

badmephisto's Speedcubing Guide

Arranged by Andy Klise of kungfoomanchu.com

First 2 Layers

You must solve the cross first. It can be done in 6 moves or less ~82% of the time and ≤7 moves 99.95% of the time. These are just optimal example solves; F2L should be solved *intuitively*.

Easy Cases (1-4)



U (R U' R')
Use (R' F R F') if no U face edges are oriented properly on final slot

y' U' (R' U R)
Use (F R' F' R) if no U face edges are oriented properly on final slot



y' (R' U' R)
Note – this image is blue and red because a cube rotation is required

(R U R')
Note – this image is green and red because no cube rotation is required

Reposition Edge (5-8)



(U' R U R') U² (R U' R')

d (R' U' R) U² (R' U R)
y' (U R' U' R) U² (R' U R)



U' (R U² R') U² (R U' R')

d (R' U² R) U² (R' U R)
y' U (R' U² R) U² (R' U R)

Reposition Edge and Flip Corner (9-14)



d (R' U' R U') (R' U' R)
y² U' (L U') d' (L' U' L)

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



U' (R U² R') d (R' U' R)

d (R' U² R) d' (R U R')



d (R' U R U') (R' U' R)
y' U (R' U R U') (R' U' R)

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

Split Pair by Going Over (15-18)



y' (R' U R U') d' (R U R')
y (L' U L) U² y (R U R')

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



(R U² R') U' (R U R')

y' (R' U² R) U (R' U' R)

Pair Made on Side (19-22)



U (R U² R') U (R U' R')

y' U' (R' U² R) U' (R' U R)



U² (R U R' U) (R U' R')

y' U² (R' U' R U') (R' U R)

Weird (23-24)



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

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



Corner in Place, Edge in U Face (25-30)



d' (L' U L) d (R U' R')
y U' (L' U' L) U (F U F')
U' (F' U F) U (R U' R')

U (R U' R') d' (L' U L)
U (R U' R') U' (F' U F)



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

y' (R' U R U') (R' U R)
(R U' R') U² (F' U F)



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

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



Edge in Place, Corner in U face (31-36)



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

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



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

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



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

d (R' U' R) d' (R U R')
y U² (L' U L) U (F U F')



Edge and Corner in Place (37-42)



Solved Pair

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



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

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

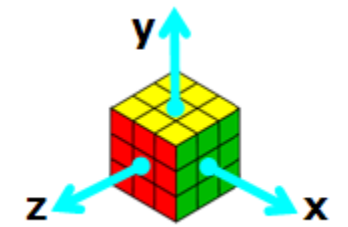


(R U' R') d (R' U' R U') (R' U' R)
y (L' U' L U) (L' U L) U² (F U F')

(R U' R') d² y (R' U' R U') (R' U R)
(R U R' U') (R U' R') U² (F' U' F)



Color Coding
Red = R U R' U' Family
Green = R U R' U Family
Blue = R F' R' F Family



Credits

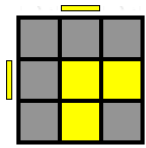
badmephisto - <http://www.badmephisto.com>
Andy Klise - <http://www.kungfoomanchu.com>
Josef Jelinek - <http://software.rubikscube.info/icube/>
And everyone else

For great speedsolving video tutorials, visit -
<http://www.youtube.com/user/badmephisto>

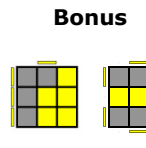
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<http://www.kungfoomanchu.com/>

Orient Last Layer (Two Look)

Step 1

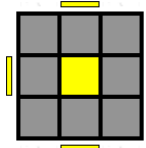
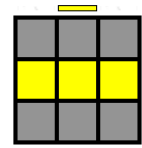


$f (R U R' U') f'$
Probability = 1/2

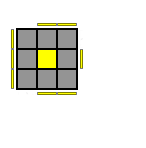


Bonus

$F (R U R' U') F'$
Probability = 1/4



$[F (R U R' U') F'] [f (R U R' U') f']$
Probability = 1/8

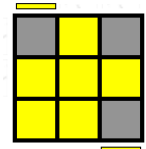


Move to Second Look
Probability = 1/8

Orient Last Layer (Two Look)

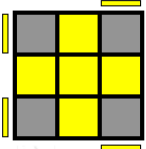
Step 2

All Edges Oriented Correctly



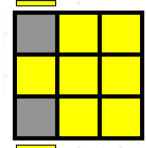
$(R U R' U) R U^2 R'$
Probability = 4/27

$R U^2 R' U' R U' R'$
Probability = 4/27



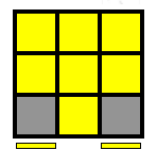
$[f (R U R' U') f'] [F (R U R' U') F']$
 $R U^2 R' U' R' U' R' U' R' U^2 R$
Probability = 4/27

