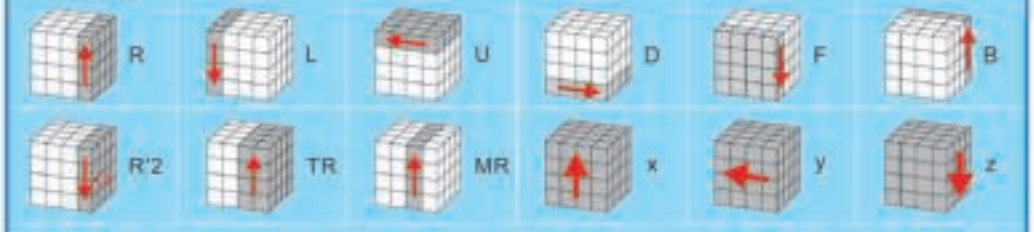
Notations



x y z: whole cube rotation
Adding [T]: turning two layers of the corresponding side
Adding [M]: turning the internal layer of the corresponding side

Adding ['] 90 degree turn counter clockwise
Adding [2]: 180 degree turn clockwise
Adding ['2]: 180 degree turn counter clockwise

Steps of solving a 4x4x4 cube

In this tutorial we will introduce the 'Reduction method' which will require us to first solve the center pieces and turn the edge pieces to form an equivalent to the 3x3x3 cube. Then we will be able quickly solve the cube using the methods for solving the 3x3x3 cube.

Solve the center pieces of all 6 sides → Pair the edge pieces → Apply 3x3x3 methods & deal with parities → Done

1 Solve the center pieces

by aligning the 4 center pieces of each colour and positioning them in the orders

STEP 1 Solve the center pieces of the yellow face.
STEP 2 Solve the center pieces of the white face.
STEP 3 Solve the center pieces of the remaing faces one by one.

Grey square on the top indicates the target position. Center pieces could be either on the sides or the bottom. Apply algorighm 1&2 accordingly to move the center piece into the target position on the top side.

Scenario 1: (center piece on sides) Apply algorithm 1

Scenario 2: (center piece on bottom) Apply algorithm 2

Finished state

Hints

For big cubes with even number of layers, the center pieces are not fixed on certain sides. You need to memorize the relative positions of the different colours. In the case of GAN460 this is top-yellow, down-white, left-orange, right-red, front-blue, back-green.

Algorithm 1

TR U TR'

Algorithm 2

TR 2 U TR' 2

2 Turn the edge pieces

to pair them up

STEP 1 Start with any pair of edge pieces (we take red/blue edges as example below). Take the right side edge slots (marked in grey below) as working slots. Use algorithm 3 to line up the edge pieces.

STEP 2 Flip the cube when the 4 edges on the top side are all paired up. Repeat step 1 for the unsolved edges (now flipped to top side) until the remaining 4 edges are all paired up.

Algorithm 3 TU' R U R' TU

If the last 2 edge pairs can not be solved, apply algorithm 4.

Algorithm 4 TU' R U R' F R' F' R TU

3 Solve the cube like the 3x3x3 cube, and deal with parities.

Now your 4x4x4 cube should look like a 3x3x3 cube. Use the 3x3x3 methods to solve it until you encounter a parity case.

In case of parity situations, use the algorithms below.

Two scenarios as shown below might happen when making the cross on the top side. Use algorithm 5 to handle it.

Algorithm 5 TR U2 x TR U2 TR U2' TR' U2 TL U2 TR' U2' TR U2 TR' U2' TR'

When solving the top face, if you entcounter the scenario where 2 opposite edges can not be solved, apply algorithm 6 once to solve it.

Algorithm 6 MR2 U2 MR2 TU2 MR2 MU2

In the emergence of any of the 3 scenarios shown on the right, apply algorithm 6 once in any direction, then continue to solve the cube using 3x3x3 methods.