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Solve the V-CUBE Start Page

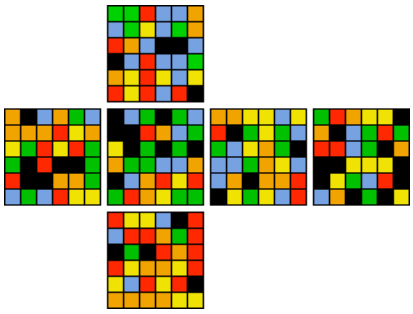
Here we will be showing a generalized method to solve all **V-CUBES** 4-11, and will work for larger sized cubes as well. This is a method that is based off of the reduction strategy, so you will need to be able to solve a 3x3 cube. A brief outline of the method is as follows:

Solution Step One: Solve Centers
Solution Step Two: Solve Edges
Solution Step Three: Solve as 3x3

In following areas of the website, we will break down each of these steps into detailed ideas for you to follow. The example that will be used will be solving with a 6x6, since it has extra parity resolution steps, but this method works for all sizes of cubes. This reduction method will enable you to solve any sized big cube with a little practice and patience.

We will provide an example solve to follow along, the scramble below has been checked, so apply it to your 6x6 cube starting with black as the Up face, and green as the Front. If any notation is confusing, please check our **notation** page for clarification, good luck!

Scramble:
d2 R2 B D2 U' r2 3f' l' 3r2 r D' d2 3u' l' 3u' U2 l' r' u' L 3u2 B2 D 3u' f' r2 3u' B2 F u l 3f 3u2 u' b2 F2 r2 F d' 3u2 b2 d' u' b2 F' D2 d r b2 F L 3r2 3f f D L 3r r' R2 D' 3u2 u L' l r' B2 l 3r R' D' u' L' r R' D B f' u r B2



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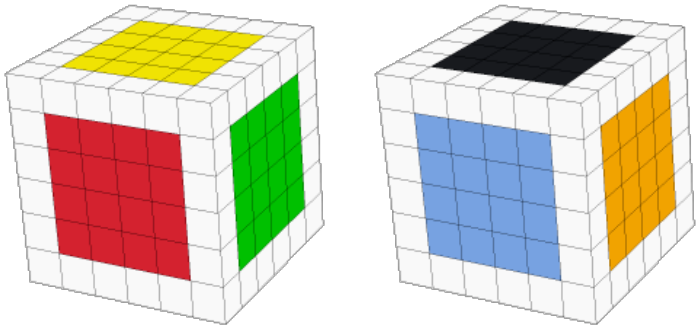
V-CUBE Solution Step 1: Solving the Centers

Here is what the first step will accomplish: a complete set of centers, leaving only the outside edges and corners.



We will be breaking this into three sub-steps: two opposite centers, next two adjacent centers, then the last two centers which will also be adjacent. You can solve opposite centers, but it's not recommended as its difficult to see both layers you're working on at once. One idea is to pick a color that stands out very clearly to you among the other colors. This will help you find pieces with less struggle.

To start, you should know that the center on this cube is comprised of 4 1x4 'strips'. The 7x7 would have 5 1x5 strips. So generically speaking, you will have a box in the middle with size (n-2) x (n-2) where n is the size of the cube, and each box will be comprised of a number of these strips.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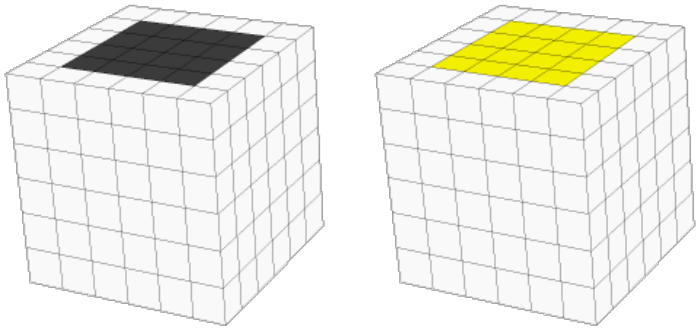
V-CUBE Solution Step 1a: Solving Two Opposite Centers

At the end of this step, we should have two opposite centers solved on the cube as shown below:



We think the best way to start building centers is by building those matching strips, and putting them all on the correct face. With even cubes, you can just match them up anywhere, but odd cubes you will base your work off of the center piece of each face.

