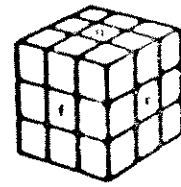


RUBIK MATH



Basic Concepts

Corner, edge pieces.

Up, Down, Left, Right, Front, Back layers.

Orientation and position of pieces.

Clockwise, Counter-clockwise moves.

180° moves.

Middle layer moves

Inverse

Notation

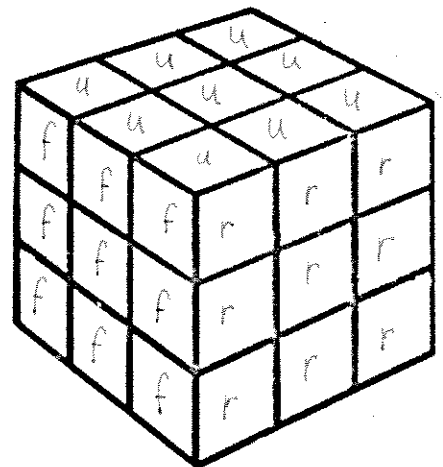
U, D, L, R, F, B

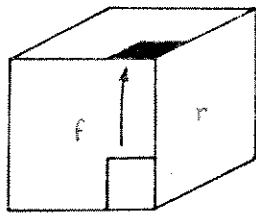
U', D', L', R', F', B'

U², D², L², R², F², B²

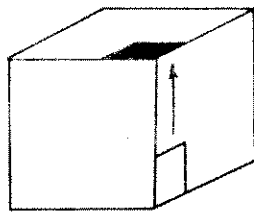
M_U, M_D, M_L, M_R, M_F, M_B

uF, dl, ulf, u, etc...

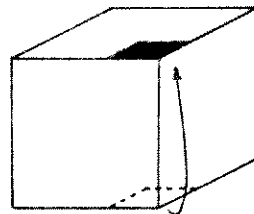




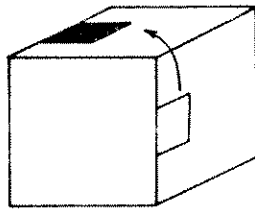
FDF'



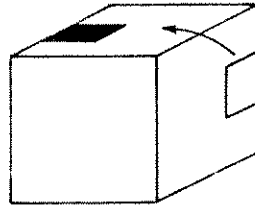
$R'D'R$



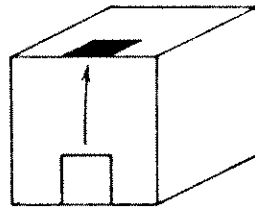
$R'B'D'BR$



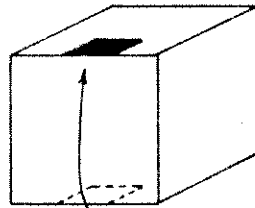
LM_0L



$L'M_0L$



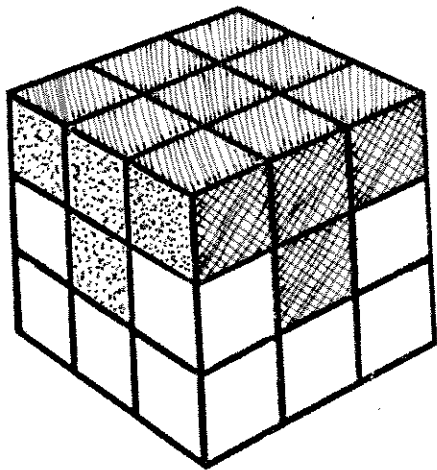
FM_0F'



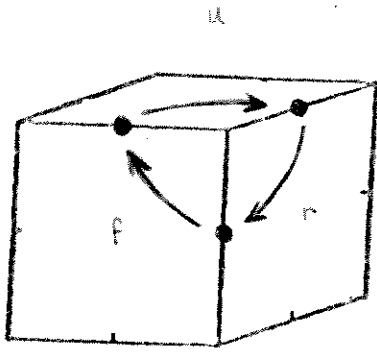
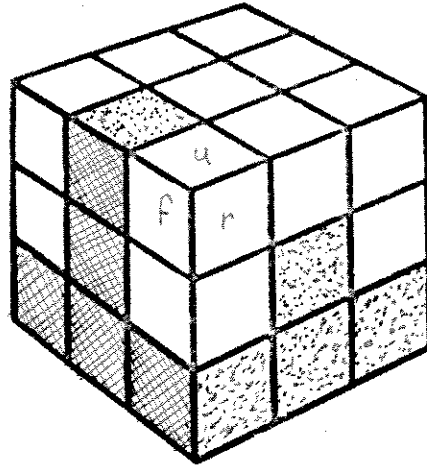
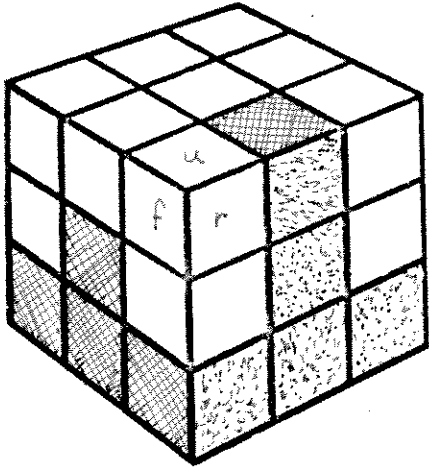
$M_0D'M_0$

