Cfop f2l algorithms pdf

The CFOP method (Cross – F2L – OLL – PLL), sometimes known as the Fridrich method, is one of the most commonly used methods for dissolving the speed of 3×3×3 Rubik's Cube. This method was first developed in the early 1980s. Czech speedcuber and nameable method Jessica Fridrich is generally attributed to popularization with publication online in 1997. [1] The method works on the layer-by-layer system, first salvages the cross normally at the bottom, continues to rescue the first two layers (F2L), direct the last layer (OLL) and finally permutation of the last layer (PLL). History The basic methods of layer by layer were among the first to be used in the early 1980s. In 1980, David Singmaster published a layer-based solution that suggested the use of the cross. [2] The CFOP's main innovation over the initial methods is its use of F2L, which solves the first two layers at the same time. Jessica Fridrich didn't make up that step. According to Singmaster's report on the 1982 World Rubik's Cup, Fridrich then used the basic method of the layer, while Dutch competitor Guus Razoux Schultz had a primitive F2L system. [3] The last layered steps of OLL and PLL include first directing the rear layered pieces, then permutating them to their correct positions. This step was proposed by Hans Dockhorn and Anneke Treep. Fridrich switched to F2L in 1982. Its main contribution to the method was the development of OLL and PLL algorithms, which together enabled the resolution of any last layer position with two algorithms and was significantly faster than previous rear layer systems. [4] CFOP, with small pranks, is by far the most popular method used by the upper cubers. Users include Mats Valk, Feliks Zemdegs and Max Park. Method Cross – This first stage involves solving four edge pieces in one outside the layer of the puzzle, centering around a normally colored centerpiece. Many speedboats usually save the cross on the underside to avoid turning the dice, which slow down times. Cross solved (White at the bottom) First two layers (F2L) – In F2L, the inguous and edge pieces are grouped up and later moved to their correct location. There are 42 standard cases for each pair on the corner, including a case where it's already solved. It can also be intuitive. First Two Layers (F2L) resolved Orientation of the Last Layer (OLL) – This rate involves manipulating the top layer so that all parts in this case have the same color on top, at the expense of incorrect colors on other pages. This rate includes a total of 57 algorithms. A simpler version called two-way OLL directs the edges first and corners later. Algorithms are usually run two to three times for this version. It uses ten algorithms, three to guide the edges and seven to guide the corner. Rear layer orientation (OLL) complete last layer permutation (PLL) – The last stage involves moving the pieces of the upper layer while their orientation. There are a total of 21 algorithms for this level. They are clearly having alphabetical names, usually based on what they look like with arrows representing what pieces are replaced (e.g. permutation A, F permutation, T permutation, etc.). Two-look PLL saves corners first and edges separately. It uses six algorithms, two for corner permutation and up to four to permutate the edges. U-perm can also be repeated if the user wants to use even fewer algorithms at the expense of typically faster resolution times. [5] There are also many advanced expansion algats used in cfop, such as COLL,[6] Winter variation,[7] VLS, ZBLL and more. But you don't have to learn to save the cube. Competition Use CFOP is heavily used and relies on a number of speeds, including Rowe Hessler, Mats Valk, and Feliks Zemdegs, for its heavy reliance on algorithms, pattern recognition and muscle memory, as opposed to more intuitive methods such as Roux or Petrus methods. Most of the top speed ers in the WCA are CFOP rescuers, including the current record holder 3x3x3 single world record holder (Yusheng Du (宇) with a time of 3.47 seconds. [8] [9] References ^ Shotaro Macky Makisumi. Speedcubing. cubefreak.net. Archived from the original of 2007-07-03. Retrieved 2007-08-31. ↑ Beginner's Rubik's Cube Solution. Archived from the original on 26 September 2015. Retrieved 15 June 2012. ↑ Singmaster, David. Cubic Circular Issue 3, Spring 1982. ↑ Fridrich, Jessica. 20 years of speedcubing. Retrieved 15 June 2012. ↑ Zemdegs, Feliks. 