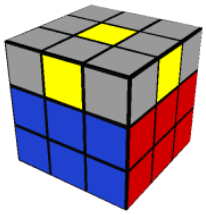
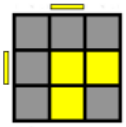
Source of algorithms: https://solvethecube.com/speedcubing
PLLs: http://www.cubewhiz.com/pll.php
PLL Recognition: http://www.cubewhiz.com/pllrecognition.php

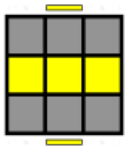
Notation

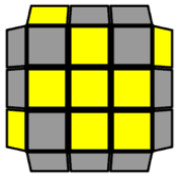
These are typically oriented to the diagram. If there is only one face shown then you are viewing the upper face with the front at the bottom.
F = Front
B = Back
R = Right
L = Left
U = Up
D = Down
M = Middle (Center of the F face downwards, i.e. with same rotation as L)
S = Side (Center of the R face downwards, i.e. with same rotation as F)
R U R' U' = Sexy Move (yes really)
R U R' = Sexy Move family
R' F R F' = Sledgehammer
R' U R" = Nice single movement pulling towards yourself. *Needs a colour but I made italic till I decide.*

OLL


R U2 (R2' F R F') U2 (R' F R F')
F (R U R' U') F' **f** (R U R' U') **f'**
F (R U R' U') S (R U R' U') **f'**
Note F + S = f
(**f** = rotate front 2 layers U to R)


f (R U R' U') **f'**
(**f** = rotate front 2 layers U to R)

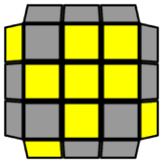

F (R U R' U') F'
Sune:



(R' U2 R) U (R' U R)

Comment: Looks like a fish. Orient head R and find a single yellow on the back of right side. Solved yellow => Anti-Sune.

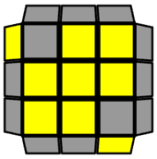
Anti-Sune:



(R U2 R') U' (R U' R')

Comment: Looks like a fish. Orient head R and find a single yellow on the front of right side. Solved yellow => Sune.

Bowtie:



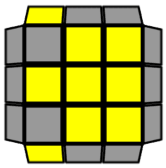
F' (**r** U R' U') (**r'** F R)

Alternative: F' (**r** U R' U') (L' U R U')

(**r** = rotate right 2 layers F to U)

Comment: Orient until you find a single yellow on the front on the right. Solved yellow => anti-sune.

Blinkers:



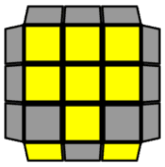
(**r** U R' U') (**r'** F R F')

Alternative: (**r** U R' U') (L' U R U')

(**r** = rotate right 2 layers F to U)

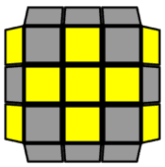
Remember: Bowtie and Blinkers are fat!

Headlights:

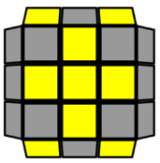


R2 D (R' U2 R) D' (R' U2 R')

Double Headlights:



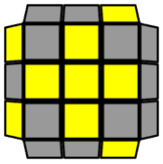
(R U R') U (R U' R') U (R U2 R')



(R U2 R' U' R U R' U' R U' R)

(R U U R' U' R U R' U' R U' R) (Same as above for comparison)
F (R U R' U')(R U R' U')(R U R' U') F'

Headlights and Blinkers:



R U2 (R2 U' R2 U') (R2 U2 R)

PLL

2 Look - Permute corners. Find 2 headlights.
Headlights on the right (Ab perm):

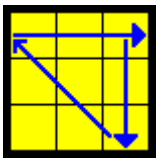
x (R2 D2) (R U R') D2 (R U' R)
(**x** = R cube = rotate U face to B)

If no headlights, do the above formula twice or:
F (R U' R' U') (R U R') F' (R U R' U') (R' F R F')