$F (R U R' U') (R U R' U') (R U R' U') F'$
 $y (R' U' R) U' (R' U R) U' (R' U^2 R)$
Probability = 2/27



$(r U R' U') (r' F R F')$
Probability = 4/27

$F' (r U R' U') (r' F R)$
Probability = 4/27



$R^2 [D (R' U^2) R] [D' (R' U^2) R']$
Probability = 4/27

Solved
Probability = 1/27

Notation



R



R'



R²



r/Rw



r'/Rw'



x



y



U



U'



U²



u/Uw



u'/Uw'



z



M



F



F'



L



L'



B



B'



D



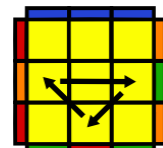
D'

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<http://www.youtube.com/user/badmephisto>

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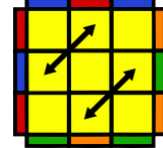
Permute Last Layer

Permutations of Edges or Corners Only



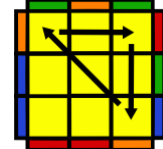
$R^2 U (R U R' U') (R' U') (R' U R')$
Ub - Probability = 1/18

$(R U') (R U) (R U) (R U) R' U' R^2$
Ua - Probability = 1/18



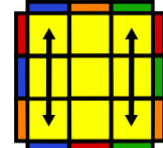
$M^2 U M^2 U M' U^2 M^2 U^2 M' U^2$
 $U^2 (R U R' U) (R' U' R' U) (R' U' R' U) R^2 U R$
Z - Probability = 1/36

$M^2 U M^2 U^2 M^2 U M^2$
H - Probability = 1/72



$x [(R' U R') D^2] [(R' U R') D^2] R^2$
Aa - Probability = 1/18

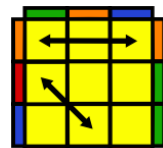
$x' [(R U' R) D^2] [(R' U R) D^2] R^2$
Ab - Probability = 1/18



$x' [(R U' R') D (R U R')] D' [(R U R') D (R U' R')] D'$
 $x' [(R U' R') D (R U R')] u^2 [(R' U R) D (R' U' R)]$
E - Probability = 1/36

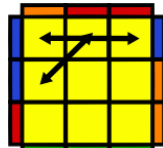
Solved
Probability = 1/72

Swap One Set of Adjacent Corners



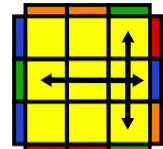
$(L U^2 L' U^2) (L F') (L' U' L U) (L F) L^2 U$
Ra - Probability = 1/18

$(R' U^2 R U^2) (R' F) (R U R' U') (R' F') R^2 U'$
Rb - Probability = 1/18



$(R' U L') (U^2 R U' R' U^2) (R L U')$
Ja - Probability = 1/18

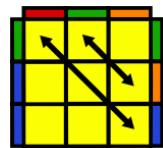
$(R U R' F') [(R U R' U') (R' F) (R^2 U' R') U']$
Jb - Probability = 1/18



$(R U R' U') (R' F) (R^2 U' R') U' (R U R' F')$
T - Probability = 1/18

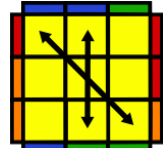
$(R' U^2 R' d') (R' F') (R^2 U' R' U) (R' F R U' F)$
F - Probability = 1/18

Swap One Set of Corners Diagonally



$(R' U R' d') (R' F') (R^2 U' R' U) (R' F R F')$
V - Probability = 1/18

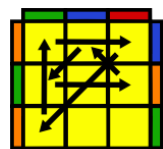
$F R U' R' U' (R U R' F') [(R U R' U') (R' F R F')]$
Y - Probability = 1/18



$[(L U' R) U^2 (L' U R')] [(L U' R) U^2 (L' U R')] U$
 $y (R U' R' U) (I U) (F U' R' F') (R U' R U) (I' U R')$
Na - Probability = 1/72

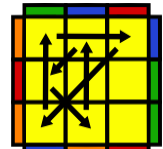
$[(R' U L') U^2 (R U' L)] [(R' U L') U^2 (R U' L)] U'$
Nb - Probability = 1/72

