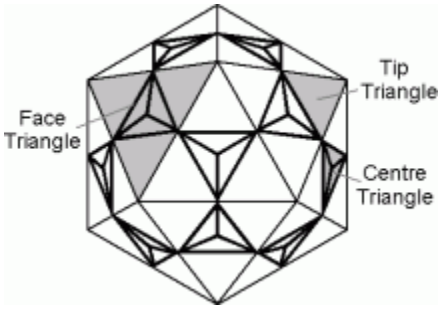
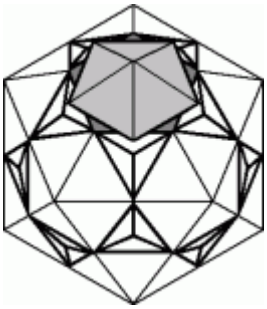
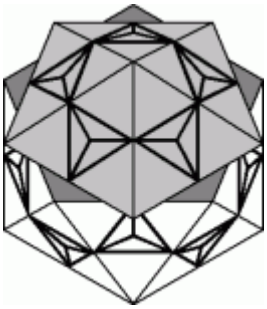
Dogic

The Dogic is an icosahedron, a regular three dimensional shape consisting of twenty triangular faces. At every corner five of those faces meet. Each of those twenty face triangles is divided further into four small triangles, a triangle in the middle (the 'centre triangle') and three triangles around it ('tip triangles'). The twenty centre triangles all have three colours, and the rest have one colour each. When the Dogic is solved all touching triangles match in colour.



There are two kinds of moves. You can twist a tip, just five tip triangles, as shown below left. You can also twist a cap, five face triangles, as shown below right.

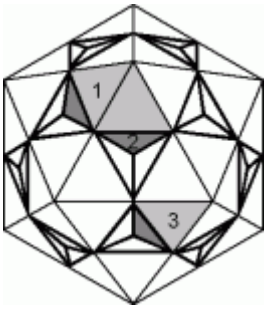


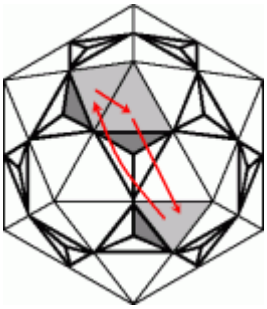


Step 1:

In this first step we will match up every tip triangle to a centre triangle. This gives a position where the four parts of each large triangle match each other. We will arrange the large triangles correctly later.

Choose any tip triangle that does not match its adjacent centre. Find a centre piece that you could match that triangle to. Do any number of cap twists (but no tip twists) to bring the two pieces in the positions 1 and 2 shown in the following picture:

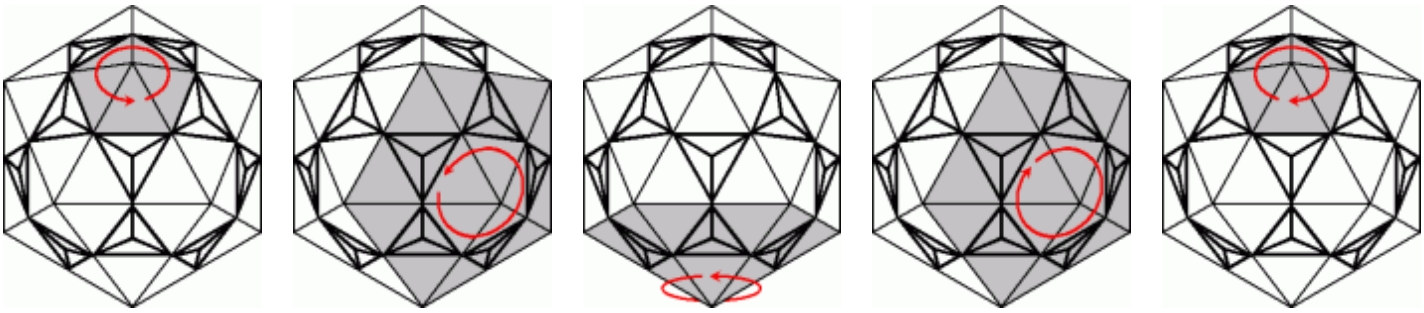




As you can see, the pieces are arranged so that a single twist of the tip would bring the tip triangle over to a matching centre, but unfortunately such a move would also disturb the other triangles at that tip.

