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"Solving the Rubik's Cube is made easy... "

HOW TO SOLVE A RUBIK'S CUBE RUBIK'S CUBE TIPS COOL STUFF

The Complete Rubiks Cube Solution Guide for Beginners!

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How to Solve a Rubik's Cube Guide for Beginners

How to Solve a Rubik's Cube | Introduction

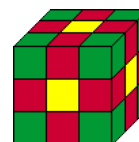
The **Rubik's cube** is a mechanical 3D puzzle, invented more than 30 years ago and considered the best selling toy at all times! Yet, solving the Rubik's Cube considered an almost impossible task, which requires an IQ of 160... **Is that really so hard?** Definitely not!! Just follow this simple step by step solving guide and you'll shortly find yourself with a solved Rubik's cube in your hands... Let's get to work!

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The mechanism of the Rubik's Cube

The Rubik's cube is actually a 26 piece puzzle. There are three types of pieces: (see image)

- Corner** piece: each carries three different colors (there are 8 corner pieces in the cube)
- Edge** piece: each carries two different colors (there are 12 edge pieces in the cube)
- Center** piece: each carries one color (6 center pieces, all are located on the core)



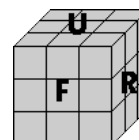
Core is the inside part of a Rubix Cube, which holds all the pieces together and attached to the center pieces with rotatable axes.

Important! The center pieces are part of the core and subsequently can't really move relative to each other. For that reason they already "solved", and the solving process is to bring the corner and the edge pieces to them (meaning there are only 20 pieces to solve out of the 26). For example, the blue center piece will be always opposite to the green center piece (on cube with standard color scheme). it doesn't matter how hard you will try to scramble the cube, it will just stay that way.

Rubiks Cube Move notation

When describing the solution we'll use the following move notation. The rubix cube notation helps to convey a sequence of moves through writing. Here is how it works: Every face given a letter:

- F (front):the face facing the solver
- B (back):the back face
- R (right):the right face
- L (left):the left face



- U (up):the upper face
- D (down):the face opposite to the upper face

The letter by itself means turning that face 90° clockwise (single turn).(e.g. R)
 Letter followed by ' (apostrophe) means turning that face 90° counter-clockwise (single turn). (e.g. R')
 Letter followed by 2 means turning that face 180° (double turn) . (e.g. R2)

For example: **F R' U2** looks that way:

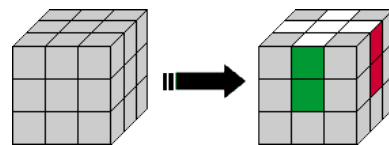
A sequence of moves called is called an **algorithm**.

(If you're having difficulty in finding the CW/C-CW direction of a face (like B or D), twist temporarily the cube so that face will become the F face which is the easiest face to determine the cw/ccw direction.)
 Don't be worried about it, all the algorithms are followed by an animation like the one of the last example.

The Rubik's Cube Solution

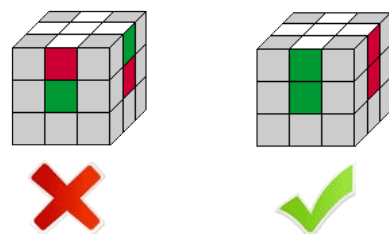
Solving the Rubix cube is made piece by piece, just like any other puzzle. Therefore the solution is divided into steps each of which solves number of pieces without destroying the ones of previous levels.

Rubik's Cube solution | Step 1: Solving the edge pieces of the top layer



In this step we have four pieces to solve.
 First choose a color to begin with (I chose the white from comfortable reasons.
 For this time, choose the white as well, because of the images along with the solution).

Because the center pieces cannot be moved relative to each other it's important to solve the edge pieces relatively correct to each other.
 For example, when solving the white: the green center is to the left of the red center, so the green-white edge piece has to be as well to the left of the red-white piece (see images)



Remember! Bring the white edge pieces to the white center, and **not** the white center to the edge pieces.

