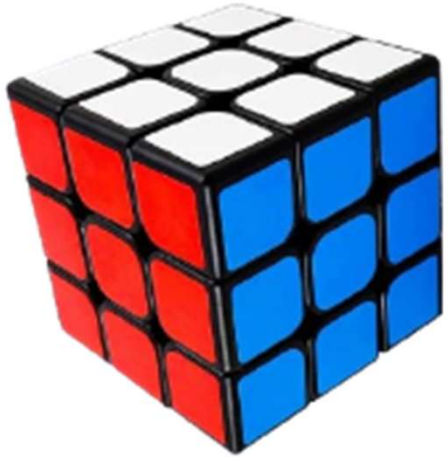
Welcome!

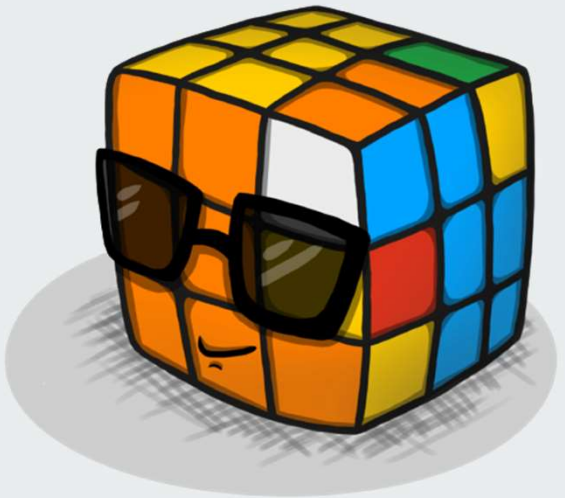
Please find a seat with a cube. Leave the Rubik's Cube in it's solved position.

If you have your own Rubik's cube, please come see me to unscramble it for today's lesson.



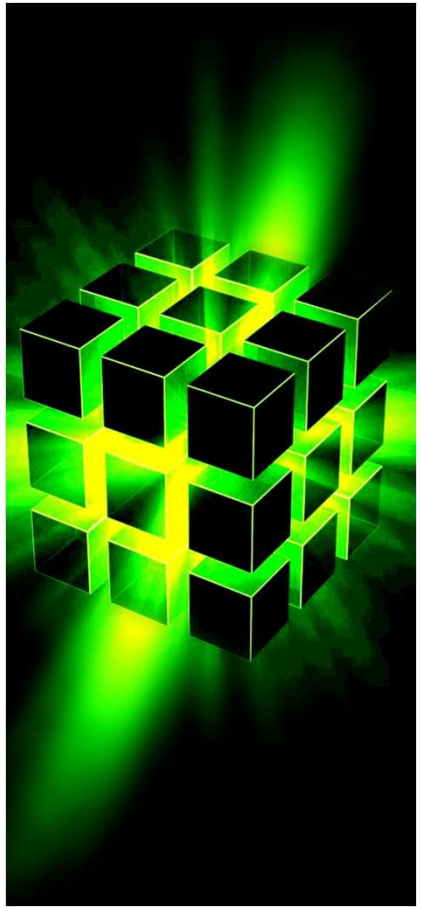
Scrambled - Solving the Rubik's Cube

Presented by Yajat Nahata



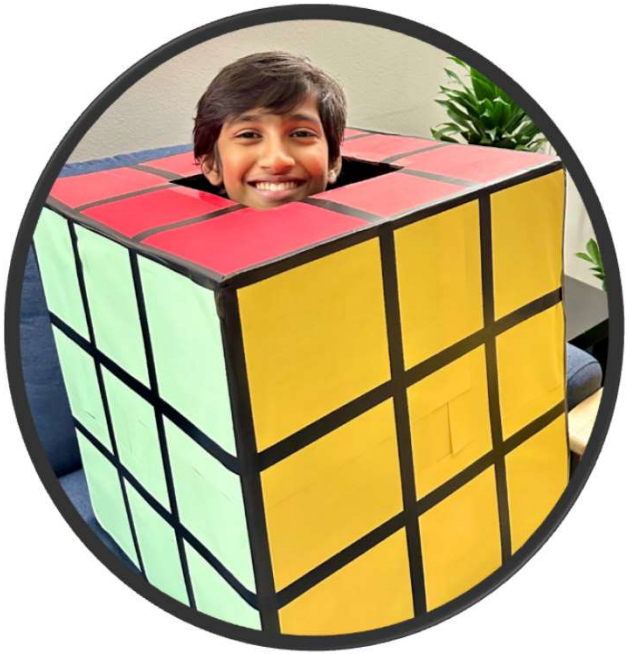
What Will Be Covered Today

- About Me!
- Brief History of the Rubik's cube
- Benefits of Solving Puzzles
- Basics of the Rubik's Cube
- Solving the Cube