Corners Only

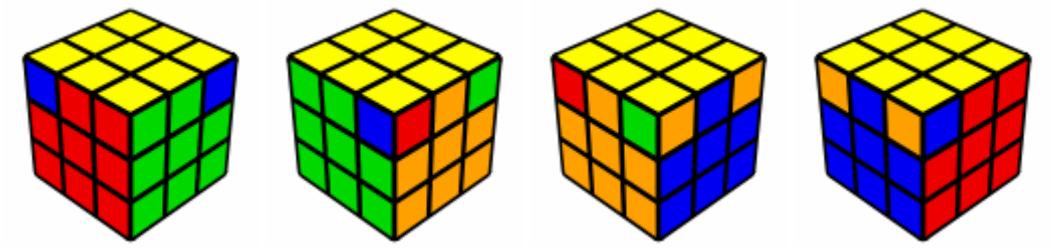
In the A permutations, I first AUF (adjust the U-face) until the "corner block" is permuted. By corner block, I mean that there is a corner and the two edges adjacent to it belong adjacent to it. Since this is very similar to the V permutation, I check to see that the two stickers next to the corner block are not opposite (if they are, then this is the V permutation).

Aa Perm (U head:L orientHL:B)

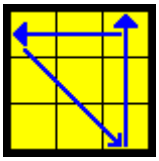


x (*R' U R'*) D2 (R U' R') D2 R2
(**x** = R cube = rotate U face to B)
Comment: This is a basic corner 3-cycle. It is one of my favorite and fastest algorithms. Perform the D2s with the left hand and everything else with the right. Put **headlights** on the back and tilt cube forward.

How to recognise: Look for the corner block. With the corner block at the front-left, the rightmost sticker will be opposite the other two in the front. The stickers on the left face are not opposite. I.e. **headlights on the left**.



Ab Perm (U’ head:R orientHL:R)

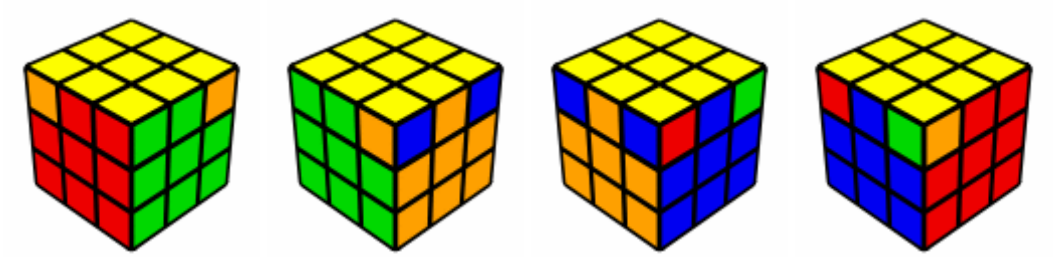


x (R2 D2) (R U R') D2 (R U' R)

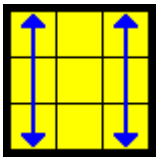
(**x** = R cube = rotate U face to B)

Comment: This is just the inverse of the other A perm. It is performed in a very similar manner. Put **headlights** on the left and tilt cube forward.

How to recognise: Look for the corner block. With the corner block at the front-left, the rightmost sticker will be not opposite the other two in the front. Instead, the opposite stickers are on the left face. I.e. **headlights on the right**.



E Perm



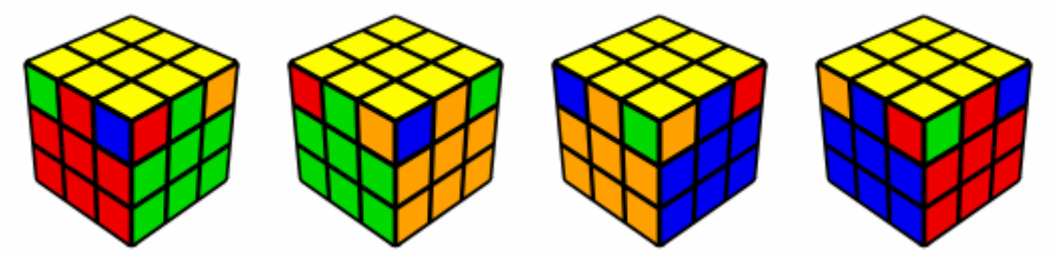
x' (R U' R' D) (R U R' D') (R U R' D) (R U' R' D')

y R2 U R' U' y (R U R' U') (R U R' U') (R U R') y' (R U' R2')

(**x’** = R' cube = rotate U face to F)

(**y** = U cube = rotate F face to L)

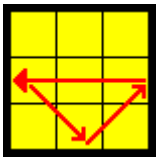
How to recognise: Other than the cases with all corners solved, this is the only case in which there are no blocks. Therefore, it is pretty easy to recognize.