2-look last layer. Cubeskills. ^ ^ ^ Reconstruction of Yusheng Du's 3.47 World Record solve ^ WCA Website Team. World Cube Association - Official Results. worldcubeassociation.org. External Links Official site CFOP method Jessica Fridrich on Speedsolving.com Wiki All OLL and PLL algorithms found on How to Solve rubik's Cube Obtained from Home » Advanced Rubik's Cube Solution » Advanced Rubik's Cube: Fridrich First Two Layers - F2L First Two Layers (F2L) Rubik's Cube Is Rusty Simulta, but not individually, it decreases significantly resolved. In the second step of the Fridrich method, we save four white things and the edges of the middle layer attached to them. The 41 possible examples in this step can be solved intuitively, but it is useful if you have a table of algorithms for instructions printed on your desk. To be effective try not to turn the dice around during the rescue and look ahead as much as possible. Familiarize yourself with algorithms so you can make them with your eyes closed. There were two separate steps in the initial method of saving the white angles and the second layer of the edges, but at this stage we should have known this. In the advanced Fridrich method we will pair them the top layer, then insert them where they belong. The simple example below shows the happy situation when the red-and-blue edge piece goes where it belongs while we save the white corner. If there's a red-blue corner somewhere else, then we need to get him to the last top of position first. R U R' In the case below the white label pointing upwards. First, we have to suck up the pieces of angle and edge, and put them where they need to be. R U2 R' U R U' R' We can never influence rescued blocks! In the conditions below, instead of F U2 F' we will make U' R U2 R' so that we do not ero the blue-orange block. F U2 F' U' R U2 R' For faster

sometimes we use double turns. Just a reminder that the letter U in the algorithm means rotating the two top layers clockwise. View the full reference to the notification page. An intuitive approach to this situation would suggest that this case be resolved in the following steps: to take two pieces into the upper layer, and then join them to insert them where they belong: (R U2 R) (F' U2 F) (U' R U R). However, the following algorithm is much faster because the same set of movements is repeated: (R U R' U'U') (R U R' U') (R U R' U)) Let's look at possible situations that could be encountered at this stage. Examples, grouped by white angle position and edge, to be pritried to this: 1st: Simple examples These are lucky cases that can be solved in 3-4 moves. R U R' F' U' F U R U' R' 2. Edge at the top of the layer The first two should be known by the beginner method: (U R U' R'R' (U' F' U F) (U' F' U F) (U R U' R'R') (U' R U R') (F' U' F) (U F' U' F) 3. Chance : As at the top, the edge in the middle (R U' R') (d R' U R) (U F' U' F) (d' F U F') (U' R U R') (d R' U' R) 4. : The corner pointing outwards, the edge in the upper layer In this case, the cube is usually brought to the base case, thus redirecting the white corner in the first phase. (F' U F U) (d' F U F) (U'R U2 R) (U'R U2 R) (U'R U R) (U'R U2 R) (U'R U' R' U) (R U) (U F' U F U) (F' U' F) (U F' U' F U') (F' U' F) (U'R U2 R' U) (F' U' F) Example 5: Upside, Edge and Top Layer y' (R' U' R U) U (R' U' R U) (R' U' R) (U2 F' U' U' F) (U' F' U2 F) (U' F' U F) (U F' U2 F) (U F' U' F) 6. Chance: Ugao u bottom, Edge in middle (R U' r' d R' U2 R) (U R' U2 R) (R U' R' U' R' R U R') (U' R U2 R') (R U' R' d R' U' R) (U' R'U' R) The steps of the Fridricha Rubik cube method: CFOP (Cross, F2L, OLL, PLL, explicit C-F-O-P or C-fop) is a 3x3 speed dissolving method proposed by several cubes around 1981. He is also known as the Fridrich Method by his popularist, Jessica Fridrich. Partly because Of Fridrich's posting of the method on its website in 1995, CFOP is the most dominant 3x3 speedcubing method since around 2000, with it and its versions used by the vast majority of top speedcubers such as Feliks Zemdegs, Max Park, Sebastian Weyer, Mats Valk, etc. The origin and appointment of Jessica Fridrich's dispute incorrectly posted as the inventor of the CFSP. In fact, in the early 80s, many events were made by other cubers, which contributed to the method in its current form. The techniques of ingredients and their original proponents are as follows: During the re-entry of the popularity of speedcubing in the late 1990s and early 2000s there was a general lack of information about sport. Fridricha's website has provided a wealth of information for those entering the sport, including a full description of the CFOP with complete lists of algorithms. As a result, many who have learned on her website have started calling this method the Fridrich method, which explains the sharing of the term today. Several high-profile cubers have long challenged this terminology; Ron van Bruchem has publicly written that he will never say CFOP Fridrich Method. This issue became well-publicened in the community cub