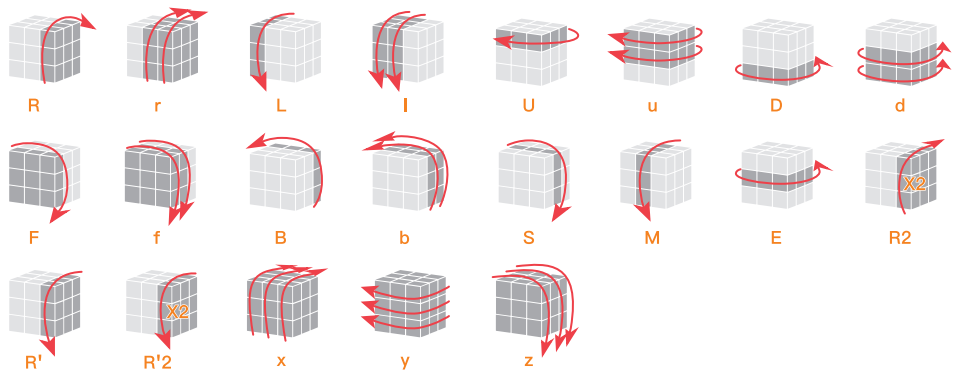




三阶魔方 CFOP 教程

3x3 CFOP TUTORIAL

魔方转动公式符号及示意图 Notation



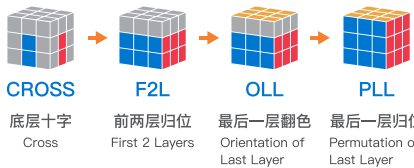
小写字母： 双层转
字母： 顺时针转 90°
字母 + '： 逆时针转 90°
字母 + 2： 转 180°

Lower-Case Letter： Turn 2 layers
Letter： Turn 90° clockwise
Letter + '： Turn 90° counterclockwise
Letter + 2： Turn 180°

蓝色字母： 用左食指拨动
红色字母： 用右拇指拨动
橙色字母： 用中指/无名指/尾指拨动

Blue Letter： By left index finger
Red Letter： By right thumb
Orange Letter： By middle finger/ring finger/little finger

CFOP 复原步骤 Steps



OLL 和 PLL 是俯视图

OLL： 蓝块和小蓝条表示黄色块

PLL： 小黑条表示特征 / 相同色块

OLL and PLL are vertical views.

OLL： The blue bars and squares represent the yellow pieces.

PLL： The black bars represent the same colored pieces.

温馨提示 Tips

*CROSS 复原方法较多，本教程主要介绍后面 3 步的复原公式。
There are many ways to solve CROSS, this tutorial introduces the next three steps of CFOP.

F2L 前两层归位

First 2 Layers

01 (R U' R' U) y' (R' U2 R U' U') (R' U R)	10 y' (R' U R U') (R' U R)	19 (R U' R' U2) (R U R') 或OR y F R U2 R' F'	28 (I U) (r U' r' U') I'	37 (R U' R' U2) y' (R' U' R)
02 (U R U' R' U') y' (R' U R)	11 (R U R' U') (R U R')	20 U (R U' U') (R' U R U' R')	29 U' (R U' U') (R' U2)(R U' R') 或OR y' r U2 R'2 U' R2 U' r'	38 (R U' R' U) (R U' R' U2) (R U' R')
03 (R' F' R U) (R U' R' F)	12 (R U R' U')2 (R U R')	21 (R U' U') (R' U' R U' R')	30 U' (R U' R' U') (R U' U' R')	39 U' (R U R' U) (R U R')
04 (R U R' U') (R U2 R' U') (R U R')	13 (R U' R' U) y' (R' U R) 或OR y' R' U R' F R F' R	22 U' (R U' R' U2) (R U' R')	31 U R U' R'	40 (R U R')
05 (R F) U (R U' R' F')(U' R') 或OR (R U' R' U') (R U' R' U) y' R' U' R	14 y' (R' U2) (R U R' U' R)	23 U' (R U R') y' (U R' U' R)	32 U' (R U' U' R' U) (R U R')	41 U' (R U' R' U) (R U R')
06 y' (R' U' R U) (R' U' R)	15 y' U' (R' U2) (R U' R' U R)	24 y' U (R' U R U') (R' U' R)	33 y' U (R' U' R) d' (R U R') 或OR U (F' U' F) U' (R U R')	
07 (R U' R' U) (R U' R')	16 y' (R' U R U' U') (R' U' R) 或OR F' L' U2 L F	25 y' (R' U' R)	34 y' U' (R' U R)	
08 (R U' R' U) (R U' U' R' U) (R U' R')	17 F U (R U' R' F') (R U' R')	26 y' U (R' U' R U') (R' U' R)	35 y' U (R' U' R U' U') (R' U R)	
09 (R U) F (R U R' U') F' R'	18 U (R U' R' U') (R U' R' U) (R U' R')	27 y' (R U' U') (R2 U' U') (R2 U' R')	36 y' U (R' U2 R U' U') (R' U R)	

