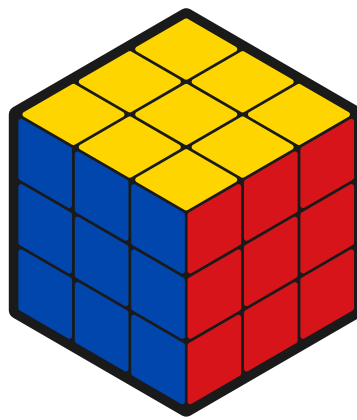




Rubik's Cube solution

Learn to solve it in 7 easy steps, with pictures and no notation

thecube.guru

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Introduction

Have you given up solving the Rubik's Cube? Or worse, have you end up changing the stickers' places? In this solution we'll explain step by step all you have to do to turn your chaotic Cube into a solved one. So, you know, **solving the Rubik's Cube is in your hands!**

Once you have learned it, you can keep all the cases on one page with the [Rubik's Cube cheat sheet](#).

Do you have a 2x2 cube? See the [2x2 Rubik's Cube solution](#), in just 3 steps.

Rubik's Cube pieces

The Rubik's Cube (please, do not write *Rubic*, *Rubick*, *Rubrik* or *Rubix*) is a mechanical 3D puzzle that has 6 colors (one for each face) and it's made of three different types of pieces:

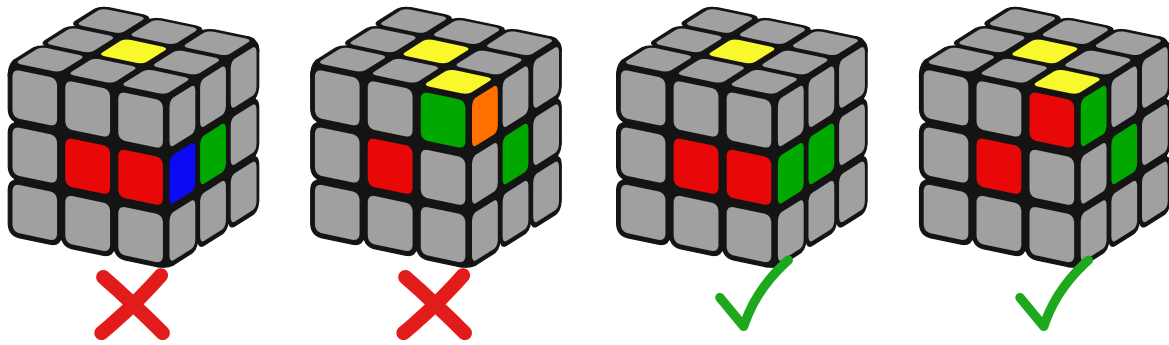
- **The center pieces:** there are 6 (in brown in this image), one for each face, and there's only one of each color. They rotate around themselves and they don't change their position, so they are always "in the correct position".
- **Corners:** there are 8 (in purple in the image), each one with three different colors.
- **Edges:** they are the pieces between the corners (in pale blue in the image). There are 12 edges in the Cube, each one with two different colors.



In total there are 20 pieces "moveable" (12 edges and 8 corners) in the Rubik's Cube, being all of them different from each other. If we rotate one face, we see that the centers stay in the same place, while edges change to positions where there were edges, and corners change to where there were corners. What I mean to say is that each piece is of one type and that type can't change (an edge will always be an edge).

Objective: solve the Rubik's Cube

Our objective is to put **all the pieces into their correct place, and with the correct orientation**. To know the pieces position and orientation we focus our attention in the centers, which as we've said are fixed. For example, the edge that goes between the green center and the red one is the green and red edge, and being well oriented when its green color is beside the green center and the red beside the red center. Consequently, a corner has 3 colors, so its position will be between the centers that have those colors.



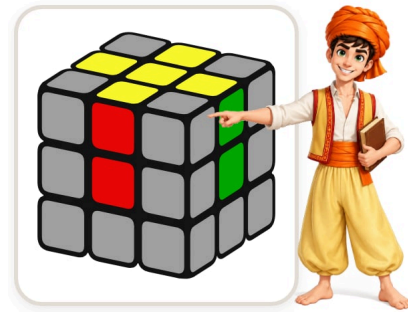
I already have one face done. What now?

If the side pieces of that face also match the centers next to them (you can see a "T" of the same color on each side), you already have the first layer: you can go straight to [Step 3](#). If only the face itself is done, start from [Step 1](#): the side colors are important for the rest of the solution.

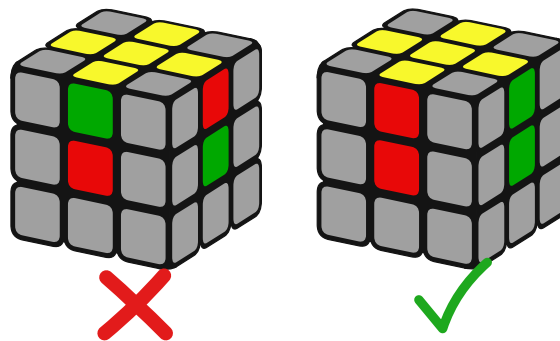
Let's start now **solving the Rubik's Cube!**

Step 1: Edges of the first face of the Rubik's Cube

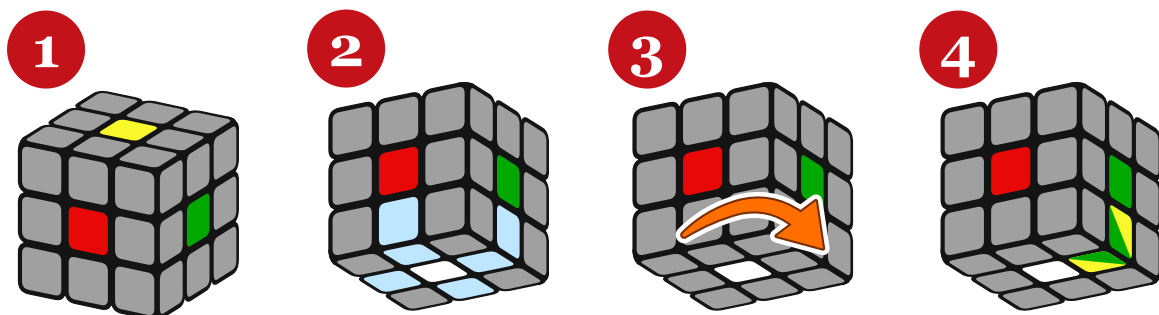
The first thing you have to do is choose the color you'll be starting with. I always **start solving the Rubik's Cube with the yellow face** and that's the one that will appear in the images of this tutorial, as you know everyone to his own taste, or in this case, to his own colors. From this point on, we'll be using yellow to talk about the first face color and white for the opposite face (yellow and white are opposites in nearly all Rubik's Cubes).