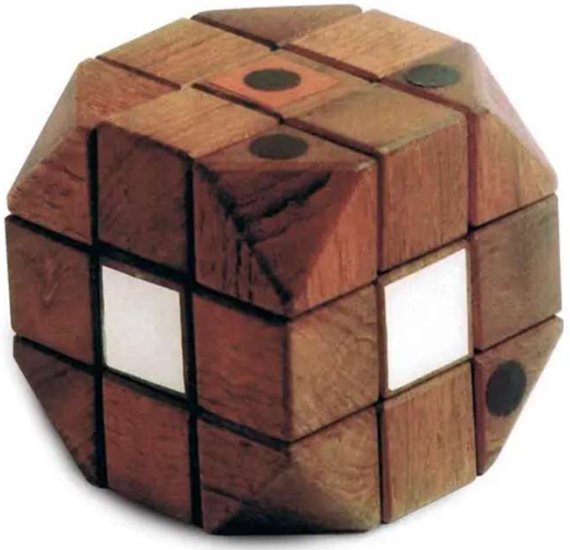
About Me!

My name is Yajat Nahata and I'm a 6th grader. I enjoy speedcubing, coding and doing math. I've recently gotten into collecting Pokémon cards. I live in Cleveland and I have lots of friends! This is my first time presenting at KidzMash. I hope you have a great time!



A Brief History of the Rubik’s Cube

- Invented in 1974 by Erno Rubik -
  a Hungarian sculptor and professor of architecture
- Originally called the Magic Cube
- It was designed to be a toy, not a puzzle
- Erno himself took 1 month to decode the Rubik's cube



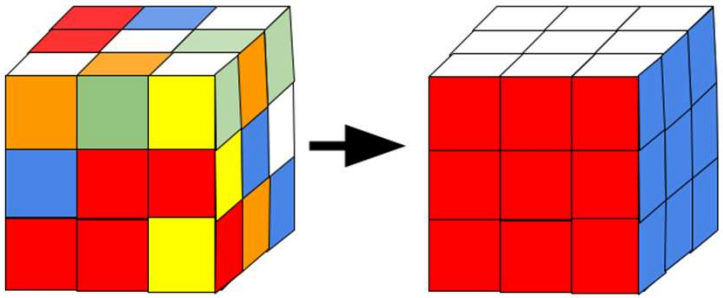
Benefits of Solving Puzzles

Enhances/Increases:

- Problem solving skills
- Creative thinking skills
- Memory
- Confidence
- Patience and perseverance
- Can be a good stress buster

Where Do We Start?

Great question! We can't just learn the beginner's method right away. First, we will focus on basics, like the pieces, layers, and algorithms. And then we can start solving the cube.



Pieces, Layers, and Algorithms

These three fundamentals are all you need to know to solve a Rubik's cube!

1. The pieces are the parts and colors that make up a Rubik's cube. They are the individual smaller squares on Rubik's Cube.
2. The layers of the cube are groups of pieces. They are like stacked sections of a Rubik's Cube.
3. Algorithms are instructions on how you turn and twist the cube. You only need to know two of them!

Always keep these fundamentals in mind when solving.

Pieces-Colors

A Rubik's cube must follow these color rules in order to be solvable.

1. Yellow and white sides must be opposite to each other
2. Green and blue sides must be opposite to each other
3. Red and orange sides must be opposite to each other