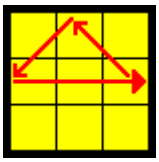
Edges Only

In each of these cases, all of the corners are solved.

Ua Perm (U’)

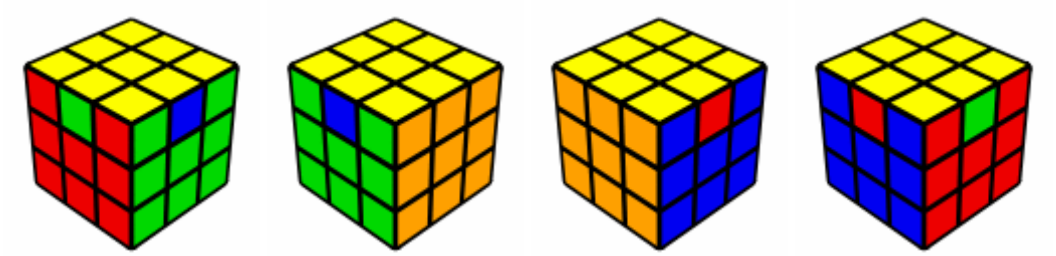


M2 U M U2 M’ U M2
(R U' R U) (R U) (R U') (R' U' R2)

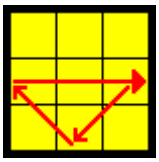


R2 (U' R' U') (R U R U) (R U' R)

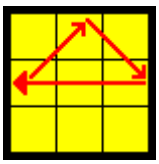
How to recognise: When the solved face is in the back, the opposite colors are on the right side. When the solved face is in the front, the opposite colors are on the left side.



Ub Perm (U)

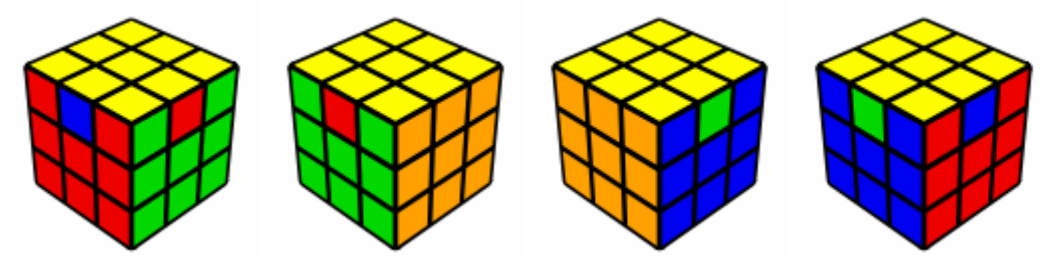


M2 U’ M U2 M’ U’ M2
(R2 U) (R U R' U') (R' U') (*R' U R'*)

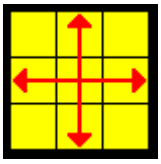


(*R' U R'*) (U' R' U' R') (U R U) R2

How to recognise: When the solved face is in the back, the opposite colors are on the left side. When the solved face is in the front, the opposite colors are on the right side.



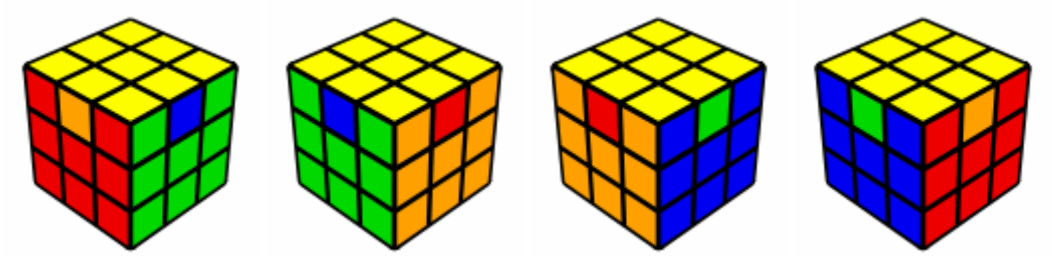
H Perm



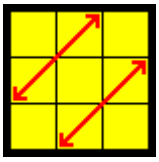
(M2 U M2) U2 (M2 U M2)
(M2 U’ M2) U2 (M2 U’ M2)

Comment: The M2 is performed by rapid pushing at the back face of the M layer with the ring and then middle fingers.

