41	30	18	9	166	155	131	121	117	99	84	66	62	44	28	24	7	159	155	139
145	134	122	113	101	90	66	55	45	33	21	11	169	151	136	118	114	96	80	76	59	42	38	22	4	169

1/H	20/L	17/	1/H	21/L	18/																				
1	161	154	133	126	117	97	88	67	59	51	30	21	1	162	151	143	121	113	103	81	72	63	41	31	23
36	15	7	168	147	138	118	109	102	81	74	65	45	37	15	5	166	144	136	125	117	95	87	77	55	46
57	50	29	22	13	162	153	132	124	116	95	86	66	61	51	29	20	11	158	148	140	118	110	99	91	69
80	72	64	43	34	14	5	167	146	139	130	110	101	84	73	65	43	35	25	3	163	154	132	122	114	92
115	94	87	78	58	49	28	20	12	160	151	131	122	106	96	88	66	58	47	39	17	9	168	146	137	128
137	129	108	99	79	70	63	42	35	26	6	166	145	142	120	111	102	80	70	62	40	32	21	13	160	152
159	152	143	123	114	93	85	77	56	47	27	18	11	164	156	134	126	116	94	85	76	54	44	36	14	6
25	4	164	144	135	128	107	100	91	71	62	41	33	18	10	157	149	138	130	108	100	90	68	59	50	28
48	39	19	10	158	150	142	121	112	92	83	76	55	42	33	24	2	161	153	131	123	112	104	82	74	64
69	60	40	31	24	3	165	156	136	127	106	98	90	78	56	48	38	16	7	167	145	135	127	105	97	86
104	84	75	54	46	38	17	8	157	148	141	120	113	101	79	71	60	52	30							



	1/H	22/L	19/		1/H	23/L	20/																		
1	164	147	142	124	106	101	84	78	61	42	37	18	1	163	156	135	129	110	102	82	75	55	47	28	22
33	15	10	162	156	139	120	115	96	79	73	56	51	34	15	9	157	150	143	122	116	97	89	69	62	42
65	48	29	24	5	157	151	134	129	111	93	88	71	56	49	29	21	2	165	144	137	130	109	103	84	76
83	66	60	43	38	20	2	166	149	143	126	107	102	90	71	63	43	36	16	8	158	152	131	124	117	96
116	98	80	75	58	52	35	16	11	161	144	138	121	111	104	83	77	58	50	30	23	3	164	145	139	118
136	130	113	94	89	70	53	47	30	25	7	158	153	132	126	105	98	91	70	64	45	37	17	10	159	151
167	148	131	125	108	103	85	67	62	45	39	22	3	166	146	138	119	113	92	85	78	57	51	32	24	4
17	12	163	145	140	123	117	100	81	76	57	40	34	19	11	160	153	133	125	106	100	79	72	65	44	38
49	32	26	9	159	154	135	118	112	95	90	72	54	52	31	25	6	167	147	140	120	112	93	87	66	59
68	63	44	27	21	4	168	150	132	127	110	104	87	74	53	46	39	18	12	162	154	134	127	107	99	80
99	82	77	59	41	36	19	13	165	146	141	122	105	94	86	67	61	40	33	26	5	168	149	141	121	114
119	114	97	91	74	55	50	31	14	8	160	155	137	128	108	101	81	73	54	48	27	20	13	161	155	136
152	133	128	109	92	86	69	64	46	28	23	6	169	148	142	123	115	95	88	68	60	41	35	14	7	169

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 (Calculated and Listed by Kanji Setsuda on April 19, 2010)

The list above shows the recent result of my preliminary challenge to composing our object of Order 13. I want to report that I could actually make more than 7 million solutions, though I listed out only the first 20 examples of them here.