This first step consists on solving the yellow cross in the top face of the Rubik's Cube. In order to do this we have to place the yellow edges into their respective position, **one by one**. We have to take into account that they have to be in a determinate order, to make them match the near center color.

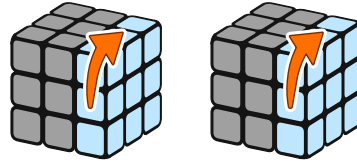
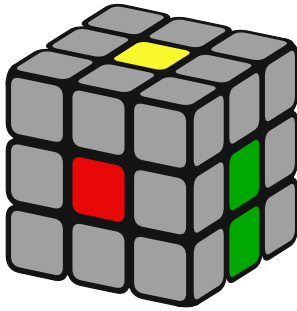


This is the most complicated step to explain, but it's one of the easiest to solve by your own. I recommend you to try resolving this first step with your Rubik's Cube before looking at the solutions. If you can't make it, follow these solutions. Take into account that you will have to **repeat this step 4 times**, once for each edge.

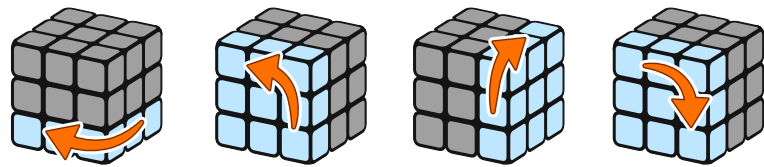
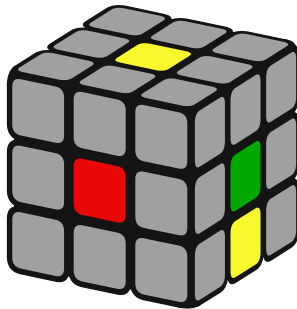


1. Hold the Rubik's Cube so the top face is yellow and the bottom one is white.
2. Search for a yellow edge on the bottom layer. **Pay attention to both colors** of the edge. If you can't find any, go down to the "*There is not any yellow edge on the bottom layer*" section.
3. If there's any yellow edge, rotate the bottom layer until that edge is 'underneath' its position.
4. Apply one of the following solutions:

Case 1: Yellow looking down

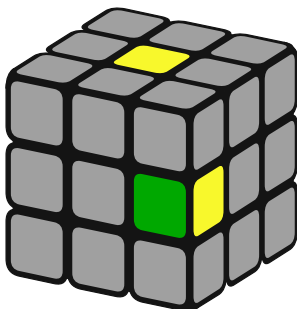


Case 2: Yellow looking to the front

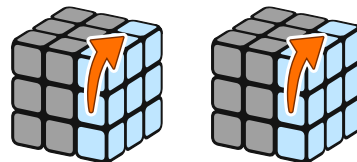
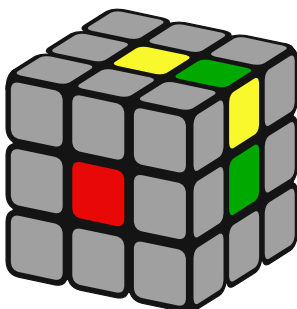


There is not any yellow edges on the bottom layer

If there's no yellow edge on the bottom layer, search one on the intermediate or upper layer and follow this solution to move the edge to the bottom layer. Then, apply the correspondent solutions depending on the case.



+ Repeat Step 1



+ Repeat Step 1

What does "+ Repeat Step 1" mean?

You will not be able to solve this case directly. However, if you perform the movements specified, you will get another case for this step.

Repeat the same thing for every edge until you solve the yellow cross. Let's see now the solution to complete the first face of the Rubik's Cube.

Frequently Asked Questions**I have solved the yellow cross, but the lateral colors do not match**

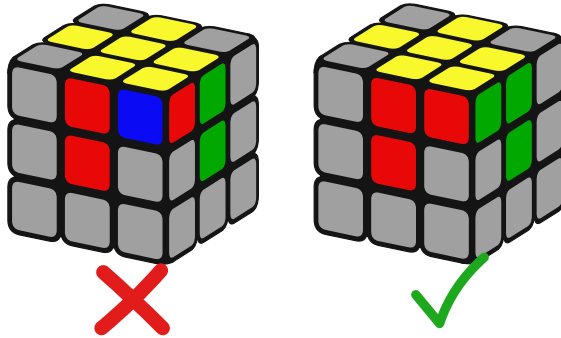
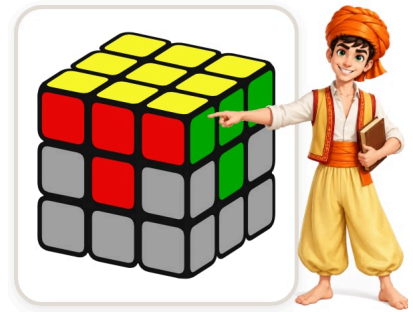
To solve this step, you do not need to solve faces, but layers (the face and the lateral colors). You will need to repeat this step again, but paying attention to the lateral colors of each edge.

