



# Solving a 3 x 3 Rubik's Cube

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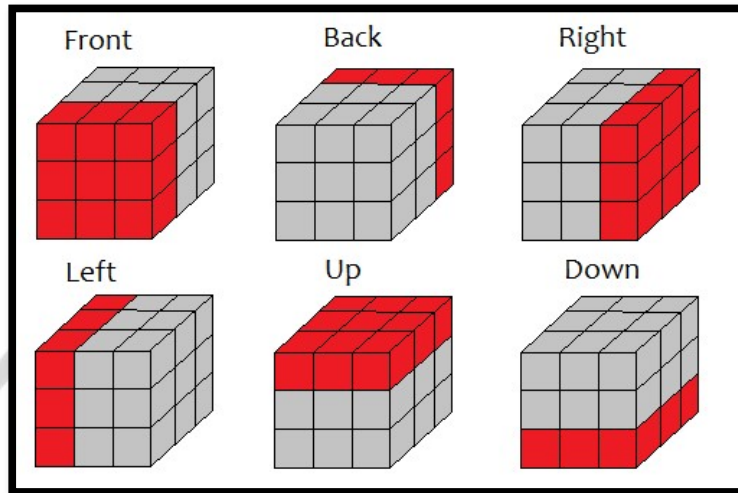
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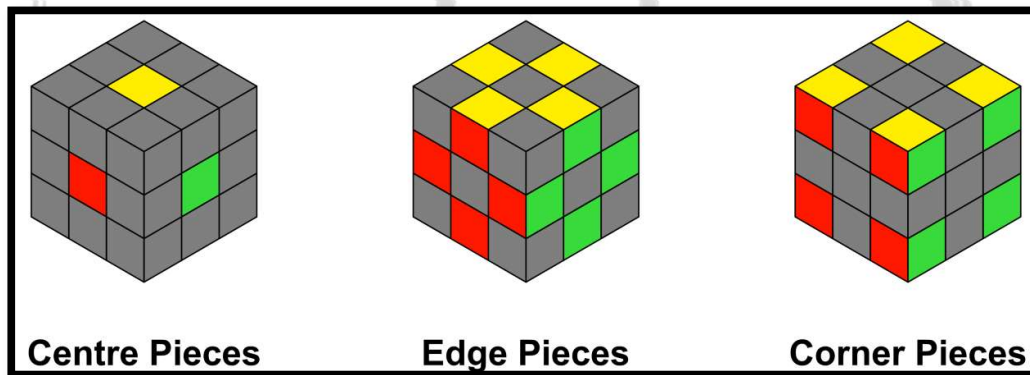
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### Understanding the cube sides & faces



### Understanding the cube pieces



### Understanding the cube rotations

C = Clockwise ↻

CC = Counter Clockwise ↻

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## STEP 1 - Making the DAISY PATTERN



1. Keep the side with YELLOW centre on the TOP
2. Arrange the WHITE edge squares around the YELLOW centre piece

## STEP 2 - Making the WHITE CROSS with EDGES matching the CENTRE PIECES



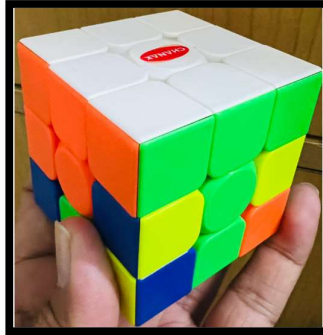
1. Keep the DAISY Pattern on the TOP
  - a. Keep the GREEN centre facing you
  - b. Match the GREEN colour of edge below WHITE edge with the GREEN centre piece by rotating the UPPER side of the cube clockwise
  - c. Once matched, Rotate the FRONT side by 90 degrees
2. Keep the DAISY Pattern on the TOP
  - a. Keep the BLUE centre facing you
  - b. Match the BLUE colour of edge below WHITE edge with the BLUE centre piece by rotating the UPPER side of the cube clockwise
  - c. Once matched, Rotate the FRONT side by 90 degrees
3. Keep the DAISY Pattern on the TOP
  - a. Keep the ORANGE centre facing you
  - b. Match the ORANGE colour of edge below WHITE edge with the ORANGE centre piece by rotating the UPPER side of the cube clockwise
  - c. Once matched, Rotate the FRONT side by 90 degrees
4. Keep the DAISY Pattern on the TOP
  - a. Keep the RED centre facing you
  - b. Match the RED colour of edge below WHITE edge with the RED centre piece by rotating the UPPER side of the cube clockwise
  - c. Once matched, Rotate the FRONT side by 90 degrees



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5. Now invert the cube to check if THE WHITE CROSS has formed and the EDGES and CENTER colours match

