Chapter 9: Fundamental Study of Composite Magic Squares:
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Section 2: Composite and Pan-Magic Squares of Order 8

#1. 'Composite' Conditions

The meaning of 'composite' is just the same with the one of order 6.
We define it with so many simultaneous equations as the next list.

[Figure 1: **Basic Form** and **Composite Conditions**]

```
  .-----------------------.      n1+ n2+ n9+n10 = S ....(1)
  |n1|n2|n3|n4|n5|n6|n7|n8|n1    n9+n10+n17+n18 = S ....(2)
  |--+--+--+--+--+--+--+--|     n17+n18+n25+n26 = S ....(3)
  |n9|10|11|12|13|14|15|16|n9   n25+n26+n33+n34 = S ....(4)
  |--+--+--+--+--+--+--+--|     n33+n34+n41+n42 = S ....(5)
  |17|18|19|20|21|22|23|24|17   n41+n42+n49+n50 = S ....(6)
  |--+--+--+--+--+--+--+--|     n49+n50+n57+n58 = S ....(7)
  |25|26|27|28|29|30|31|32|25   n57+n58+ n1+ n2 = S ....(8)
  |--+--+--+--+--+--+--+--|      n2+ n3+n10+n11 = S ....(9)
  |33|34|35|36|37|38|39|40|33   n10+n11+n18+n19 = S ...(10)
  |--+--+--+--+--+--+--+--|     n18+n19+n26+n27 = S ...(11)
  |41|42|43|44|45|46|47|48|41   n26+n27+n34+n35 = S ...(12)
  |--+--+--+--+--+--+--+--|     n34+n35+n42+n43 = S ...(13)
  |49|50|51|52|53|54|55|56|49   n42+n43+n50+n51 = S ...(14)
  |--+--+--+--+--+--+--+--|     n50+n51+n58+n59 = S ...(15)
  |57|58|59|60|61|62|63|64|57   n58+n59+ n2+ n3 = S ...(16)
  '-----------------------'      n3+ n4+n11+n12 = S ...(17)
   n1 n2 n3 n4 n5 n6 n7 n8 n1   n11+n12+n19+n20 = S ...(18)
   ------------------------------------------------
  n19+n20+n27+n28 = S ...(19) | n22+n23+n30+n31 = S ...(43)
  n27+n28+n35+n36 = S ...(20) | n30+n31+n38+n39 = S ...(44)
  n35+n36+n43+n44 = S ...(21) | n38+n39+n46+n47 = S ...(45)
  n43+n44+n51+n52 = S ...(22) | n46+n47+n54+n55 = S ...(46)
  n51+n52+n59+n60 = S ...(23) | n54+n55+n62+n63 = S ...(47)
  n59+n60+ n3+ n4 = S ...(24) | n62+n63+ n6+ n7 = S ...(48)
   n4+ n5+n12+n13 = S ...(25) |  n7+ n8+n15+n16 = S ...(49)
  n12+n13+n20+n21 = S ...(26) | n15+n16+n23+n24 = S ...(50)
  n20+n21+n28+n29 = S ...(27) | n23+n24+n31+n32 = S ...(51)
  n28+n29+n36+n37 = S ...(28) | n31+n32+n39+n40 = S ...(52)
  n36+n37+n44+n45 = S ...(29) | n39+n40+n47+n48 = S ...(53)
  n44+n45+n52+n53 = S ...(30) | n47+n48+n55+n56 = S ...(54)
  n52+n53+n60+n61 = S ...(31) | n55+n56+n63+n64 = S ...(55)
  n60+n61+ n4+ n5 = S ...(32) | n63+n64+ n7+ n8 = S ...(56)
   n5+ n6+n13+n14 = S ...(33) |  n8+ n1+n16+ n9 = S ...(57)
  n13+n14+n21+n22 = S ...(34) | n16+ n9+n24+n17 = S ...(58)
  n21+n22+n29+n30 = S ...(35) | n24+n17+n32+n25 = S ...(59)
  n29+n30+n37+n38 = S ...(36) | n32+n25+n40+n33 = S ...(60)
  n37+n38+n45+n46 = S ...(37) | n40+n33+n48+n41 = S ...(61)
  n45+n46+n53+n54 = S ...(38) | n48+n41+n56+n49 = S ...(62)
  n53+n54+n61+n62 = S ...(39) | n56+n49+n64+n57 = S ...(63)
  n61+n62+ n5+ n6 = S ...(40) | n64+n57+ n8+ n1 = S ...(64)
   n6+ n7+n14+n15 = S ...(41) |
  n14+n15+n22+n23 = S ...(42) | ... Composite Conditions
```

What properties can you find if you accept only these 64 composite conditions at first? Are all rows, columns and pan-diagonals also classified into two groups according to their sums just as in the case of order 6?