I do not understand anything of this step

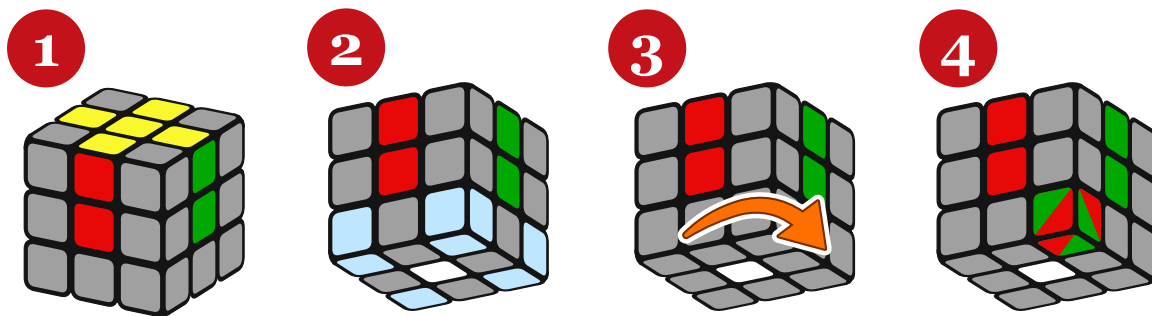
The first and the second steps are the most difficult to explain, as there are a lot of possible combinations. I recommend you to try to solve this step by yourself first. Even if you are not able to solve it, you will understand better how the pieces move around the cube.

Step 2: Corners of the first face of the Rubik's Cube

Once we have resolved the cross of the first face of the [Rubik's Cube](#), we should solve the rest of the first face putting the corners into their position **one by one**. We shouldn't place them wherever we want to because each corner has a determinate position in the Rubik's Cube.

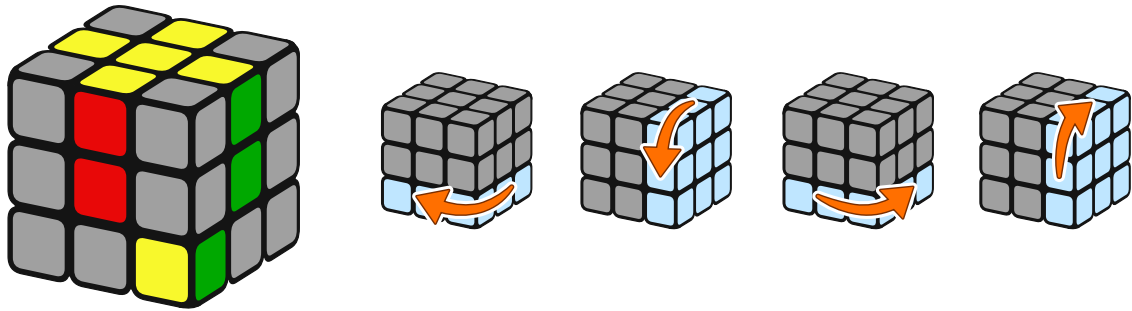


In a similar way as in the previous step, we follow these solutions. Take into account that you will have to **repeat this step four times**, one for each corner.

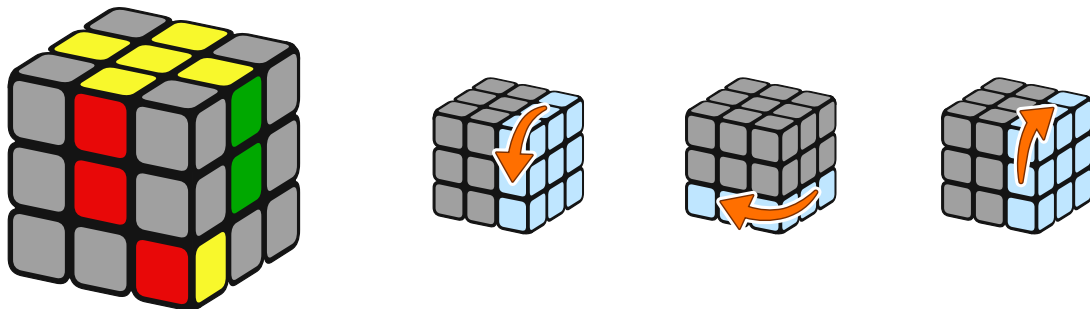


1. Hold the Rubik's Cube in a way in which the yellow face is the top one, and the white face the bottom one.
2. Search in the bottom layer for a corner with yellow on it. Pay attention to the three colors in each corner. If you can't find any, go down to the "*There is not any yellow corners on the bottom layer*" section.
3. Rotate the bottom layer until such corner is 'underneath' its position.
4. Apply one of the following solutions:

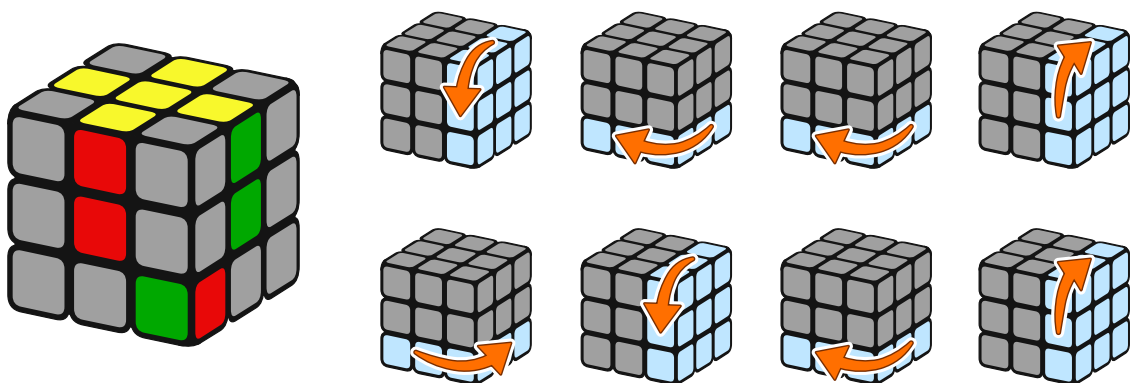
Case 1: Yellow looking to the left



Case 2: Yellow looking to the right

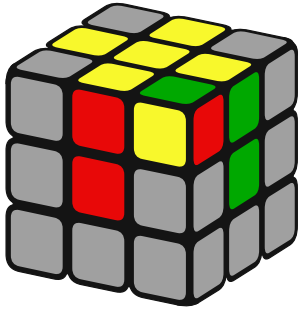


Case 3: Yellow looking down



There is not any yellow corners on the bottom layer

If there's no yellow corner in the bottom layer of the Rubik's Cube it is because they are in top layer but out of their places. Follow this solution to move the corner to the bottom layer. Then, apply the correspondent solutions depending on the case.