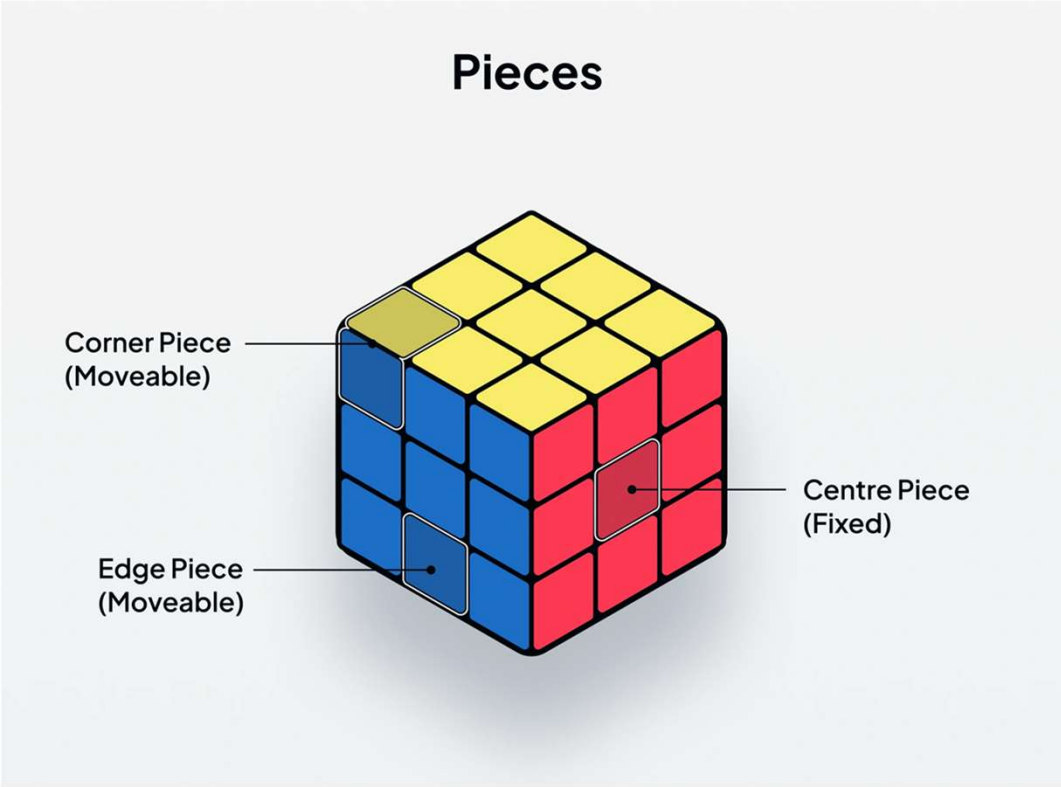
If there is a Rubik's cube that doesn't follow these rules, consider it unsolvable.

Pieces-Parts

There are 3 parts of a Rubik's cube:

1. Center
    - They can never move from their spot
    - Only has 1 color on it
    - Determines what color it's side is
2. Corner
    - Has 3 colors on it
3. Edge
    - Has 2 colors on it

Make sure when solving that you turn the right piece into the right spot.

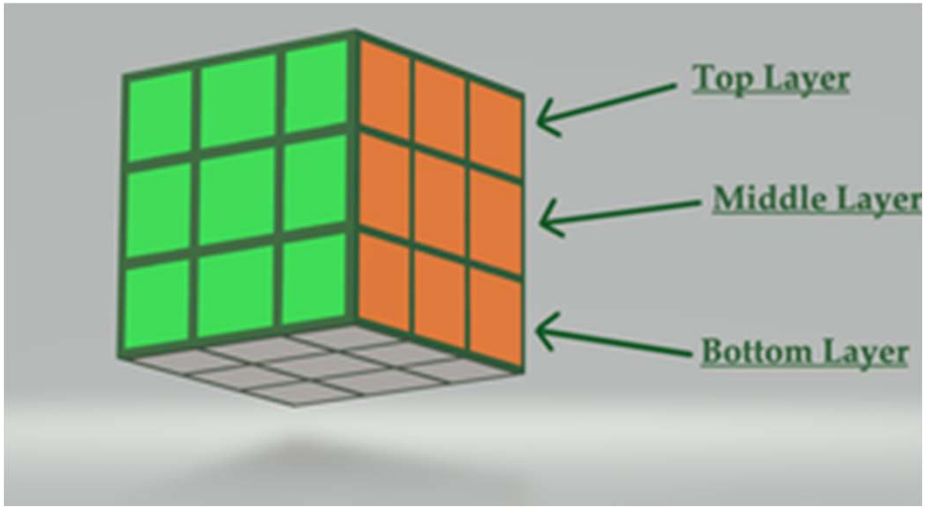


Layers

The beginners method solves the cube layer by layer.

There are 3 layers of a cube.

1. Top Layer
2. Middle Layer
3. Bottom Layer



Algorithms

Algorithms are instructions on how to twist and turn the cube. We will learn 2 basic algorithms using these notations.

