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'**) U^2 (R U' R')

d (R' U' **R**) U$^{2\prime}$ (R' U R)
y' (U R' U' **R**) U^2 (R' U R)

U' (R U$^{2\prime}$ **R'**) U^2 (R U' R')

d (R' U^2 **R**) U$^{2\prime}$ (R' U R)
y' U (R' U^2 **R**) U^2 (R' U R)

Reposition Edge and Flip Corner (9-14)

d (R' U' R U')(**R'** U' R)
y^2 U' (L U') d' (**L'** U' L)

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

U' (R U$^{2\prime}$ R') d (**R'** U' R)

d (R' U^2 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) U^2 y (**R** U R')

(R U' R' U) d (**R'** U' R)
(R U' R') U^2 (**F'** U' F)

(R U^2 R') U' (**R** U R')

y' (R' U^2 R) U (**R'** U' R)

Pair Made on Side (19-22)

U (R **U^2** R') U (R U' R')

y' U' (R' **U^2** R) U' (R' U R)

U^2 (R **U** R' U)(R U' R')

y' U^2 (R' **U'** R U')(R' U R)

Weird (23-24)

(R U R' U') U' (R U R' U')(**R** U R')
U^2 R^2 U^2 (R' U' R **U'**) R^2

y' (R' U' R U) U (R' U' R U)(**R'** U' R)
y' U^2 R^2 U^2 (R U R' **U**) R^2

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') U^2 (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'**) U^2 (R U' R')
y U' (L U' **L'**) U^2 (L U' L)

U' (R U$^{2\prime}$ R') U (**R** U R')
U (R U R') U^2 (**R** U R')
d (R' U **R**) U^2 (R' U R)

(U' R U R') d (**R'** U' R)
U^2 (R U' R') U' (**F'** U' F)

d (R' U' R) d' (**R** U R')
y U^2 (L' U L) U (**F** U F')

Edge and Corner in Place (37-42)

Solved Pair

(R U' R') d (R' U^2 **R**) U$^{2\prime}$ (R' U R)
(R U R') U^2 (R U^2 R') d (**R'** U' R)

(R U' R') U' (R U **R'**) U^2 (R U' R')
y (L' U' L) U^2 (L' U L U')(**L'** U' L)

(R U' R' U)(R **U$^{2\prime}$** R') U (R U' R')
(R U R') U^2 (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) U^2 (**F** U F')

(R U' R') d^2 y (R' **U'** R U')(R' U R)
(R U R' U')(R U' R') U^2 (**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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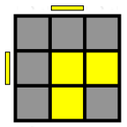
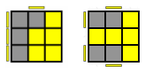
Orient Last Layer (Two Look)
Step 1



f (R U R' U') f'

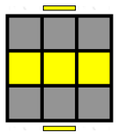
Probability = ½

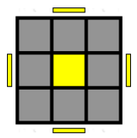
Bonus



F (R U R' U') F'

Probability = ¼



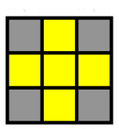


[F (R U R' U') F'][f (R U R' U') f']

Probability = 1/8

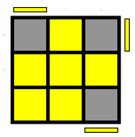
Move to Second Look

Probability = 1/8



Orient Last Layer (Two Look)
Step 2

All Edges Oriented Correctly

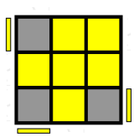


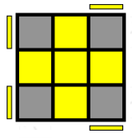
(R U R' U) R U² R'

Probability = 4/27

R U² R' U' R U' R'

Probability = 4/27



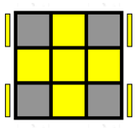


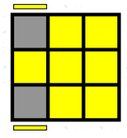
R' U2 R2 U R2 U R2 U2 R'

Probability = 4/27

R U R' U R U' R' U R U2 R'

Probability = 2/27



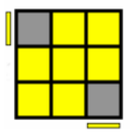


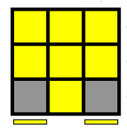
(r U R' U')(r' F R F')

Probability = 4/27

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

Probability = 4/27



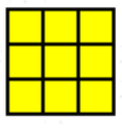


R² [D (R' U²) R][D' (R' U²) R']