Double Spins



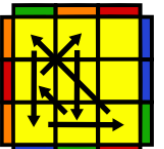
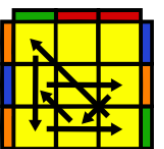
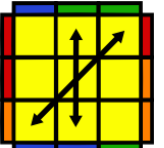
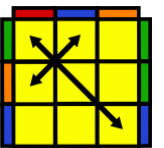
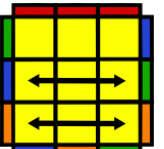
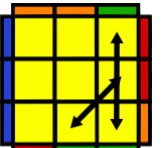
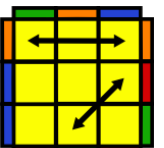
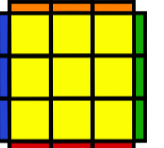
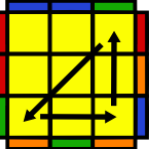
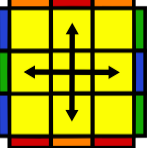
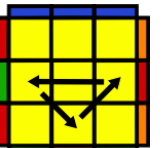
$R^2 u' R U' R' U' R u' R^2 (y' R U' R)$
Ga - Probability = 1/18

$R^2 u' R U' R U' R' u' R^2 (y R U' R')$
Gc - Probability = 1/18



$(R U R') y' R^2 u' R U' R' U' R u' R^2$
Gd - Probability = 1/18

$(R' U' R) y R^2 u' R U' R U' R' u' R^2$
Gb - Probability = 1/18



Orient Last Layer

Red = R U R' U' Family, Green = R U R' U Family, Blue = R F' R' F Family
 Try to recognize each pattern by viewing the fewest number of faces

All Edges Oriented Correctly (OCLL1-OCLL8)

$R U^2 R' U' R U' R'$
 OCLL6 - 26 - Probability = 1/54

$(R U R' U) R U^2 R'$
 OCLL7 - 27 - Probability = 1/54

$F (R U R' U') (R U R' U') (R U R' U') F'$
 $y (R' U' R) U' (R' U R) U' (R' U^2 R)$
 OCLL1 - 21 - Probability = 1/108

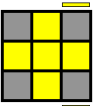
$[f (R U R' U') f'] [F (R U R' U') F']$
 $R U^2 R^2 U' R^2 U' R^2 U^2 R$
 OCLL2 - 22 - Probability = 1/54

$(r U R' U') (r' F R F')$
 OCLL4 - 24 - Probability = 1/54

$F' (r U R' U') (r' F R)$
 OCLL5 - 25 - Probability = 1/54

$R^2 [D (R' U^2) R] [D' (R' U^2) R']$
 OCLL3 - 23 - Probability = 1/54

Solved
 OCLL8 - 58 - Probability = 1/216



Corners Correct, Edges Flipped (E1-E2)

$M' U M U^2 M' U M$
 E1 - 28 - Probability = 1/54

$(R U R' U') M' (U R U' r')$
 E2 - 57 - Probability = 1/108



P-Shapes (P1-P4)

$f (R U R' U') f'$
 P1 - 44 - Probability = 1/54

$f' (L' U' L U) f$
 P2 - 43 - Probability = 1/54



$R U B' U' R' U R B R'$
 $R d L' d' R' U R B R'$
 P3 - 32 - Probability = 1/54

$R' U' F U R U' R' F' R$
 $y^2 L' d' R d L U' L' B' L$
 P4 - 31 - Probability = 1/54



W-Shapes (W1-W2)

$(L' U' L U') (L' U L U) (L' F' L' F)$
 W1 - 36 - Probability = 1/54

$(R U R' U) (R U' R' U') (R' F R F')$
 W2 - 38 - Probability = 1/54



Squares (S1-S2)

$r' U^2 (R U R' U) r$
 S1 - 5 - Probability = 1/54

$r U^2 R' U' R U' r'$
 S2 - 6 - Probability = 1/54



L Shapes (L1-L6)

$F (R U R' U') (R U R' U') F'$
 L2 - 48 - Probability = 1/54

$F' (L' U' L U) (L' U' L U) F$
 L1 - 47 - Probability = 1/54



$(R' F R' F') R^2 U^2 y (R' F R F')$
 L3 - 49 - Probability = 1/54

$R' F R^2 B' R^2 F' R^2 B R'$
 L4 - 50 - Probability = 1/54



$I' U' L U' L' U L U' L' U^2 I$
 $y^2 r' U' R U' R' U R U' R' U^2 r$
 L5 - 53 - Probability = 1/54

$(r U R' U) R U' R' U R U^2 r'$
 L6 - 54 - Probability = 1/54



Fish Shapes (F1-F4)

$(R' U' R) y' x' (R U') (R' F) (R U R')$
 $(R U R' U') R' F R^2 U R' U' F'$
 F1 - 9 - Probability = 1/54

$R U R' y R' F R U' R' F' R$
 $(R U R' U) (R' F R F') R U^2 R'$
 F2 - 10 - Probability = 1/54