U: Up

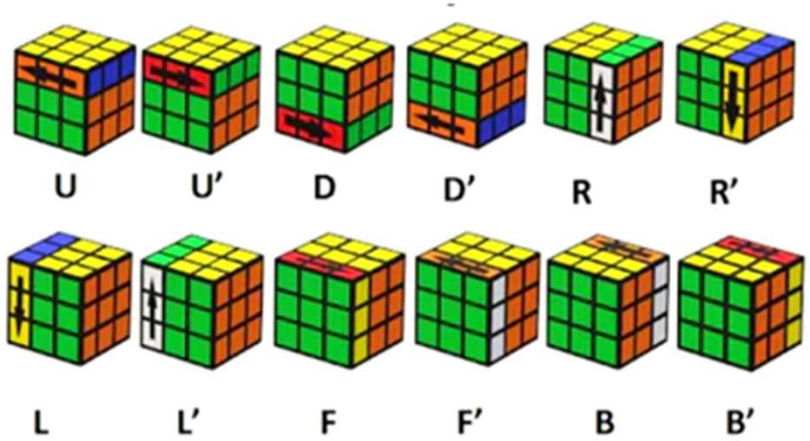
D: Down

R: Right

L: Left

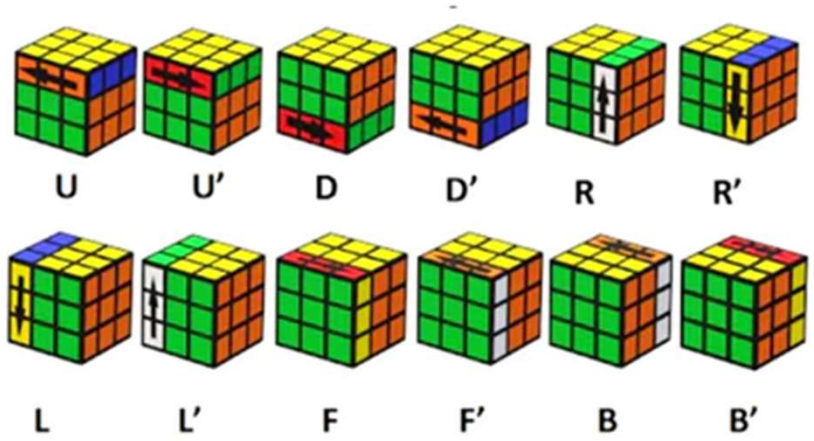
F: Front

B: Back



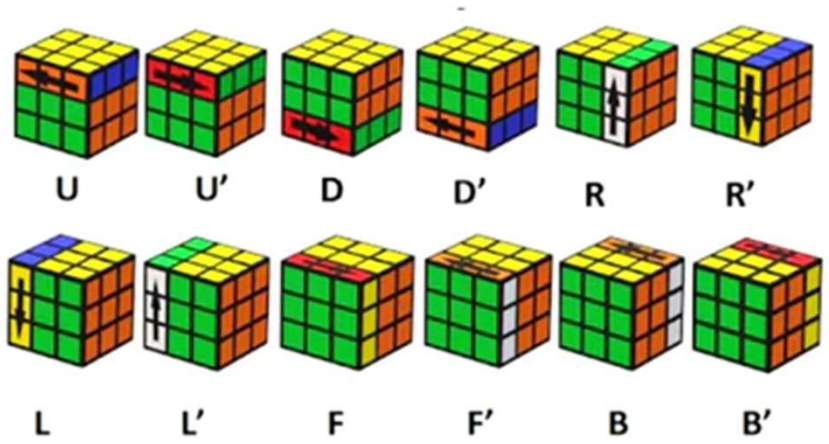
The Right Hand Algorithm

This algorithm uses the notations **R U R' U'** and will be one of the algorithms to use when solving the cube. If you do this 6 times correctly on a Rubik's cube, it will go back to it's solved position. Use the chart to help you make the moves.



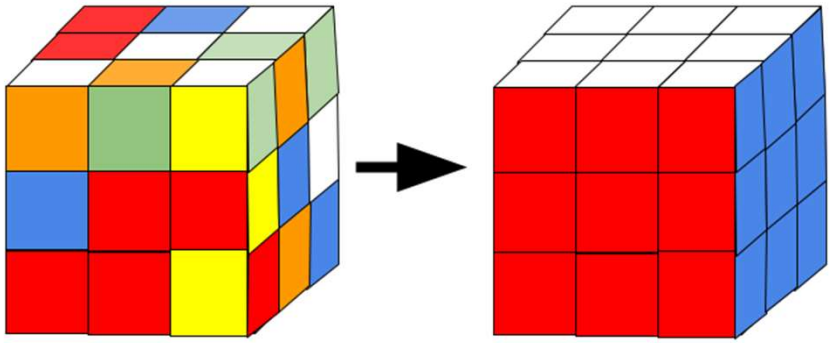
The Left Hand Algorithm

Same as the right hand one but with the left hand. It goes **L' U' L U.** If you do it 6 times it will solve the cube like the right hand one. It is the second algorithm we will use.



8 Steps

Now you can start scrambling your Rubik's cube because we will get started solving it. There are 8 steps to achieve this.

