

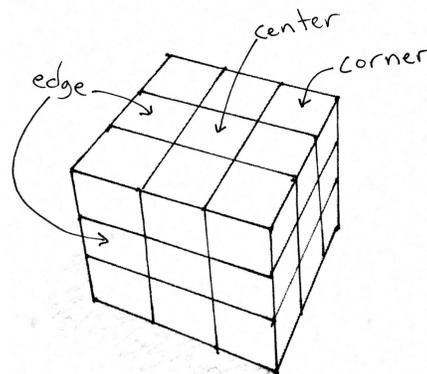
# Solving Rubik's Cubes: All Corners Last (ACL method)

Greg Briggs and Jay Gairson, May 2017 - Printable PDF File

Rubik's cube solutions require technique. This "all corners last" or ACL approach has slightly more problem solving left to you and slightly less memorization than other methods.

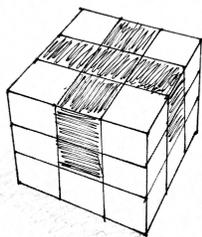
Here's a few basics to keep in mind:

- Centers are already solved! You will never twist the center layers. Locate the white and yellow centers on your cube. These are going to be the white and yellow sides.
- You will be working from the white side towards the yellow side.
- The cube is made of plastic blocks, each block has either three colors (corner blocks) or two colors (edge blocks)



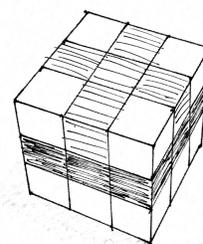
## Part 1: First Two Layers of the Cube

For this section, think of the yellow side as a "work area" that's OK to scramble and the white side as a "done" area which you should not twist. When solving the cube, you will choose a target block to move into a chosen destination, to do this you will: move the target block into the work area, bring the destination spot into the work area, twist the work area to bring the target into the destination, and then rotate the destination back into place.

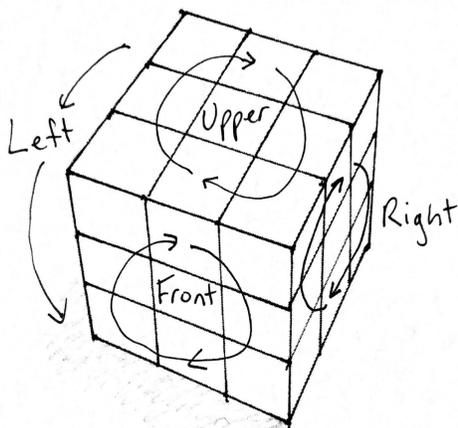


**1.1 Solve a white cross** (plus sign). The white edges must also match the centers on the sides of the cube.

**1.2 Solve the edges of the middle layer.** Use the technique mentioned above, but do not break your white cross.



## Part 2: Advanced Moves



### Definitions:

**F** = twist Front face clockwise

**U** = twist Upper face clockwise

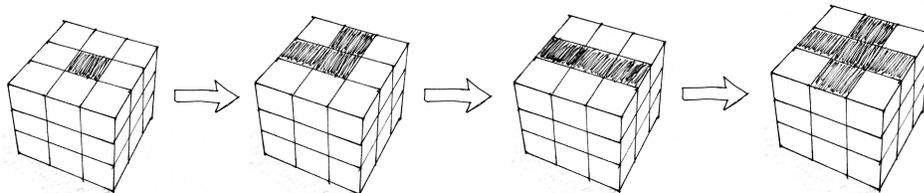
**R** = twist Right face clockwise

**L** = twist Left face clockwise

If the letter is marked prime, turn counterclockwise instead. So **F'** means Front counterclockwise, which can be spoken as "un-front". Another example, **U R'** means Upper clockwise then Right side counterclockwise, spoken as "upper un-right".

## 2.1 Yellow Edges facing up (reorienting edges)

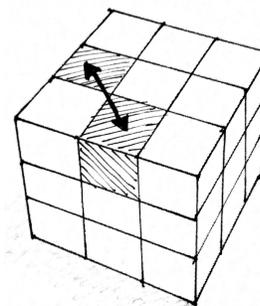
Hold your cube with the Yellow side up. If you see a Yellow cross, you are already done. Otherwise you need to apply/repeat this move up to three times until you get one. If you see an L-shape in yellow, make sure to point it towards the left and back. The move to create the yellow cross is as follows: **F R U R' U' F'**



## 2.2 Yellow Edges into correct location, by swapping

Your Yellow Edge pieces need to be fixed so that they agree with the centers of the sides. First, twist the yellow side to match as many edges as you can. Then, this swaps the Upper-Front edge with the Upper-Left edge:

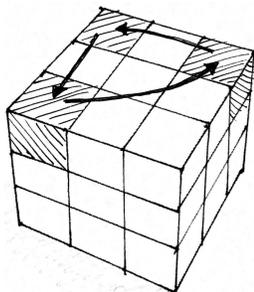
**R U R' U R U U R' U**



## 2.3 Corners pieces into the correct corner locations

Move the corner blocks into the corners where all 3 colors match the 3 centers, even if they are facing the wrong way (the piece seems to be twisted). This moves the Upper layer corner pieces (except the front right one) in a counterclockwise triangle:

**U R U' L' U R' U' L**



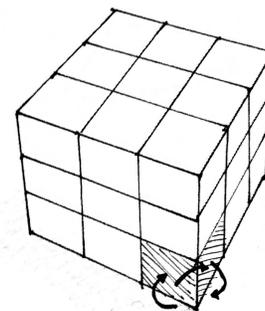
Focus on corners of the white side first. Take note of where the corners having white are and where they should be. As needed, rotate the whole cube to change the side facing up, in order to move the corners you desire, along the triangle. If you hold the cube with white on the right or front side, then you can

use this move to replace one corner at a time from the yellow side into the white side. Also, you can temporarily twist the yellow side to more easily get access to a corner that you need for the white side. Once the white side has all the correct corners, then work on the yellow side.

## 2.4 Last move! Fixing each corner piece (reorient corners)

Again work on the white side first. The white side should be the bottom if it has at least two corners that need twisting. This move twists two or three corners in the bottom layer: **F R' F' R F R' F' R**

This move performs one twist. Run this move 3 times in total. Each time, it has twisted a corner in the bottom front right, totalling 3 corner twists. Once a corner is done, then twist the bottom to work on a different corner. If you didn't do it 3 times, the top will look jumbled; just keep doing it until it's fixed. At the end of the move, twist the bottom back to its original position.



If you have only one white corner left to twist, it is impossible since this move twists two or three corners. You'll have to turn the cube to it's side so you can twist a white and a yellow corner.