Solving the Rubik's cube

Stage 1 – making a cross

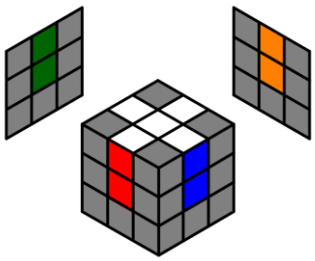
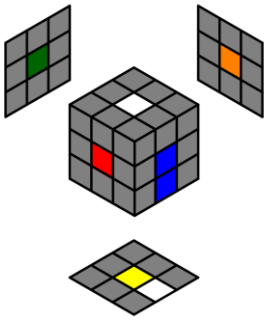


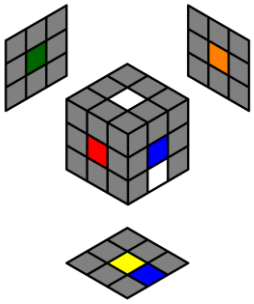
Figure 1

The first stage is to make a cross so that all the edges line up over the correct centre pieces in the middle layer.

Find a white edge piece (in the diagram we've used the white-blue piece) and move this so it sits on the bottom layer of the cube. Rotate the bottom layer so that the piece is under the appropriate centre square (in this case blue). It will be in one of these two situations:



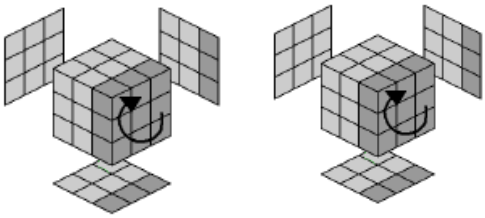
Situation 1A



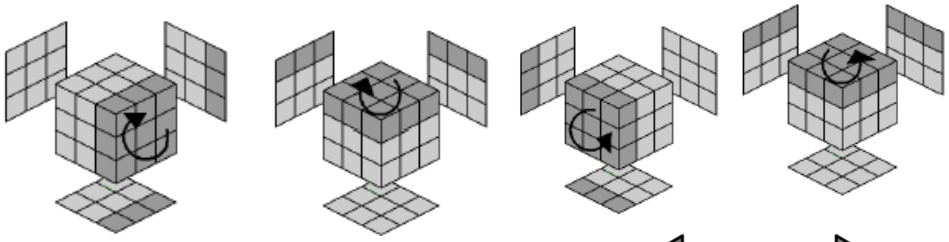
Situation 1B

Do the following moves to put the edge piece in the correct position on the top layer –

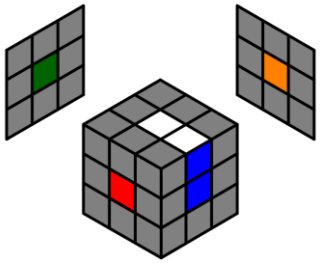
Moves 1A:



Moves 1B:



You should have moved the white-blue piece into its correct position.



Repeat this for the other 3 white edge pieces. Sometimes moving the piece onto the bottom layer might dislodge a piece that is already correct – a single turn should put it back.

When you have done this you should have the cross in Figure 1.

Stage 2 – filling in the corners on the first layer

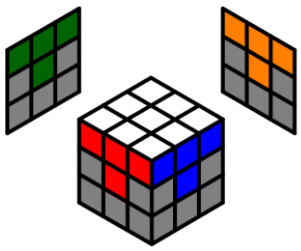


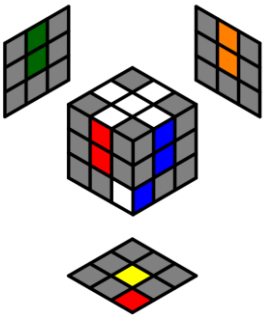
Figure 2

The next stage is to fill in the four corners to complete the top layer.

To do this find a white corner piece on the bottom layer* and position it so that it is directly under the space in which it needs to go into. Now do the 4 moves for situation 2A below.

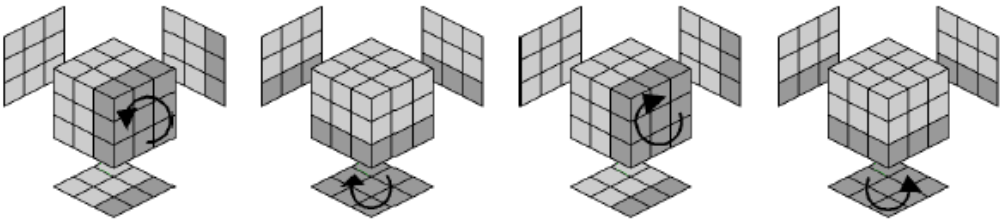
Each time you repeat this set of 4 moves it moves the piece from top to bottom or bottom to top and twists it. Repeating them 6 times will cycle through all possible positions and one of these will be the correct one.