Let's make some algebraic study in the same way as follows.

```
[1] (1)+(3)+(5)+(7)
    n1+ n2+ n9+n10 = S ....(1)
   n17+n18+n25+n26 = S ....(3)
   n33+n34+n41+n42 = S ....(5)
 +)n49+n50+n57+n58 = S ....(7)
 -------------------------------
(n1+n9+n17+n25+n33+n41+n49+n57)+(n2+n10+n18+n26+n34+n42+n50+n58) = 4*S
           L1                 +            L2                  = 4*S
  (9)+(11)+(13)+(15)
    n2+ n3+n10+n11 = S ....(9)
   n18+n19+n26+n27 = S ...(11)
   n34+n35+n42+n43 = S ...(13)
 +)n50+n51+n58+n59 = S ...(15)
 -------------------------------
(n2+n10+n18+n26+n34+n42+n50+n58)+(n3+n11+n19+n27+n35+n43+n51+n59) = 4*S
           L2                 +            L3                  = 4*S
  (17)+(19)+(21)+(23)
(n3+n11+n19+n27+n35+n43+n51+n59)+(n4+n12+n20+n28+n36+n44+n52+n60) = 4*S
    L3 + L4 = 4*S
  (25)+(27)+(29)+(31)
(n4+n12+n20+n28+n36+n44+n52+n60)+(n5+n13+n21+n29+n37+n45+n53+n61) = 4*S
    L4 + L5 = 4*S
..........
Therefore,
  L1 = L3 = L5 = L7 = LS1;
  L2 = L4 = L6 = L8 = LS2; (LS1 + LS2 = 4*S)
  All columns are classified into two groups according to their sums.
  But you cannot yet say LS1 = LS2 = 2*S = 260.

[2] In the same way
  (1)+(17)+(33)+(49)
    n1+ n2+ n9+n10 = S ....(1)
    n3+ n4+n11+n12 = S ...(17)
    n5+ n6+n13+n14 = S ...(33)
 +) n7+ n8+n15+n16 = S ...(49)
 ---------------------------------
(n1+n2+n3+n4+n5+n6+n7+n8)+(n9+n10+n11+n12+n13+n14+n15+n16)= 4*S
          R1             +            R9                  = 4*S
  (2)+(18)+(34)+(50)
(n9+n10+n11+n12+n13+n14+n15+n16)+(n17+n18+n19+n20+n21+n22+n23+n24)=4*S
    R9 + R17 = 4*S
  (3)+(19)+(35)+(51)
(n17+n18+n19+n20+n21+n22+n23+n24)+(n25+n26+n27+n28+n29+n30+n31+n32)=4*S
    R17 + R25 = 4*S
...........
Therefore
  R1 = R17 = R33 = R49 = RS1;
  R9 = R25 = R41 = R57 = RS2; (RS1 + RS2 = 4*S)
  All rows are classified into two groups according to their sums
  But you cannot yet say RS1 = RS2 = 260.
```

If you want all rows and columns equal to the magic constant 260, you must add at least `L1 = R1 = 260` to the composite conditions at first by yourself.

[3] Before going to study pan-diagonals, we must study some other interesting properties here.

[Figure 1(again): **Basic Form** and **Composite Conditions**]

```
 .----------------------.    n1+ n2+ n9+n10 = S
 |n1|n2|n3|n4|n5|n6|n7|n8|    n9+n10+n17+n18 = S --> n1+n2=n17+n18=P1
 |--+--+--+--+--+--+--+--|   n17+n18+n25+n26 = S --> n9+n10=n25+n26=Q1
 |n9|10|11|12|13|14|15|16|   n25+n26+n33+n34 = S --> n17+n18=n33+n34=P1
 |--+--+--+--+--+--+--+--|   n33+n34+n41+n42 = S --> n25+n26=n41+n42=Q1
 |17|18|19|20|21|22|23|24|   n41+n42+n49+n50 = S --> n33+n34=n49+n50=P1
 |--+--+--+--+--+--+--+--|   n49+n50+n57+n58 = S --> n41+n42=n57+n58=Q1
 |25|26|27|28|29|30|31|32|   n57+n58+ n1+ n2 = S       (P1+Q1=S)
 |--+--+--+--+--+--+--+--|    n2+ n3+n10+n11 = S
 |33|34|35|36|37|38|39|40|   n10+n11+n18+n19 = S --> n2+n3=n18+n19=P2
 |--+--+--+--+--+--+--+--|   n18+n19+n26+n27 = S --> n10+n11=n26+n27=Q2
 |41|42|43|44|45|46|47|48|   n26+n27+n34+n35 = S --> n18+n19=n34+n35=P2
 |--+--+--+--+--+--+--+--|   n34+n35+n42+n43 = S --> n26+n27=n42+n43=Q2
 |49|50|51|52|53|54|55|56|   n42+n43+n50+n51 = S --> n34+n35=n50+n51=P2
 |--+--+--+--+--+--+--+--|   n50+n51+n58+n59 = S --> n42+n43=n58+n59=Q2
 |57|58|59|60|61|62|63|64|   n58+n59+ n2+ n3 = S       (P2+Q2=S)
 '----------------------'    n3+ n4+n11+n12 = S
                            n11+n12+n19+n20 = S --> n3+n4=n19+n20=P3
 .....                      n19+n20+n27+n28 = S --> n11+n12=n27+n28=Q3
```

n19+n20=n35+n36=P3; n27+n28=n43+n44=Q3; n35+n36=n41+n52=P3;
n43+n44=n59+n60=Q3; (P3+Q3=S)