### STEP 3 - Arranging WHITE corner pieces around the WHITE CROSS & solving the First Line

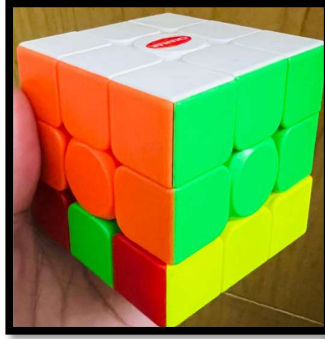


1. Keep the WHITE CROSS on the TOP
2. Check the WHITE corner pieces in the bottom line
3. Keep the WHITE corner piece side facing you
  - a. **If the WHITE corner piece is on the left corner**
    - i. check the left side colour of the WHITE corner piece. Rotate the bottom line (clock or anti-clockwise) of the cube to match the piece with centre colour
    - ii. Keep the WHITE corner piece side facing you
    - iii. Rotate the bottom line clockwise once
    - iv. Rotate the left clockwise once
    - v. Rotate the bottom line anti-clockwise once
    - vi. Rotate the left anti-clockwise once
  - b. **If the WHITE corner piece is on the right corner**
    - i. check the right-side colour of the WHITE corner piece. Rotate the bottom line (clock or anti-clockwise) of the cube to match the piece with centre colour
    - ii. Keep the WHITE corner piece side facing you
    - iii. Rotate the bottom line anti-clockwise once
    - iv. Rotate the right anti-clockwise once
    - v. Rotate the bottom line clockwise once
    - vi. Rotate the right line clockwise once
  - c. **Repeat steps 3a or 3b** until the TOP side squares are all WHITE the first line of the cube is solved.



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## STEP 4 - Solving the Middle Layer



1. Keep the completed WHITE side on the TOP
2. At the bottom (YELLOW centre side), look for EDGES with NO YELLOW Piece
3. Rotate the bottom line to arrange one of the EDGE (with NO YELLOW Piece) to form a "T"
4. Check the colour of the piece at the bottom EDGE of the "T"
5. Keep the "T" formation facing you
6. Rotate the bottom line of the cube once clockwise or anti-clockwise in the opposite direction of the colour that matches the centre colour
  - a. **If bottom line is rotated clockwise,**
    - i. Rotate left side down once
    - ii. Then rotate bottom line anti-clockwise once
    - iii. Rotate left side up once
    - iv. Keep the WHITE corner piece side facing you
    - v. Rotate the bottom line anti-clockwise once
    - vi. Rotate the right anti-clockwise once
    - vii. Rotate the bottom line clockwise once
    - viii. Rotate the right line clockwise once
  - b. **If bottom line is rotated anti-clockwise,**
    - i. Rotate right side down once
    - ii. Then rotate bottom line clockwise once
    - iii. Rotate right side up once
    - iv. Keep the WHITE corner piece side facing you
    - v. Rotate the bottom line clockwise once
    - vi. Rotate the left anti-clockwise once
    - vii. Rotate the bottom line anti-clockwise once
    - viii. Rotate the left line clockwise once
    - ix. **Repeat steps 6a or 6b until the middle layer is complete.**



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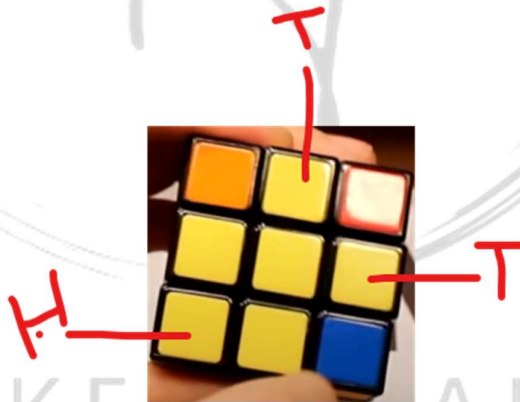
## STEP 5 - Making the YELLOW CROSS



1. Check for the YELLOW side of the cube for the shape you see that is formed by YELLOW pieces
2. If the shape appears like a L, follow the L Algorithm
  - a. Keep the YELLOW side on the TOP
  - b. L Shape Algorithm:  $F=C \rightarrow U=C \rightarrow R=C \rightarrow U=CC \rightarrow R=CC \rightarrow F=CC$
3. If the shape appears like a Line/Bar, follow the Bar Algorithm
  - a. Keep the YELLOW side on the TOP
  - b. Bar Algorithm:  $F=C \rightarrow R=C \rightarrow U=C \rightarrow R=CC \rightarrow U=CC \rightarrow F=CC$

## STEP 6 - Arranging YELLOW corner pieces around the YELLOW CROSS

1. Check the YELLOW side of the cube if you have the perfect YELLOW CROSS
2. If you have the perfect YELLOW CROSS:
  - a. Check for the YELLOW PIECES at the corner. Keep the YELLOW corner piece facing right
  - b. Follow the FISH Algorithm
  - c. Algorithm to Make FISH:  $R=C \rightarrow U=C \rightarrow R=CC \rightarrow U=C \rightarrow R=C \rightarrow U=C \rightarrow U=C \rightarrow R=CC$
  - d. You will get the YELLOW pieces in shape of the FISH (like shown in the image)



- e. Keep the FISH Head facing bottom left of the cube and YELLOW side on the TOP