Center 1:

To complete our first (black) center, we used the following sequence:

y' U' 3r / 3U' L' d2 3b / 3d' F' U r' F2 r F l' / L d' 3d' r'

The slashes separate the sequence into the moves for each individual strip, and below we will describe the intent of each individual move.

First, the y is just a cube rotation to make the next moves easier to perform, U' places the 1x2 block so 3r can complete the entire strip on top.

The next move, 3U', places the 3rd piece of our second strip on the R face. Then L' places the piece we use in the 2D layer, and then d2 puts the final piece of the strip into place. 3b places this new strip next to the strip we already built on top, completing 2 strips on the top of our cube.

3d' makes a nice 2x1 block on the F face, just missing its 2 corners. F' U are setup moves to line up the extra corner in the top layer with the block on the front face. The next 3 moves complete the strip, and we recommend you take special notice of this pattern because it occurs frequently, and is a great trick to have in your repertoire. F l' are the final two moves to put the third strip into place.

L postitions the edge on the Left face for matching the corner to it with the D' move. 3d' matches the bottom and top 2 groups on the back face, and r' puts it into place, completing our first center!

This center is usually pretty easy to complete since we don't have any other completed centers to worry about messing up. Our next center will take more moves to complete because of the new restrictions resulting from the solved face. Remember there are many, many ways to complete any center, and you have six to choose from, so try and make your life as easy as possible by choosing easy starts and familar patterns.

Center 2:

Now since we have finished the black center to start, we will finish its opposite (yellow) center next, and our next sequence starts with x2, putting the completed center on the D face. How we chose to build each strip is shown below, but with less detail than above. Try and walk through the sequences backwards and forwards and see for yourself what each move is doing.

Yellow Strip 1: F' R 2U 3u 3b' U2 3b
This completes a strip on the L face and puts it into the top. Notice how parts of the bottom solved center come out of place, but are quickly restored at the end after we store the new strip in the U layer.

Yellow Strip 2: L u'd F2 u d' U2 3b' U2 3b
This is an interesting pattern. We switch the yellows to a verticle arragement with the L, then transfer our two outside edges to the front face; F2 repositions them so the deep-cut moves will make another line on the L face. The last 4 moves place the strip in the top. Notice again the technique used to put this strip in.

Yellow Strip 3: 3D y' r U2 r'
This pattern is very easy, we drop in the final piece of the strip, do a cube rotation to make the placement friendlier for the hands, replace an unfixed line with a fixed one with the r, U2 to save it, then r' to restore our bottom center.

Yellow Strip 4: 3D L' 3u' u' L' u' U' l' U2 l
This final strip should be pretty straight forward after the previous examples, so see if you can figure out what each move is doing.

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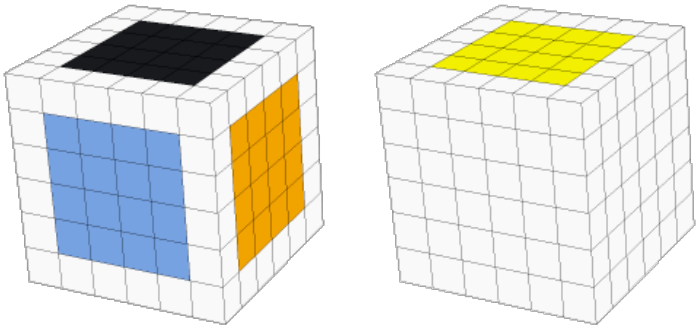
V-CUBE Solution Step 1b: Solving Two Adjacent Centers

In this step, we will be solving two more centers, this time adjacent ones. This will bring us to four total centers solved.



Now after solving the first 2 centers, we have 4 centers all in the middle to finish. At this point we can choose any center to continue with, since in this position the orange center looks the easiest, we will continue with that one.

3rd Center:

First let's do a z cube turn, placing our yellow completed face on R and the black one on L. Notice that we have regained a decent amount of freedom with this center, and as long and we don't do any deep u or d cuts, we won't mess with anything we've already completed.