n4+n5=n20+n21=P4; n12+n13=n28+n29=Q4; n20+n21=n36+n37=P4;
n28+n29=n44+n45=Q4; n36+n37=n52+n53=P4; n44+n45=n60+n61=Q4; (P4+Q4=S)
n5+n6=n21+n22=P5; n13+n14=n29+n30=Q5; n21+n22=n37+n38=P5;
n29+n30=n45+n46=Q5; n37+n38=n53+n54=P5; n45+n46=n61+n62=Q5; (P5+Q5=S)
n6+n7=n22+n23=P6; n14+n15=n30+n31=Q6; n22+n23=n38+n39=P6;
n30+n31=n46+n47=Q6; n38+n39=n54+n55=P6; n46+n47=n62+n63=Q6; (P6+Q6=S)
n7+n8=n23+n24=P7; n15+n16=n31+n32=Q7; n23+n24=n39+n40=P7;
n31+n32=n47+n48=Q7; n39+n40=n55+n56=P7; n47+n48=n63+n64=Q7; (P7+Q7=S)

```
 n1+ n9+ n2+n10 = S
 n2+n10+ n3+n11 = S --> n1+n9=n3+n11=M1
 n3+n11+ n4+n12 = S --> n2+n10=n4+n12=N1
 n4+n12+ n5+n13 = S --> n3+n11=n5+n13=M1
 n5+n13+ n6+n14 = S --> n4+n12=n6+n14=N1
 n6+n14+ n7+n15 = S --> n5+n13=n7+n15=M1
 n7+n15+ n8+n16 = S --> n6+n14=n8+n16=N1   (M1+N1=S)
```

n9+n17=nn11+n19=M2; n10+n18=n12+n20=N2; n11+n19=n13+n21=M2;
n12+n20=n14+n22=N2; n13+n21=n15+n23=M2; n14+n22=n16+n24=N2; (M2+N2=S)
n17+n25=n19+n27=M3; n18+n26=n20+n28=N3; n19+n27=n21+n29=M3;
n20+n28=n22+n30=N3; n21+n29=n23+n31=M3; n22+n30=n24+n32=N3; (M3+N3=S)
....
n49+n57=n51+n59=M7; n50+n58=n52+n60=N7; n51+n59=n53+n61=M7;
n52+n60=n54+n62=N7; n53+n61=n55+n63=M7; n54+n62+n56+n64=N7; (M7+N7=S)

There are many types of complementary pairs such as Pn+Qn=S; Mn+Nn=S.
But you cannot always expect Pn=Qn=C(=65), nor you can always say Mn=Nn=C.

What properties can you find among 4 tops of any blocks such as {n1, n3, n17, n19}, {n1, n4, n25, n28}, or {n1, n6, n41, n46}?

[Figure 1(again): **Relationship among 4 tops of any Block**]

```
What relationship is there among {n1, n3, n17, n19}?
 .----------------------.
 |n1|n2|n3|n4|n5|n6|n7|n8|n1       n1+n2=n17+n18(=P1)
 |--+--+--+--+--+--+--+--|       -)n2+n3=n18+n19(=P2)
 |n9|10|11|12|13|14|15|16|n9     --------------------
 |--+--+--+--+--+--+--+--|       n1-n3=n17-n19 --> n1+n19=n3+n17
 |17|18|19|20|21|22|23|24|17          ('Cross-sums are equal.')
 |--+--+--+--+--+--+--+--|
 |25|26|27|28|29|30|31|32|25  How about {n1, n4, n25, n28}?
 |--+--+--+--+--+--+--+--|        n1+ n2+ n9+n10 = S
 |33|34|35|36|37|38|39|40|33     n17+n18+n25+n26 = S
 |--+--+--+--+--+--+--+--|        n3+ n4+n11+n12 = S
 |41|42|43|44|45|46-47-48-41    +)n19+n20+n27+n28 = S
 |--+--+--+--+|-+--+--| |     ------------------------
 |49|50|51|52|53|54|55|56|49    -) n9+n10+n17+n18 = S
 |--+--+--+--+|-+--+--| |     -)n11+n12+n19+n20 = S
 |57|58|59|60|61|62|63|64|57   --------------------------
 '---------------|-------' |    n1+n2+n3+n4+n25+n26+n27+n28=2*S
  n1 n2 n3 n4 n5 n6-n7-n8-n1   -)  n2+ n3+n26+n27=P2+Q2 = S
                               ---------------------------
                              Therefore n1+ n4+n25+n28 = S
  {n1, n4, n25, n28} are 4 tops of 4 x 4 block. Every 4 tops of any 4 x 4 block
within add up to the same composite sum S(=130).
  4 tops of 6 x 6 block {n1, n6, n41, n46} are just the same as 4 tops of 4 x
4 block {n1, n6, n41, n46} in the extended space.
  Therefore n1+ n6+n41+n46 = S
  {n1, n8, n57, n64} are not only the 4 tops of the largest 8 x 8 block, but
also the 4 tops of the smallest 2 x 2 block on the right side bottom.
```

After all you can say every 4 tops of any block 2 x 2, 4 x 4, 6 x 6 or 8 x 8 add up to the composite sum 130.

```
How about {n1, n5, n33, n37}?
    n1+ n2=n33+n34(=P1)           n2+n20=n4+n18 (Cross-sums of 3 x 3)
 +)n36+n37= n4+ n5(=P4)        +)n18+n36=n20+n34 (Cross-sums of 3 x 3)
 ----------------------         -----------------
 n1+n2+n36+n37=n4+n5+n33+n34;     n2+n36=n4+n34; --> n1+n37=n5+n33
  This proves cross-sums are equal to each other among 4 tops of any 5 x 5 block.

How about {n1, n7, n49, n55}?
  They are not only 4 tops of 7 x 7 block, but also 4 tops of 3 x 3 block in
the extended space on the right side bottom. Cross-sums are equal. n1+n55=n7+n49
```

After all you can say cross-sums are equal to each other among every 4 tops of any 3 x 3, 5 x 5 or 7 x 7 block.