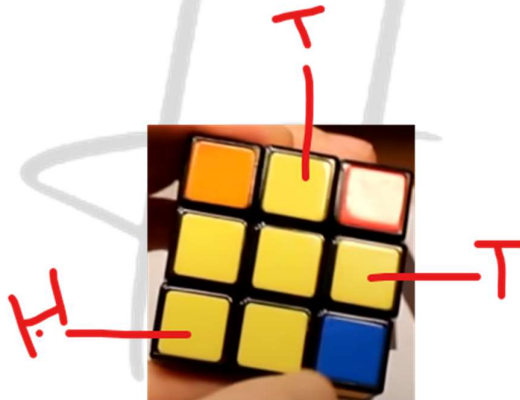
f. Follow the Algorithm:  $R=C \rightarrow U=C \rightarrow R=CC \rightarrow U=C \rightarrow R=C \rightarrow U=C \rightarrow U=C \rightarrow R=CC$

3. If you do not have the perfect CROSS and have other shapes:

a. If you have this shape on your cube



- i. Keep the YELLOW T on the TOP
- ii. Follow the Algorithm:  $R=C \rightarrow U=C \rightarrow R=CC \rightarrow U=C \rightarrow R=C \rightarrow U=C \rightarrow U=C \rightarrow R=CC$
- iii. You will get the YELLOW pieces in shape of the FISH (like shown in the image)



iv. Keep the FISH Head facing bottom left of the cube and YELLOW side on the TOP

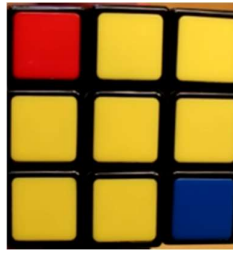


- v. Follow the Algorithm:  $R=C \rightarrow U=C \rightarrow R=CC \rightarrow U=C \rightarrow R=C \rightarrow U=C \rightarrow U=C \rightarrow R=CC$
- vi. REPEAT UNTIL YELLOW SIDE IS SOLVED  $\rightarrow$  Keep the FISH Head facing bottom left of the cube and YELLOW side on the TOP
- vii. REPEAT UNTIL YELLOW SIDE IS SOLVED  $\rightarrow$  Follow the Algorithm:  $R=C \rightarrow U=C \rightarrow R=CC \rightarrow U=C \rightarrow R=C \rightarrow U=C \rightarrow U=C \rightarrow R=CC$

b. If you see this shape on your cube



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- i. Keep the YELLOW T on the TOP
- ii. Find a YELLOW piece on the sides and keep the YELLOW piece side facing you
- iii. Follow the Algorithm:  $R=C \rightarrow U=C \rightarrow R=CC \rightarrow U=C \rightarrow R=C \rightarrow U=C \rightarrow U=C \rightarrow R=CC$
- iv. You will get the YELLOW pieces in shape of the FISH (like shown in the image)
- v. Keep the FISH Head facing bottom left of the cube and YELLOW side on the TOP
- vi. Follow the Algorithm:  $R=C \rightarrow U=C \rightarrow R=CC \rightarrow U=C \rightarrow R=C \rightarrow U=C \rightarrow U=C \rightarrow R=CC$
- vii. REPEAT UNTIL YELLOW SIDE IS SOLVED  $\rightarrow$  Keep the FISH Head facing bottom left of the cube and YELLOW side on the TOP
- viii. REPEAT UNTIL YELLOW SIDE IS SOLVED  $\rightarrow$  Follow the Algorithm:  $R=C \rightarrow U=C \rightarrow R=CC \rightarrow U=C \rightarrow R=C \rightarrow U=C \rightarrow U=C \rightarrow R=CC$

#### **STEP 7 - Arranging the matching CORNER PIECES in pending line**

1. Keep the YELLOW side on the TOP
2. Check if there are any 2 matching corner pieces. If yes, align them to the matching side and keep that side away from you
3. Follow the Algorithm:  $R=CC \rightarrow F=C \rightarrow R=CC \rightarrow B=C \rightarrow B=C \rightarrow R=C \rightarrow F=CC \rightarrow R=CC \rightarrow B=C \rightarrow B=C \rightarrow R=C \rightarrow R=C$
4. REPEAT Follow the Algorithm UNTIL THE CORNER PIECES ARE MATCHING:  $R=CC \rightarrow F=C \rightarrow R=CC \rightarrow B=C \rightarrow B=C \rightarrow R=C \rightarrow F=CC \rightarrow R=CC \rightarrow B=C \rightarrow B=C \rightarrow R=C \rightarrow R=C$

#### **STEP 8 - Finishing the cube**

1. Keep the YELLOW side on the TOP
2. Check if there is any completed side. If yes, align the matching pieces on the side and keep that side away from you
3. Follow the algorithm:  $R=C \rightarrow R=C \rightarrow U=C \rightarrow R=C \rightarrow U=C \rightarrow R=CC \rightarrow U=CC \rightarrow R=CC \rightarrow U=CC \rightarrow R=CC \rightarrow U=C \rightarrow R=CC$

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