Case 1 or 2 + Repeat Step 2

What does "+ Repeat Step 2" mean?

You will not be able to solve this case directly. However, if you perform the movements specified, you will get another case for this step.

Repeat this step for each corner until you solve the first layer of the Rubik's Cube. Now it's time to see the solutions to build the second layer.

Frequently Asked Questions

I have solved the yellow face, but the lateral colors do not match

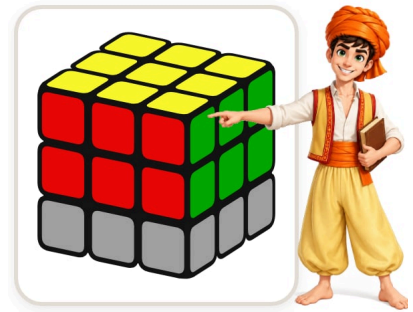
To solve this step, you do not need to solve a face, but a layer (the face and the lateral colors). You will need to repeat this step again (and maybe also step 1), but paying attention to the lateral colors of each edge.

I do not understand anything of this step

The first and the second steps are the most difficult to explain, as there are a lot of possible combinations. I recommend you to try to solve this step by yourself first. Even if you are not able to solve it, you will understand better how the pieces move around the cube.

Step 3: The second layer of the Rubik's Cube

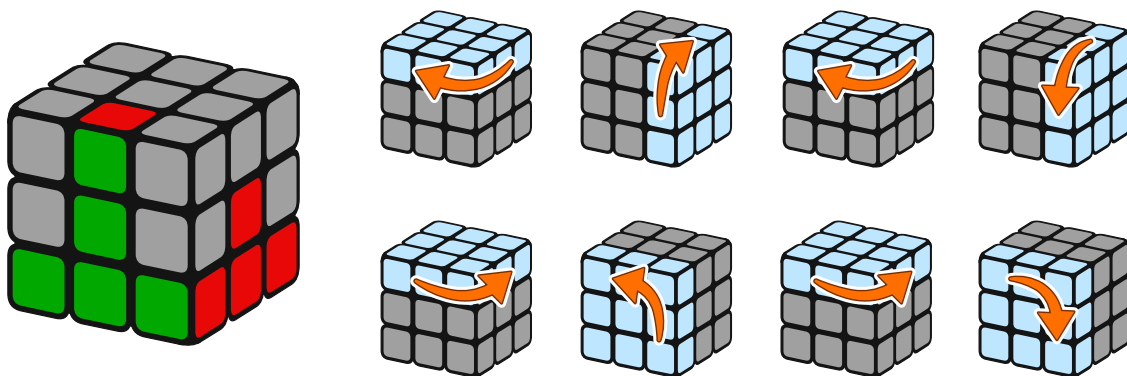
Now we will solve the second layer of the [Rubik's Cube](#). Remember that the center pieces are fixed, so there's no need to place them. Bear in mind that you will have to **repeat this step 4 times** to solve the Rubik's Cube, once for each edge.



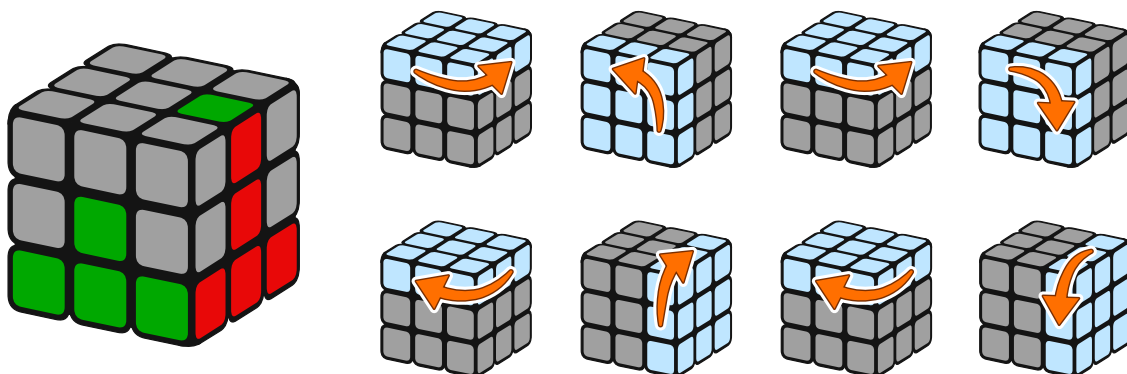
1. Hold the Rubik's Cube in a way the white face is the top one and the yellow face the bottom one.
2. Search for an edge in the top layer with no white color in any of its sides. If you can't find any, go down to the *"There is not any edges without white color in the upper layer"* section.
3. Rotate the top layer until that edge and the lateral center color matches, forming a T inverted.
4. Follow one of the following solutions according to the position the edge would have to go from where it's located, right or left.

These are the possible cases:

Case 1: The edge has to move to the right from where it is now placed.

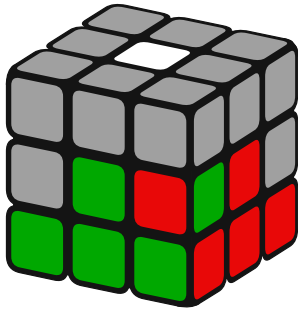


Case 2: The edge has to move to the left from where it is now placed.



