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Ortega Corners-First Solution Method for Rubik's Cube

by Victor Ortega and Josef Jelinek

Introduction

This solution method is designed to solve Rubik's cube and to solve it quickly, efficiently, and without having to memorize a lot of sequences. For ease and speed of execution, turns are mostly restricted to the top, right, and front faces, and center and middle slices. Strong preference is given to the right face, since it is one of the easiest faces to turn for many people. Yet all sequences are minimal (or very close to minimal) by the slice-turn metric.

For an introduction to the notation used in this page, go to the cube concepts page.

This solution method orients cubies before positioning them. The idea is that it is easier to permute cubies after they've been oriented than before orienting them, because once the cubies have been oriented, the facelet colors that determine their permutation make easily identifiable patterns on the cube. Orienting cubies, whether done before or after positioning them, is always easy because orientation requires focusing on only one face color and on the patterns that that color makes on the cube. For middle-slice edges on the last layer, permuting cubies after they've been oriented is a very simple affair, thus reinforcing this principle.

Do not worry about centers or edges while solving corners. Position centers while beginning to solve edges. You really only need to position top and bottom centers at that point, but positioning all centers may make things easier for you. Middle-slice centers will be positioned along with middle-slice edges on the last step.

This solution method is based on Minh Thai's Winning Solution. Ideas and sequences are borrowed from other solution methods, and appropriate attributions are made in those sections.

Go to Solving Corners to continue.

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Solving Corners

1. Orient Top Corners

You should be able to manage this on your own. Do not worry about positions - all corners will be permuted in step 3. You should be able to orient top corners in 6 moves or less. For the greatest speed and efficiency, try to do this in one look. For smoother cubing you should try to orient these corners on bottom face, because the next step can be done faster then (no cube rotation afterwards, easier looking ahead).

(average number of turns for this step ... 5)

2. Orient Bottom Corners

Rotate the whole cube so that bottom face becomes top face. Orient the corners depending on which of the seven patterns below you see:

T pattern:

R U R' U' F' U' F

L (F) pattern:

F R' F' U' R' U R

MI pattern:

R U R' U R U2 R'

Inverse MI pattern:

R' U' R U' R' U2 R

PI pattern:

R U R2 F' R'2 U R'

U pattern:

R' F' U' F U R

H pattern:

R2 U2 R' U2 R2

(average number of turns for this step ... 7)

3. Position All Corners

A pair here represents two adjacent corners on the top or bottom layer. Such a pair is considered to be solved correctly if the two corners are positioned correctly relative to each other. A solved pair will be easy to identify because the two adjacent facelets on the side (not top or bottom) will be of the same color. A layer can have only zero, one, or four correct pairs.

The number and location of correct pairs can be quickly identified by merely looking at two adjacent side faces (that is, not top or bottom). For a given layer, if you see one correct pair and one incorrect pair, then there is only one correct pair on that layer. If you see two correct pairs, then all four pairs are correct. If you see no correct pairs but both pairs consist of opposite colors, then there are no correct pairs on that layer. If you see no correct pairs and only one pair consisting of opposite colors, then there is one correct pair on that layer, and it is opposite to the pair with the opposite colors.

Proceed with one of the following sequences depending on how many solved pairs you have:

0 (no pairs solved):

R2 F2 R2

1 (bottom-back pair solved):

R U' F U2 F' U R'

1 (top-back pair solved):

R' U R' B2 R U' R

2 (top-back and bottom-back pairs solved):

R2 U F2 U2 R2 U R2

4 (bottom pairs solved):

F2 U' R U' R' U F2 U R U R'

5 (bottom and top-back pairs solved):

R U' R F2 R' U R F2 R2

(average number of turns for this step ... 8)

Go to Solving Edges to continue.

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Solving Edges

At this point, align corners and position centers. The cube is now fully symmetric except for edges. Pick the new top and bottom face depending on what will make solving top and bottom edges easiest. Steps 4 and 5 can be combined, although this requires monitoring more cubies simultaneously and may not yield a speed gain or a reduction in number of movements. See a beginner's method for details on steps 4 through 6.

4. Solve Three Top Edges

In order to do this step efficiently, you need not position centers and allign corners in the previous step. Instead, you can solve first (or first two opposite) top edge using one or two turns ignoring centers and then, you can solve the top center together with another top edge.

(average number of turns for this step ... 9)

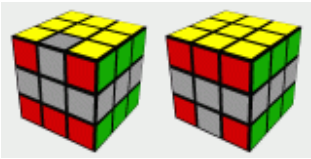
5. Solve Three Bottom Edges

To reduce the number of turns required, you can combine this and the following step when solving the third bottom edge. There are several possible cases that are easy to find and very efficient. In addition, you should force yourself to look ahead in this step and try to prevent slower cases to occur.

(average number of turns for this step ... 12)

6. Solve One More Top or Bottom Edge

Often, you can solve the last top or bottom edge in the previous step thus omit this step and reduce turns and time.



(average number of turns for this step ... 4)

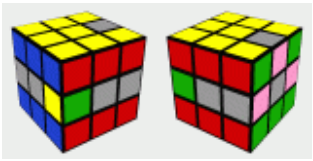
At this point, the last top or bottom edge will either be in the middle layer, in position but not oriented, or solved. Depending on the case, proceed as follows to solve that last edge (if necessary) while orienting the middle layer edges.

7. Solve Last Top Edge and Orient Middle Edges

a) Top Edge in Middle Layer

Position the "notch" at top-right and the edge cubie at left-front, with the facelet with the top color on the left face. If the edge cubie is twisted, mirror vertically (top-right

becomes bottom-right, right-face turns go in the opposite direction)



As shown in the diagram, the pink-marked edges are oriented correctly - o - if the pink facelet's color matches the color of the adjacent or opposite center. Otherwise the edge is oriented incorrectly (flipped) - x.

ooo

E R E R' E' R' E R

oox

E R' E' R' E R' E' R'

oxo

E' R E R2 E R

oxx

R' E' R E R' E R

xoo

R2 E R E' R E R E' R'

xox

R' E R' E' R' E' R E R E' R

xxo

R' E' R' E R E R

xxx

R' E R' E R' E' R2 E' R

b) U Edge Twisted in Its Position

There will be 1 or 3 twisted edges in the middle layer:

front-right twisted:

R U2 R' E2 R2 E' R' U2 R'

front-right not twisted:

R' E' R' E' R' E' R'

c) U Edge Solved

There will be 0, 2, or 4 edges twisted in the

middle layer:

2 adjacent (front-left and front-right):

R2 F M F' R2 F M' F'

2 opposite (front-left and back-right):

F M F' R2 F M' F' R2

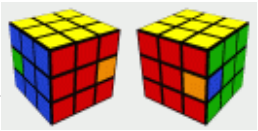
4:

R F2 R2 E R E2 R F2 R2 E R

(average number of turns for this step ... 9)

8. Position Midges

Send front-right to back-left, back-left to back-right, and back-right to front-right:



R2 E' R2

Exchange centers with opposites:

M2 E' M2

Exchage front-right with back-right, front-left with back-left:

R2 E2 R2

(average number of turns for this step ... 4)

Average number of turns for this method ... 58

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