Orange Strip 1: F' 3r U
Orange Strip 2: l2
Orange Strip 3: F' l' D r F' l2 r2
Orange Strip 4: 3R U' 3R' B' 3r' U 3r' r2

Odd vs. Even:

Now is the time you must know if your cube has fixed centers. The easiest way to check this is to count the pieces along an edge. If you count an odd number, your puzzle has fixed centers, and the piece in the middle of each face tells you what color is going to belong on that face. If you count an even number, your puzzle does not have fixed centers, so you will be responsible for assigning a color to each face.
More importantly, you will be responsible for building the centers in the correct order for your cube to be solvable and dealing with any parity problems that happen. After solving even cubes for a while, you will be familiar enough with your color scheme that you will just know from memory what order to build them in. For now, the best way is to check a corner. The three colors on that corner will tell you what order is correct for your cube.
For example, if you've finished the yellow face, and see a corner that has blue, orange, and yellow you can see that Blue Orange Yellow is in a clockwise direction. Following this idea and using your opposites as a basis, you should easily be able to build 4 centers in their correct relative position.

Center 4:

Next we chose to build the blue center. See if you can tell what face (U or D) it will go on relative to the orange face. If you figured out that it will go on the D face, you're correct, and will also see the reason for our next move, the rotation x2. It brings the face where the blue pieces belong to the top, and puts our fixed center on the B face.

Blue Strip 1: completed already!
Blue Strip 2: D 3r F 3r' 3R' F2 3R
Blue Strip 3: l' F' l F' 3L' F 3L 3r U2 3r'
Blue Strip 4: D' 3R F 3R' F' l F l' F' l F' l'

These moves should have started to become a little more familar by now, and the ideas are the same here as they were on the second center. As always, try and see what each move does, and if you don't understand a move, look at what happens to every face as a result, not just the ones you can see easily. Also, notice things have gotten a lot more wiggly and we are running out of free faces to do our matching and postitioning on. The final two centers will be even more restricted!

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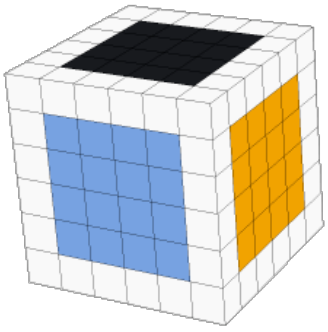
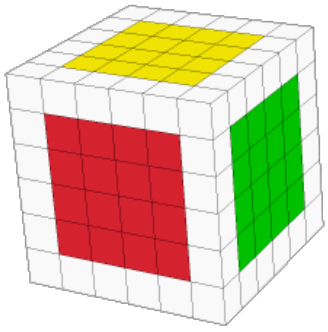
V-CUBE Solution Step 1c: Solving the Final Centers

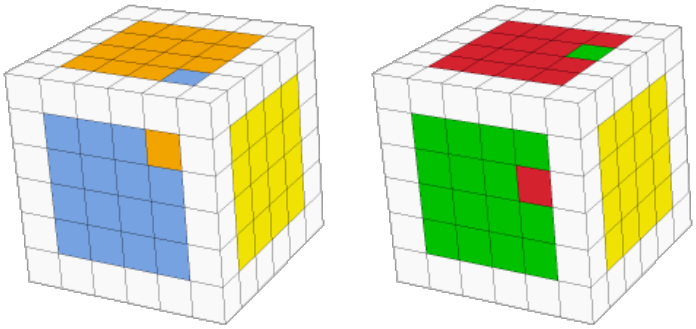
After this step we will acheive our goal of having all the center pieces in a correct spot.





Technically, we only focus on one center at this stage of the solution. This is because if we solve one, the other will have to be solved as well as long as we've done the first four correctly. This step can be mostly achieved with the ideas presented so far. Build the strips and put them into position. Below are two good ways to move single pieces between adjacent faces. These algs should be used as little as possible. With a good look-ahead and experimentation, lining up the last center into strips will get easier. While these algs do accomplish our goal, there are much less turn-intensive ways to complete centers than just using these algs repeatedly. Click on either picture to watch the alg performed.

corners: A U A' U A U2 A' edges: A' F' B' F A F' B



In these examples, A is the slice that both our pieces to be swapped are originally on, and B is the slice it lands on after we turn the F face. You can also switch opposite layer pieces with these algs by making the A/B into half turns. While it's useful in some situations, we recommend avoiding opposite centers except for the first two.