#2. Pan-diagonals of Composite Square of Order 8

What properties do our composite conditions add to the pan-diagonals?

Let's have some algebraic study here. Let's not assume the constant sums of all pan-diagonals now at first and not yet define any equality of all sums.

[Figure 2: **Basic Form & List of Pan-diagonal Equations**]

```
  n1+n10+n19+n28+n37+n46+n55+n64=pd1;  | n1+n16+n23+n30+n37+n44+n51+n58=pb1;
  n2+n11+n20+n29+n38+n47+n56+n57=pd2;  | n2+n9+n24+n31+n38+n45+n52+n59=pb2;
  n3+n12+n21+n30+n39+n48+n49+n58=pd3;  | n3+n10+n17+n32+n39+n46+n53+n60=pb3;
```

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

```
  n4+n13+n22+n31+n40+n41+n50+n59=pd4;  | n4+n11+n18+n25+n40+n47+n54+n61=pb4;
  n5+n14+n23+n32+n33+n42+n51+n60=pd5;  | n5+n12+n19+n26+n33+n48+n55+n62=pb5;
  n6+n15+n24+n25+n34+n43+n52+n61=pd6;  | n6+n13+n20+n27+n34+n41+n56+n63=pb6;
  n7+n16+n17+n26+n35+n44+n53+n62=pd7;  | n7+n14+n21+n28+n35+n42+n49+n64=pb7;
  n8+n9+n18+n27+n36+n45+n54+n63=pd8;   | n8+n15+n22+n29+n36+n43+n50+n57=pb8;

Compare the pd1 with pb1, you will find the common entries {n1, n37}.
  n1+n10+n19+n28+n37+n46+n55+n64=pd1;
  n1+n16+n23+n30+n37+n44+n51+n58=pb1;
   n10+n64=n16+n58 (Cross-sums of 7 x 7);
   n19+n55=n23+n51 (Cross-sums of 5 x 5);
   n28+n46=n30+n44 (Cross-sums of 3 x 3); Therefore pd1 = pb1

  n2+n11+n20+n29+n38+n47+n56+n57=pd2;
  n2+n9+n24+n31+n38+n45+n52+n59=pb2;  {n2+n38} is common.
   n29+n47=n31+n45 (Cross-sums of 3 x 3);
   n20+n56=n24+n52 (Cross-sums of 5 x 5);
    n9+n59=n11+n57 (Cross-sums of 7 x 7); Therefore pd2 = pb2
  pd3 = pb3;  pd4 = pb4;  pd5 = pb5;  pd6 = pb6;  pd7 = pb7;  pd8 = pb8;

  n1+n10+n19+n28+n37+n46+n55+n64=pd1;
  n3+n10+n17+n32+n39+n46+n53+n60=pb3;  {n10+n46} is common.
   n1+n19=n3+n17 (Cross-sums of 3 x 3);
   n37+n55=n39+n53 (Cross-sums of 3 x 3);
   n28+n64=n32+n60 (Cross-sums of 5 x 5); Therefore pd1 = pb3

  n1+n10+n19+n28+n37+n46+n55+n64=pd1;
  n5+n12+n19+n26+n33+n48+n55+n62=pb5;  {n19+n55} is common.
   n10+n28=n12+n26 (Cross-sums of 3 x 3);
   n1+n37=n5+n33 (Cross-sums of 5 x 5);
   n46+n64=n48+n62 (Cross-sums of 3 x 3); Therefore pd1 = pb5

  n1+n10+n19+n28+n37+n46+n55+n64=pd1;
  n7+n14+n21+n28+n35+n42+n49+n64=pb7;  -->  pd1 = pb7

 After all       pd1 = pb1 = pd3 = pb3 = pd5 = pb5 = pd7 = pb7 = P
 In the same way pd2 = pb2 = pd4 = pb4 = pd6 = pb6 = pd8 = pb8 = Q
 And P + Q = 2*K = 520
```

All pan-diagonals are classified into 2 groups according to their line-sums: (1) The group of 8 pan-diagonals with n1, n3, n5 and n7 and (2) the one of 8 pan-diagonals with n2, n4, n6 and n8.

In each group they are all equal to one another. But you cannot always say all the sums are equal to 260, only under the composite conditions.

If you want all pan-diagonals to be equal to the magic constant, you must add at least one condition `pd1=260` to the list of composite definitions at first by yourself.

#3. Making a 'Composite' Pan-diagonal Magic Square of Order 8

Let's actually make some composite pan-diagonal magic square of order 8 here.

I made the 'Composite and Complete' magic squares before. They have all complementary pairs of 65 only on their pan-diagonals. But this time let's not add those strict conditions to our object.

We only give our object (1) the Composite Conditions and (2) `RS1=LS1=pd1=K(=260)`.

```
n1+n2+n3+n4+n5+n6+n7+n8=K          ...(RS1);
n1+n9+n17+n25+n33+n41+n49+n57=K    ...(LS1);
n1+n10+n19+n28+n37+n46+n55+n64=K   ...(pd1);
```

If you like, you may well add any other pan-diagonal condition such as

```
n1+n16+n23+n30+n37+n44+n51+n58=K   ...(pb1);
n2+n11+n20+n29+n38+n47+n56+n57=K   ...(pd2);
n2+n9+n24+n31+n38+n45+n52+n59=K    ...(pb2);
...
```

You can never lose anything you want to have, even if you add these conditions.