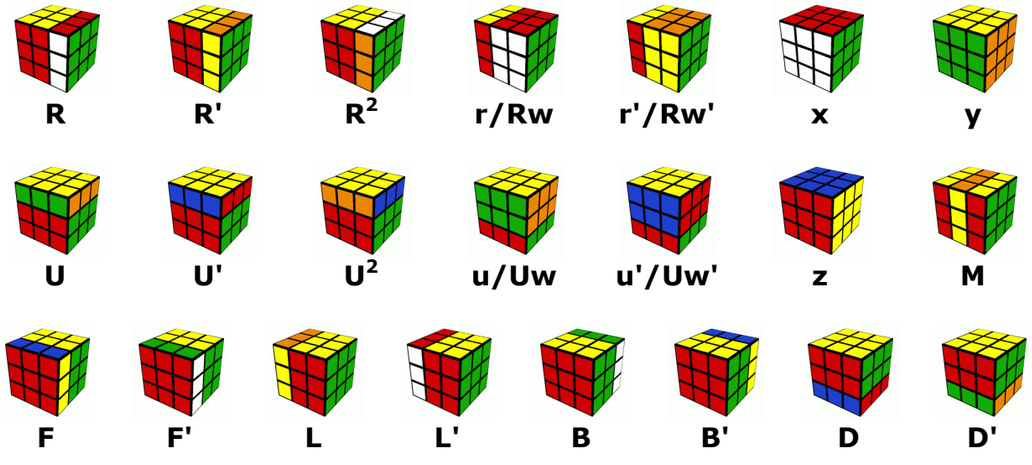
Probability = 4/27

Solved

Probability = 1/27



Notation



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Permute Last Layer

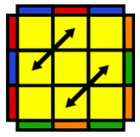
Permutations of Edges or Corners Only

R² U (R U R' U')(R' U')(R' U R')

Ub - Probability = 1/18

(R U')(R U)(R U)(R U') R' U' R²

Ua - Probability = 1/18

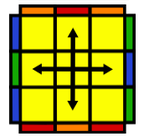


M² U M² U M' U² M² U² M' U²
U² (R U R' U)(R' U' R' U)(R U' R' U') R² U R

Z - Probability = 1/36

M² U M² U² M² U M²

H - Probability = 1/72

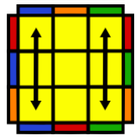


R' F R' B2 R F' R' B2 R2
x [(R' U R') D²][(R U' R') D²] R²

Aa - Probability = 1/18

R B' R F2 R' B R F2 R2
x' [(R U' R) D²][(R' U R) D²] R²

Ab - Probability = 1/18



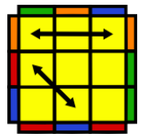
x'[(R U' R') D (R U R')] D' [(R U R') D (R U' R')] D'
x'[(R U' R') D (R U R')] u² [(R' U R) D (R' U' R)]

E -Probability = 1/36

Solved

Probability = 1/72

Adjacent Corners Swap

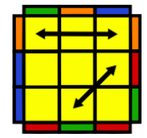


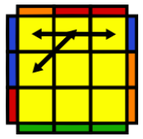
(L U²' L' U²')(L F')(L' U' L U)(L F) L²' U

Ra - Probability = 1/18

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

Rb - Probability = 1/18



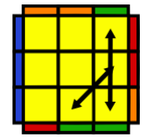


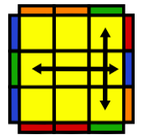
(R' U L')(U² R U' R' U²)(R L U')

Ja - Probability = 1/18

(R U R' F')[(R U R' U')(R' F)(R² U' R') U']

Jb - Probability = 1/18



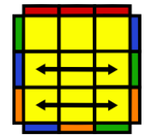


(R U R' U')(R' F)(R² U' R') U' (R U R' F')

T - Probability = 1/18

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

F - Probability = 1/18



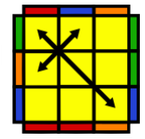
Opposite Corners Swap

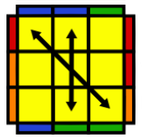
(R' U R' d')(R' F')(R² U' R' U)(R' F R F)

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



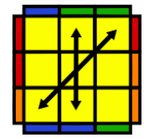


[(L U' R) U² (L' U R')][(L U' R) U² (L' U R')] U
y (R U' R' U)(l U)(F U' R' F')(R U' R U)(l' U R')

Na - Probability = 1/72

[(R' U L') U² (R U' L)][(R' U L') U² (R U' L)] U'

Nb - Probability = 1/72



G

R2 U R' U R' U' R U' R2 [[D U'] R' U R D'