How to recognise: All of the corners are solved and there are no solved faces, and the edges that need to be swapped are opposite colors.



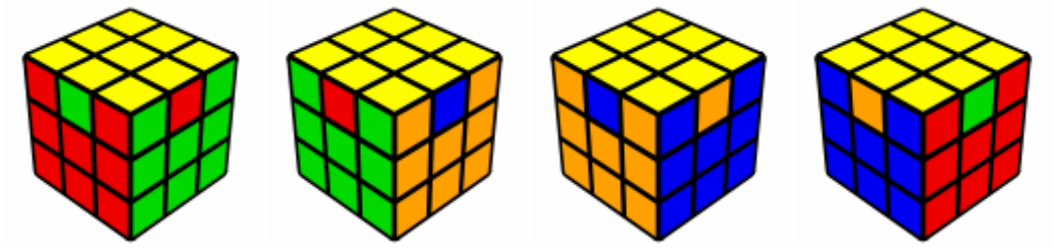
Z Perm



R' U' R2 U (R U R' U') R U R U' R U' R' U2
(M2 U) (M2 U) (M' U2) (M2 U2) (M' U2)
(M2 U) (M2 U) (M U2) (M2 U2) (M U2)

Single directions can be inverted:
y (M2 U') (M2 U') (M' U2) (M2 U2) (M' U2)
(**y** = U cube = rotate face F to L)
Comment: U2 can also be performed at the beginning.

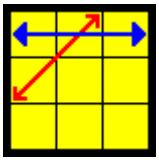
How to recognise: All of the corners are solved and there are no solved faces, but the edges that need to be swapped are not opposite colors.



Swapping Two Adjacent Corners & Two Edges

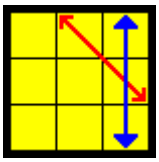
In these cases, you could have a solved block of 2, 3, or 4 pieces.

Ja Perm (block:R)



(R' U L') U2 (R U' R') U2 (L R U')

Comment: *I perform the R of the [R L] a split second after I start the L so that I can immediately perform the U' to AUF when the L face has been moved to where it belongs.*

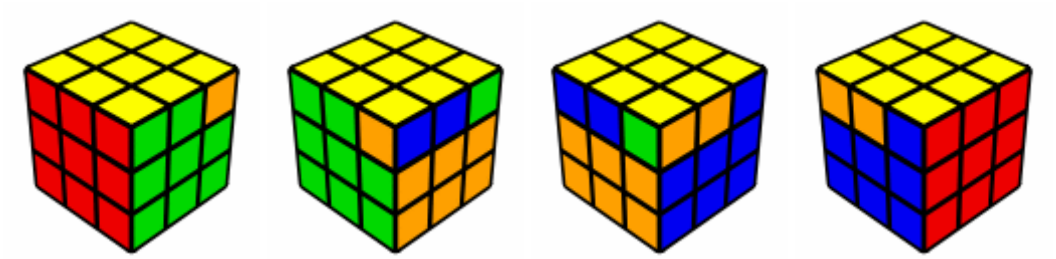


x R2 F R F' R U2 **r'** U **r** U2
(F U' R') (F R2 U' R' U' R U R' F') (R U R' F')
(**r** = rotate right 2 layers F to U)
(**x** = R cube = rotate U face to B)

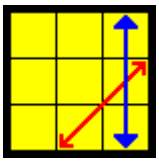
Sexy J Perm!

https://www.youtube.com/watch?v=7oUmz-gFU_w
R' U2 R U R' **z** R2' U R' D R U'
z (D' R2' D R D' R2' U R' D R U') (Same as above but rotated to start - note the similarity)
(**z** = F cube = rotate U face to R)

How to recognise: A face is completely solved and the solved portion wraps around to the **right side** of the cube.



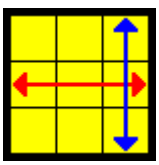
Jb Perm (block:L)



(R U R' F') (R U R' U') (R' F R2 U' R' U')
Similar to T Perm and Y Perm.

