MoYu — CUBING CLASSROOM

2x2 Cube
3x3 Cube
4x4 Cube
5x5 Cube

Step 1: Solve the Down Face
Choose your favorite color as down face and match up all these colors(there are 4 pieces in this color), you just need to solve it same as the corner pieces of a 3x3 cube.

Step 2: OLL - Solve the Top Face
In this step you need to orient the color of the top face. The result should be that the opposite color to the bottom color will be completed. There are 7 cases.

OLL1:R2 U2 R'U2 R2   OLL2:F RUR'U'RUR'U'F'   OLL3:F R U R'U'F'

OLL4:R U R'U'R'F R F'   OLL5:F R'F'R U R U'R'   OLL6:R U'R'U'R U R'U F'

Alg 3:R2 U' R2 U2 F2 U' R2

If one of the layers is already solved, to solve the last layer, you need to learn these 2 algorithms.
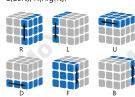
Alg 4:RU2R'U'RU2L'UR'U'L   Alg 5:RU'R'U'F2U'RUR'UF2

Done! Congratulations! You have solved the cube, keep practicing these algorithms you will be able to solve the cube in 10 seconds.

3x3 cube beginner's method
Notation used in solving the cube:
U(Up), D(Down), F(Front), B(Back), L(Left), R(Right).

R   L   U
D   F   B

STEP 3. Solve edge pieces on the middle layer
Case 1
Alg 1: F U F U F U' F' U' F'

Case 2
Alg 2: R' U' R' U' R' U R U R

Case 3
Alg 3: R U U R' U R U U R' UF' U' F

STEP 6. Position top corners correctly
Alg 1: R2 F2 R B' R F2 R B'R'

Alg 2: R B' R F2 R' B' R F2 R2

How to Solve a 2x2 Cube

A 2x2 cube consists of 8 corner pieces, and no other types of cubies. The number of possible positions of the cube is 3,674,160.

The 2x2 cube is actually a regular 3x3 cube without the edges and the center pieces. So basically solving the 2x2 cube will be identical to solving only the corners of the 3x3. If you can solve a 3x3 cube, 2x2 is not a problem.

The maximum number of turns required to solve a 2x2 cube is up to 14 turns only.

Color scheme: On most cubes blue is opposite to green, red is opposite to orange and yellow is opposite to white.
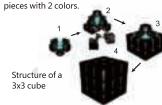
OLL7:R U R'U R U U R'

Step 3: Permute remaining colors
At last we need to match up all colors of the top and bottom layers, there are 5 cases.

If the top layer and bottom layer are not solved, you need to learn these 3 algorithms.

Alg 1:R2 B2 R2

Alg 2:R' U R' B2 R U' R

How to Solve a 3x3 Cube

A 3x3 cube consists of 26 small pieces and 1 core, 6 center pieces are fixed on the core, 8 corner pieces with 3 colors and 12 edge pieces with 2 colors.

Structure of a 3x3 cube

STEP 1. Make a cross on the bottom layer

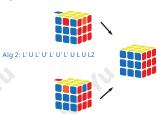STEP 2. Solve edge pieces on the bottom

X   Y   Z

STEP 4. Make a cross on the top layer
In this step you will make a cross on the top using an algorithm. You may have to repeat it a few times depends on different case.

Alg : F R U R' U' F'

STEP 5. Solve the top face
Alg 1:R' U' RU' R' U2R

Alg 2: RUR'URU2R'

STEP 7. Position last few edges correctly
Alg 1:R U' R U R U R U' R' U' R2

Alg 2: L' U L' U' L' U' L' U L U L2
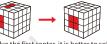

How to Solve a 4x4 Cube

A 4x4 cube consists of 56 small pieces and 1 core, 24 center pieces, 8 corner pieces and 24 edge pieces. There are no fixed center pieces in the 4x4 cube, so we have to remember the color scheme before we scramble the cube.

The beginning method of solving a 4x4 cube is to match up the center pieces and edge pieces then solve the cube like a regular 3x3 cube, we may need to use some algorithms to handle with some parities.

Notation used in solving the cube:
U(Up), D(Down), F(Front), B(Back),L(Left),R(Right).
For example, R means a clockwise move with 90 degrees on the RIGHT side when looking at the RIGHT face. The letter with a "'" after it means a counter-clockwise move when looking at that face directly, like L'. The letter with a '2' after it means a move with 180 degrees, such as U2. Lower-case letters mean turning 2 layers of the corresponding face, such as f.