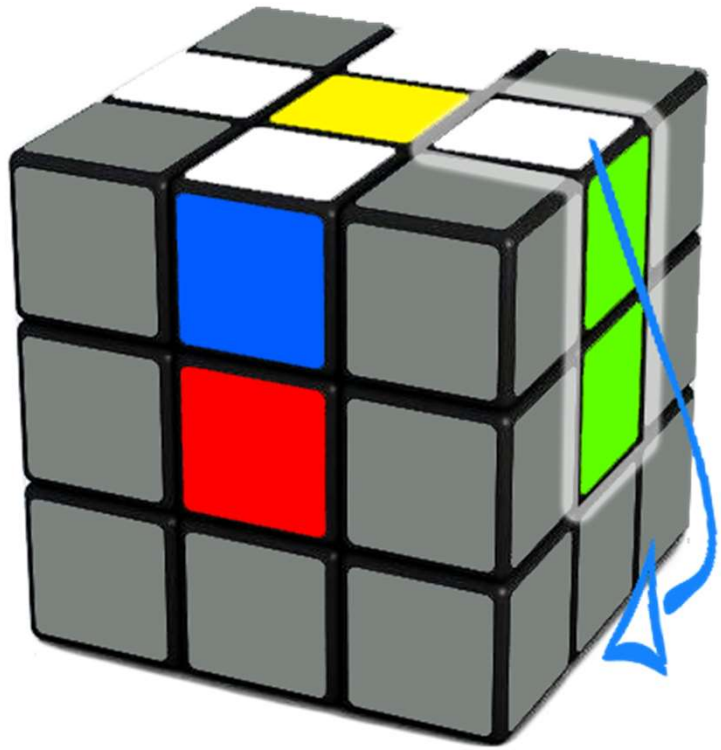


Step 1: The Daisy

- Create a daisy pattern on your Rubik's cube as shown in the picture

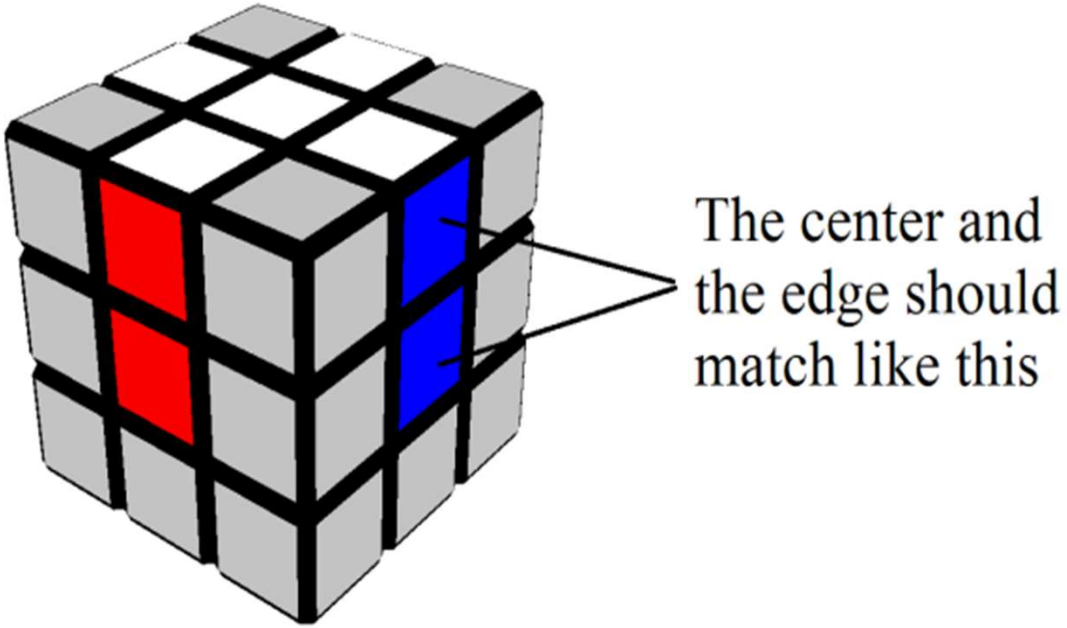
Step 2: The Cross

- After creating the daisy, align one piece to its center
- Move it down to the bottom layer as shown



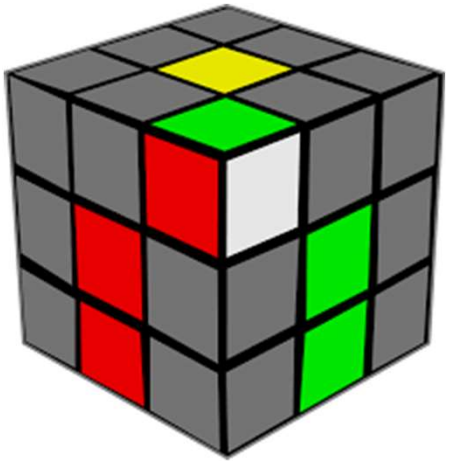
Step 2: The Cross (Continued)

Do this with all the pieces and your cube should look like this:

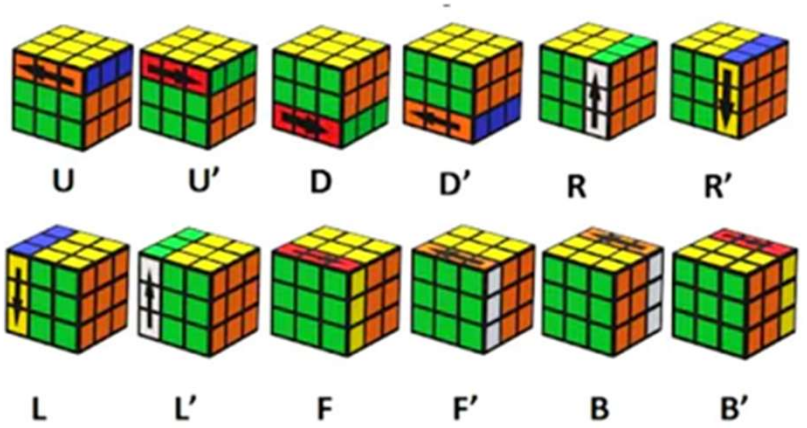


Step 3: Solving the Bottom Layer

- Find a corner piece on the top layer of the cube that has the color white
- Match it up with it's center pieces
- Use **R U R' U'** multiple times until it snaps into place

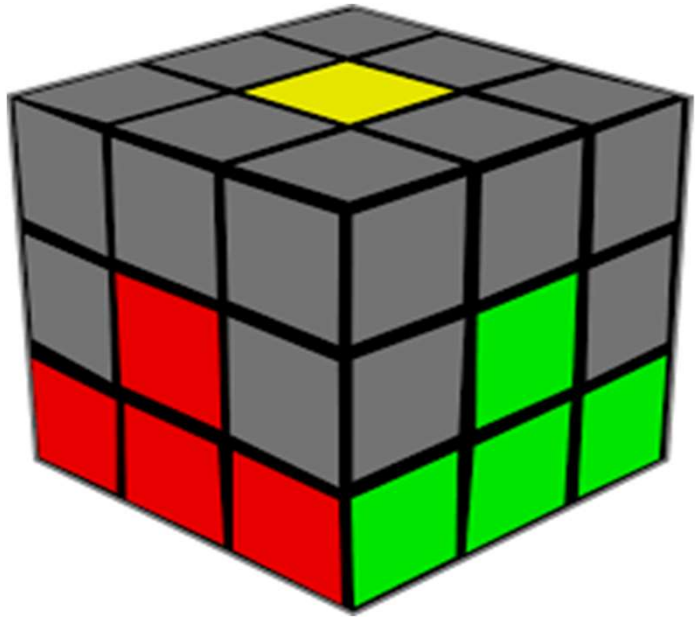


Its center pieces are green and red. Do R U R' U' until it snaps into place



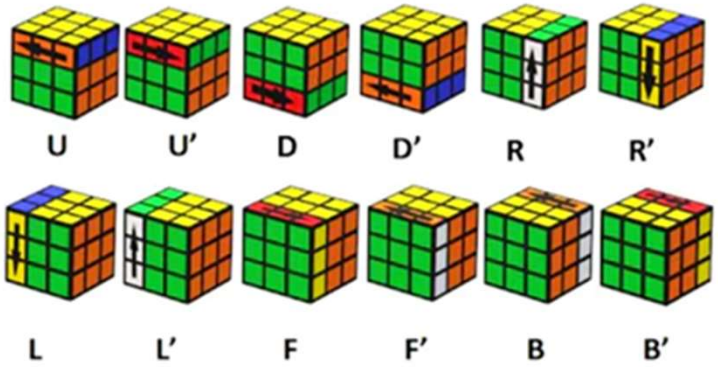
Step 3: Solving the Bottom Layer (Continued)

Do this until all the white corners are in place. The cube should look like this:



Step 4: Solving the Middle Layer

- Get an edge piece on the top layer that doesn't have the color yellow on it
- Match it up with it's center. Then on the other color of the edge piece (in the picture it is orange) turn it to its opposite side (red)
- If you turned it left, do the right hand algorithm and the left hand algorithm afterwards. If you turn it right, do the left hand algorithm and then the right hand



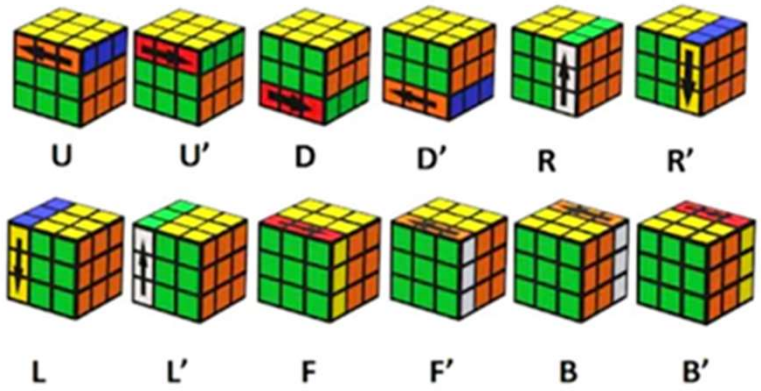
Step 4: Solving the Middle Layer (Continued)

Do this with all the pieces. The cube should look like this afterward:

We are almost there!