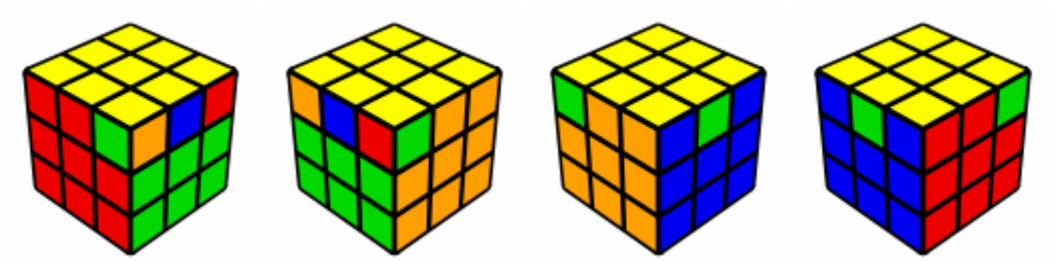
How to recognise: A face is completely solved and the solved portion wraps around to the **left side** of the cube.

T perm

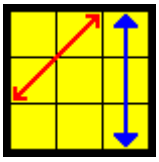


(R U R' U') (R' F R2 U' R' U') (R U R' F')
Comment: *It is long but definitely very fast and easy. It can be performed in almost one swift motion without any re-adjusting of the fingers. Note that it is a combination of two easy orientations.*
Similar to Jb Perm and Y Perm.

How to recognise: This is the only case with blocks on opposite sides. The edge sticker on the left face is opposite to the corners. I typically recognize this case by looking at any of those three sides.

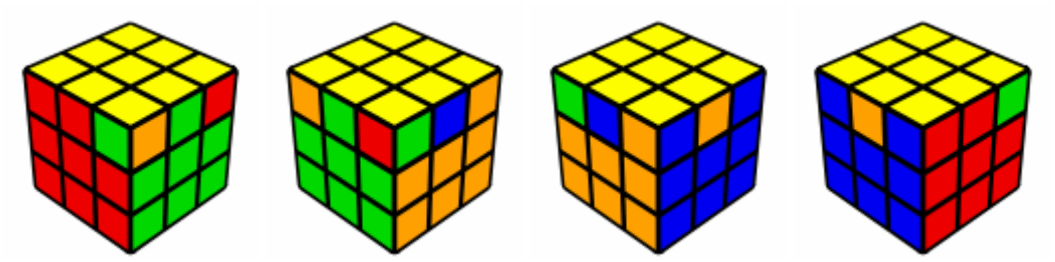


Ra Perm (block:L head:L orientHL:L)

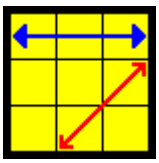


(R U R' F') (R U2 R' U2) (R' F) R U R U2 R' U'
Comment: Notice the similarity with the Jb permutation.
Comment: Orientate headlights **left**.

How to recognise: 2x2 block on the **left**, headlights to the **left**. There is a solved block and when you AUF, the corner opposite that block is also solved. If you look at the solved corners, the block is on the right.

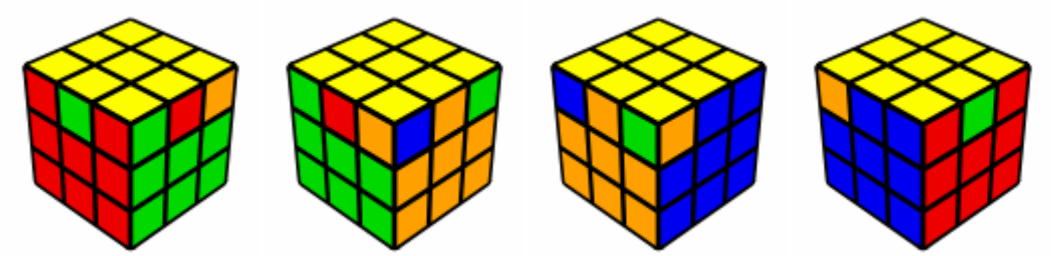


Rb Perm (block:R head:R orientHL:F)

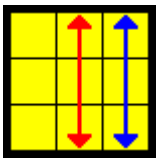


(R' U2 R U2) (R' F) (R U R' U') (R' F' R2 U')
Comment: Orientate headlights **front**.

How to recognise: 2x2 block on the **right**, headlights to the **right.** There is a solved block and when you AUF, the corner opposite that block is also solved. If you look at the solved corners, the block is on the left.