Example continued

First, do an x cube rotation. This is the primary reason for solving adjacent centers, as we can see all of the center pieces we have left to postition on just the F and U faces. There are nearly unlimited ways to complete this final center. We decided on completing the red center and to ignore the green pieces, as we don't care how they get swapped around. We know if all the red centers are correct, the green ones will have to be also, unless we make a mistake. Here we will also present more advanced examples of grouping pieces together. Try and follow, and be sure to experiment and invent your own as well.

Red Strip 1&2: U' 3r U2 3r'U2 l'U2 l
This makes a red 2x4 block horizontally across the U face.

Most of the Rest: U r U2 r' F2 r' F' r F r' F r
This basically makes two strips with one piece missing and places them in the U face.

Final Piece 1: F2 r' F' 3L F r F'3L'
After the F2, this situation perfectly matches our edges example above.

Final Piece 2: l F 2R' F' l' F 3R
Notice that this is the same as above, just mirrored.

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V-CUBE Solution Step 2: Matching Edge Groups

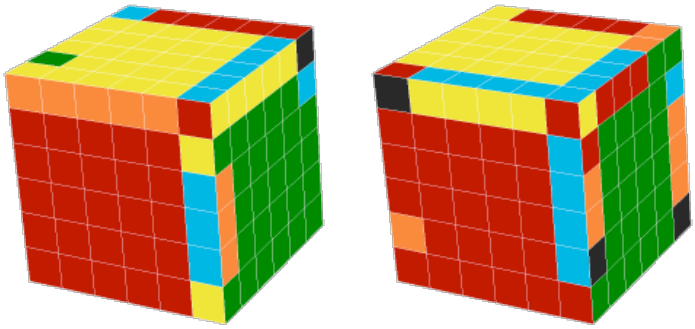
In the examples below, we will be solving the orange/blue edge group. These two ideas are the basis for almost all of the edge pairing in the examples below. See if you can break down a couple example groups into their setup, join, store, and restore sections for each piece or group of pieces.

edge pairing alg: A R U R' A'

In this alg, 'A' is any single (or multiple) horizontal slices between Up and Down layers. In the single edge example A would be the 2U slice. The idea is to pair the pieces up, remove them from the 'working' layer, then restore our centers. Notice in the setup, that our edge to be matched is placed across from our started edge, but flipped.

Also, you can match up multiple pieces as long as the centers are correctly restored. In the multiple edges position we are able to match up two edges instead of just one, using the correct setup moves before we shoot the group out. Here A would equal the d and u slices, and the alg to match all of them up would be: (d u) R U R' (d' u'). At first, it can be difficult to find what you're looking for but as you get further into the solve location becomes easier. Since you have already paired up groups you have reduced the possibilities for leftover pieces to look through. You can click on either picture to watch the alg performed.

single edge multiple edges



If you're having problems resolving the last two or three groups, look at our additional edges page for some more advanced techniques, algorithms, and ideas that may come in handy as you get more familiar with the solving process.

Example continued

As shown above, we will now be pairing up groups of edges pieces in our example. There are 12 groups of edges, each consisting of four pieces. We will match them up piece by piece until we have completed an entire group, and then store that group on the Up or Down face of the cube. Sometimes everything will work out, but more often than not there is extra work at the end of matching things up to complete all the edge groups. The description will walk you through the first couple builds, but gives less detail as it goes along. Anything not shown is for the reader to figure out as an exercise. Since you know what color group is being fixed, it should be easy for you to follow what's going on. Also, notice how the green/yellow and blue/red group are intentionally paired up with the outside edges swapped.

Edges:

Blue/Black: F2 U F u2 d R' U R u2 d'
The F2 puts the blue/black piece in the bottom so we can do the U move to place another blue/black piece across from it. F puts both of these in the middle slice so all 4 pieces are set up in the middle layers. Notice how the rest of the alg is almost exactly the same forward as it is backwards. u2 d align the top and bottom blue/black piece with the pair of blue/blacks on the back face. R' U R pulls the fixed group out of the build layer and replaces it with an unfixed edge. u2 d' restores our centers back to the solve position, and now you should have a blue/black group in the back of the top face.

Orange/Black: R U2 R' u' 3D2 R U' R' u 3D2
Here R U2 R' grabs the black oranges in the Up layer and brings them opposite of the black/orange on the FL border. u' and 3D2 match up the 4 pieces, then R U' R shoots the group up into the top layer. Finally, u and 3D2 restore our centers.