The next list contains a part of my calculation result for the standard solutions of this type. The solutions must be too many for me to count them up through. It must also take too long a time to do that job. I could not help giving it up.

```
** 'Composite & Pan-Diagonal' Magic Squares 8x8 **
  *** Print the Standard Solutions with n1=1 ***
                     1/                         5/                         9/
  1 64  3 62  5 60  7 58     1 64  3 62  5 60  7 58     1 64  3 62  5 60  7 58
 63  2 61  4 59  6 57  8     63  2 61  4 59  6 57  8     63  2 61  4 59  6 57  8
 25 40 27 38 29 36 31 34    25 40 27 38 29 36 31 34    25 40 27 38 29 36 31 34
 39 26 37 28 35 30 33 32    24 41 22 43 20 45 18 47    16 49 14 51 12 53 10 55
 42 23 44 21 46 19 48 17    42 23 44 21 46 19 48 17    42 23 44 21 46 19 48 17
 24 41 22 43 20 45 18 47    39 26 37 28 35 30 33 32    39 26 37 28 35 30 33 32
 50 15 52 13 54 11 56  9    50 15 52 13 54 11 56  9    50 15 52 13 54 11 56  9
 16 49 14 51 12 53 10 55    16 49 14 51 12 53 10 55    24 41 22 43 20 45 18 47
                    13/                        21/                        25/
  1 64  3 62  5 60  7 58     1 64  3 62  5 60  7 58     1 64  3 62  5 60  7 58
 63  2 61  4 59  6 57  8     63  2 61  4 59  6 57  8     63  2 61  4 59  6 57  8
 26 39 28 37 30 35 32 33    26 39 28 37 30 35 32 33    26 39 28 37 30 35 32 33
 40 25 38 27 36 29 34 31    24 41 22 43 20 45 18 47    23 42 21 44 19 46 17 48
 41 24 43 22 45 20 47 18    42 23 44 21 46 19 48 17    41 24 43 22 45 20 47 18
 23 42 21 44 19 46 17 48    40 25 38 27 36 29 34 31    40 25 38 27 36 29 34 31
 50 15 52 13 54 11 56  9    49 16 51 14 53 12 55 10    50 15 52 13 54 11 56  9
 16 49 14 51 12 53 10 55    15 50 13 52 11 54  9 56    16 49 14 51 12 53 10 55
                    29/                        33/                        37/
  1 64  3 62  5 60  7 58     1 64  3 62  5 60  7 58     1 64  3 62  5 60  7 58
 63  2 61  4 59  6 57  8     63  2 61  4 59  6 57  8     63  2 61  4 59  6 57  8
 26 39 28 37 30 35 32 33    26 39 28 37 30 35 32 33    41 24 43 22 45 20 47 18
 16 49 14 51 12 53 10 55    15 50 13 52 11 54  9 56    40 25 38 27 36 29 34 31
 41 24 43 22 45 20 47 18    42 23 44 21 46 19 48 17    26 39 28 37 30 35 32 33
 40 25 38 27 36 29 34 31    40 25 38 27 36 29 34 31    23 42 21 44 19 46 17 48
 50 15 52 13 54 11 56  9    49 16 51 14 53 12 55 10    50 15 52 13 54 11 56  9
 23 42 21 44 19 46 17 48    24 41 22 43 20 45 18 47    16 49 14 51 12 53 10 55
```

```
                    49/
 1 64  3 62  5 60  7 58
63  2 61  4 59  6 57  8
42 23 44 21 46 19 48 17
40 25 38 27 36 29 34 31
26 39 28 37 30 35 32 33
24 41 22 43 20 45 18 47
49 16 51 14 53 12 55 10
15 50 13 52 11 54  9 56
                   109/
 1 64  3 62  5 58  7 60
63  2 61  4 59  8 57  6
25 40 27 38 29 34 31 36
39 26 37 28 35 32 33 30
42 23 44 21 46 17 48 19
24 41 22 43 20 47 18 45
50 15 52 13 54  9 56 11
16 49 14 51 12 55 10 53
                   157/
 1 64  3 62  5 58  7 60
63  2 61  4 59  8 57  6
42 23 44 21 46 17 48 19
40 25 38 27 36 31 34 29
26 39 28 37 30 33 32 35
24 41 22 43 20 47 18 45
49 16 51 14 53 10 55 12
15 50 13 52 11 56  9 54
                   217/
 1 64  3 62  7 60  5 58
63  2 61  4 57  6 59  8
25 40 27 38 31 36 29 34
39 26 37 28 33 30 35 32
42 23 44 21 48 19 46 17
24 41 22 43 18 45 20 47
50 15 52 13 56 11 54  9
16 49 14 51 10 53 12 55
                   265/
 1 64  3 62  7 60  5 58
63  2 61  4 57  6 59  8
42 23 44 21 48 19 46 17
40 25 38 27 34 29 36 31
26 39 28 37 32 35 30 33
24 41 22 43 18 45 20 47
