Mastering Rubik's Cube, Don Taylor, Penguin Books, 1980, 0140061029, 9780140061024, . .

The geometry of the classical groups , Donald E. Taylor, 1992, Mathematics, 229 pages. .

Skywatchers of Ancient MÐ“Â©xico , Anthony F. Aveni, 1980, History, 355 pages. Combining as it does the romance of space with the mystery of the past, the study of pre-Columbian skywatchers of the New World has drawn increasing scientific and popular ....

Handbook of cubik math , Alexander H. Frey, David Singmaster, 1982, Mathematics, 193 pages. .

Conquer that Cube , Czes Kosniowski, 1981, Mathematics, 32 pages. Features step-by-step instructions and illustrations of the sequences of moves necessary for solving Rubik's Cube.

Puzzle it Out Cubes, Groups and Puzzles, John Ewing, Czes Kosniowski, 1982, Mathematics, 64 pages. Explains the mathematical theory of groups and how it can be used to solve Rubik's Cube and similar puzzles.

Inside Rubik's Cube and Beyond , Christoph Bandelow, Jun 1, 1982, , 125 pages. .

Adventures in Group Theory Rubik's Cube, Merlin's Machine, and Other Mathematical Toys, David Joyner, 2002, Mathematics, 262 pages. "A tour through the algebra of several 'permutation puzzles'... If you like puzzles, this is a somewhat fun book. If you like algebra, this is a fun book. If you like puzzles ....

Mathematics of the Rubik's Cube design , Hana M. Bizek, Jul 1, 1997, Mathematics, 298 pages. .

University Record For Faculty and Staff Members of the University of Michigan, , 1957, , . .

The 1970s , Kelly Boyer Sagert, Jan 1, 2007, History, 261 pages. Covering the turbulent decade that ushered in Ms. magazine, Mood rings, Studio 54, Stephen King horror novels, and granola, this compelling book chronicles the significant ....

Richard Feynman a life in science, John R. Gribbin, Mary Gribbin, Jun 1, 1997, , 301 pages. A profile of the noted physicist and author of Surely You're Joking Mr. Feynman captures his wit, his genius, and his eccentricities and outlines his remarkable contributions ....

Genius The Life and Science of Richard Feynman, , 1992, Biography & Autobiography, 531 pages. A biography of the flamboyant Nobel Prize-winning scientist describes how Feynman cracked safes, played the bongos, studied the behavior of Jell-O, and conducted experiments in ....

This is a must-have for any serious Cube fan. Whether you've just got a few squares out of place or your cube is thouroughly scrambled, this book will teach you how to solve the cube quickly and easily. With enough practice, this book will help you become a Cubemaster. While it won't teach you how to win the Rubik's Cube World Championship, it should please the average Cube fan.

Great for those who are not savvy solving puzzles, but want to learn. One need not know the subtle laws of mathematics to read this booklet. Reading all the pages first, and then experimenting with each section will make the Cube not-so-unfriendly. The diagrams are explanatory, but the author has done all that possible in the way of helpful directions. Step-by-step keys to the patterns, aesthetics, and games are provided. The Cube is examined layer by layer and detailed instructions to put them all together are given.

The first solution I learned was from Don Taylor's book, Mastering Rubik's Cube. It works in a 3-layer approach where you solve one side, the four edge cubes in the next layer, then the last side. Layer solutions are nice because you can see steady progress, but they are bad for speed because after solving the first layer, all the moves are complicated by the fact that you can't mess up the first layer.

About two decades ago an infernal device appeared on the scene which was destined to rock the international world of puzzles. No doubt more world citizens attempted to conquer Rubik's Cube than any other puzzle known to man. And it is also probable that more people failed in that quest than ever before.

The method described on this web site is for any and all of you. The solution is divided into five parts. It is so simple that, once learned, one cannot forget the moves. You will not have to twist the cube incessantly in order to figure out how the moves are made. However, it is also intended for experienced cubists who have mastered a given method and can still solve a cube in about a minute. That is because, as will be shown, The Ultimate Solution to Rubik's Cube will require only about one-third to two-thirds the number of moves required by most other methods.

Rubik's Cube is enjoying something of a comeback. "Rubik's" is now a trademark of Seven Towns Ltd and the Cube is distributed in the United States by Oddzon Products, Inc.. While the solutions in paperback form are out of print a large number of solutions are readily available on the internet. Clearly these solutions are an effort to improve on others which have gone before. Whatever else may be true, these solutions, and the number of times they are accessed by web users, demonstrate that, after more than two decades, there are thousands of avid fans still interested in Rubik's Cube and other Rubik concoctions.

The majority of solutions on the web appear to trace their lineage back to the solution popularized by James Nourse (The Simple Solution to Rubik's Cube, 1981). Devoid of the shortcuts, either explicit or implied, Nourse built the cube by forming a cross on one face with correctly placed and oriented edge pieces. He then moved corner pieces into correct position and orientation on that same face. He completed the central section of the cube by properly placing and orienting the central edge cubes. This was accomplished without disturbing the cubes on the first face.

The moves that Nourse used to solve the first face were so simple and straightforward that, once the cubist had practiced them a few times he could carry them out without memorizing a series of moves. However, things became a little more complicated with the placement of edge pieces in the center section.