OLL 最后一层翻色

Orientation of Last Layer

01 (R U' U') (R'2 F R F') U2 (R' F R F')	10 (R U R' U) (R'2 F R F') (R U' U' R')	19 (r' R U) (R U R' U' r) (R'2 F R F')	28 (r U R' U') (R U R' U') (R U' R')	37 F (R U' R' U') (R U R' F')	46 (R' U') (R' F R F') (U R)	55 (r U' U' R' U') (r' R2 U R' U') (r U' r')
02 F (R U R' U') F' f (R U R' U') f'	11 (r' R2 U R' U) (R U' R' R' U) M'	20 (r U R' U') M'2 U (R U' R' U') M'	29 (R U R' U') (R U' R' F' U' F) (R U R')	38 (R U R' U) (R U' R' U') (R' F R F')	47 b' (U' R' U R)2 b (U' R' U) F' (L' U' L U)2 F	56 (r U r') (U R U' R')2 (r U' r') 或OR (f R U R' U' F') (R U R' U') (R' F R F')
03 f (R U R' U') f' U' F (R U R' U') F'	12 M' (R' U' R U') (R' U2 R U') M	21 (R U' U') (R' U' R U' R' U') (R U' R')	30 f (R U) (R2 U' R' U) (R2 U' R') f'	39 (R U R' F' U' F) U (R U2 R')	48 F (R U R' U')2 F'	57 (R U R' U') M' (U R U' r')
04 f (R U R' U') f' U F (R U R' U') F'	13 f (R U) (R2 U') (R' U R U') f'	22 (R U' U') (R'2 U') (R2 U') (R'2 U') (U' R)	31 R' F R U R' U' F2 U F R	40 (R' F) (R U R' U') F' (U R)	49 (R B') (R'2 F R2 B) (R'2 F' R)	
05 (r' U2) (R U R' U) r 或OR y2 I' U2 L U L' U I	14 (R' F) (R U R' F' R) (F U' F')	23 (R'2 D') (R U' U' R' D) (R U' U' R)	32 (R U) (B' U') (R' U R B R') 或OR S (R U R' U') (R' F R f)	41 (R U R' U) (R U' U' R') F (R U R' U') F'	50 (r' U) (r2 U' r'2 U') (r2 U r')	
06 (r U' U') (R' U' R U' r') 或OR y2 I U2 L' U' L U' I'	15 (r' U' r) (R' U' R U) (r' U r)	24 (r U R' U') (r' F R F')	33 (R U R' U') (R' F R F')	42 (R' U' R U') (R' U2 R) F (R U R' U') F'	51 f (R U R' U')2 f'	
07 (r U R' U) (R U' U' r') 或OR y2 I U L' U L U2 I'	16 (r U r') (R U R' U') (r U' r')	25 F' (r U R' U') (r' F R)	34 (R U R2 U') (R' F) (R U R U' F')	43 (B' U') (R' U R B) 或OR f' (L' U' L U) f	52 (R' F' U' F U') (R U R' U R)	
08 (r' U' R U') (R' U2 r) 或OR y2 I' U' L U' L' U2 I	17 (R U R' U) (R' F R F') U2 (R' F R F')	26 (R U' U') (R' U' R U' R') 或OR y' R' U' R U' R' U2 R	35 (R U' U') (R'2 F R F') (R U' U' R')	44 f (R U R' U') f'	53 (r' U2) (R U R' U') (R U R' U r)	
09 (R U R' U') (R' F) (R2 U R' U') F'	18 (r U R' U) (R U' U' R') (r' U' R U') (R' U2 r)	27 (R U R' U) (R U' U' R') 或OR y' R' U2 R U R' U R	36 (R' U' R U') (R' U R U) (I U' R' U)	45 F (R U R' U') F'	54 (r U' U') (R' U' R U) (R' U' R U' r')	