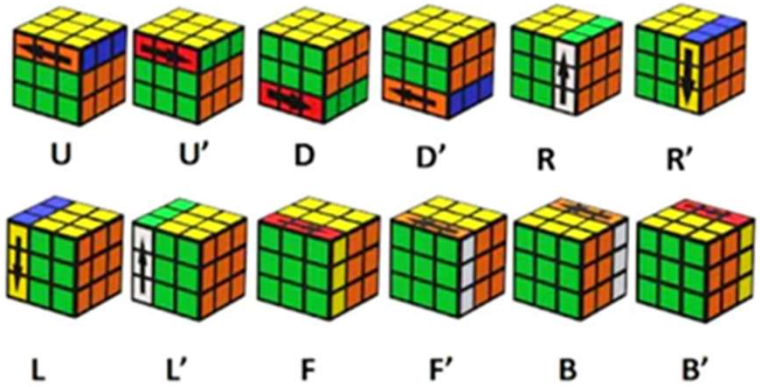
Step 5: The Yellow Cross (Case 1)

- If you have a yellow dot like in the photo, do **F** and then the right hand algorithm then **F'** and you will get a different case



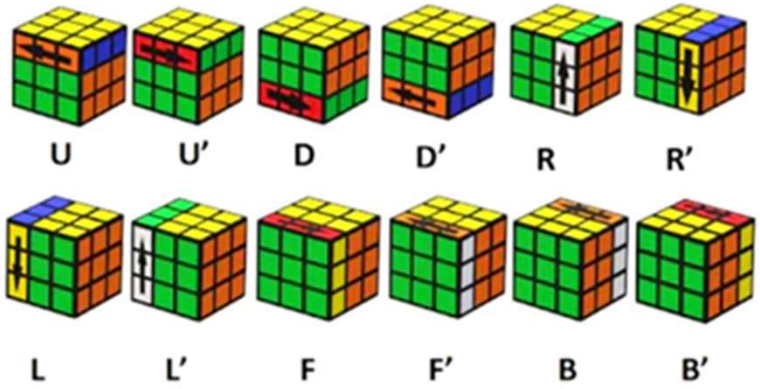
Step 5: The Yellow Cross (Case 2)

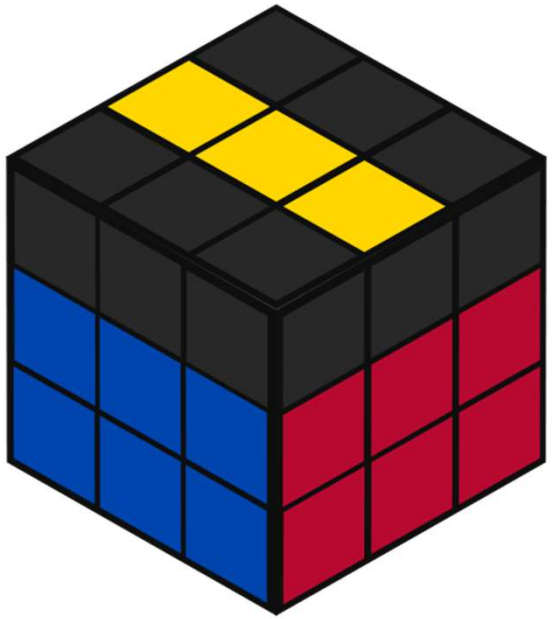
- If you have a yellow L shape like in the photo, hold the cube so it shows 9 o'clock and then **F** and the right hand algorithm and **F'** and you will get a different case



Step 5: The Yellow Cross (Case 3)

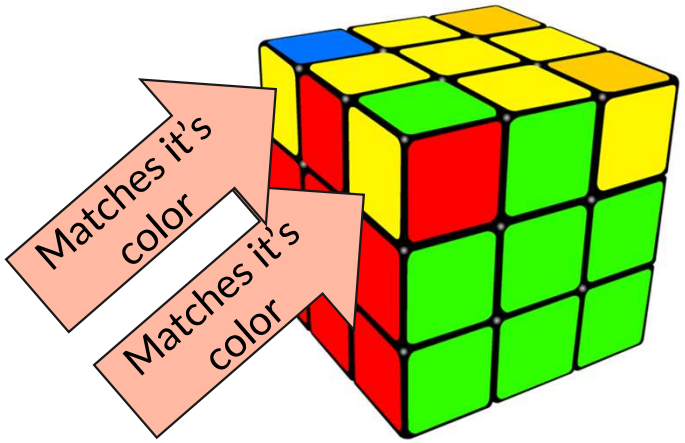
- If you have a yellow line shape like in the photo, hold the cube so it shows a horizontal line and then **F** and the right hand algorithm and **F'** and you will solve the yellow cross