Ga - Probability = 1/18

U2 R2 F2 R U2 R U2 R' F R U R' U' R' F R2 U2

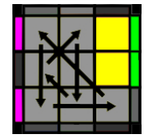
Gc - Probability = 1/18

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

Gd - Probability = 1/18

R' U' R U D' R2 U R' U R U' R U' R2 D

Gb - Probability = 1/18

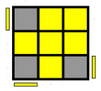


Orient Last Layer

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

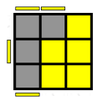
P-Shapes (P1-P4)

f (R U R' U') f'

P1 - 44 - Probability = 1/54

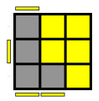
f ' (L' U' L U) f

P2 - 43 - Probability = 1/54



R U B' U' R' U R B R'
R d L' d' R' U R B R'

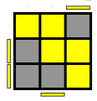
P3 - 32 - Probability = 1/54



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)



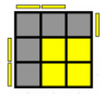
(L' U' L U') (L' U L U) (L F' L' F)

W1 - 36 - Probability = 1/54

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

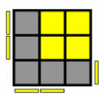
W2 - 38 - Probability = 1/54

Squares (S1-S2)



r' U^2 (R U R' U) r

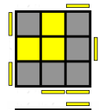
S1 - 5 - Probability = 1/54



r U^2 R' U' R U' r'

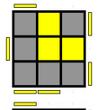
S2 - 6 - Probability = 1/54

L Shapes (L1-L6)



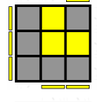
F (R U R' U') (R U R' U') F'

L2 - 48 - Probability = 1/54



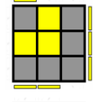
F' (L' U' L U) (L' U' L U) F

L1 - 47 - Probability = 1/54



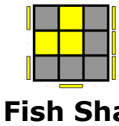
(R' F R' F') R^2 U^2 y (R' F R F')

L3 - 49 - Probability = 1/54



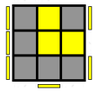
R' F R^2 B' R^2, F' R^2 B R'

L4 - 50 - Probability = 1/54



l' U' L U' L' U L U' L' U^2 l
y^2 r' U' R U' R' U R U' R' U^2 r

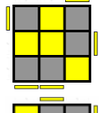
L5 - 53 - Probability = 1/54



(r U R' U) R U' R' U R U^2, r'

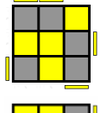
L6 - 54 - Probability = 1/54

Fish Shapes (F1-F4)



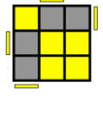
(R' U' R) y' x' (R U') (R' F) (R U R')
(R U R' U') R' F R^2 U R' U' F'

F1 - 9 - Probability = 1/54



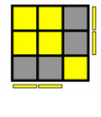
R U R' y R' F R U' R' F' R
(R U R' U) (R' F R F') R U^2 R'

F2 - 10 - Probability = 1/54



(R U^2 R') (R' F R F') (R U^2 R')

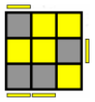
F3 - 35 - Probability = 1/54



F R U' R' U' R U R' F'

F4 - 37 - Probability = 1/54

Awkward Shapes (A1-A4)

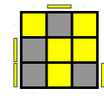


(R U R' U') R U' R' F' U' F R U R'
[F (R U R' U') F'] U^2 [(R U R' U') (R' F R F')]

A1 - 29 - Probability = 1/54

R^2 U R' B' R U' R^2 U R B R'

A2 - 30 - Probability = 1/54

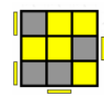


[(R U R' U) R U^2 R'] [F (R U R' U') F']

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



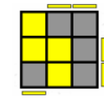
Lightning Bolts (B1-B6)

(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

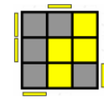


[F' (L' U' L U) F] y [F (R U R' U') F']
y (r U R' U) (R' F R F') R U^2 r'

B3 - 11 - Probability = 1/54

[F (R U R' U') F'] U [F (R U R' U') F']

B4 - 12 - Probability = 1/54

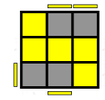


R B' R' U' R U B U' R'
y^2 L F' (L' U' L U) F U' L'

B5 - 39 - Probability = 1/54

R' [F (R U R' U') F'] U R

B6 - 40 - Probability = 1/54



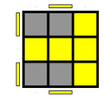
T-Shapes (T1-T2)

(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

(l' U' l) (L' U' L U) (l' U l)

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

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