Use any cap twists to bring some other unmatched triangle at position 3. If there are no other unmatched triangles, put a triangle there that is the same colour as the tip triangle at position 2.

The small triangles can now be moved by the following sequence of five moves:

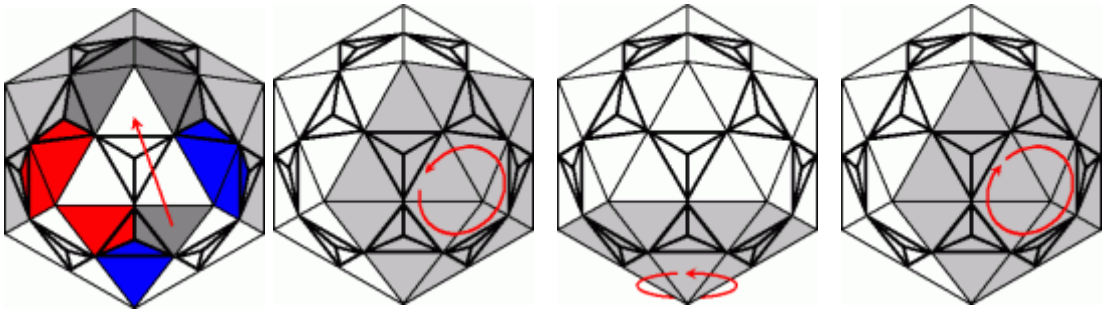


Repeat this whole procedure until all the little triangles match their centres. The Dogic II is now already solved, but the ordinary Dogic still needs to have its large triangles arranged correctly.

Step 2:

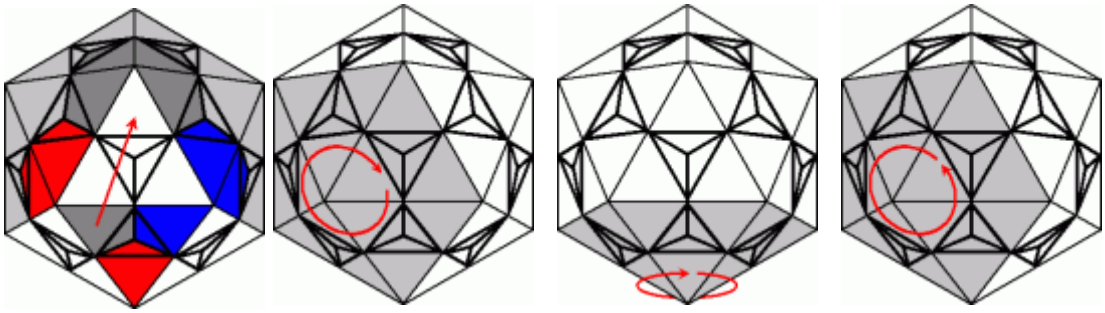
In this step we will arrange 15 of the 20 face triangles, leaving only five faces that meet at one corner. The following move sequence shows how to insert a face triangle at a corner without disturbing any other faces there.

