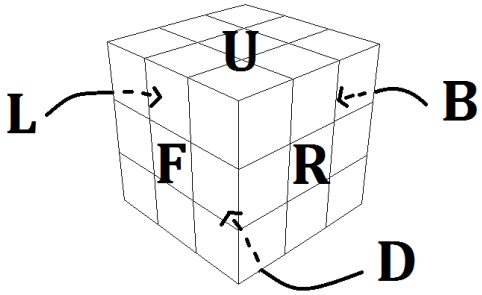
How to solve a Rubik's cube

0 Notation

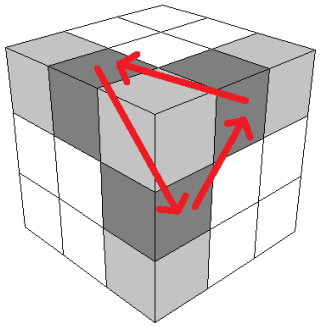
Use the following notation to describe moves



All moves are *clockwise* when looking at that face.

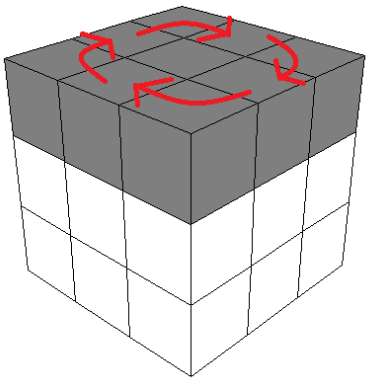
1 Solve edges

Position edges: Use edge 3-cycle to correctly position all edges.



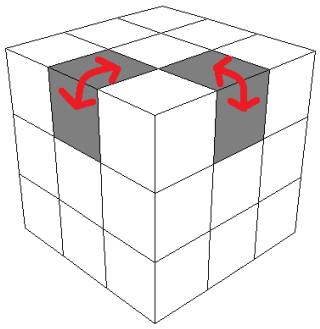
$$[F, R^{-1}] = FR^{-1}F^{-1}R$$

Fix edge parity: If you need to swap two edges, use a move which changes the parity. Then finish with 3-cycles.



$$U$$

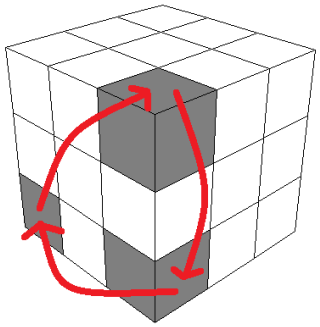
Orient edges: Flip edges one pair at a time until all edges are solved. This is just a combination of *two* different edge 3-cycles.



$$[F, R^{-1}][U^{-1}, R] = (FR^{-1}FR)(U^{-1}RUR^{-1})$$

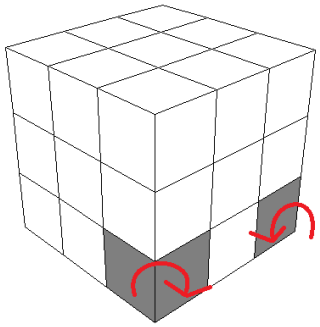
2 Solve corners

Position corners: Use corner 3-cycle to correctly position all corners



$$[[F, R^{-1}], D] = (FR^{-1}F^{-1}R)D \;\; (R^{-1}FRF^{-1})D^{-1}$$

Orient corners: Twist pairs of corners until all corners are solved. This is just a combination of *two* different corner 3-cycles.



$$\begin{aligned}&[[F, R^{-1}], D^{-1}][[R, D^{-1}], F] \\ &= ((FR^{-1}F^{-1}R)D^{-1} \;\; (R^{-1}FRF^{-1})D) \\ &\qquad ((RD^{-1}R^{-1}D)F \;\; (D^{-1}RDR^{-1})F^{-1})\end{aligned}$$