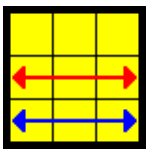
F Perm



R' U' F' (R U R' U') (R' F R2 U' R' U') R U R' U R

Comment: This is a T permutation with a 3 move setup in the beginning and a cancellation of one of those moves at the end.

Similar to Jb Perm and Y Perm.

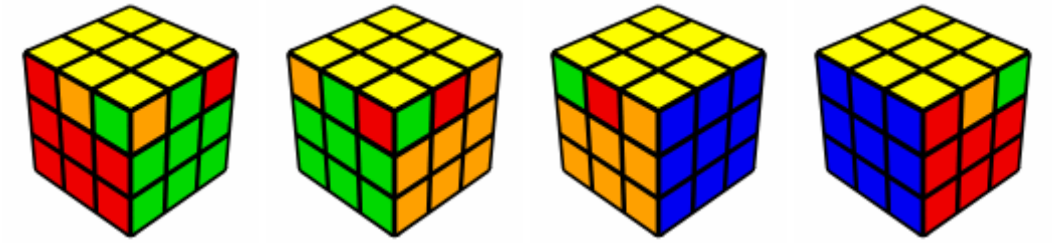


(R' U2 R' **d'**)(R' F') (R2 U' R' U)(R' F R U' F)

(**d'** = rotate lower 2 layers F to L)

Comment: Alternative - Badmephisto. See V perm - similar

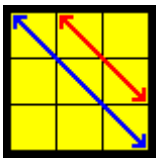
How to recognise: This case has a solved face but no other blocks



Permutations Of Two Diagonal Corners & Two Edges

In each of these cases, two diagonal corners need to swap.

V Perm

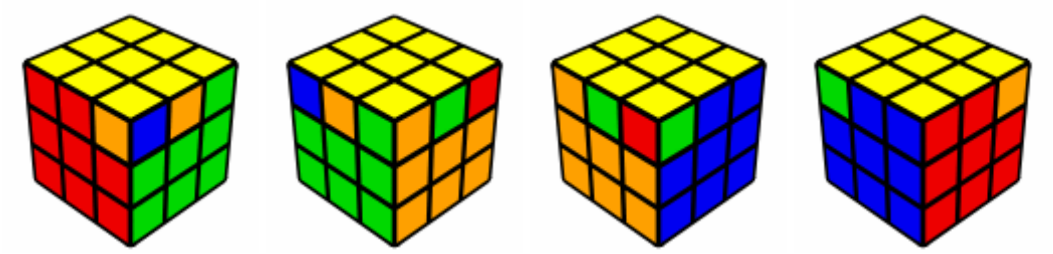


(R' U R' **d'**) (R' F') (R2 U' R' U) (R' F R F)

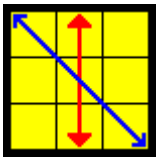
(**d'** = rotate lower 2 layers F to L)

Comment: Orientate 2x2 block **front left**. This is alternative F perm with some changes.

How to recognise: This looks like an A permutation except the stickers adjacent to the corner block are opposite colors on both faces instead of just one. I.e. **A Perm with no headlights**.



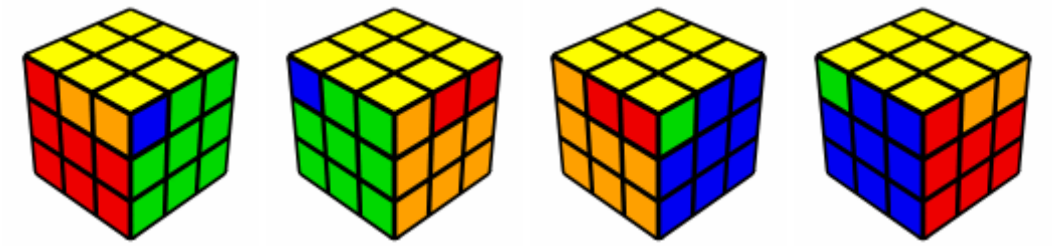
Na Perm (block:R)



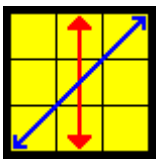
(**z**) D (R' U) (R2 D' R D U') (R' U) (R2 D' R U' R)
(**y'**) (R U R' U) (R U R' F') (R U R' U') R' F R2 U' R' U2 (R U' R')
(**z** = F cube = rotate U face to R)
(**y'** = U' cube = rotate face F to R)

Comment: The first alg can be mostly done similar to the Sexy J perm. This alg could also be performed using <R,U,L> if you don't do the rotation, but this way is faster with practice.