*If a corner piece is in the top layer do the moves in 2A to move it onto the bottom layer.



Situation 2A

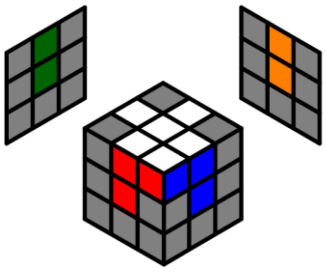
Moves 2A:



You should have moved the corner piece into its correct position.

Repeat this for the other 3 white corner pieces.

When you have done this you should have the layer in Figure 2.



Stage 3 – completing the second layer

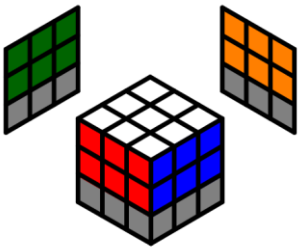
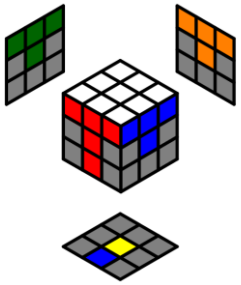


Figure 3

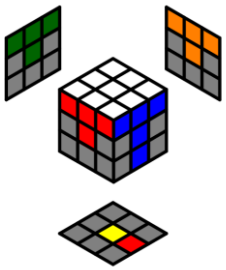
Now you need to put in the 4 edge pieces to complete the second layer.

Look on the bottom layer for an edge piece that should go in the middle layer. Twist the bottom layer so that its colour matches the correct centre square.

You should have situation 3A (it is to the left of the gap it needs to go into) or situation 3B (it is to the right of the gap it needs to go into).

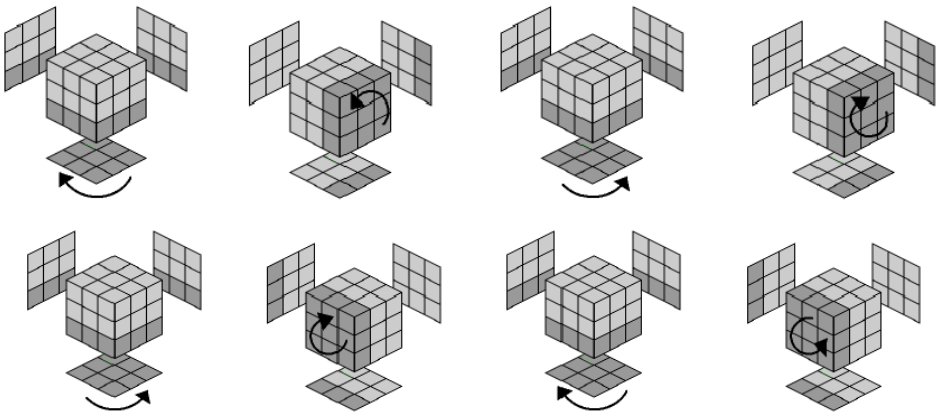


Situation 3A

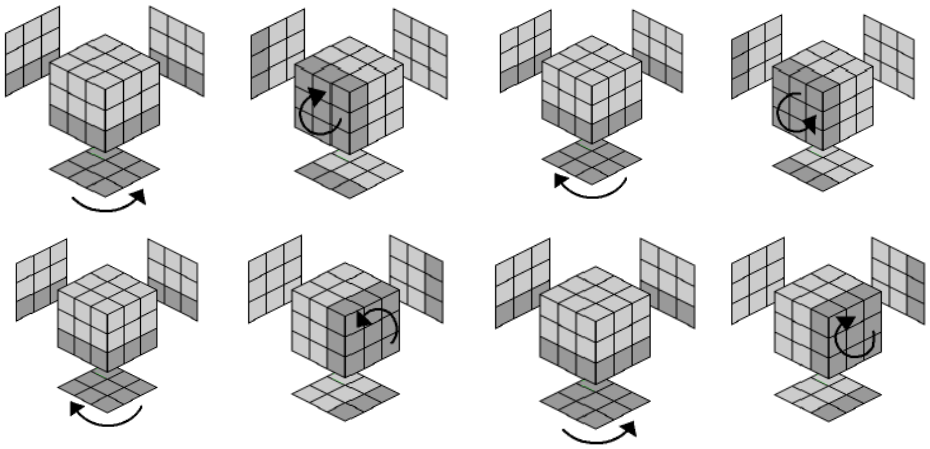


Situation 3B

Moves 3A:



Moves 3B:



Stage 4 – Getting the bottom edge pieces in the correct position

Turn the cube upside down so that the white layer is on the bottom and the yellow layer on the top.