A:



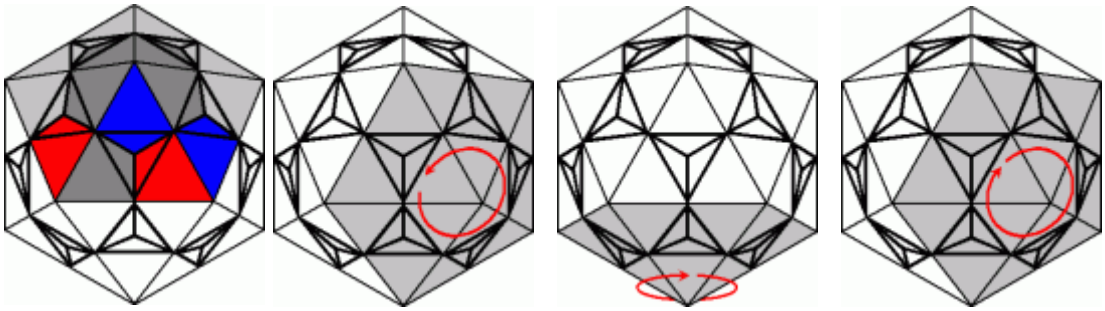
Sequence A can also be done in mirror image, in case the face needs to twist the other way.

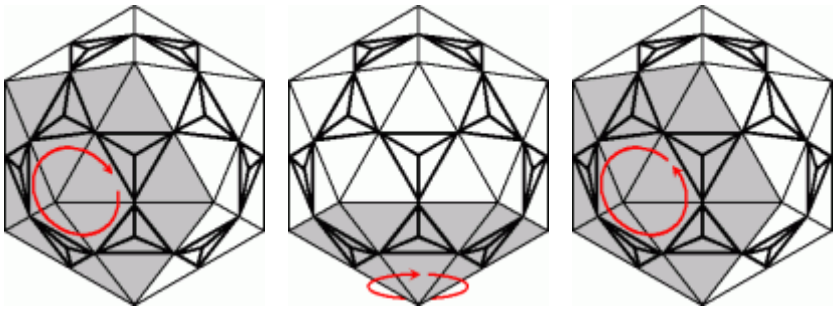
B:



If a face triangle is in the correct spot but needs to be twisted, then the following move sequence will fix it. Note that it is the inverse of sequence A, followed by sequence B, so it takes out the piece and then inserts it again differently. The effect is that the face has been twisted clockwise.

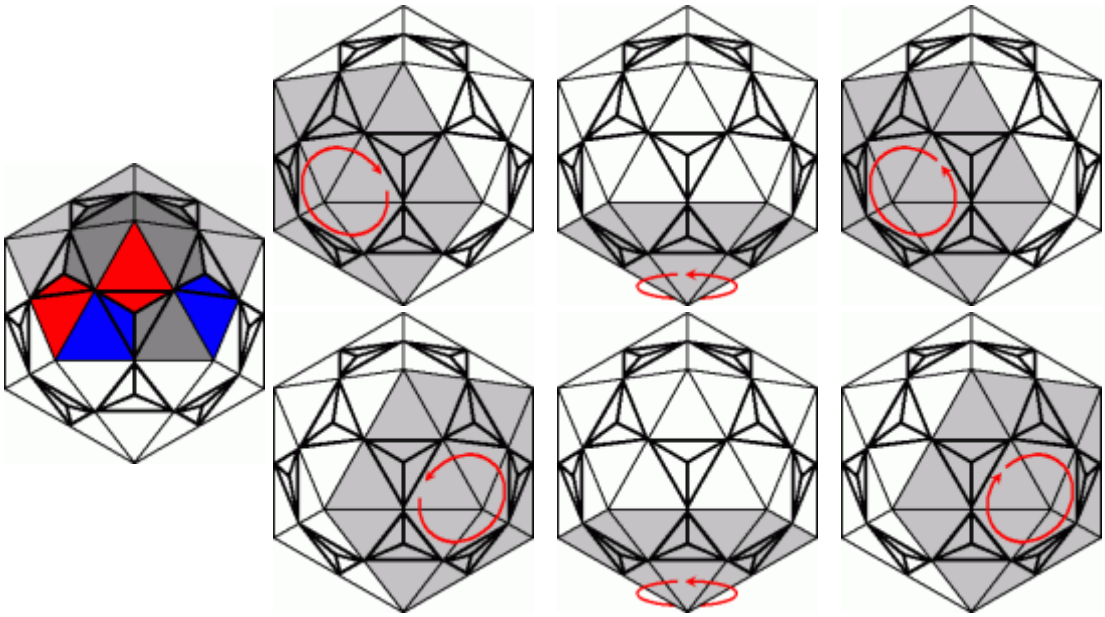
C:





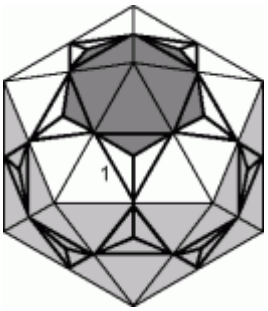
Similarly, the inverse of B followed by A will give a face an anti-clockwise twist.

D:



Step 3:

If all the previous steps worked, there is only one cap of five face triangles that we still need to solve. In this step we will twist the remaining faces so that the shared corner has a single colour. We will use the same sequences C and D we used before.



a. Turn the cap to bring to the front (at position 1) one of the faces that needs a clockwise twist. If all the twisted faces need an anti-clockwise twist, then bring any one of them to the front.

b. Apply C to twist the face clockwise.

c. Turn the cap to bring to the front one of the faces that need an anti-clockwise twist.

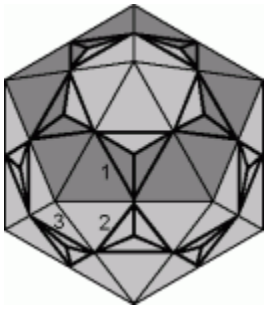
d. Apply D to twist the face anti-clockwise.

e. Repeat for all the twisted pieces in the cap.

Note that the C mixes some of the previously solved faces, but these are repaired when you do D to twist another face.

Step 4:

The final step is to put the faces of the last cap in the correct order. Turn the cap to bring as many pieces as possible to the correct position. If it is not already solved, there should either be three or four faces that need to be repositioned. Remember which face or faces are correct, because this cap will be turned a lot, and you must use these correct faces as guide points for placing the other faces.



a. Turn the cap to bring one of the incorrect faces to the front (at position 1).

b. Do the inverse of sequence A (i.e. three first twists of sequence C), taking out the incorrect face at 1 and putting it aside at 2.

c. Turn the cap to bring to the front the place where the face should be.

d. Do sequence A, putting the first incorrect face in the correct position relative to the others, and taking out a second incorrect face (which is temporarily placed at 3).

e. Turn the cap to bring to the front the place where this second face should be.

f. Apply the inverse of A once again, putting the second incorrect face in position. The piece it replaces is at position 2.

g. Continue in this way, alternating A and its inverse, to take out and correctly replace the pieces of the last cap one by one, until they are all correctly placed.

The most important thing about this step is that you alternate the sequences A and its inverse. This way any solved faces that get mixed will be restored soon afterwards. When all the pieces in the last cap are the correct you should have done A and its inverse the same number of times, so that all the faces will be restored.

Dogic II & Dogic III

The Dogic II has 10 colours and Dogic III has 5 colors. In the solved state every face is a single colour, and each colour occurs exactly twice or four times amongst the 20 faces, namely on opposite sides of the puzzle. You can re-arrange the position of the faces by simply turning the Caps. The Dogic II and Dogic III can be solved in a very similar way as the original Dogic. You can follow the same steps as before, with very minor changes:

Step 1: Exactly the same.
Step 2: The same, but simpler since you never need to twist the faces.
Step 3: This step is unnecessary, again since you never need to twist the faces.
Step 4: It may happen that three of the last five faces are correct at the start of step 4. This is a problem since with the techniques outlined there it is not possible to swap just two faces. To solve this, you have to break up some of the work from step 2, because you have to swap two of the faces that have the same colour. Once you have made such a swap (any colour pair will do), the last cap will be solvable with the method from step 4.

Written by Jaap Scherphuis.