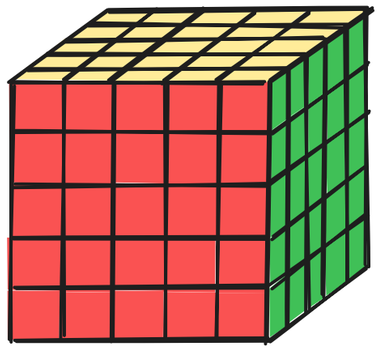
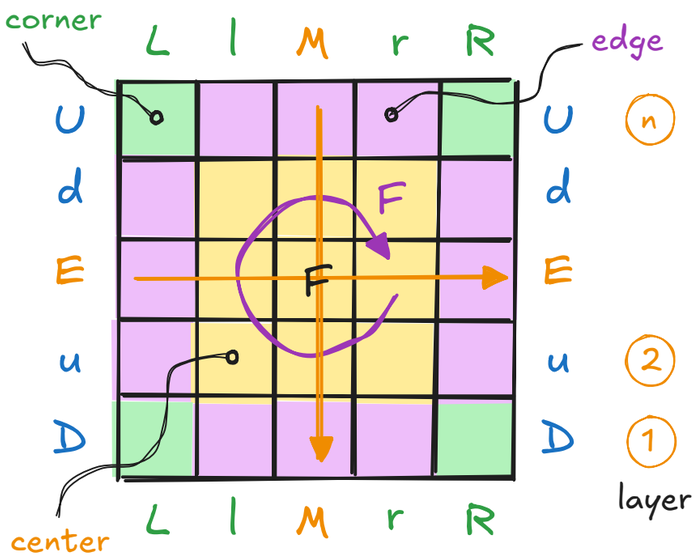
BIG CUBES



Front view:



F: indicates view

B = back

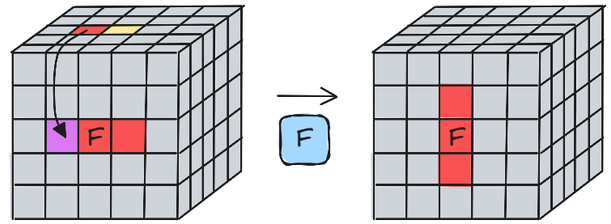
R: 90°CW R': 90°CCW R²: 180°

Turn cube: X: like turning R
Y: like turning U
Z: like turning F

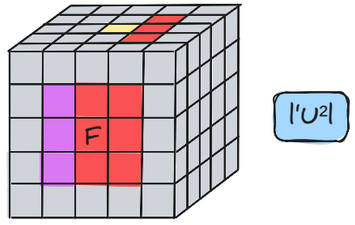
1) Solve centers

* first solve white center on bottom (layer 1)
* then solve centers in middle layers, clockwise y'
  red → blue → orange → green
* if n (number of layers) is odd, the middle face of center will determine the color of the center
* when solving middle layer centers, use top layer as temporary container
* finally last (yellow) layer is automatically solved

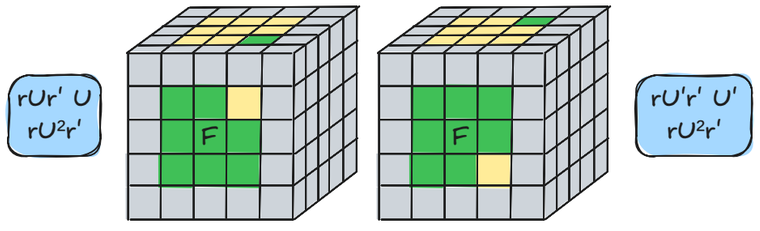
[1] create horizontal middle line in front face and turn it vertical



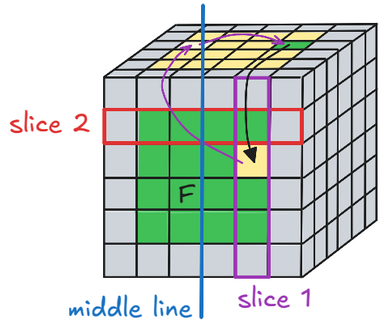
[2] create full lines on top and insert them in front



* tip for last (green) center on 5x5



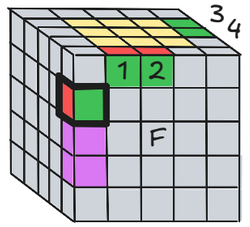
* tip for last (green) center on cubes n ≥ 5



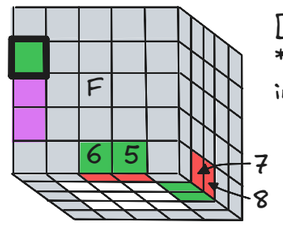
[1] slice 1 down r'
[2] turn F or F' so yellow face on other side of the middle line F'
[3] slice 2 down l
[4] turn front back (F or F') F
[5] slice 1 (back) up r
[6] turn front again as step 2 F'
[7] slice 2 (back) up l'
[8] restore front F

2) Pair edges

* white on bottom, yellow on top
* use u, E, d layers to pair vertical edges
the middle layer centers can be (temporary) broken but the center pieces have to remain in the same horizontal layer
* look at the top piece of front-left edge, and find other two edge pieces