around 2008, which may be why. The term CFOP has since been understood by increasing use compared to then, also partly motivated by efforts to standardise terminology in the classification of methods, and is now often seen as a Fridrich method. While some cubers still insist on the term CFOP, Fridrich's contribution to the popularization of the method is undeniable, and many others accept the term Fridrich Method as an established terminology and a fully valid synonym for CFOP. The CFOP steps can be viewed as an advanced version of the Layer-By-Layer method. It specifically combines some steps of this method into one using multiple algorithms. Here, he's just clear the CFOP without any extra tricks. Also, the cube is usually solved with a white side on top of the cross, yellow at the bottom for the cross, and opposite for other steps. However, it is not necessary. Cross Make a cross on one side by solving all the edges of a man's face. Make sure the margins are aligned with the centers of the second layer. Virtually all top CFOP solutions nowadays solve the cross at the bottom to avoid z2 or x2 rotation cubes. Earlier in the 2000s, a tackle on another face, such as The Cross on the left, was also popular. Many top rescuers are also colour neutral to save the cross with fewer moves and plan out F2L pairings. F2L (First Two Layers) Fill four slots between cross parts, one slot at a time. Each slot is filled by inserting an angle and corresponding edge at the same time. Most of the 41 cases have reasonable intuitive solutions. To complete this step, one remains with only the last layer, which is usually placed on top. OLL (Orientation of the Last Layer) Make the entire top (last layer) cubes solid color. 57 non-trivial cases. These new ones in OLL break down step-by-two. This greatly reduces the number of cases; The 2-view OLL has 9 cases. Note, however, that this is a few seconds slower PLL (Permutation of the Last Layer) Finally finish the cube with the permuting of the upper layer of the cube. 21 non-trivial cases. new for PLL to break down step into two. This greatly reduces the number of cases; The 2-view PLL has 6 cases. However, note that this is a few seconds slower Pro Easy to learn – CFOP is generally considered the easiest method to learn as it easily transitions from the initial methods. It doesn't require a great understanding of how the cube works - Due to the lack of blockbuilding or the orientation of the edge required in CFOP, the method relies more on pattern recognition and algorithms. Although the cross and F2L are solved intuitively, they are more straightforward than blockbuilding with Roux or edge orientation and ZZ blockbuilding. It is by far the most researched method – Since cfop is the most prevalent method and has for many years, much more research on CFOP has been done than any other method, meaning more resources, several different algorithms to be selected, and more community members to help and advise. All world records for the 3x3 Rubik's Cube since 2003 have been set by the CFOP, excluding Kian Mansour 9.54 of the single-hand Ao5 in May 2018. Statistically the fastest speed resolution method - Statistically speaking, despite counting the moves, the CFOP proved to be the fastest method at the moment. As of June 1, 2016, the top four speedsolvers on average 3x3 used the method, as well as the top 15 speedsolvers in 3x3 singles. Algorithms cons - CFOP with 4 Look last layer makes a total of 16 algorithms (10 2-view OLL algs and 6 2-look PLL algs). The entire CFOP has 57 OLL and 21 PLL for a total of 78 algorithms. If a person had learned one full CFOP algae per day (OLL and PLL), it would take just over 2 and a half months to learn everything. Number of shifts – CFOP has a slightly higher average movecount than ZZ and a much higher movecount compared to Roux. Relying on inspection - CFOP relies on the use of inspection time to quickly resolve the cross (and the first pair, depending on how advanced the user is). In cases where there is no inspection time, such as large cubes, where it is necessary to pass between the reduction of the cube and the steps of 3x3x3, this can be a disadvantage, as the cross must be done on the fly, rather than planned. Although this may be the case, cfop is still the most popular choice for the 3x3x3 stage on large cubes, since planning and executing a Roux or ZZ solution is usually more difficult than doing CFOP. Difficulty of the cross - Planning a cross during the examination may take some time to master. It requires a fair amount of experience, similar to the design of the first block with Roux or EOLine with ZZ. See also Cross F2L OLL/PLL 4LLL CFCE ZZ Roux Permutations of corners only Permutations of edges only