4x4x4 Cube   5-11-2016

a) 2x2 planar subsets
    1) Most-Perfect Cube
    2) Reversible Cube
        a) Additional constraints - pairs symmetrically opposite on the same row/col/pilar have the same sum.

b) 2x2x2 sub cube partitions (partitions do not overlap)
    1) polarization of the 8 sub cubes to align with the 4x4x4 cube

c) Magic Cube Criteria – row/col/pilar/triagonal lines

d) Blending of the criteria above …

    Example: Reversible Most-Perfect Square

Most-Perfect Space

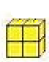
all 2x2 planar partitions have the same sum

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

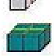
all 108 2x2 partitions in this 4x4x4 cube sum to 130

Example:

20 45
5 60
(20+5+45+60) = 130

 36

 36

 36

108

2x2 planar partitions

* Values that are 8 spaces apart on the Hilbert curve through this cube sum to 260

Reversible Cube :

https://oeis.org/A270205

How many diagonally opposite pairs have the same sum in this cube ?

Example: * 1 + 4 = 2 + 3
* 1 + 48 = 10 + 39
* 1 + 64 = 10 + 55

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

Magic Cube Conditions 4x4x4

```
// Basic Conditions: C=130
n01+n02+n03+n04=C & n01+n17+n33+n49=C & n01+n05+n09+n13=C &
n05+n06+n07+n08=C & n02+n18+n34+n50=C & n02+n06+n10+n14=C &
n09+n10+n11+n12=C & n03+n19+n35+n51=C & n03+n07+n11+n15=C &
n13+n14+n15+n16=C & n04+n20+n36+n52=C & n04+n08+n12+n16=C &
n17+n18+n19+n20=C & n05+n21+n37+n53=C & n17+n21+n25+n29=C &
n21+n22+n23+n24=C & n06+n22+n38+n54=C & n18+n22+n26+n30=C &
n25+n26+n27+n28=C & n07+n23+n39+n55=C & n19+n23+n27+n31=C &
n29+n30+n31+n32=C & n08+n24+n40+n56=C & n20+n24+n28+n32=C &
n33+n34+n35+n36=C & n09+n25+n41+n57=C & n33+n37+n41+n45=C &
n37+n38+n39+n40=C & n10+n26+n42+n58=C & n34+n38+n42+n46=C &
n41+n42+n43+n44=C & n11+n27+n43+n59=C & n35+n39+n43+n47=C &
n45+n46+n47+n48=C & n12+n28+n44+n60=C & n36+n40+n44+n48=C &
n49+n50+n51+n52=C & n13+n29+n45+n61=C & n49+n53+n57+n61=C &
n53+n54+n55+n56=C & n14+n30+n46+n62=C & n50+n54+n58+n62=C &
n57+n58+n59+n60=C & n15+n31+n47+n63=C & n51+n55+n59+n63=C &
n61+n62+n63+n64=C & n16+n32+n48+n64=C & n52+n56+n60+n64=C &

//Self-Complementary Conditions:
n01+n64=65 & n02+n63=65 & n03+n62=65 & n04+n61=65 &
n05+n60=65 & n06+n59=65 & n07+n58=65 & n08+n57=65 &
n09+n56=65 & n10+n55=65 & n11+n54=65 & n12+n53=65 &
n13+n52=65 & n14+n51=65 & n15+n50=65 & n16+n49=65 &
n17+n48=65 & n18+n47=65 & n19+n46=65 & n20+n45=65 &
n21+n44=65 & n22+n43=65 & n23+n42=65 & n24+n41=65 &
n25+n40=65 & n26+n39=65 & n27+n38=65 & n28+n37=65 &
n29+n36=65 & n30+n35=65 & n31+n34=65 & n32+n33=65 &
n33+n32=65 & n34+n31=65 & n35+n30=65 & n36+n29=65 &
n37+n28=65 & n38+n27=65 & n39+n26=65 & n40+n25=65 &
```

```
//* Pan-Triagonal Conditions: C=130 *
n01+n22+n43+n64=C & n01+n24+n43+n62=C &
n01+n30+n43+n56=C & n01+n32+n43+n54=C &
n02+n23+n44+n61=C & n02+n21+n44+n63=C &
n02+n31+n44+n53=C & n02+n29+n44+n55=C &
n03+n24+n41+n62=C & n03+n22+n41+n64=C &
n03+n32+n41+n54=C & n03+n30+n41+n56=C &
n04+n21+n42+n63=C & n04+n23+n42+n61=C &
n04+n29+n42+n55=C & n04+n31+n42+n53=C &
n05+n26+n47+n52=C & n05+n28+n47+n50=C &
n05+n18+n47+n60=C & n05+n20+n47+n58=C &
n06+n27+n48+n49=C & n06+n25+n48+n51=C &
n06+n19+n48+n57=C & n06+n17+n48+n59=C &
n07+n28+n45+n50=C & n07+n26+n45+n52=C &
n07+n20+n45+n58=C & n07+n18+n45+n60=C &
n08+n25+n46+n51=C & n08+n27+n46+n49=C &
n08+n17+n46+n59=C & n08+n19+n46+n57=C &
n09+n30+n35+n56=C & n09+n32+n35+n54=C &
n09+n22+n35+n64=C & n09+n24+n35+n62=C &
n10+n31+n36+n53=C & n10+n29+n36+n55=C &
n10+n23+n36+n61=C & n10+n21+n36+n63=C &
n11+n32+n33+n54=C & n11+n30+n33+n56=C &
n11+n24+n33+n62=C & n11+n22+n33+n64=C &
n12+n29+n34+n55=C & n12+n31+n34+n53=C &
n12+n21+n34+n63=C & n12+n23+n34+n61=C &
n13+n18+n39+n60=C & n13+n20+n39+n58=C &
n13+n26+n39+n52=C & n13+n28+n39+n50=C &
n14+n19+n40+n57=C & n14+n17+n40+n59=C &
n14+n27+n40+n49=C & n14+n25+n40+n51=C &
n15+n20+n37+n58=C & n15+n18+n37+n60=C &
n15+n28+n37+n50=C & n15+n26+n37+n52=C &
n16+n17+n38+n59=C & n16+n19+n38+n57=C &
n16+n25+n38+n51=C & n16+n27+n38+n49=C &
```