There were now eight moves in each of two series. While it was possible to follow the progress of the series, it was even easier to memorize each series and make a successful application without understanding the process. If one forgot the series at a later time one had to return to the text to relearn it.

But the black box character of the puzzle increased at the next step. Here a 10 move series causes two corner pieces on the bottom face to exchange places. (Nourse, Singmaster, et. al. refer to either

a one- quarter rotation or a one-half rotation of a cube face as a "move". Others emphasize "turns". A turn is a one-quarter rotation of a cube face. Hence a one-half rotation of a face is two turns. In this discussion I will use the former convention.) It would be an unusual person indeed who could figure out how the series brought about that result. And he would get no help from Nourse who apparently reasoned that the reader did not need to understand a series, just be able to apply it.

At the next step he does not even tell the reader that a ten move series will cause three of the bottom corner pieces to rotate (in a counterclockwise direction) while remaining in place. Rather, the reader learns how to hold various color patterns on the bottom face and applies the same series over and over again until all bottom corner pieces are properly oriented. The black box nature of Rubik's Cube is firmly established.

It may be inevitable that this type of solution must turn Rubik's Cube into a black box puzzle. Even more of a problem is the fact that the final steps (the placement and orientation of the bottom edge pieces) can require such an inordinately large number of moves. It is possible that these edge pieces could need as many as 63 moves to complete the cube.

Olefsky and Bowen (both on the Internet) and Ostrop (Solving the Cube, 1981) form a cross on the bottom (second) face and then move the edge pieces into proper position (swap). They then move the bottom corners into place and finally rotate the corners. Olefsky makes a change in placing the top corner pieces. He leaves one corner vacant as a "working corner" and places center section edge pieces above this corner using a four move series. When three edge pieces have been placed he puts the fourth corner piece in place and then uses an eight move series to place the fourth center section edge piece.

Don Taylor (Mastering Rubik's Cube, 1980) moves corner pieces of the bottom face (final layer) into their correct positions and then moves the edge pieces into position. He then rotates the corner pieces and, finally, flips the edge pieces until all pieces on the bottom layer are correctly placed and oriented. Taylor's method gave an average of 120 moves to solve the scrambled cube.

Minh Thai (The Winning Solution, 1982) places all of the corner pieces before any of the edge pieces. His method appears to be descended from the solution presented by Ideal Toy Company (The Ideal Solution, 1980). In the latter, one places the corner pieces of the first face and then three edge pieces on the first face. This is followed by placing the four corner pieces of the second face and then orienting those pieces. Minh Thai puts in edge pieces only after placing all corner pieces. But he places three edge pieces in the first face and then three edge pieces in the second face in proper position/orientation using the same basic approach. The final two edge pieces (face 1 and face 2) are placed simultaneously. Both approaches complete the cube by orienting the middle edge pieces and then correctly placing them.

Minh Thai's primary contribution was to devise a specific series for every possible situation. Thus he requires 42 series (of up to 14 moves) to solve the cube rather than about 16. But he does it in far fewer moves. Using his method my average for 50 trials was 74 moves with a minimum of 60. The Ideal Solution average was about 130 moves

As a general rule one can reduce the number of moves required by increasing the number of series used in the solution. For example, Nourse's solution requires about a dozen series and gave me an average of about 110 moves to solve the cube. Nourse says that, using his shortcuts, he can get that average down to less than 100 moves. If I use all of Nourse's shortcuts there are about 20 different series and I get an average of 95 moves (in 50 trials) to solve a scrambled cube.

Fridrich's method is similar to "The Simple Solution" (with shortcuts) for the first two layers. But after that the wheels come off! Jessica will always complete the solution with two series (she calls them algorithms) with an average of 9 and 12 moves respectively. She has determined that there are only 40 possible arrangements (56 counting mirror images) of the corner and edge pieces of the last layer. A specific series may be devised for each which will orient all eight pieces of this layer.

Counting all the possibilities, including the simultaneous placing of corners and edges in the first two layers, one would need to memorize more than 100 cube arrangements and corresponding algorithms in order to use Jessica's method. In addition, to be able to compete with her, you would need to be able to spin cube faces at the rate of about three turns per second. (That let's me out. All I can do is about 1.5 turns per second; but then I am 75 years old.) In addition, I cannot comprehend the monumental memorizing task which she has evidently accomplished.

Ultimately one's personal choice for solving the cube is a matter of taste. If you don't like any of these then check others on the Internet. To see some of what's available, click on Cubeman's Cube-Related Links, Rubik's Cube Resource List or Matt Monroe's Rubik's Cube Links. (All of the methods from the internet which are referenced here may be reached from one or more of these links pages.)

Many of these are variations on a theme; usually James Nourse's theme. In many instances the contribution of the authors is to include a set of very interesting graphics which may make the solution easier for you to learn. However, if the author is a speed cubist like Lars Petrus (who competed with Thai and Fridrich in Budapest) then the procedure can get very complex in a hurry! Nevertheless you should check out Petrus's solution. It is distinctly different from others you may have seen and the graphics are fantastic!

Petrus has not yet completed his solution on the Web (he has "dozens to hundreds" of examples yet to post) but he claims to average about 60 moves in solving a cube for speed. Hence the 1982 finalists for whom their methods are known average about 58, 60 and 74 moves to solve a scrambled cube. The best that the others can do is about 95 moves. However, these three finalists had to employ 42 to 100+ series and up!