There is not any edges without white color in the upper layer

If there's no edges in the top layer with no white color in any of its sides it is because they are in the middle layer but out of their places. Follow this solution to move the edge to the upper layer. Then, apply the correspondent solutions depending on the case.



Case 1 or 2 + Repeat Step 3

What does "+ Repeat Step 3" mean?

You will not be able to solve this case directly. However, if you perform the movements specified, you will get another case for this step.

Repeat this step with the 4 edges until you solve the second layer. Now it's time to take a look to the solution of the second cross of the Rubik's Cube.

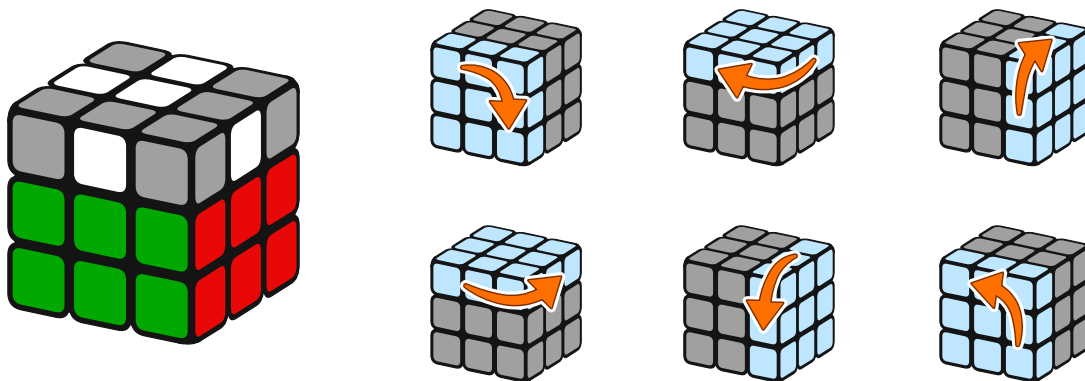
Step 4: The second cross of the Rubik's Cube

We have already solved the first two layers of the [Rubik's Cube](#). Our objective now is that the four edges of the top layer have their white color looking up, building up a white cross. We only focus in the white face edges, **without paying attention to the corners**.

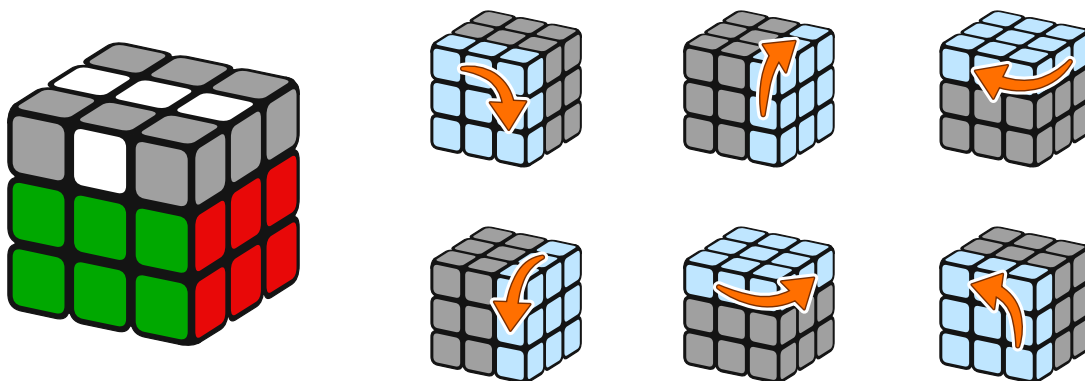
There might be four white edges in the top face of the Cube, or two, or none. If the four edges are white in the top face, we can skip to the next step. **If there are two white edges in the top face** of the Rubik's Cube, apply one of the following solutions depending on whether the edges are one beside the other or on the opposite side.



Case 1: Adjoining edges

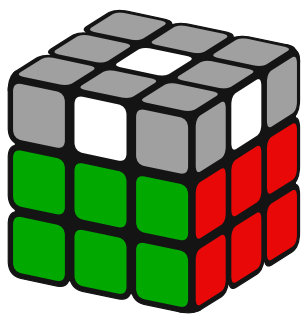


Case 2: Opposite edges



Case 3: No edge is right

If **there hadn't been any white edge** in the top face of the Rubik's Cube, execute one of the two previous solutions and you will get two white edges in the top layer. Finally, execute the solution depending on the case you have obtained.



**Case 1
or
Case 2**

+

**Repeat
Step 4**

What does "+ Repeat Step 4" mean?

You will not be able to solve this case directly. However, if you perform the movements specified, you will get another case for this step.

By doing this, we will solve the second cross of the Rubik's Cube. Now it's time to check the solution to position the second cross edges.

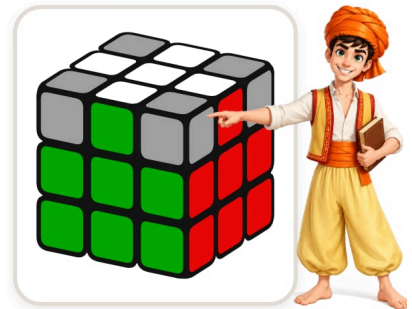
Frequently Asked Questions

I have a different case. I have one or three white edges in the top face

In that case, your cube is unsolvable. Take a look at [how to fix your unsolvable Rubik's Cube](#).