Twist the (new) top layer so that as many of the yellow edge pieces are in the correct position (but it doesn't matter whether the yellow side face the bottom or not).

In the example in Figure 4 the yellow-green and yellow-red edges are in the correct position but the yellow-orange and yellow-blue are not.

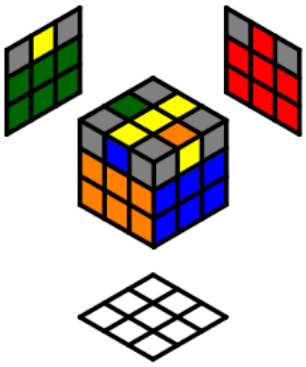
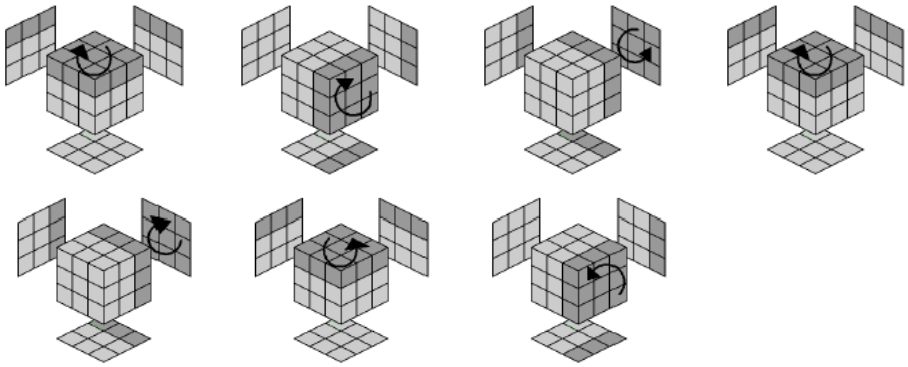


Figure 4

Place the ones you wish to swap at the front. You might need to repeat these moves more than once.

Moves 4:



Stage 5 – Getting the bottom corners in the correct position

With the bottom edge pieces in the correct position you should then move the corner pieces to the correct position. You should need to perform two or four swaps to get the pieces in the correct positions – it should never need an odd number of swaps.

In between each pair of swaps the bottom two layers will be mixed up – it is important to keep the cube in the correct position so that they go back into place after the second swap.

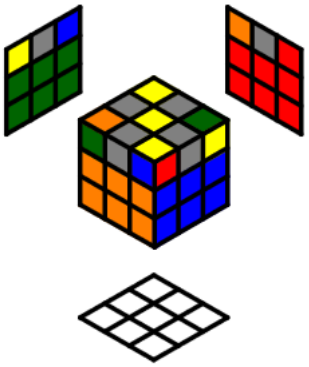


Figure 5a

In the example in figure 5 the yellow-green-orange corner is in the correct position but the other three are not. In this example you would need to perform the following swaps:

- yellow-blue-orange with yellow-red-green
- yellow-blue-red with yellow-blue-orange

To perform a pair of swaps move the top layer so the first pair of cubes you want to swap are in the position as shown in figure 5b.

- Perform *Moves 5* once.
- Twist the top layer only so the second pair you wish to swap are in the positions in figure 5b.
- Perform *Moves 5* a second time.

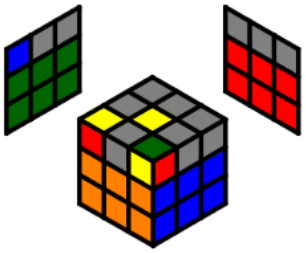
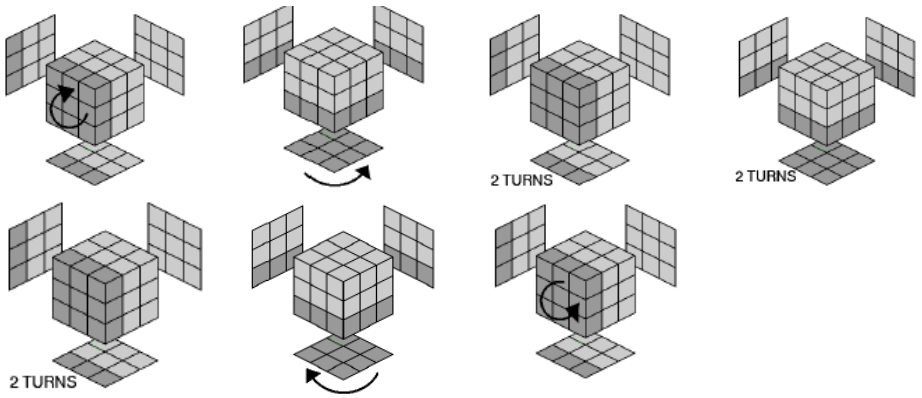


Figure 5b

Moves 5:



Stage 6 – Flipping the bottom edges

With all the bottom pieces in the correct position you should flip any bottom edge pieces so they are the right way round. You should need to perform two or four flips to get the pieces in the correct positions – it should never need an odd number of flips.