2x2x2 sub cube polarization

```
n06 < n17 &    n08 < n04 &    n14 < n10 &    n16 < n12 &
n06 < n02 &    n08 < n07 &    n14 < n13 &    n16 < n15 &
n06 < n18 &    n08 < n03 &    n14 < n09 &    n16 < n11 &
n06 < n05 &    n08 < n19 &    n14 < n25 &    n16 < n27 &
n06 < n01 &    n08 < n20 &    n14 < n26 &    n16 < n28 &
n06 < n21 &    n08 < n23 &    n14 < n29 &    n16 < n31 &
n06 < n22 &    n08 < n24 &    n14 < n30 &    n16 < n32 &
// sym red     //sym red      // sym red     // sum red
n02 > n05 &    n04 > n07 &    n10 > n13 &    n12 > n15 &
n05 > n22 &    n07 > n24 &    n13 > n30 &    n15 > n32 &

n38 < n34 &    n40 < n36 &    n46 < n42 &    n48 < n44 &
n38 < n37 &    n40 < n39 &    n46 < n45 &    n48 < n47 &
n38 < n33 &    n40 < n35 &    n46 < n41 &    n48 < n43 &
n38 < n49 &    n40 < n51 &    n46 < n57 &    n48 < n59 &
n38 < n50 &    n40 < n52 &    n46 < n58 &    n48 < n60 &
n38 < n53 &    n40 < n55 &    n46 < n61 &    n48 < n63 &
n38 < n54 &    n40 < n56 &    n46 < n62 &    n48 < n64 &
//sym red      // sym red     //sym red      // sym red
n34 > n37 &    n36 > n39 &    n42 > n45 &    n44 > n47 &
n37 > n54 &    n39 > n56 &    n45 > n62 &    n47 > n64 &
```