49 16 51 14 55 12 53 10
15 50 13 52  9 54 11 56
                   325/
 1 64  3 62  7 58  5 60
63  2 61  4 57  8 59  6
25 40 27 38 31 34 29 36
39 26 37 28 33 32 35 30
42 23 44 21 48 17 46 19
24 41 22 43 18 47 20 45
50 15 52 13 56  9 54 11
16 49 14 51 10 55 12 53
                   649/
 1 64  3 62 11 56  9 54
63  2 61  4 53 10 55 12
21 44 23 42 31 36 29 34
43 22 41 24 33 30 35 32
38 27 40 25 48 19 46 17
28 37 26 39 18 45 20 47
50 15 52 13 60  7 58  5
16 49 14 51  6 57  8 59
```

```
                    73/
 1 64  3 62  5 60  7 58
63  2 61  4 59  6 57  8
49 16 51 14 53 12 55 10
40 25 38 27 36 29 34 31
26 39 28 37 30 35 32 33
24 41 22 43 20 45 18 47
42 23 44 21 46 19 48 17
15 50 13 52 11 54  9 56
                   121/
 1 64  3 62  5 58  7 60
63  2 61  4 59  8 57  6
26 39 28 37 30 33 32 35
40 25 38 27 36 31 34 29
41 24 43 22 45 18 47 20
23 42 21 44 19 48 17 46
50 15 52 13 54  9 56 11
16 49 14 51 12 55 10 53
                   181/
 1 64  3 62  5 58  7 60
63  2 61  4 59  8 57  6
49 16 51 14 53 10 55 12
40 25 38 27 36 31 34 29
26 39 28 37 30 33 32 35
24 41 22 43 20 47 18 45
42 23 44 21 46 17 48 19
15 50 13 52 11 56  9 54
                   229/
 1 64  3 62  7 60  5 58
63  2 61  4 57  6 59  8
26 39 28 37 32 35 30 33
40 25 38 27 34 29 36 31
41 24 43 22 47 20 45 18
23 42 21 44 17 46 19 48
50 15 52 13 56 11 54  9
16 49 14 51 10 53 12 55
                   289/
 1 64  3 62  7 60  5 58
63  2 61  4 57  6 59  8
49 16 51 14 55 12 53 10
40 25 38 27 34 29 36 31
26 39 28 37 32 35 30 33
24 41 22 43 18 45 20 47
42 23 44 21 48 19 46 17
15 50 13 52  9 54 11 56
                   433/
 1 64  3 62  9 56 11 54
63  2 61  4 55 10 53 12
21 44 23 42 29 36 31 34
43 22 41 24 35 30 33 32
38 27 40 25 46 19 48 17
28 37 26 39 20 45 18 47
50 15 52 13 58  7 60  5
16 49 14 51  8 57  6 59
                   757/
 1 64  3 62 11 54  9 56
63  2 61  4 53 12 55 10
21 44 23 42 31 34 29 36
43 22 41 24 33 32 35 30
38 27 40 25 48 17 46 19
28 37 26 39 18 47 20 45
50 15 52 13 60  5 58  7
16 49 14 51  6 59  8 57
```

```
                    85/
 1 64  3 62  5 60  7 58
63  2 61  4 59  6 57  8
50 15 52 13 54 11 56  9
40 25 38 27 36 29 34 31
26 39 28 37 30 35 32 33
23 42 21 44 19 46 17 48
41 24 43 22 45 20 47 18
16 49 14 51 12 53 10 55
                   145/
 1 64  3 62  5 58  7 60
63  2 61  4 59  8 57  6
41 24 43 22 45 18 47 20
40 25 38 27 36 31 34 29
26 39 28 37 30 33 32 35
23 42 21 44 19 48 17 46
50 15 52 13 54  9 56 11
16 49 14 51 12 55 10 53
                   193/
 1 64  3 62  5 58  7 60
63  2 61  4 59  8 57  6
50 15 52 13 54  9 56 11
40 25 38 27 36 31 34 29
26 39 28 37 30 33 32 35
23 42 21 44 19 48 17 46
41 24 43 22 45 18 47 20
16 49 14 51 12 55 10 53
                   253/
 1 64  3 62  7 60  5 58
63  2 61  4 57  6 59  8
41 24 43 22 47 20 45 18
40 25 38 27 34 29 36 31
26 39 28 37 32 35 30 33
23 42 21 44 17 46 19 48
50 15 52 13 56 11 54  9
16 49 14 51 10 53 12 55
                   301/
 1 64  3 62  7 60  5 58
63  2 61  4 57  6 59  8
50 15 52 13 56 11 54  9
40 25 38 27 34 29 36 31
26 39 28 37 32 35 30 33
23 42 21 44 17 46 19 48
41 24 43 22 47 20 45 18
16 49 14 51 10 53 12 55
                   541/
 1 64  3 62  9 54 11 56
63  2 61  4 55 12 53 10
21 44 23 42 29 34 31 36
43 22 41 24 35 32 33 30
38 27 40 25 46 17 48 19
28 37 26 39 20 47 18 45
50 15 52 13 58  5 60  7
16 49 14 51  8 59  6 57
                   865/
 1 64  3 62 17 48 19 46
63  2 61  4 47 18 45 20
13 52 15 50 29 36 31 34
51 14 49 16 35 30 33 32
38 27 40 25 54 11 56  9
28 37 26 39 12 53 10 55
42 23 44 21 58  7 60  5
24 41 22 43  8 57  6 59
```