Red/Black: F2 u' R U2 R'3D'L' U' L u 3D U'F D L' 3U' R U' R' 3U
This one is a bit more cumbersome. We're forced to do just 3 pieces, then reset and position to get our final piece in.

The rest of the edge groups are shown below:
Red/Yellow: R2 u L' U L u' F'L 3D' L'U L 3D B d L U' L' d'
Orange/Yellow: R U2 R' 3D' L' U' L F' L F L' 3D D R d' L' U L d
Green/Black: R U' R' d 3d2 L' U' L d' 3d2 F' R 3D' L' U L 3D
Blue/Yellow: x2 L U R U' R' d 3d R' U2 R d' 3d'
Green/Yellow: R 3d2 L' U' L F' L F L' 3d2 (swapped wings)
Blue/Red: y2 D2 R u 3D' F U' F' u' 3D (swapped wings)
Blue/Orange: L2 3D2 R U2 R' 3D2 L R2 3D2 U' L' U L 3D2
Orange/Green: R2 u' R U R' F R' F' R u
Fix 2 parity groups: U2 R' u' d R U R' F R' F' R u d'

Take special notice that we have stored the Green/Yellow group in BR and it still has the wings swapped.

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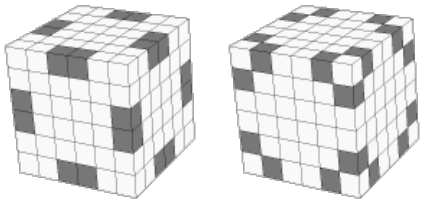
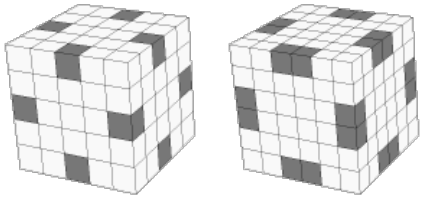
V-CUBE Solution Step 2: Special Edge Cases

On this page, we will try and present some more advanced ideas for solving the edges. Now it will be important to understand the difference between inside and outside edges. The pictures below show the inner and outer edges on a 6x6.

Inner Edges Outer Edges

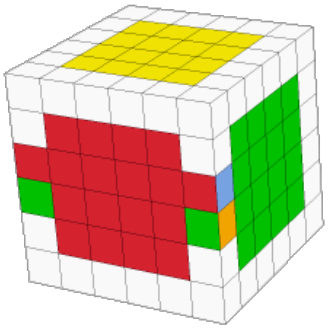


One way to solve these final edges groups is to match up all the inner edges, converting the final four edge groups into the resolution of 5x5 edges. No matter what the size of the cube, working inside to outside will help reduce the complication of the last two edge groups. The below comparison shows the similarites between a reduced 6x6 cube and a regular 5x5.

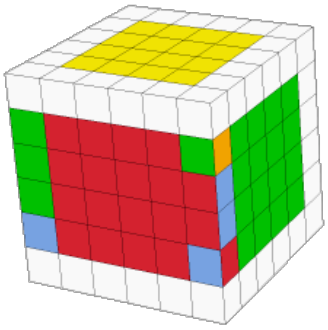


To pair up these inside groups we use the same strategy as before, just being sure to work inside to outside. Many times you will be left with just 2 edges groups to solve, below are the 3 algs you need to finish the edges. The first is for even cubes with two inside edges needing to be swapped. Next is the alg needed to pair up the final 2 groups of outside edges with their inner edge groups. (Notice that these first two algs are basically the same, just different setup moves) The third algs is for when you get a case where the last group's two outside wings need to be swapped. Click on the picture to see the alg performed.

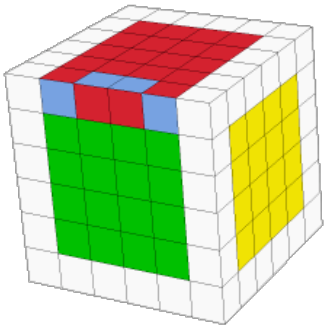
alg: 3d R U R' F R' F' R 3d'



alg: d R U R' F R' F' R d'



alg: r2 B2 U2 l U2 r' U2 r U2 F2 r F2 2l' B2 r2



Example continued

We have a case like the last example shown above, the Green/Yellow group is in BR. We'll do cube rotations to get it to our FU spot, and apply the parity fix.