Maneuvers for the construction of the first layer

u

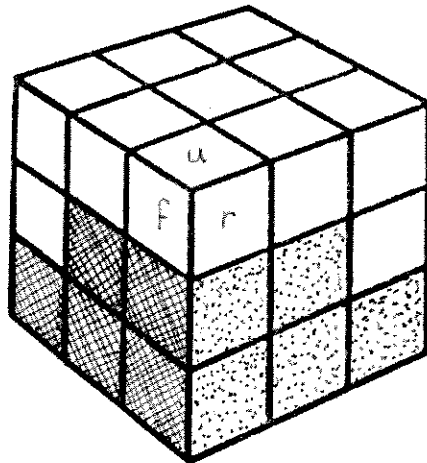


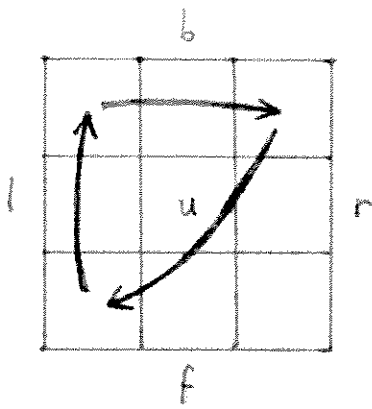
The first layer.



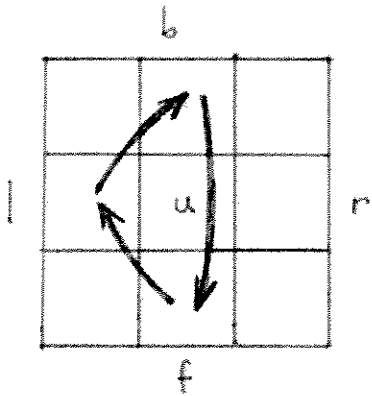
$(ULDR) F (R'D'L'U') F'$

The second layer.

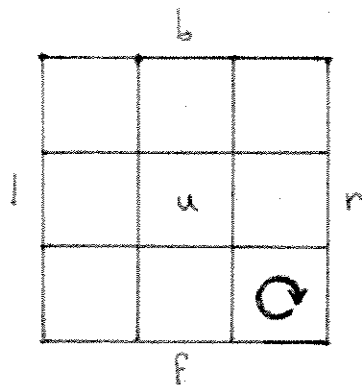




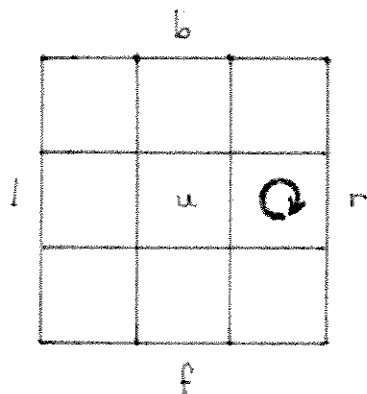
$$(L'U \cdot R \cdot U'L)(U \cdot R' \cdot U')$$



$$L^2 U M_F \cdot U^2 \cdot M'_F U L^2$$

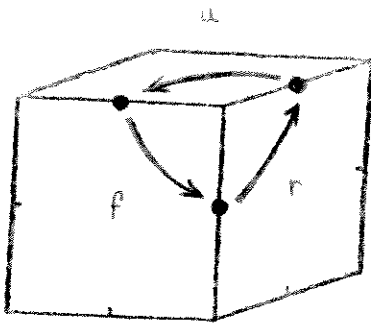


$$(RF'R'F)^2 \quad (\text{three times})$$



$$(M_b R)^4 \quad (\text{twice})$$

The third layer.