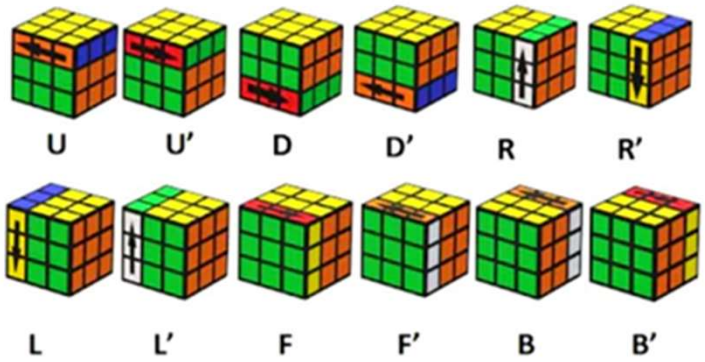
Step 6: The Yellow Corner Match

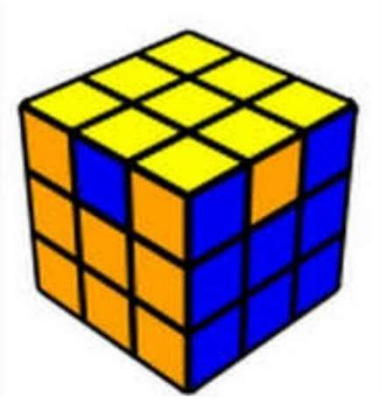
- Keep turning the top layer until 2 corner colors match like in the picture
- Make sure the 2 solved corners are on the left
- Do the right hand algorithm 3 times then turn the cube left and do the left hand algorithm 3 times
- If the corners are diagonal, do the same algorithm for the other case



Step 7: Yellow Corner Solve

- Turn the cube upside-down and get and unsolved corner in the bottom right
- Do the right hand algorithm until it is in the correct position. It is OK if the white side is destroyed because it will get fixed. When the corner is in the correct position, turn to another corner
- Do this with all the corners. The yellow side should be solved and the white side should be fixed

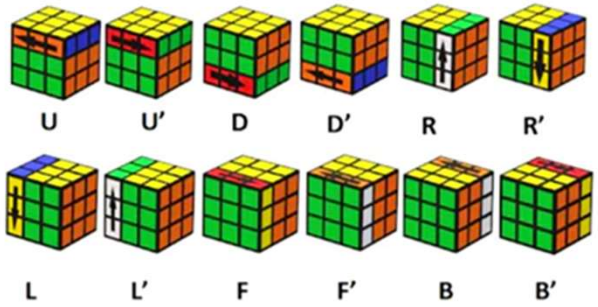




The cube should Look something Like this.

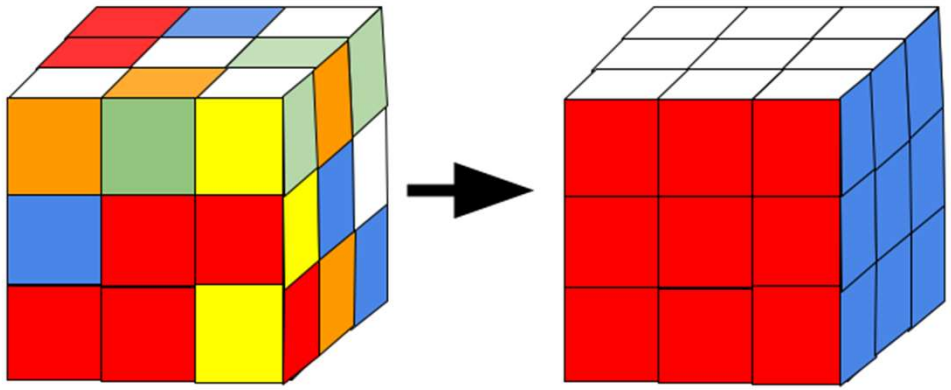
Step 8: SOLVING THE CUBE!!

- We just need to solve the green, blue, red and orange sides. If one of those sides is solved, make the side that is solved facing you
- Do the right hand algorithm, the left hand algorithm, the right hand algorithm 5 times and the left hand algorithm 5 times. You may need to do it again
- If none of the sides are solved, do the same steps I mentioned previously and you will get a different case!



WE DID IT!

We solved the Rubik's cube! But there might be more. If time permits, we can take a look at my other cubes!



Thanks For Coming!

If you have any questions, feel free to ask!