Green/Yellow: x' y r2 B2 U2 l U2 r' U2 r U2 F2 r F2 2l' B2 r2

Now you have successfully converted your 6x6 into a psuedo 3x3 cube!

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V-CUBE Solution Step 3: Solving as a 3x3

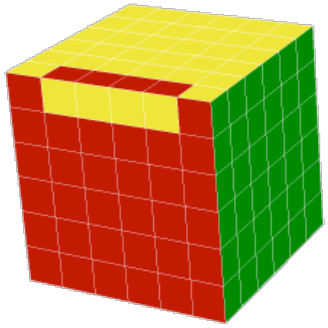
Here we will finally complete our goal of completely solving our V-cube. At this point you will notice all the centers and edge groups are paired up so we can use our favorite 3x3 method to complete our solve. We will address both even and odd cubes below.

Odd Cubes:
With odd cubes the final stage will be normal, solving exactly as a 3x3 would without any special cases arising. As the size of the cube increases you will have to change/adapt your handling techniques to keep this stage fast and smooth.

Even Cubes:
With even cubes the final stage will involve some special situations that only happen on even-numbered cubes. The two algs below will resolve both of these problems. The two kinds of parities that arise are the edge orientation parity and the permutation parity.

Edge Orientation Parity

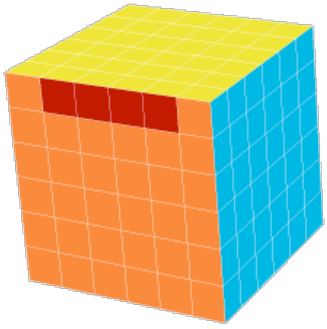
alg: 3r2 B2 U2 3l U2 3r' U2 3r U2 F2 3r F2 3l' B2 3r2



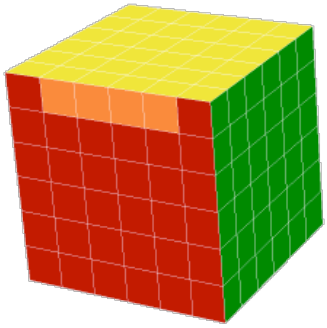
This is the same alg used in the edge pairing step, but set up slightly different, with the L and R turns cutting the cube in half instead of shallower cuts. In the above alg, the goal is to fix the badly oriented edge, not the whole layer. You will know that you need this alg when you get to the last layer and have an odd number of correct or incorrect edges. Click on the picture to watch the alg performed.

Permutation Parity

alg: 3u2 3r2 U2 3r2 R2 U2 3r2 3u2



front view



rear view

This alg will swap two edge groups directly across from each other. If the last layer edges doesn't match any of the normal 3x3 last layer permuations then applying this alg will transform it into a normal case. Above is the position it directly fixes, click either picture to watch the alg performed.
There is also a position where the two swapped edge groups are next to each instead of across. To fix this situation use the same alg as above, but apply the setup moves R' U R U first. After applying the permutation parity alg, you will have to use the inverse inverse of the setup, which is U' R' U' R.

As a note to the reader, in this position, the parity is actually in the corners, not the edges. It will happen 50% of the time and is caused when the edges are paired up in a way that their parity does not match the corner parity. Unless both edge and corner parity are odd or even it will not be a regular 3x3 solve. For a better understanding of parity, check out Wiki's article here.

Example continued

Now we will solve the cube as normal, in our example using the CFOP method.

Cross: x' B L D B2 R2
Pair 1 (RG): y' L U' L' U L U L'
Pair 2 (RB): L' U L R' U R
Pair 3 (OG): y' R U2 R' U' R U2 R'
Pair 4 (OB): y U' R U R' U' y' R' U' R
OLL Parity: there was no OLL parity on this solve
OLL: L' U' L U' L' y' U' L' U L F
PLL Parity: 3u2 3r2 U2 3r2 R2 U2 3r2 3u2

PLL: x' R U' R' U D R' D U' R' U R D2

You should now have a complete V-cube, congratulations! With practice and hard work you can become one of the best in the world. Good luck, and remember to have fun!

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