973/

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

1081/

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

1189/

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

1297/

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

1405/

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

1513/

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

1621/

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

1729/

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

1837/

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

1945/

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

2053/

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

2161/

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

2269/

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

2377/

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

2485/

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

2593/

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

3025/

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

3457/

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

3889/

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

4321/

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

4753/

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

5185/

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

5617/

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

7345/

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

7777/

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

8209/

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

8641/

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

9073/

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

9505/

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

9937/

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

10369/

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

10801/

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

11233/

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

12961/

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

13393/

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

13825/

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

14257/

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

14689/

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

15121/

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

15553/

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

20737/

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

25921/

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

31105/

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

36289/

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

41473/

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

46657/

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

51841/

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

57025/

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

62209/

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

67393/

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

72577/

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

77761/

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

82945/

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

88129/

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

93313/

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

98497/

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

103681/

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

108865/

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

114049/

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

119233/

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

124417/

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

129601/

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

134785/

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

139969/

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

145153/

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

150337/

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

155521/

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

160705/

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

165889/

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

169345/

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

174529/

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

177985/

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

181441/

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

186625/

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

190081/

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

193537/

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

196993/

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

202177/

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

207361/

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

212545/

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

217729/

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

222913/

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

228097/

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

233281/

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

. . . . . .

We must try to find anything different, such as the smaller set of solutions.

How about finding 'fundamental solutions' of the same type?

But it should be the next problem how we could give inequality conditions to the critical positions. If you give the more strict conditions, the less solutions you will get. It might be a relief, but you must always make them as reasonably as possible.

I studied elaborately about the possibility of line-exchange in a square. Which rows and columns can we exchange with each other?

I have found many ways to do that. But I skip to explain about the whole process here. I only mention about a few steps and the result.

[Figure 3: **Basic Form and Possibility of Line Exchange**]

```
                          OK (4-6) Line Exchange
 n1 n2 n3 n4 n5 n6 n7 n8    n1 n2 n3 n4 n5 n6 n7 n8
 n9 10 11 12 13 14 15 16    n9 10 11 12 13 14 15 16
 17 18 19 20 21 22 23 24    17 18 19 20 21 22 23 24
 25 26 27 28 29 30 31 32    41 42 43 44 45 46 47 48<-
 33 34 35 36 37 38 39 40    33 34 35 36 37 38 39 40
 41 42 43 44 45 46 47 48    25 26 27 28 29 30 31 32<-
 49 50 51 52 53 54 55 56    49 50 51 52 53 54 55 56
 57 58 59 60 61 62 63 64    57 58 59 60 61 62 63 64

n1+n10+n19+n28+n37+n46+n55+n64=K; n1+n10+n19+n44+n37+n30+n55+n64=NewPD1
 n28+n46=n30+n44 (Cross-sums of 3 x 3 block within) Therefore NwePD1=K;
n8+n15+n22+n29+n36+n43+n50+n57=K; n8+n15+n22+n45+n36+n27+n50+n57=NewPD2
 n29+n43=n27+n45 (Cross-sums of 3 x 3 block within) Therefore NwePD2=K;
.........
n17+n18+n41+n42=n17+n18+n25+n26=S (Because n25+n26=n41+n42=Q1)
n31+n32+n55+n56=n31+n32+n39+n40=S (Because n39+n40=n55+n56=Q7)
.........
                          OK (3-7) Line Exchange
 n1 n2 n3 n4 n5 n6 n7 n8    n1 n2 n3 n4 n5 n6 n7 n8
 n9 10 11 12 13 14 15 16    n9 10 11 12 13 14 15 16
 17 18 19 20 21 22 23 24    49 50 51 52 53 54 55 56<-
 25 26 27 28 29 30 31 32    25 26 27 28 29 30 31 32
 33 34 35 36 37 38 39 40    33 34 35 36 37 38 39 40
 41 42 43 44 45 46 47 48    41 42 43 44 45 46 47 48
 49 50 51 52 53 54 55 56    17 18 19 20 21 22 23 24<-
 57 58 59 60 61 62 63 64    57 58 59 60 61 62 63 64

n1+n10+n19+n28+n37+n46+n55+n64=K; n1+n10+n51+n28+n37+n46+n23+n64=NewPD1
 n19+n55=n23+n55 (Cross-sums of 5 x 5 block within) Therefore NwePD3=K;
n8+n15+n22+n29+n36+n43+n50+n57=K; n8+n15+n54+n29+n36+n43+n18+n57=NewPD4
 n18+n54=n22+n50 (Cross-sums of 5 x 5 block within) Therefore NwePD4=K;
.........
n9+n10+n49+n50=n9+n10+n17+n18=S (Because n49+n50=n17+n18=P1)
n23+n24+n63+n64=n55+n56+n63+n64=S (Because n55+n56=n23+n27=P7)
.........
```

I decided to make the 'fundamental form' with n1=1, and rearrange all other entries except n1, giving such inequality conditions as: `n1<n3<n7<n5`, `n1<n17<n49<n33`, `n2>n4>n8>n6`, `n9>n25>n57>n41` and `n2>n9`.

These conditions are so strict that they should make you have the smallest set of fundamental solutions and take the shortest time to calculate all.

I must report I finally found the 360 'fundamental solutions' of that type.

Of course, each row, each column and each pan-diagonal of our result adds up to the magic constant 260.