Polarized Reversible Cubes

all 108 2x2 planar subset diagonals have the same sum
though those sums may differ

all 8 2x2x2 subcube partitions have the same orientation

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Polarized Reversible Cube

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

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

each 8   2x2x2 subcube polarized

n01 < n17 &	n09 < n10 &	n33 < n34 &	n41 < n42 &
n01 < n02 &	n09 < n13 &	n33 < n37 &	n41 < n45 &
n01 < n18 &	n09 < n14 &	n33 < n38 &	n41 < n46 &
n01 < n05 &	n09 < n25 &	n33 < n49 &	n41 < n57 &
n01 < n06 &	n09 < n26 &	n33 < n50 &	n41 < n58 &
n01 < n21 &	n09 < n29 &	n33 < n53 &	n41 < n61 &
n01 < n22 &	n09 < n30 &	n33 < n54 &	n41 < n62 &
n03 < n04 &	n11 < n12 &	n35 < n36 &	n43 < n44 &
n03 < n07 &	n11 < n15 &	n35 < n39 &	n43 < n47 &
n03 < n08 &	n11 < n16 &	n35 < n40 &	n43 < n48 &
n03 < n19 &	n11 < n27 &	n35 < n51 &	n43 < n59 &
n03 < n20 &	n11 < n28 &	n35 < n52 &	n43 < n60 &
n03 < n23 &	n11 < n31 &	n35 < n55 &	n43 < n63 &
n03 < n24 &	n11 < n32 &	n35 < n56 &	n43 < n64 &

central 2x2x2 cube polarized		4x4x4 cube corners polarized	
n22 < n23 &	n22 < n39 &	n01 < n49 &	n01 < n13 &
n22 < n26 &	n22 < n42 &	n01 < n04 &	n01 < n64 &
n22 < n27 &	n22 < n43 &	n01 < n52 &	n01 < n61 &
n22 < n38 &		n01 < n16 &	

Polarizing Criteria

All 108 2x2 planar subset diagonals have the same sum though those sums may differ.

All 8 2x2x2 subcube partitions have the same orientation as the entire cube.