How to recognise: Every face looks the same. On each face, the two right stickers are the same color and the left sticker is opposite that color.

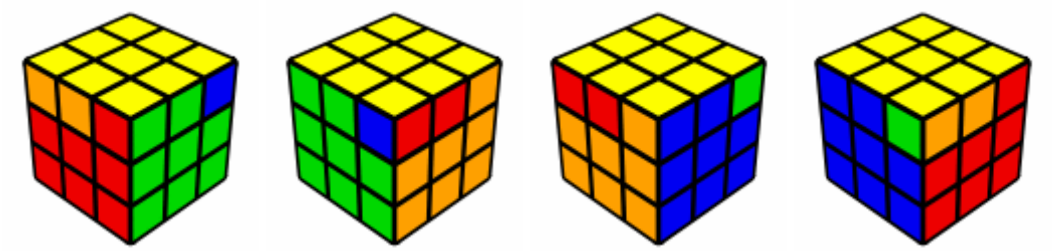


Nb Perm (block:L)

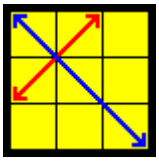


(**z**) U' (R D') (R2' U R' D U') (R D') (R2' U R' D R')
(**y'**) (R' U R U') R' (F' U' F) (R U R' F) R' F' (R U' R)
(**z** = F cube = rotate U face to R)
(**y'** = U' cube = rotate face F to R)
Comment: First is just the mirror of the other first Na permutation.

How to recognise: Every face looks the same. On each face, the two left stickers are the same color and the right sticker is opposite that color.



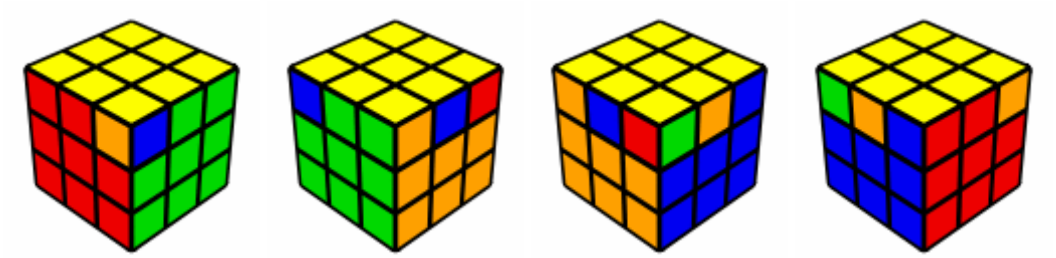
Y Perm



F (R U' R' U') (R U R' F') (R U R' U') (R' F R F')

Comment: Similar to Jb Perm and T Perm.

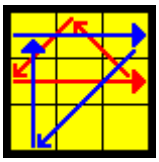
How to recognise: There are two blocks in this case and they are on adjacent faces. The corner that is adjacent to each of these blocks is opposite the color of these blocks.



Cycling Three Corners & Three Edges

Though these look the trickiest to recognize, they are actually quite simple. I first AUF to solve the 1x1x2 block. Then, I rotate the cube such that the two corners that share the same color on the same face are on the left side. Then, based on whether the block is at the back, front, far part of the right, or close part of the right, I know whether to apply Gc, Ga, Gb, or Gd, respectively.

Ga Perm (block:F orientHL:L)



(R2' **u**) (*R' U R'* U' R **u'**) R2' **y'** (R' U R)

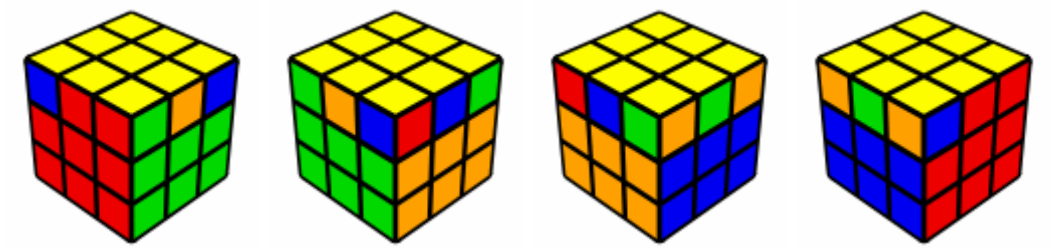
(R2' **u**) (*R' U R'* U' R **u'**) R2' (F' U F)

(**u** = rotate upper 2 layers F to L)

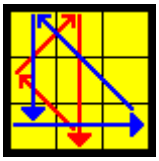
(**y'** = U' cube = rotate face F to R)

Comment: Orientate headlights **left**. Solved cube ⇒ Gb perm.

