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Modeling the Megaminx

Data Structure

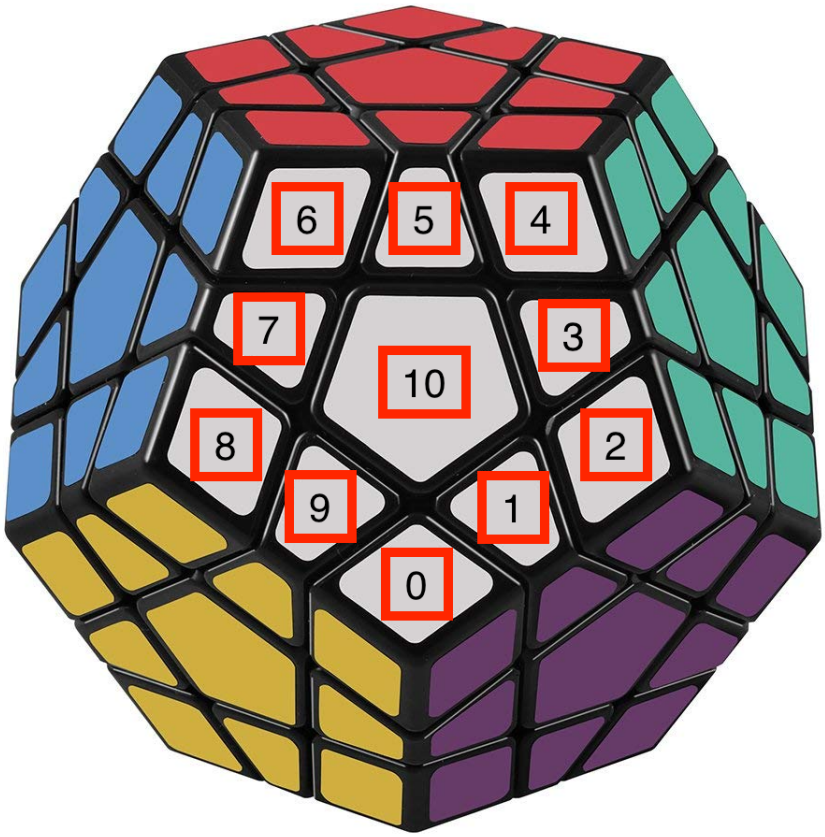
I used a 2D char array with the 12 entries of the first dimension representing each face of the megaminx, and the 11 entries of the second dimension representing each node of one face.

GUI Output

Here is how each face on the GUI matches up with a face of the actual cube:

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

The digits represent:



Sample output of a solved cube:

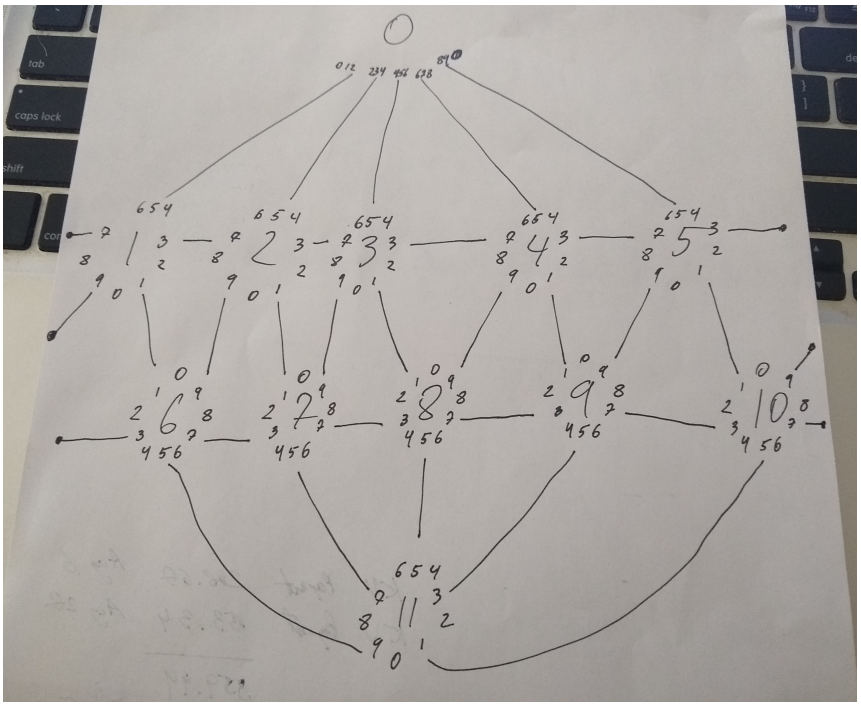
```
                    r
                  r r r r
                   r r r
                   r r r

 p p p      b b b      w w w      g g g      t t t
 p p p      b b b      w w w      g g g      t t t
p p p p    b b b b    w w w w    g g g g    t t t t
   p          b          w          g          t

        l          y          P          L          o
     l l l l    y y y y    P P P P    L L L L    o o o o
      l l l      y y y      P P P      L L L      o o o
      l l l      y y y      P P P      L L L      o o o

                   G G G
                   G G G
                 G G G G
                    G
```