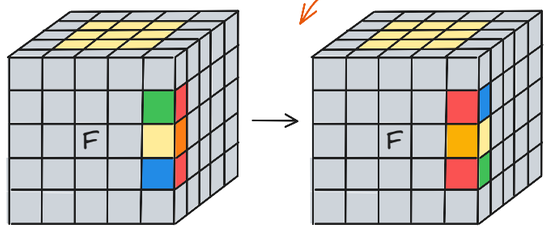


[1] when edge piece in upper layer
* if green in front (not top)
in position 1 or 2
RU'R' d' or E'
* if green on top (not in front)
in position 3 or 4
F'UF d' or E'

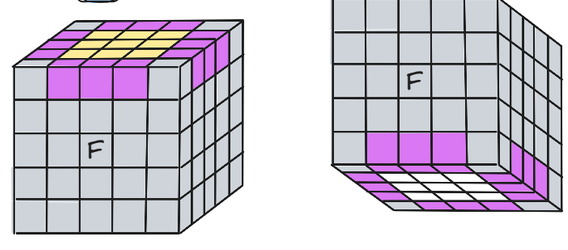


[2] when edge piece in bottom layer
* if green in front (not bottom)
in position 5 or 6
R'DR d' or E'
* if green on bottom (not front)
in position 7 or 8
F'D'F d' or E'

[3] when edge piece in middle layer (2, 3, or 4)
* if it is in correct layer
* if it is in wrong layer (or mirrored)
then use edge flipping algorithm
RUR' F R'F'R
and then E or d



* when an edge is correct, first put it in top layer in one of the 4 available slots on (yellow) top
* then flip cube x² and build 4 edges on (white) top

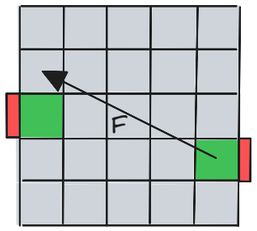


* now 4 correct edges are in white layer
and 4 correct edges are in yellow layer
* for the last 4 (vertical) edges, first repair the middle layer centers so all centers are correct by using:

u , E and d

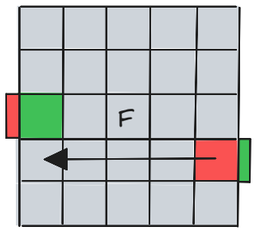
* from now on, side faces turn only 180° (not 90°)
or use edge flipping algorithm
* look at the edge in the front-left side, look at the middle edge piece, this is leading (in this case green/red)
* put matching edge piece on the front-right edge by using:

R² or B²



[1] if front color matches

u' [flip] u



[2] if front color doesn't match
* first flip the edge

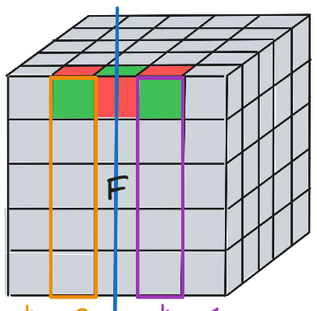
[flip]

* then put in place

d [flip] d'

* if only one edge is incorrect, because some of the pieces have to be flipped (in this case, two of the three edges have to be flipped), use this algorithm to solve

→ parity



put the edge in front-top

r'U² lF² l'F²
r²U² rU² r'U²
F²r²F²

symmetric → in this case: r

in this case: l

(you can also turn both l+L instead of only l
or turn both r+R instead of only r)

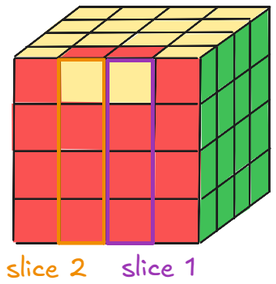
3) Solve like 3x3

* now all centers are correct and all edges are paired, the cube can be solved like a normal 3x3 cube

* however there can be some parity (some edge pieces seemes to be correct, but actually they need to be swapped with other edge piece with same colors)

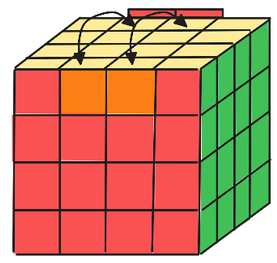
* parity if n (number of layers) is even

[1] one edge need to be flipped



* use algorithm described in previous column

[2] two of the four top edges have incorrect position

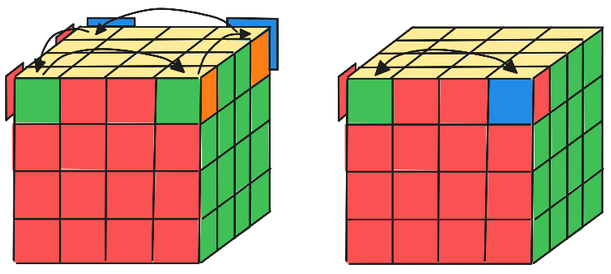


* swap places of top-front and top-back edge

r²U² r²(U+u)² r²u²

* use 3x3 algorithms to solve

[3] corners are well orientated, but can't be placed correctly using 3x3 algorithms



* use algorithm [2] to swap two edges

* use 3x3 algorithms to solve