R   L'   U2   f
(=U+U)

STEP 1. Solve the centres
Center pieces of the 4x4 cube are not fixed, so we have to remember the color scheme first. A big center consists of 4 small centers, genarally we make 2 small centers into a bar, then make another bar and match up with the first bar into a big center.

After we solve the first center, it is better to solve the oppsite center next, then slove remaining centers one by one.
The method to make 2 bars into a big center:

r U2 r'

STEP 2: Pair-up all edge pieces
There are 24 pieces(12 pairs) edge pieces, we need to pair-up all the edge pieces with their identical twins on the 4x4 cube, into edge blocks, then the cube will look like a 3x3 cube.
An algorithm we need to learn: R U R' F R' F' R
Firstly we put 2 edges with the same color in the same face(here we use red-blue edge as an example):
(1)If the 2 edges are in the same line, we do u'+R U R' F R' F' R+u , then we'll see 2 red-blue edges matched up.

u'+R U R' F R' F' R+u

(2)If the 2 edges are not in the same line, we do R U R' F R' F' R, then we can see 2 edges are lined up.

R U R' F R' F' R

This algorithm can match up all 12 pairs edge pieces.

STEP 3- Solve like a 3x3 cube
After we solve all the centers and edges, the cube will look like a regular 3x3 cube, then we can solve the cube just like a 3x3 cube, but we may meet some parities in the last layer.
OLL Parity: We can not make a cross on the top face
In this case we do Algorithm 1: r2 B2 U2 l U2 r' U2 r U2 F2 r F2 l' B2 r2, then the parity case will turn into a normal condition.

PLL Parity: 2 edges swap or other abnormal cases in the last layer
When the color of top face are orientated, we may get 2 edges swap or other abnormal cases in the last layer, here we can use algorithm 2: MR2 U2 MR2 u2 MR2 u2 U2(MR2 means internal right layer moves 180 degrees), then whis parity will turn into a normal case, at last we solve the remaining pieces with the same method in the 3x3 cube.

Alg 1

Alg 2

How to Solve a 5x5 Cube

5x5 is not very difficult after you know how to solve a 4x4 cube, we will use the same method, centers first, then edges, at last solve it like a 3x3 cube. There is no parities when you solve the 3x3 part.

STEP 1 Solve the centres
Just like the 4x4 cube, we solve the centers by matching up 3 bars and put them together to make a big center, centers of the 5x5 cube are fixed, so there is no need to memorize the color scheme.

Generally we solve the center bar, then 2 side bars, next match up these 3 bars into a big center.

The first center is not a difficult thing, after we finish the first center, next step is to handle with its oppsite center, what we need to pay attention to is do not break the first center when we match up the oppsite center.

After 2 centers are done, next step is to solve the remaining 4 centers one by one. For the last 2 centers, we need to make only two corner center pieces remain to be swapped, like pictures below:

l'U2 l U l' U l

The way to solve center pieces is flexible, we need to practice and think about it more.

STEP 2. Pair-up all edge pieces
An edge piece consists of 3 small pieces, we need to use the same algorithm: R U R' F R' F' R to match up these edges. Firstly we need match the middle edge and another edge with the same color up, like pictures below:

Put the middle edge on the right side, another piece on the left side, there are 2 different cases:

u'+R U R' F R' F' R+u   d+R U R' F R' F' R+d'

Then let's hand to the third edge. Put the solved 2 edges to the lower right side, the third edge set to the lower left side. We can use the algorithm: R U R' F R' F' R to adjust the position(please refer to the method on solving the edges of a 4x4 cube). There are 2 cases:

d+R U R' F R' F' R+d'   y' u+R U R' F R' F' R+u'
(y' means move the Front face to the Right face)

Then a big edge piece is solved, other edges can be solved in the same way.
We may meet such a case, 3 right pieces are matched, but the colors need to swap position, as shown in picture:

In this case we use the 4x4 cube parity algorithm 1 to handle with: r2 B2 U2 l U2 r' U2 r U2 F2 r F2l' B2 r2

Alg 1

Tafter 12 pairs edges are solved, the 5x5 cube is exactly the same as a 3x3 cube.

STEP 3. Solve like a 3x3 cube
Solve the cube like a 3x3 cube, there is no parities in the 5x5 cube.

Congrats, now you know how to solve the 5x5 cube.