Representation of how the faces of the output are laid out, in comparison with the actual cube. Connecting lines represent adjacent faces.



Sample output with each middle node replaced by the face number:

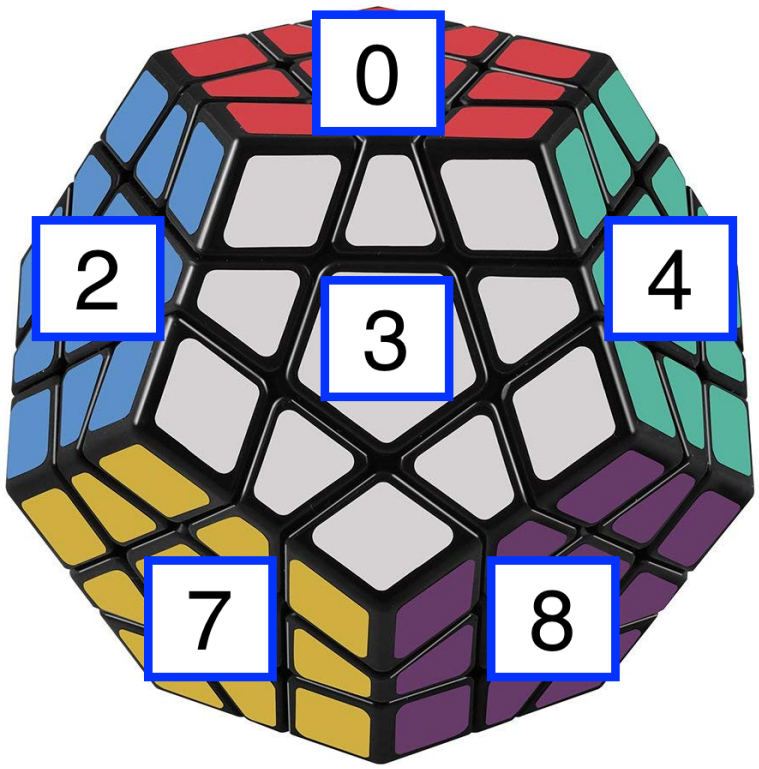
```
                    r
                  r r r r
                   r 0 r
                   r r r

  p p p       b b b       w w w       g g g       t t t
  p 1 p       b 2 b       w 3 w       g 4 g       t 5 t
p p p p     b b b b     w w w w     g g g g     t t t t
   p           b           w           g           t

      l           y           P           L           o
    l l l l     y y y y     P P P P     L L L L     o o o o
     l 6 l       y 7 y       P 8 P       L 9 L       o 10 o
     l l l       y y y       P P P       L L L       o o o

                          G G G
                           G 11 G
                         G G G G
                            G
```

For example, these faces would be:



The Randomizer

The functions rotateClock(char[], int[], int[], int) and rotateCounterClock(char[], int[], int[], int) each have 12 possible different faces to spin. The face to spin is based an input from 0-11 into the final int paramater of these functions. The random number generator `rand()%12` can be used to select a face to rotate at random. For my megaminx, I've chosen to randomize clockwise and solve counterclockwise. Therefore, only the rotateClock function is used in randomization.