In between each pair of flips the bottom two layers will be mixed up – it is important to keep the cube in the correct position so that they go back into place after the second flip.

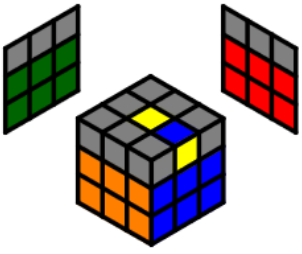
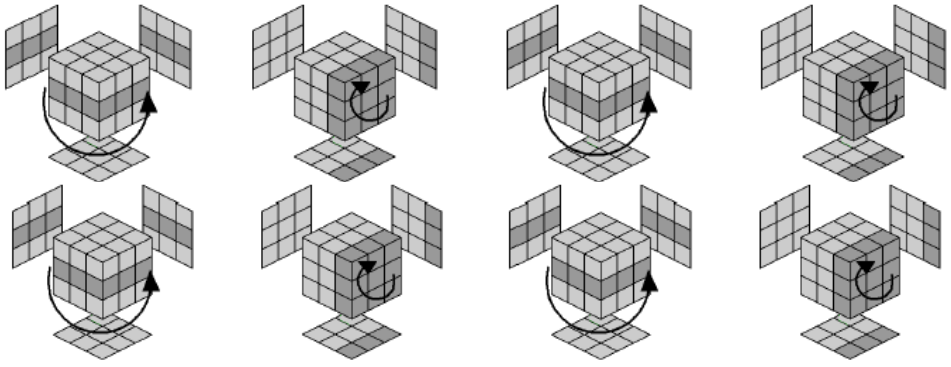


Figure 6

To perform a pair of flips move the top layer so the first edge you want to flip is in the position of the yellow-blue edge in figure 6.

- Perform *Moves 6* once.
- Twist the top layer only so the second edge you want to flip is in the position of the yellow-blue edge in figure 6.
- Perform *Moves 6* a second time.

Moves 6:

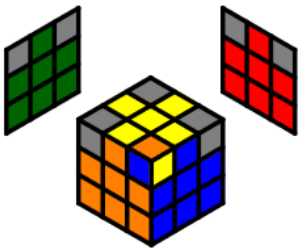


When you have flipped all the bottom edge pieces so they are the right way round you might need to twist the top layer so that they are back in their correct positions.

Stage 7 – Twisting the bottom corners

The last stage is to twist the bottoms corners so they are orientated correctly.

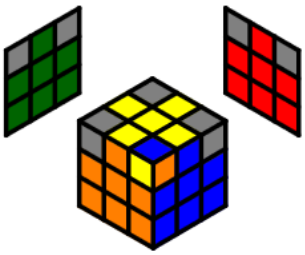
In between sets of moves the bottom two layers will be mixed up – it is important to keep the cube in the correct position so that they go back into place.



Situation 7a

To twist the bottom corners you should do one of the following:

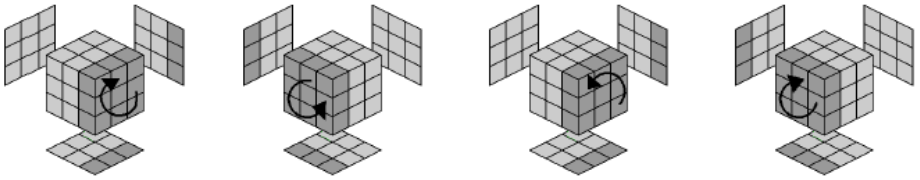
- Moves 7A followed by moves 7B.
- Moves 7B followed by moves 7A.
- Moves 7A three times.
- Moves 7B three times.



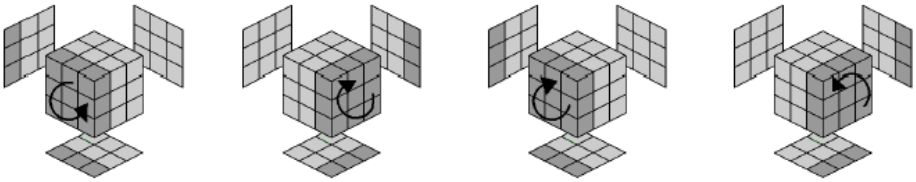
Situation 7b

In between each set of moves you will need to rotate the top layer only so that the corner you want to twist is in the position shown in situation 7a or situation 7b and then perform either moves 7A or moves 7B.

Moves 7A:
(repeat 4 times)



Moves 7B:
(repeat 4 times)



Well done – you've solved the cube!