Step 5: Position the second cross of the Rubik's Cube

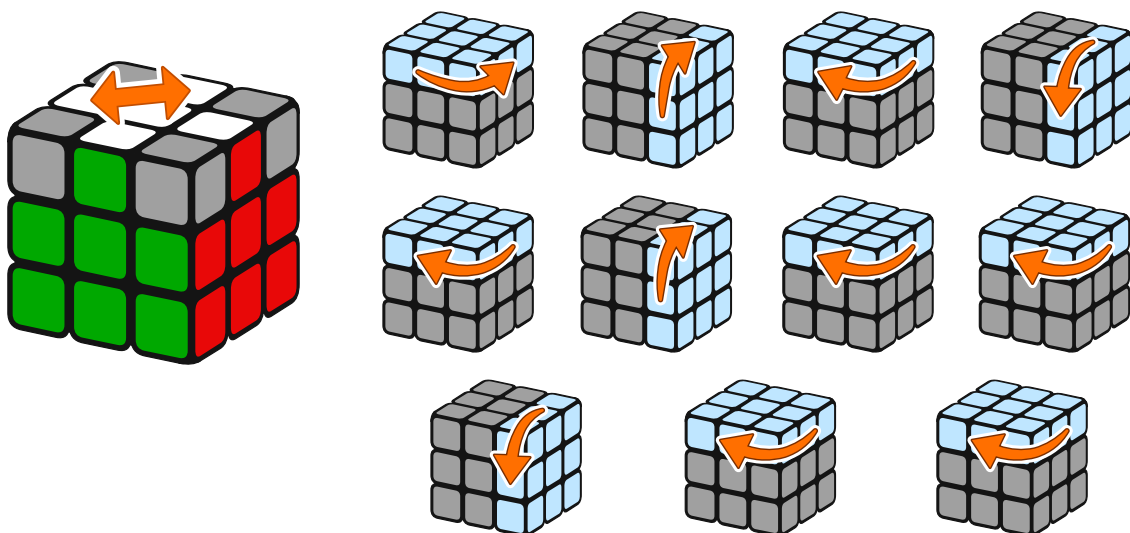
In the last step we've solved the second cross of the [Rubik's Cube](#). In this new step we'll make the lateral cross colors to match with the center colors. We will only focus on the white Cube's edges, **without paying attention to the corners**.



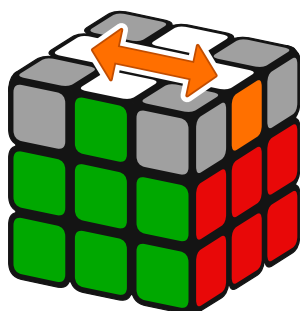
1. Rotate the top layer of the Rubik's Cube until there are two edges that coincide with their centers colors. If there is only one that coincides, continue rotating the top layer.
2. Apply one of the following solutions depending on whether the right positioned edges are one beside the other or on the opposite side.

These are the possible cases:

Case 1: Adjoining edges



Case 2: Opposite edges



Case 1 + Repeat Step 5

What does "+ Repeat Step 5" mean?

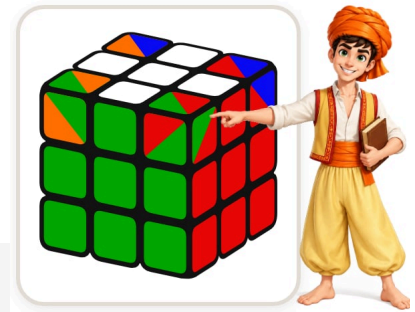
You will not be able to solve this case directly. However, if you perform the movements specified, you will get another case for this step.

We should have solved the position of the second cross of the Rubik's Cube. Now it's time to see the solution to position the corners in their right place.

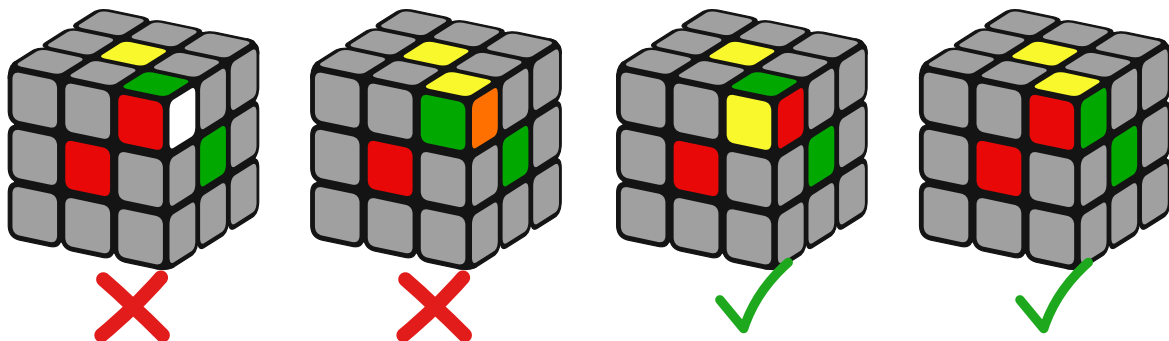
Step 6: Position the corners of the Rubik's Cube

We have already solved to position all the [Rubik's Cube](#) pieces except for the corners of the last layer. This penultimate step consists on putting the corners into their right position, **without paying attention to their orientation**. So, we have to clearly know what it means that a corner is in its right position in a Rubik's Cube:

A corner is in its right position if the 3 nearer center colors are the same 3 the corner has.

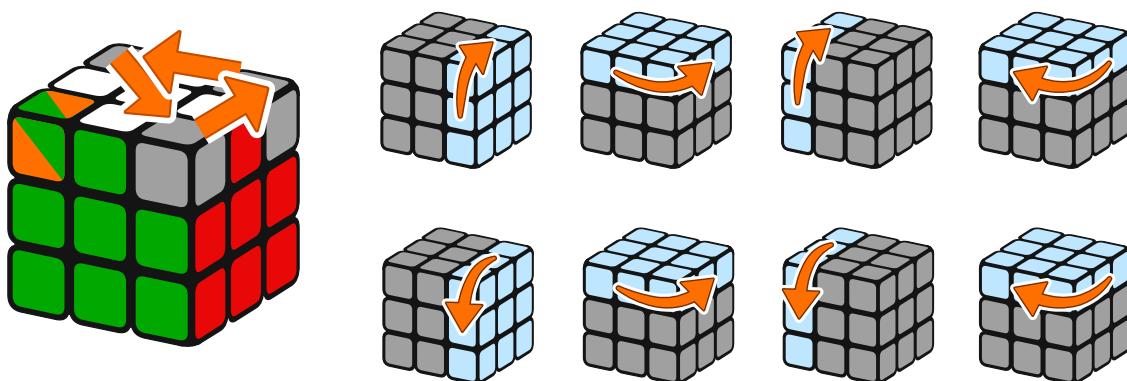


Let's see some examples to illustrate scenarios where corners aren't in their position and others where they are in a Rubik's Cube:

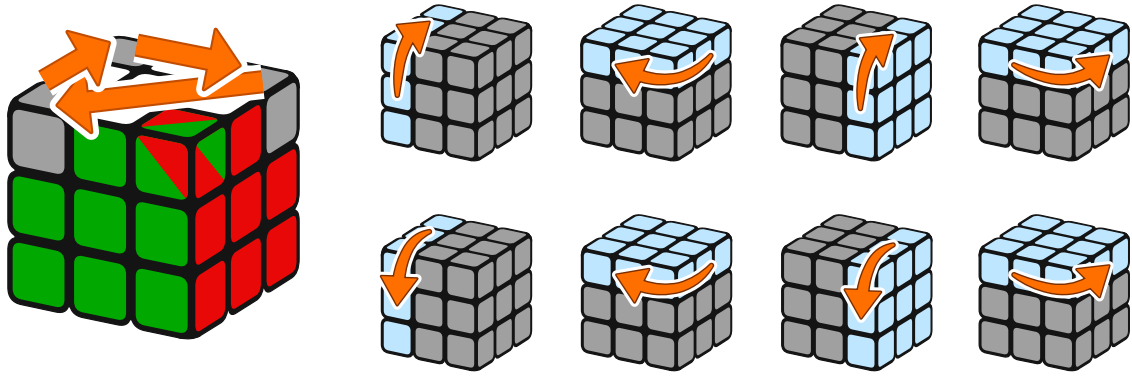


It's possible that the four corners are in their right position from the beginning (skip to the next step), that there is one corner in its place, or none. **If there's only one in its position**, follow one of the first two solutions whether you see the right method to place the rest of the corners in their position.

Case 1: Three corners out of their position (a)

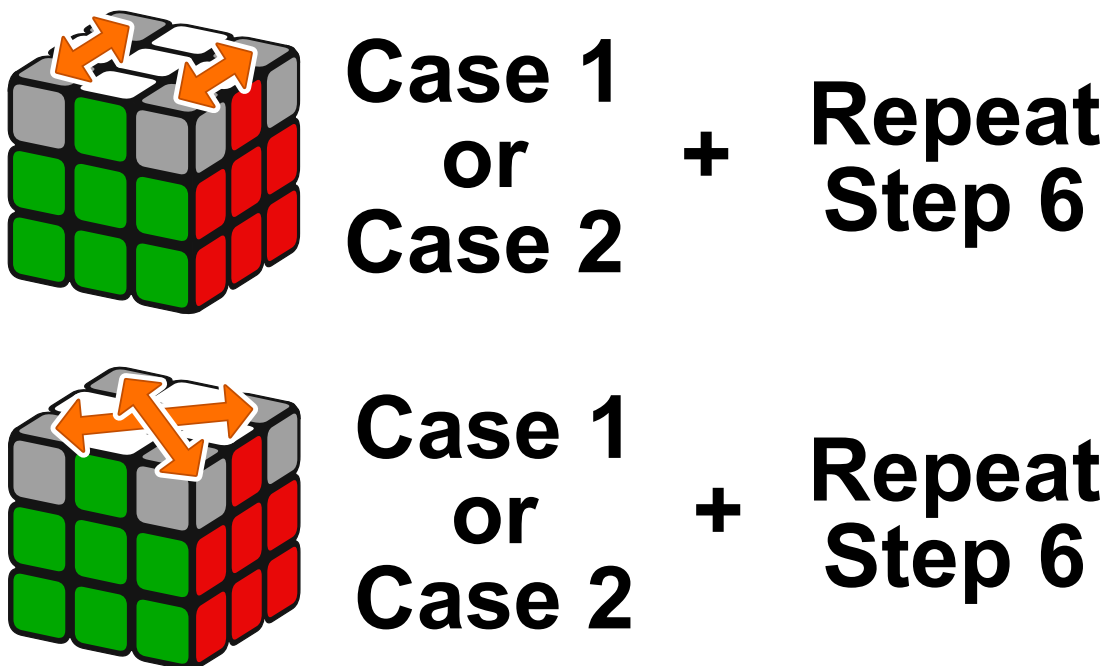


Case 2: Three corners out of their position (b)



Cases 3 and 4: No corners in their right place

If there isn't any corner in its position, follow any of the two previous solutions and you will get one of the corners put into its place. Finally, follow the solution depending on the case you have obtained.



What does "+ Repeat Step 6" mean?

You will not be able to solve this case directly. However, if you perform the movements specified, you will get another case for this step.

Now we've solved the Rubik's Cube in order to put the corners into their position. In the last step we'll see the solution to make the corners rotate till we end up with the solved Rubik's Cube in your hands!

Frequently Asked Questions

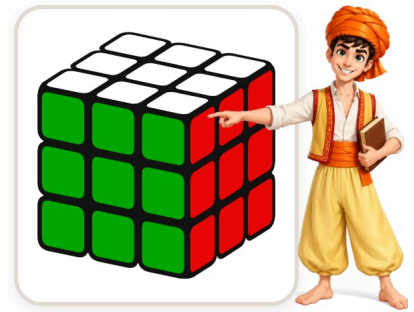
I have a different case. There are only two corners out of their position

In that case, your cube is unsolvable. Take a look at [how to fix your unsolvable Rubik's Cube](#).

Step 7: Turn the corners of the Rubik's Cube

In the previous step we have solved the Rubik's Cube in order to put all the pieces into their right position. We just have left the rotation of the last layer corners and we'll have [solved the Rubik's Cube](#).

Maybe there are two, three or four incorrectly oriented corners in the last layer of the Rubik's Cube. If there are **two incorrectly oriented corners**, we will execute the following solution with a variant or another depending on the scenario we have.