108 2x2 planar subsets

xy plane	xz plane	yz plane
n01 + n18 = n02 + n17 &	n01 + n06 = n02 + n05 &	n01 + n21 = n05 + n17 &
n17 + n34 = n18 + n33 &	n17 + n22 = n18 + n21 &	n02 + n22 = n06 + n18 &
n33 + n50 = n34 + n49 &	n33 + n38 = n34 + n37 &	n03 + n23 = n07 + n19 &
n02 + n19 = n03 + n18 &	n49 + n54 = n50 + n53 &	n04 + n24 = n08 + n20 &
n18 + n35 = n19 + n34 &	n02 + n07 = n03 + n06 &	n17 + n37 = n21 + n33 &
n34 + n51 = n35 + n50 &	n18 + n23 = n19 + n22 &	n18 + n38 = n22 + n34 &
n03 + n20 = n04 + n19 &	n34 + n39 = n35 + n38 &	n19 + n39 = n23 + n35 &
n19 + n36 = n20 + n35 &	n50 + n55 = n51 + n54 &	n20 + n40 = n24 + n36 &
n35 + n52 = n36 + n51 &	n03 + n08 = n04 + n07 &	n33 + n53 = n37 + n49 &
n05 + n22 = n06 + n21 &	n19 + n24 = n20 + n23 &	n34 + n54 = n38 + n50 &
n21 + n38 = n22 + n37 &	n35 + n40 = n36 + n39 &	n35 + n55 = n39 + n51 &
n37 + n54 = n38 + n53 &	n51 + n56 = n52 + n55 &	n36 + n56 = n40 + n52 &
n06 + n23 = n07 + n22 &	n05 + n10 = n06 + n09 &	n05 + n25 = n09 + n21 &
n22 + n39 = n23 + n38 &	n21 + n26 = n22 + n25 &	n06 + n26 = n10 + n22 &
n38 + n55 = n39 + n54 &	n37 + n42 = n38 + n41 &	n07 + n27 = n11 + n23 &
n07 + n24 = n08 + n23 &	n53 + n58 = n54 + n57 &	n08 + n28 = n12 + n24 &
n23 + n40 = n24 + n39 &	n06 + n11 = n07 + n10 &	n21 + n41 = n25 + n37 &
n39 + n56 = n40 + n55 &	n22 + n27 = n23 + n26 &	n22 + n42 = n26 + n38 &
n09 + n26 = n10 + n25 &	n38 + n43 = n39 + n42 &	n23 + n43 = n27 + n39 &
n25 + n42 = n26 + n41 &	n54 + n59 = n55 + n58 &	n24 + n44 = n28 + n40 &
n41 + n58 = n42 + n57 &	n07 + n12 = n08 + n11 &	n37 + n57 = n41 + n53 &
n10 + n27 = n11 + n26 &	n23 + n28 = n24 + n27 &	n38 + n58 = n42 + n54 &
n26 + n43 = n27 + n42 &	n39 + n44 = n40 + n43 &	n39 + n59 = n43 + n55 &
n42 + n59 = n43 + n58 &	n55 + n60 = n56 + n59 &	n40 + n60 = n44 + n56 &
n11 + n28 = n12 + n27 &	n09 + n14 = n10 + n13 &	n09 + n29 = n13 + n25 &
n27 + n44 = n28 + n43 &	n25 + n30 = n26 + n29 &	n10 + n30 = n14 + n26 &
n43 + n60 = n44 + n59 &	n41 + n46 = n42 + n45 &	n11 + n31 = n15 + n27 &
n13 + n30 = n14 + n29 &	n57 + n62 = n58 + n61 &	n12 + n32 = n16 + n28 &
n29 + n46 = n30 + n45 &	n10 + n15 = n11 + n14 &	n25 + n45 = n29 + n41 &
n45 + n62 = n46 + n61 &	n26 + n31 = n27 + n30 &	n26 + n46 = n30 + n42 &
n14 + n31 = n15 + n30 &	n42 + n47 = n43 + n46 &	n27 + n47 = n31 + n43 &
n30 + n47 = n31 + n46 &	n58 + n63 = n59 + n62 &	n28 + n48 = n32 + n44 &
n46 + n63 = n47 + n62 &	n11 + n16 = n12 + n15 &	n41 + n61 = n45 + n57 &
n15 + n32 = n16 + n31 &	n27 + n32 = n28 + n31 &	n42 + n62 = n46 + n58 &
n31 + n48 = n32 + n47 &	n43 + n48 = n44 + n47 &	n43 + n63 = n47 + n59 &
n47 + n64 = n48 + n63 &	n59 + n64 = n60 + n63 &	n44 + n64 = n48 + n60 &