How to recognise: The two corners with the same color are on the left face but the block is on the front face. I.e. 2x2 block on the **front (right),** headlights on the **left**.



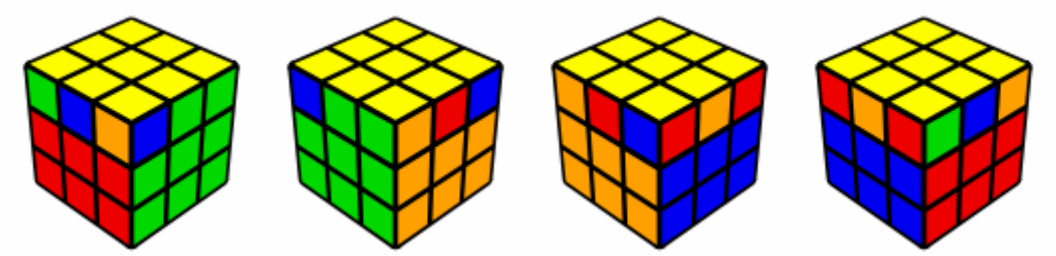
Gb Perm (block:R(B) orientHL:L)



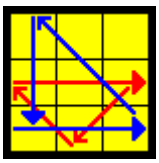
(R' U' R) **y** (R2' **u** R' U) (R U' R **u'** R2')

(**y** = U cube = rotate F face to L)
(**u** = rotate upper 2 layers F to L)
Comment: Orientate headlights **left**. Solved cube ⇒ Ga perm.

How to recognise: The two corners with the same color are on the left face but the block is on the back part of the right face. I.e. 2x2 block on the **right,** headlights on the **back**. Or block on the **right (back)**, headlights on the **left**.



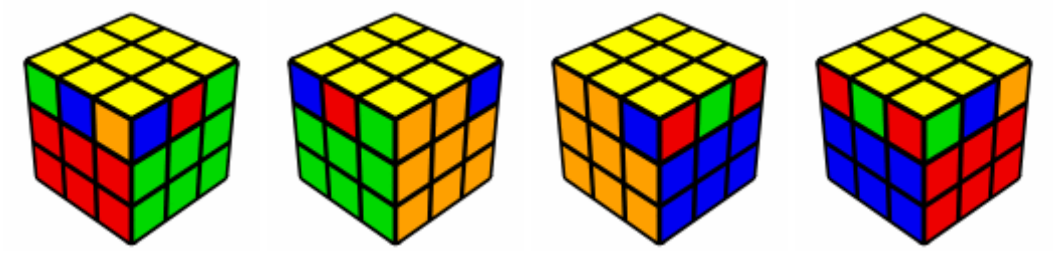
Gc Perm (block:B orientHL:L)



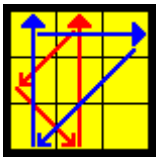
(R2 **u'** R U') (R U R' **u** R2) (**f** R' **f'**)
(R2 **u'** R U') (R U R' **u** R2) **y** (R U' R')

(**y** = U cube = rotate F face to L)
(**u** = rotate upper 2 layers F to L)
Comment: Orientate headlights **left**. Solved cube ⇒ Gd perm.

How to recognise: The two corners with the same color are on the left face but the block is on the back face. I.e. 2x2 block on the **left,** headlights on the **right**. Or block on the **back (right)**, headlights on the **left**.



Gd Perm (block:R(F) orientHL:L)



(R U R') **y'** (R2 **u'** R U') (*R' U R'* **u** R2)

(**y'** = U' cube = rotate face F to R)
(**u** = rotate upper 2 layers F to L)

Comment: This is the inverse of Gc. Orientate headlights **left**. Solved cube ⇒ Gc perm.

How to recognise: The two corners with the same color are on the left face but the block is on the front part of the right face. I.e. 2x2 block on the **left,** headlights on the **back**. Or block on the **right (front)**, headlights on the **left**.