



### Assumptions:

- Steps 1-4 are performed with white layer on top.
- Steps 5-8 are performed with yellow layer on top.

## Step 1: The Cross

- Appoint the lord dictator. Find a white edge piece that is already in the white layer, white side up. If there are none, put one up. If there are more than one, choose one and depose the others. There can be only one.
- Align the dictator. Rotate the white layer until the lord dictator is aligned with the appropriately colored center piece.
- Form the cross. Place the other edge pieces into their correct places relative to the lord dictator. Realign the lord dictator after each new piece is placed.

## Step 2: First-layer corner pieces

- Find a white corner piece that is in "ready position." (In the bottom layer, with white face pointing left or right, but not down.) This piece is the "kid" in the corners story.
- Rotate the bottom layer until the kid is underneath its proper home.
- Identify which of the adjacent colored layers is the kid's "real parents" (as opposed to the evil step-parents).
- Execute the corners story.

### Corners story:

- Kid runs in the direction that their white face is pointing, away from family. (To get out of the way.)*
- Parents drive down to the curb.*
- Kid gets in the car with parents.*
- Parents drive home with the kid.*

### Step 3: Second-layer edge pieces (except one)

- a) Find a second-layer edge piece that is in “ready position” (sitting in the bottom layer). This piece is the “kid” in the edges story.
- b) Find the kid’s home, then rotate bottom layer so that the kid is lined up with real parents (layer whose center piece matches the kid’s outward-facing color).
- c) If applicable, rotate top layer so that “empty” corner space is above the kid’s home.
- d) Execute the edges story.
- e) Repeat until three of the second-layer edge pieces are placed (with one edge space remaining “empty.”)

#### *Edges story:*

- i. Kid runs away from real parents, toward evil step-parents. (To get out of the way.)*
- ii. Parents drive down to the curb.*
- iii. Kid gets in car with parents.*
- iv. Parents drive home with kid.*

### Step 4: Last second-layer edge piece

- a) Rotate top layer so that “empty” first-layer corner space is above the “empty” edge space.
- b) Put the missing first-layer corner piece into this space using the corners story.
- c) Realign the top layer so that it matches center pieces again. The corner piece above the “empty” edge space is now “big brother” in the big brother, littler brother story.
- d) Find the one remaining second-layer edge piece, find its home, then rotate bottom layer so that the kid is lined up with its real parents. This edge piece is “little brother in the story.
- e) Execute the big brother, little brother story in order to get the two pieces adjacent to each other.
- f) Put big brother back into place using the first-layer corners story. (Little brother will be brought up with him).

#### *Big brother, little brother story:*

- i. Little brother sees the evil stepparents and runs away!*
- ii. Evil stepparents drive down to the curb.*
- iii. Little brother sees that they have big brother captive, and RUNS BACK to save him (meanwhile, big brother slips away).*
- iv. Evil stepparents panic and drive back home. Meanwhile, big brother reunites with little brother.*

## Step 5: Place the third-layer corners

- a) Find 2 adjacent corner pieces that share some (non-yellow) color X.
- b) Rotate the yellow layer so that both of those pieces are on the color X side.
- c) Check whether these two corner pieces need to swap places. If they do, execute the scuba story.
- d) Check whether the opposite two corner pieces need to swap. Execute scuba story if needed.

*Scuba story:*

- i. Left-hand family drives up.
- ii. Kids get out of car.
- iii. Parents go home.
- iv. Kids dive down into the water.
- v. Time passes.
- vi. Kids get out of water.
- vii. Parents return.
- viii. Kids get into car.
- ix. Family goes home.
- x. Finishing move. (rotate yellow layer twice)

*Singmaster: L' U' L F U F' L' U L*

## Step 6: Orient the third-layer corners

- a) Count the number of yellow "ups" among the corner pieces. Call this X.
- b) If  $X = 1$   
Execute the summer camp story while "preserving" the "up" piece.  
Else  
Execute the summer camp story while "preserving" a "right" piece.

Continue until all 4 corners are "ups." (Maximum of 3 iterations.)

*Summer camp story:*

- i) Left-hand family drives up.
- ii) Kids get out of car.
- iii) Parents go home.
- iv) Kids venture forward into summer camp. They don't like it, so they call their parents.
- v) Parents return.
- vi) Kids get into car. (U2)
- vii) Family goes home.
- viii) Finishing move. (rotate yellow layer twice)

*Singmaster: L' U' L U' L' U2 L*

## Step 7: Place the third-layer edges

Search for an edge piece that is already in the right place.

If you find one

Note which direction the other 3 pieces need to rotate in order to be correctly placed. (CW or CCW.) Execute the park story accordingly.

Else

Execute either version of the park story on any side, then repeat rule.

*Park story:*

- i. Middle family drives up (slice).*
- ii. Kid gets out of the car either CW or CCW, depending on what you noted earlier.*
- iii. Middle parents go home.*
- iv. Kid walks to the opposite side of the park (turn yellow layer twice in same direction as before).*
- v. Parents return.*
- vi. Kid gets in car.*
- vii. Family goes home.*

*Singmaster (CW): M' U M U2 M' U M*

*Singmaster (CCW): M' U' M U2 M' U' M*

## Step 8: Orient the third-layer edges

- a) Choose one of the edge pieces that you want flip. Hold the cube so that edge piece is on the right. Execute the first part of the family walk story. (The "family" is the row of white pieces directly beneath the edge piece that needs flipping.)
- b) Rotate the yellow layer to position one of the other edge pieces that need flipping over the right-hand "family" that stars in this story. Execute the second half of the family walk story.
- c) If there remains another pair of edge pieces that need flipping, repeat steps a and b.

*Family walk story, Part I (R' E' R2 E2 R')*:

- i) Right hand family goes out their back door.*
- ii) The kid sneaks away from parents and runs toward you.*
- iii) Parents go looking for kid (while kid avoids them).*
- iv) Kid runs toward you again, sees parents, continues running.*
- v) Parents give up and go home.*

*Family walk story, Part II (R E2 R2 E R):*

- i) Parents come out front door*
- ii) Kid runs past them.*
- iii) Parents go looking for kid (while kid avoids them).*
- iv) You tell kid to go home, so kid catches up with parents.*
- v) Family goes home*

## Singmaster notation explained

(from Wikipedia)

- *F* (Front): the side currently facing the solver
- *B* (Back): the side opposite the front
- *U* (Up): the side above or on top of the front side
- *D* (Down): the side opposite the top, underneath the Cube
- *L* (Left): the side directly to the left of the front
- *R* (Right): the side directly to the right of the front

When a [prime symbol](#) ( ' ) follows a letter, it denotes a face turn counter-clockwise, while a letter without a prime symbol denotes a clockwise turn. A letter followed by a 2 denotes two turns, or a 180-degree turn.

For methods using middle-layer turns (particularly corners-first methods) there is a generally accepted "MES" extension to the notation where letters *M*, *E*, and *S* denote middle layer turns. It was used e.g. in Marc Waterman's Algorithm.<sup>[31]</sup>

- *M* (Middle): the layer between L and R, turn direction as L (top-down)
- *E* (Equator): the layer between U and D, turn direction as D (left-right)
- *S* (Standing): the layer between F and B, turn direction as F