Rubik's Cube Assistant

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COMPSCI-2

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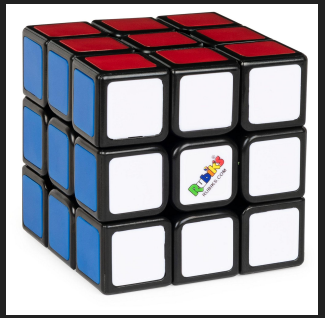
Introduction

About Me and My Inspiration

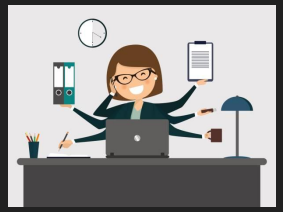
- Chaffey College freshman majoring in computer science
- Interested in solving Rubik's cubes for 4 years
- First solve was memorably satisfying
- Want to help others understand the how

What is a Rubik's Cube?

- Cubic combination puzzle by Erno Rubik
- Goal: All faces are a single color
- Different approaches to solving



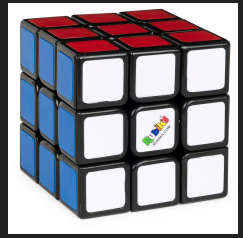
Project Implementation



ASSISTANT

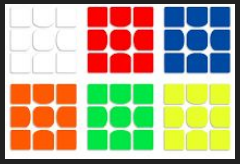
- Points to user's cube
- Beginners method (white cross, corners, second layer, yellow cross, corners)
- Switch statement: check the stage of the solve, then do the process for it (uses fallthrough)

- Stored as 3D array of faces
- Turns/Rotations: Strings
- Iterate through faces to find a sticker
- Get adjacent stickers by checking face, row, column



CUBE

- Has, face, color, row, column
- Groups sticker data



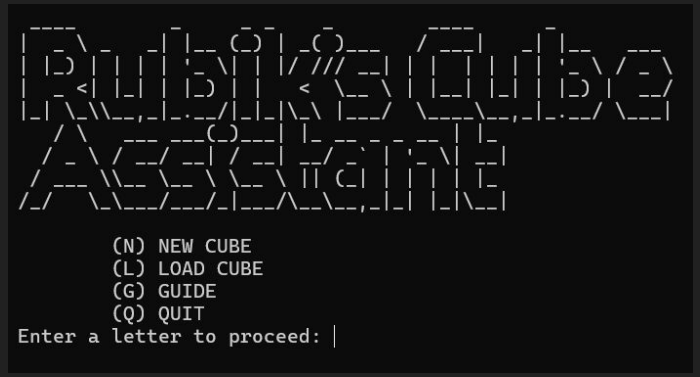
STICKER DATA (struct)

MAIN

- Bool menu navigation
- Cube scrambling (randomize string or prompt)
- File handler and cube objects for saving/loading
- Let user interact w/ cube + assistant
- Handle testing logic

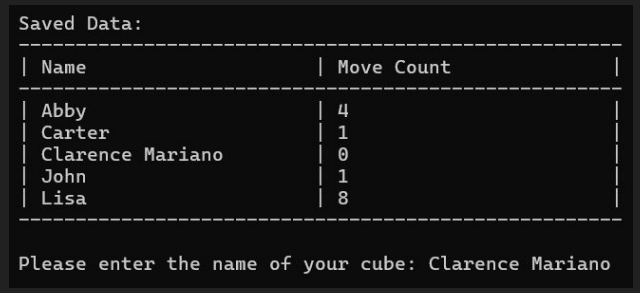
- File name is stored
- Verify files w/ ifstream + Cube's static members
- Map to store cubes to names
- Add entries when processing files, use entry to load

FILE HANDLER

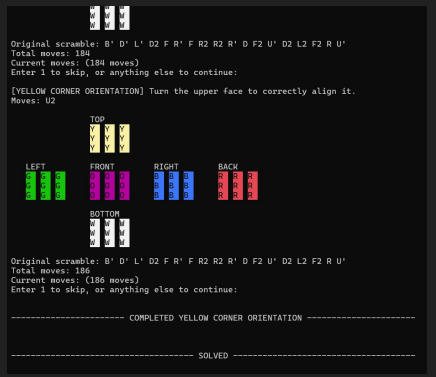

(N) NEW CUBE
(L) LOAD CUBE
(G) GUIDE
(Q) QUIT
Enter a letter to proceed:


[Clarence Mariano'S CUBE]
TOP
LEFT
FRONT
RIGHT
BACK
BOTTOM
COMMANDS
U: Clockwise turn on the top side.
L: Clockwise turn on the left side.
F: Clockwise turn on the front side.
R: Clockwise turn on the right side.
B: Clockwise turn on the back side.
D: Clockwise turn on the bottom side.
x: Clockwise rotation on the x-axis.
y: Clockwise rotation on the y-axis.
z: Clockwise rotation on the z-axis.
Note: You can append a "'" to a letter for a counterclockwise move, or "2" for two moves.
SOLVE
UNDO
SAVE
EXIT
Original scramble: B' D' L' D2 F R' F R2 R2 R' D F2 U' D2 L2 F2 R U'
Total moves: 0
Current moves: None
Please enter a command or sequence of moves (EX: U2 D2 F2 B2 L2 R2):

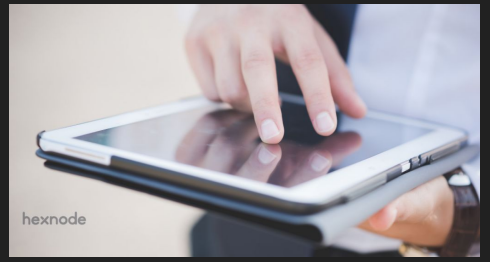
Live Demo


Saved Data:
Name	Move Count
Abby	4
Carter	1
Clarence Mariano	0
John	1
Lisa	8
Please enter the name of your cube: Clarence Mariano


COMPLETED SECOND LAYER
COMPLETED YELLOW CROSS
COMPLETED YELLOW EDGES
[YELLOW CORNERS POSITION] Rotate the cube so that the Yellow-Green-Orange corner is
Moves: y
TOP
LEFT
FRONT
RIGHT
BACK
BOTTOM
Original scramble: B' D' L' D2 F R' F R2 R2 R' D F2 U' D2 L2 F2 R U'
Total moves: 149
Current moves: (149 moves)
Enter 0 to exit, 1 to skip, or anything else to continue:


Original scramble: B' D' L' D2 F R' F R2 R2 R' D F2 U' D2 L2 F2 R U'
Total moves: 184
Current moves: (184 moves)
Enter 1 to skip, or anything else to continue:
[YELLOW CORNER ORIENTATION] Turn the upper face to correctly align it.
Moves: U2
TOP
LEFT
FRONT
RIGHT
BACK
BOTTOM
Original scramble: B' D' L' D2 F R' F R2 R2 R' D F2 U' D2 L2 F2 R U'
Total moves: 186
Current moves: (186 moves)
Enter 1 to skip, or anything else to continue:
COMPLETED YELLOW CORNER ORIENTATION
SOLVED

Future Work/Conclusion



- Allow the user to input their own cube
  - User can follow along with their physical cube
- Implementing more solving methods (CFOP, Roux, etc.)
  - Would become a better learning tool
- Rendering the cube in 3D
  - Rotation by dragging, see pieces more easily