The next list shows a part of the result of my newest calculation.

```
*** 'Composite & Pan-Diagonal' Magic Squares of Order 8 ***
** List of the 360 Fundamental Solutions with n1=1(Part) **
```

1/

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

4/

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

7/

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

10/

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

13/

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

16/

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

19/

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

22/

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

25/

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

31/

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

37/

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

43/

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

49/

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

52/

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

55/

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

58/

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

61/

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

73/

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

82/

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

91/

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

97/

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

103/

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

105/

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

108/

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

111/

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

112/

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

113/

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

137/

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

176/

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

191/

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

203/

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

227/

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

235/

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

241/

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

245/

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

255/

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

258/

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

260/

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

261/

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

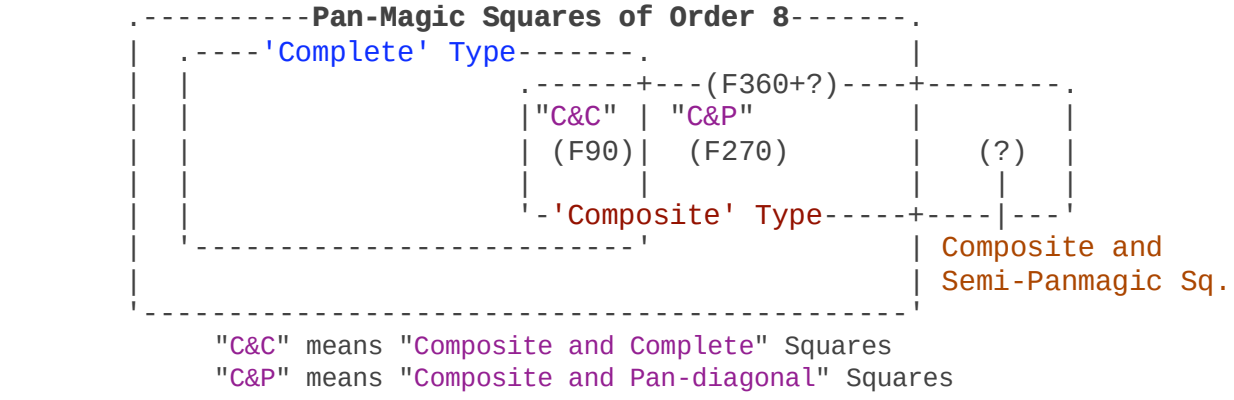
```
                    291/                    312/                    325/
 1 63  3 61 12 54 10 56    1 63  3 61  8 58  6 60    1 63  3 61  8 58  6 60
60  6 58  8 49 15 51 13   56 10 54 12 49 15 51 13   48 18 46 20 41 23 43 21
17 47 19 45 28 38 26 40   17 47 19 45 24 42 22 44    9 55 11 53 16 50 14 52
44 22 42 24 33 31 35 29   40 26 38 28 33 31 35 29   40 26 38 28 33 31 35 29
53 11 55  9 64  2 62  4   57  7 59  5 64  2 62  4   57  7 59  5 64  2 62  4
16 50 14 52  5 59  7 57   16 50 14 52  9 55 11 53   24 42 22 44 17 47 19 45
37 27 39 25 48 18 46 20   41 23 43 21 48 18 46 20   49 15 51 13 56 10 54 12
32 34 30 36 21 43 23 41   32 34 30 36 25 39 27 37   32 34 30 36 25 39 27 37
                    331/                    343/                    351/
 1 62  2 61 12 55 11 56    1 62  2 61  8 59  7 60    1 62  2 61  8 59  7 60
60  7 59  8 49 14 50 13   56 11 55 12 49 14 50 13   48 19 47 20 41 22 42 21
17 46 18 45 28 39 27 40   17 46 18 45 24 43 23 44    9 54 10 53 16 51 15 52
44 23 43 24 33 30 34 29   40 27 39 28 33 30 34 29   40 27 39 28 33 30 34 29
53 10 54  9 64  3 63  4   57  6 58  5 64  3 63  4   57  6 58  5 64  3 63  4
16 51 15 52  5 58  6 57   16 51 15 52  9 54 10 53   24 43 23 44 17 46 18 45
37 26 38 25 48 19 47 20   41 22 42 21 48 19 47 20   49 14 50 13 56 11 55 12
32 35 31 36 21 42 22 41   32 35 31 36 25 38 26 37   32 35 31 36 25 38 26 37
                    355/                    359/
 1 60  2 59 22 47 21 48    1 60  2 59 14 55 13 56
56 13 55 14 35 26 36 25   48 21 47 22 35 26 36 25
 3 58  4 57 24 45 23 46    3 58  4 57 16 53 15 54
54 15 53 16 33 28 34 27   46 23 45 24 33 28 34 27
43 18 44 17 64  5 63  6   51 10 52  9 64  5 63  6
30 39 29 40  9 52 10 51   30 39 29 40 17 44 18 43
41 20 42 19 62  7 61  8   49 12 50 11 62  7 61  8
32 37 31 38 11 50 12 49   32 37 31 38 19 42 20 41
```

[Count = 360] OK!

I found the 90 fundamental solutions of "C&C" magic squares contained in this list. The C&C solutions really make the subset of our pan-diagonal 360 solutions set. The count ratio is `90 : 360 = 1 : 4`. I also found how to reconstruct many other solutions by these fundamentals, though I skip to explain it now (I also found they have the "Ten Principal Solutions" in their list).

It is known the set of 'pan-magic' type is usually bigger than that of 'complete' one in higher orders, whether it is 'composite' type or not. The 'Complete MS88' with all complementary pairs of 65 only on their pandiagonals is getting rare in the usual pan-magic squares of order 8.

[Figure 4: **Conceptual Diagram for the Set and its Sub-set**]



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