$(R U^2 R') (R' F R F') (R U^2 R')$
 F3 - 35 - Probability = 1/54

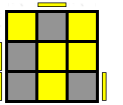
$F R U' R' U' R U R' F'$
 F4 - 37 - Probability = 1/54



Awkward Shapes (A1-A4)

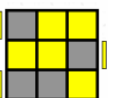
$(R U R' U') R U' R' F' U' F R U R'$
 $[F (R U R' U') F'] U^2 [(R U R' U') (R' F R F')]$
 A1 - 29 - Probability = 1/54

$R^2 U R' B' R U' R^2 U R B R'$
 A2 - 30 - Probability = 1/54



$[(R U R' U) R U^2 R'] [F (R U R' U') F']$
 A3 - 41 - Probability = 1/54

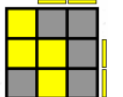
$[R' U^2 (R U R' U) R] y [F (R U R' U') F']$
 $(R' F R F') (R' F R F') (R U R' U') (R U R')$
 A4 - 42 - Probability = 1/54



Lightning Bolts (B1-B6)

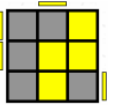
$(r U R' U) R U^2 r'$
 B1 - 7 - Probability = 1/54

$r' U' R U' R' U^2 r$
 B2 - 8 - Probability = 1/54



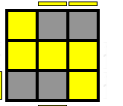
$[F' (L' U' L U) F] y [F (R U R' U') F']$
 $y (r U R' U) (R' F R F') R U^2 r'$
 B3 - 11 - Probability = 1/54

$[F (R U R' U') F'] U [F (R U R' U') F']$
 B4 - 12 - Probability = 1/54



$R B' R' U' R U B U' R'$
 $y^2 L F' (L' U' L U) F U' L'$
 B5 - 39 - Probability = 1/54

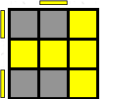
$R' [F (R U R' U') F'] U R$
 B6 - 40 - Probability = 1/54



T-Shapes (T1-T2)

$(R U R' U') (R' F R F')$
 T1 - 33 - Probability = 1/54

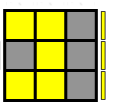
$F (R U R' U') F'$
 T2 - 45 - Probability = 1/54



C-Shapes (C1-C2)

$(R U R'^2 U') (R' F) (R U) (R U') F'$
 $(R U R' U') x D' R' U R U' D x'$
 C1 - 34 - Probability = 1/54

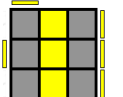
$R' U' (R' F R F') U R$
 C2 - 46 - Probability = 1/54



I Shapes (I1-I4)

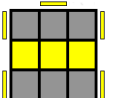
$f (R U R' U') (R U R' U') f'$
 I1 - 51 - Probability = 1/54

$(R U R' U) R d' R U' R' F'$
 $R' U' R U' R' d R' U R B$
 I2 - 52 - Probability = 1/54



$R' U^2 R^2 U R' U R U^2 x' U' R' U$
 I3 - 55 - Probability = 1/108

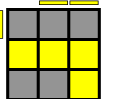
$F (R U R' U') R F' (r U R' U') r'$
 I4 - 56 - Probability = 1/108



Knight Move Shapes (K1-K4)

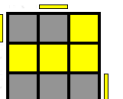
$F U R U' R^2 F' R (U R U' R')$
 K1 - 13 - Probability = 1/54

$R' F R U R' F' R y' R U' R'$
 K2 - 14 - Probability = 1/54



$(I' U' I) (L' U' L U) (I' U I)$
 K3 - 15 - Probability = 1/54

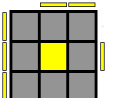
$(r U r') (R U R' U') (r U' r')$
 K4 - 16 - Probability = 1/54



No Edges Flipped Correctly (O1-O8)

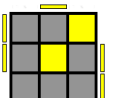
$R U^2 R' (R' F R F') U^2 (R' F R F')$
 O1 - 1 - Probability = 1/108

$[F (R U R' U') F'] [f (R U R' U') f']$
 O2 - 2 - Probability = 1/54



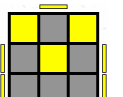
$[f (R U R' U') f'] U' [F (R U R' U') F']$
 O3 - 3 - Probability = 1/54

$[f (R U R' U') f'] U [F (R U R' U') F']$
 O4 - 4 - Probability = 1/54



$[F (R U R' U) F'] y' U^2 (R' F R F')$
 O6 - 18 - Probability = 1/54

$M U (R U R' U') M' (R' F R F')$
 O7 - 19 - Probability = 1/54



$(R U R' U) (R' F R F') U^2 (R' F R F')$
 O5 - 17 - Probability = 1/54

$M U (R U R' U') M^2 (U R U' r')$
 O8 - 20 - Probability = 1/216