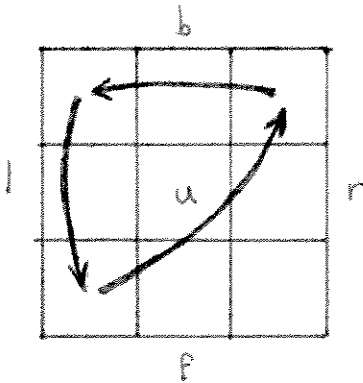


(Going counter-clockwise)

clockwise move, twice

or

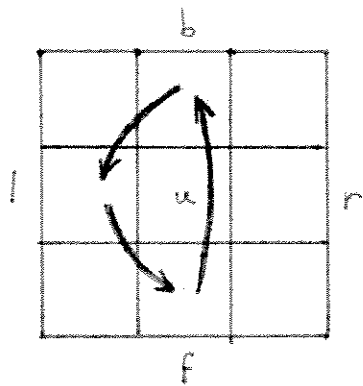
$$F(ULDR)F'(R'D'L'L')$$



clockwise move, twice

or

$$(U \cdot R \cdot U')(L'U \cdot R' \cdot U'L)$$

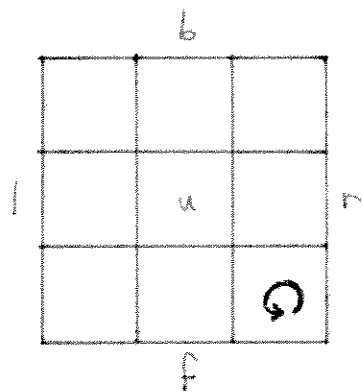


clockwise move, twice

or

$$L^2 U' M_F \cdot U^2 \cdot M'_F U' L^2$$

(Almost the same move . Just change every U to U')

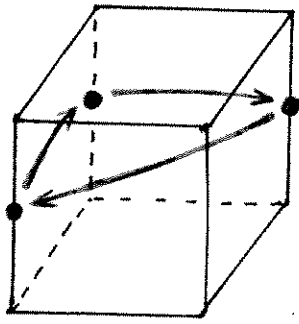


$$= (RF'R'F)^4 \quad (\text{with clockwise twist})$$

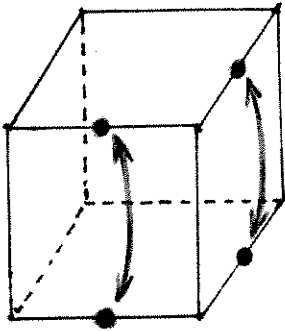
or

$$(F'RFR')^2 \quad (\text{with clockwise twist, or three times})$$

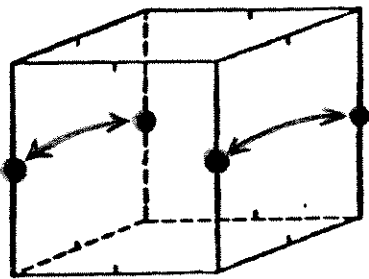
(Other moves).



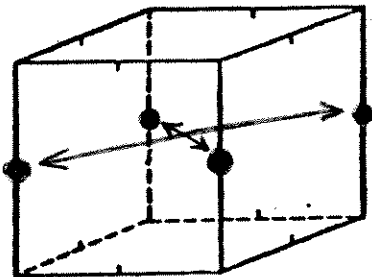
$$B^2 M_U B^2 M'_U$$



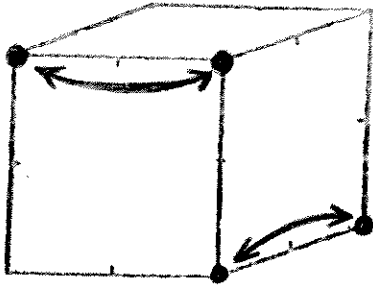
$$(R^2 F^2)^3$$



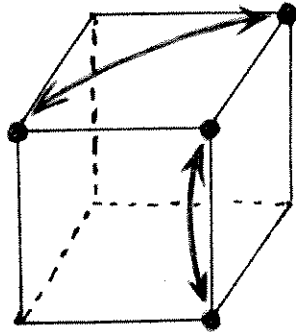
$$(R^2 M_D^2)^2$$



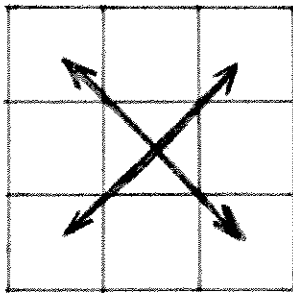
$$(M_R^2 M_D^2)^2$$



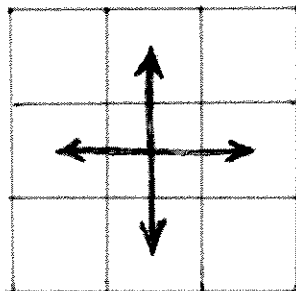
$$(FRF'R')^3$$



$$(FR'F'R)^3$$



$$(R^2F^2B^2L^2)D(R^2F^2B^2L^2)U$$



$$(R^2F^2B^2L^2)D(R^2F^2B^2L^2)U'$$

Rubik Math

$$M_R^2 M_F^2 M_D^2 \quad (\text{checkerboard})$$

$$M_R^2 M_U M_R^2 M_D \quad (4\text{-dots})$$

$$M_R M'_F M'_R M_F \quad (6\text{-dots})$$