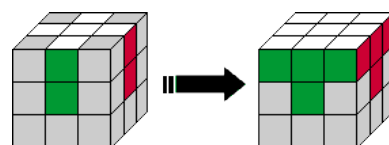
Use the following examples to complete these step:

F2

U' R U

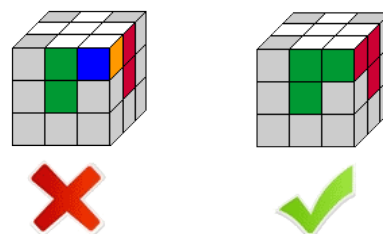
F' U' R U

Rubik's Cube solution | Step 2: Solving the corner pieces of the top layer



In this step we'll solve the four corner pieces of the top layer.

Pay attention! The corner piece has to match not only the white on Top, but also the colors to the left and right (see correct/wrong images).
 If the wanted corner piece is located in the top layer but In the wrong place (see wrong image) or not oriented correctly, insert a non-white corner there, and by that the white corner piece will go back to the bottom layer.



Inserting a corner piece to its solved location will be done in this way:
 First find an unsolved white corner (from the bottom layer)
 then position it right under the place it should go to.
 use one of the following moves:

$F D F'$

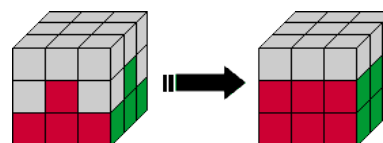
$R' D' R$

$R' D2 R D R' D' R$

repeat that for the other three corners.

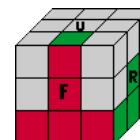
* Solving a corner that its white sticker is opposite to the upper face (third case), is done in two stages.
 The first is orienting the corner piece so the white sticker will be on one of the side faces (done by- $R' D2 R D$).
 The second is a second case solving ($R' D' R$).

Rubik's Cube solution | Step 3: Solving the edge pieces of the middle layer



In this step we'll solve the four edge pieces of the middle layer,
 And by that we actually complete the first two layers (a.k.a F2L).

Turn the cube over so the solved layer will be in the bottom.
 Then locate one of the edge pieces to form an upside down T shape (see image)
 In order to insert the edge to its location we'll use one of the following algs:

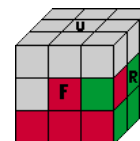


$U' L' U L U F U' F'$

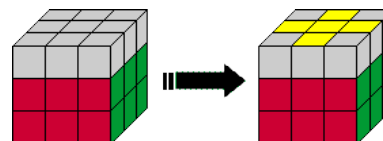
$U R U' R' U' F' U F$

repeat that for the other three edge pieces.

In a case that an edge piece is in its correct location but not oriented correctly (see image),
 Insert a wrong edge piece to this location, and as a result the wanted edge piece
 would go back to the top layer (just like in the previous step with the corners)



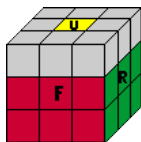
Rubik's Cube solution | Step 4: Orienting the last layer edges



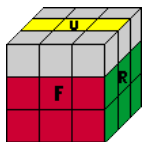
In this step, for the first time we won't completely solve the pieces But only orient them correctly.

In other words our goal is to form a cross shape on the upper face of the cube.

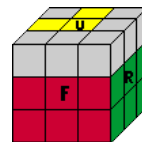
There are only four possible orientation states for the last face:



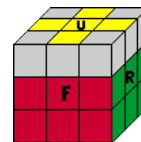
State 1



State 2



State 3



State 4

In order to achieve our objective (state 4) we'll use the following algorithm:

$$R' U' F' U F R$$

This algorithm promotes the cube one state ahead.

Meaning that triggering this alg on state 1 promotes the cube to state 2 and so on.

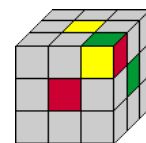
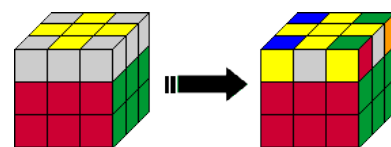
Pay attention! Executing this alg from the right angle is crucial. (for example, in step 3 it's important to execute this alg when the two correctly oriented edge pieces are facing to the back and the left faces and not to the front\right faces.