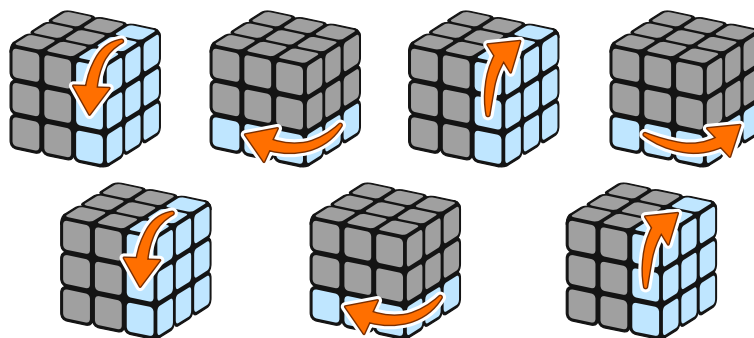
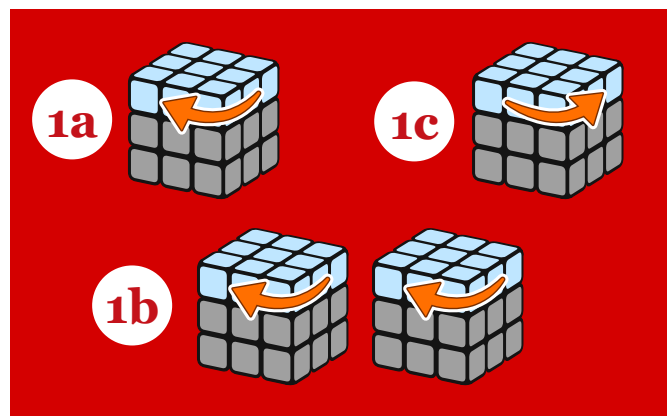
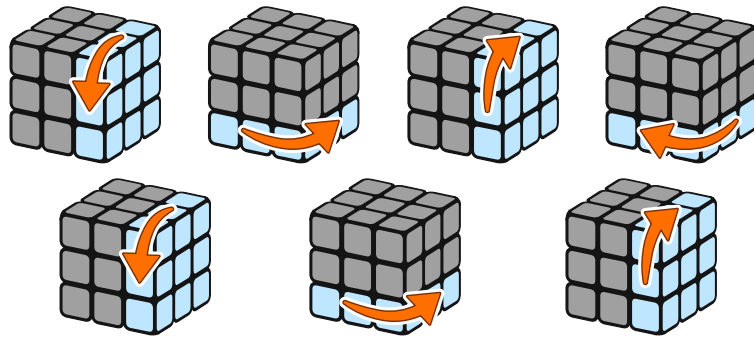
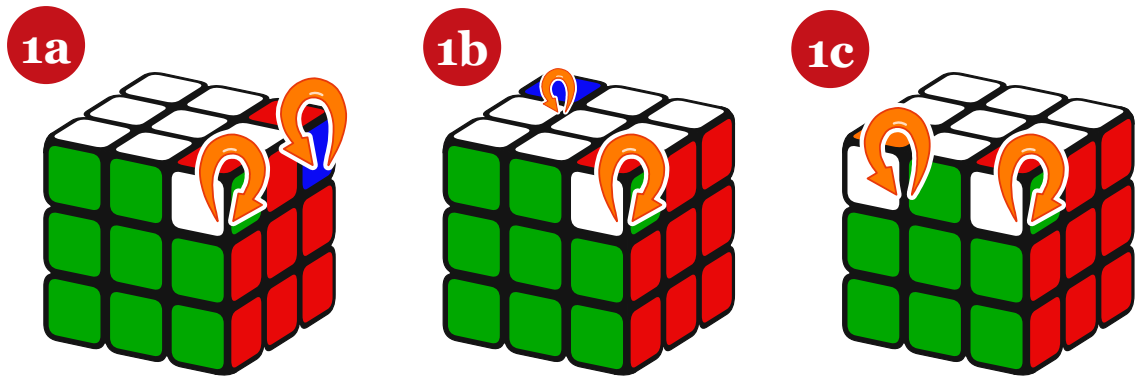


READ THIS BEFORE MOVING THE CUBE!

Very Important: This step is not as easy as others, but not much more complicated. But before proceeding to solve it you must know a few things. In Case 1 there are three subcases, so first of all is to see what subcase is the one that you have. To resolve this step, execute the first set of movements. Then, make the correspond movement depending on the variant of the red table you have. Finally, follow the last set of movements.

Case 1: (Read first the above message) Two corners incorrectly oriented

Notice that the 'nearest' corner is the one that needs a clockwise rotation.



Cases 2, 3 and 4: Three or four corners incorrectly oriented

If there are **three or four incorrectly oriented corners**, set the Rubik's Cube like you see in the photos and apply the first of the previous solutions, solving at least one of the corners. Finally, execute the corresponding solution to the case you have obtained.



Case 1a +

**Repeat
Step 7**



Case 1a +

**Repeat
Step 7**



Case 1a +

**Repeat
Step 7**

What does "+ Repeat Step 7" mean?

You will not be able to solve this case directly. However, if you perform the movements specified, you will get another case for this step.

Frequently Asked Questions

I have a different case. I have only one corner incorrectly oriented

In that case, your cube is unsolvable. Take a look at [how to fix your unsolvable Rubik's Cube](#).

Were you able to solve the Rubik's Cube? **Congratulations!**

Can we help you with anything else?

Now that you have been able to solve the cube, you may be interested in:

- Learn how to [memorize the solution of the Rubik's Cube](#).
- Print the [Rubik's Cube cheat sheet](#), with all the cases on a single sheet of paper.



- Solve the [2x2 Rubik's Cube](#), in just 3 steps.
- Make [Rubik's Cube patterns](#), like the checkerboard or the cube in a cube.
- Time your solves with our [Rubik's Cube timer](#), with official scrambles.
- [Buy Rubik's Cubes and other puzzles](#).
- Watch the [Rubik's Cube records](#).
- Learn more about the Rubik's Cube on [our blog](#).

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