

2x2 Rubik's Cube Solver Final Project

Jordan Turley

For my final project, I implemented a 2x2 Rubik's cube solver. I implemented A* with a heuristic to search for a solution to the cube. This project was a lot like the Back 2 Back assignment, because I was using the same search technique, but the data structure for the cube was completely different. To represent the cube, I used 6 2D arrays, one for each side. To rotate a side, I use an algorithm to actually rotate just that side, but to move the pieces on the other sides, I just decided to do it all by hand. I'm sure there is probably some clever algorithm that would have saved me time, but because it is only a 2x2, it didn't take very long. If I was trying to do this for a 3x3, I would probably have to use an algorithm, but just hard coding in the turns worked fine for me for this.

To use this program, the user picks the orientation that they will keep the cube. The user has to know which side is the front, left, right, etc... throughout the whole program, or else it will not work and the user will get an incorrect solution. Then, the program prompts the user to type in the colors on each side, and then solves the cube.

I implemented this in Java. I did not use any third-party packages or libraries.

I learned a lot from this project. I had to think about how I wanted to model the cube, and how I wanted to let the user enter the colors on each side. I also had to recall A* from the beginning of the semester, and implement it again. I feel like this reinforced my understanding of A*, as well as how I would code a Rubik's cube. I've been interested in cubing since high school, so it was really interesting to code something that could solve something like this. In the future, I might want to try a 3x3 solver, but I feel like it could take a very long time to run.