Rubik's Cube solution | Step 5: Permuting the last layer corners

In this step our goal is to **permute** the four last layer corner pieces.

Pay attention! our objective is only to locate the four corners in their place, not to orient them.

For example look at the image (see image), the yellow-green-red corner is well permuted.

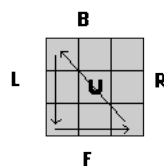


In this step there are only 2 different states:

- Two well permuted corners are adjacent.
- Two well permuted corners are diagonal.

If you can't find 2 well permuted corners, turn the upper face (U) until they'll show up. They must be there.

In order to complete this step we'll use the following algorithm:



$$L R' U' R U L' U' R' U R$$

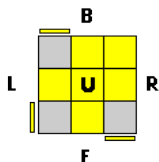
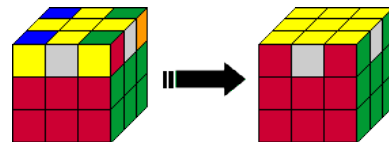
This algorithm rotates 3 corner pieces counter-clockwise, and leaves the fourth corner in place.

If you have 2 adjacent well permuted corners you just have to turn the upper face once (U). that move will relocate the corners so there will be only one well permuted corner and another three needed to be rotated counter-clockwise. Now just execute the algorithm above (L R' U' R U L' U' R' U R) and by this single execution you actually completed this level.(remember to execute the algorithm from the right angle)

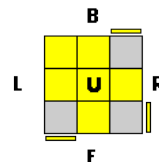
If you have 2 diagonal well permuted corners just execute this algorithm above once (the angle doesn't matter), and by that your cube state will change to two adjacent well permuted corners. Then follow the two adjacent corners instructions.

Rubik's Cube solution | Step 6: Orienting the last layer corners

In this step our goal is to orient the four corner pieces of the last layer, the one's we have just located.
In order to do that we'll use the two following algorithms:



$L U L' U L U2 L' U2$



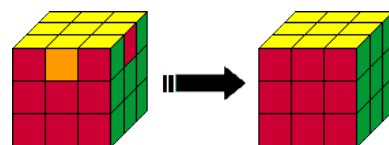
$R' U' R U' R' U2 R U2$

These algorithms actually do the same thing, just in opposite directions. The first algorithm orient three corners clockwise, while the other one orient three corners counter-clockwise. For that reason you can learn only one of them if you like (executing one alg twice equals to executing the second once).

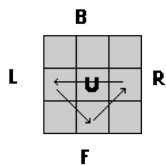
If you have only one well oriented corner (like in the alg images) then execute the suitable alg and complete this step.

If you have two well oriented corners or no well oriented ones, execute these algs randomly from different angles until you'll get only one oriented corner and then execute the suitable alg one more time and complete this step. (Fdg)

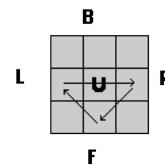
Rubik's Cube solution | Step 7 (and last!): Permuting the last layer edge pieces



In this step our goal is to permute the last layer edges to their solved locations and by that complete the rubix cube.
For that we'll use the following two algorithms:



$R U' R U R U R U' R' U' R2$



$R2 U R U R' U' R' U' R' U R'$

Just like the previous step algs, these algorithms actually do the same thing, just in opposite directions. The first algorithm rotates three edges clockwise, while the other rotates three edges counter-clockwise. For that reason you'll have to learn only one of them if you like.

In this step there are only two possible states:

If you have one solved edge piece, then execute once the suitable alg above and by that actually **complete the whole Rubiks Cube!**

If you have no solved edge pieces, then execute once any of the algs above (the angle doesn't matter), and by that, one of the edges will become solved. Then follow the instructions for one solved edge.

Congratulations!!You made it! Keep practicing the solving until you'll be able to solve the Rubik's cube without looking at the algorithms, I'm promising it will soon happen!

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