PLL 最后一层归位

Permutation of Last Layer

01 Ua M'2 U M U2 M' U M'2 或OR (R U' R)(U R)2 (U' R' U' R'2)	10 V R' U R U' R' f' (U' R U'2 R') (U' R U' R') f R	19 Gb (R' d' F) (R2 u) (R' U) (R' U' R u' R'2)
02 Ub M'2 U' M U2 M' U' M'2 或OR (R2 U)(R U) (R' U)2 (R' U R')	11 Y F (R U' R' U') (R U R' F') (R U R' U') (R' F R F')	20 Nb (R' U R U') (R' F' U') (F R U R' F) (R' F' R U' R)
03 H M'2 U M'2 U2 M'2 U M'2	12 Ja z (U' R D') (R2 U R' U') (R2 U) (D R')	21 Na (R U R' U) (R U R' F') (R U R' U') (R' F) (R2 U' R' U2) (R U' R')
04 Z M' U (M'2 U)2 M' U2 M'2 U'	13 Jb (R U R' F') (R U R' U') (R' F) (R2 U' R' U')	
05 Aa x' R2 D2 (R' U' R) D2 (R' U R')	14 Rb (R' U2) (R U' U') (R' F R U R' U') (R' F' R2 U')	
06 Ab x' (R U' R) D2 (R' U R) D2 R'2	15 Ra (R U' R' U') (R U R D) (R' U' R D') (R' U2 R' U')	
07 E x' (R U' R' D) (R U R' D') (R U R' D) (R U R' D)	16 Gc (R'2 U' R U' R) (U R' u) (R2 f R' f')	
08 T (R U R' U') (R' F) (R2 U' R' U') (R U R' F')	17 Gd (R U R' U') y' (R2 u' R U') (R' U R' u R2)	
09 F (R' U' F') (R U R' U') (R' F) (R2 U' R' U') (R U R' U R)	18 Ga R2 U R' U R' U' R U' R2 (U' D) R' U R (D' U)	

魔方日常护理

1、日常使用时，需要定时给魔方添加养护油，以便长期养护，减少磨损；当魔方手感干涩时，需要给魔方添加润滑油；当魔方过滑时，可给魔方添加稳速油。

2、给魔方上油时，应向接触面或卡脚处滴入1-2滴(油太多会导致魔方变粘)，然后转动魔方数次，使油均匀粘附在魔方内部。

3、切勿使用魔方油以外的润滑油，否则可能会导致魔方手感变差。

Maintenance

1. In daily usage, it is necessary to regularly add GAN lube NO.1 to the cube for long-term maintenance and reducing wear. Please lubricate the cube with GAN lube NO.2 before it becomes dry and when the cube is too slippery, please add GAN lube NO.3 to the cube.

2. When lubricating the cube, please start with only 1-2 drops to the contact surface or corner feet (Too much lube will make the cube too sticky.), and then turn the cube several times until the lube is evenly distributed.

3. Do not use lubricating lube other than cube lube, otherwise it may lead to the poor hand feeling of the cube.