Reversible Criteria

108 2x2 planar subsets all sum to 130 for the Most-Perfect Cube

```
// 2x2 cell blocks on the x,y plane

n01 + n17 + n02 + n18 = C &
n17 + n33 + n18 + n34 = C &
n33 + n49 + n34 + n50 = C &

n02 + n18 + n03 + n19 = C &
n18 + n19 + n34 + n35 = C &
n34 + n35 + n50 + n51 = C &

n03 + n04 + n19 + n20 = C &
n19 + n20 + n35 + n36 = C &
n35 + n36 + n51 + n52 = C &

n05 + n06 + n21 + n22 = C &
n21 + n22 + n37 + n38 = C &
n37 + n38 + n53 + n54 = C &

n06 + n07 + n22 + n23 = C &
n22 + n23 + n38 + n39 = C &
n38 + n39 + n54 + n55 = C &

n07 + n08 + n23 + n24 = C &
n23 + n24 + n39 + n40 = C &
n39 + n40 + n55 + n56 = C &

n09 + n10 + n25 + n26 = C &
n25 + n26 + n41 + n42 = C &
n41 + n42 + n57 + n58 = C &

n10 + n11 + n26 + n27 = C &
n26 + n27 + n42 + n43 = C &
n42 + n43 + n58 + n59 = C &

n11 + n12 + n27 + n28 = C &
n27 + n28 + n43 + n44 = C &
n43 + n44 + n59 + n60 = C &

n13 + n14 + n29 + n30 = C &
n29 + n30 + n45 + n46 = C &
n45 + n46 + n61 + n62 = C &

n14 + n15 + n30 + n31 = C &
n30 + n31 + n46 + n47 = C &
n46 + n47 + n62 + n63 = C &

n15 + n16 + n31 + n32 = C &
n31 + n32 + n47 + n48 = C &
n47 + n48 + n63 + n64 = C &
```

```
// 2x2 cell blocks on the x,z plane

n01 + n02 + n05 + n06  = C &
n17 + n18 + n21 + n22 = C &
n33 + n34 + n37 + n38 = C &
n49 + n50 + n53 + n54 = C &

n02 + n03 + n06 + n07 = C &
n18 + n19 + n22 + n23 = C &
n34 + n35 + n38 + n39 = C &
n50 + n51 + n54 + n55 = C &

n03 + n04 + n07 + n08 = C &
n19 + n20 + n23 + n24 = C &
n35 + n36 + n39 + n40 = C &
n51 + n52 + n55 + n56 = C &

n05 + n06 + n09 + n10 = C &
n21 + n22 + n25 + n26 = C &
n37 + n38 + n41 + n42 = C &
n53 + n54 + n57 + n58 = C &

n06 + n07 + n10 + n11 = C &
n22 + n23 + n26 + n27 = C &
n38 + n39 + n42 + n43 = C &
n54 + n55 + n58 + n59 = C &

n07 + n08 + n11 + n12 = C &
n23 + n24 + n27 + n28 = C &
n39 + n40 + n43 + n44 = C &
n55 + n56 + n59 + n60 = C &

n09 + n10 + n13 + n14 = C &
n25 + n26 + n29 + n30 = C &
n41 + n42 + n45 + n46 = C &
n57 + n58 + n61 + n62 = C &

n10 + n11 + n14 + n15 = C &
n26 + n27 + n30 + n31 = C &
n42 + n43 + n46 + n47 = C &
n58 + n59 + n62 + n63 = C &

n11 + n12 + n15 + n16 = C &
n27 + n28 + n31 + n32 = C &
n43 + n44 + n47 + n48 = C &
n59 + n60 + n63 + n64 = C &
```

```
// 2x2 cell blocks on the y,z plane

n01 + n17 + n05 + n21 = C &
n02 + n18 + n06 + n22 = C &
n03 + n19 + n07 + n23 = C &
n04 + n20 + n08 + n24 = C &

n17 + n33 + n21 + n37 = C &
n18 + n34 + n22 + n38 = C &
n19 + n35 + n23 + n39 = C &
n20 + n36 + n24 + n40 = C &

n33 + n49 + n37 + n53 = C &
n34 + n50 + n38 + n54 = C &
n35 + n51 + n39 + n55 = C &
n36 + n52 + n40 + n56 = C &

n05 + n21 + n09 + n25 = C &
n06 + n22 + n10 + n26 = C &
n07 + n23 + n11 + n27 = C &
n08 + n24 + n12 + n28 = C &

n21 + n37 + n25 + n41 = C &
n22 + n38 + n26 + n42 = C &
n23 + n39 + n27 + n43 = C &
n24 + n40 + n28 + n44 = C &

n37 + n53 + n41 + n57 = C &
n38 + n54 + n42 + n58 = C &
n39 + n55 + n43 + n59 = C &
n40 + n56 + n44 + n60 = C &

n09 + n25 + n13 + n29 = C &
n10 + n26 + n14 + n30 = C &
n11 + n27 + n15 + n31 = C &
n12 + n28 + n16 + n32 = C &

n25 + n41 + n29 + n45 = C &
n26 + n42 + n30 + n46 = C &
n27 + n43 + n31 + n47 = C &
n28 + n44 + n32 + n48 = C &

n41 + n57 + n45 + n61 = C &
n42 + n58 + n46 + n62 = C &
n43 + n59 + n47 + n63 = C &
n44 + n60 + n48 + n64 = C
```

Mixing and matching different criteria to produce a cube.

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

Pan-triagonal and Polar

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

Most-Perfect , Polar, RowColPil Reversible

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

Pan-triagonal and self complementary Magic Cube

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

Cube form for coding criteria