CS174A Project Proposal

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Introduction

In this project, we intend to make a computer game for a 3 by 3 by 3 Rubik's Cube. Players can also try to solve it here themselves!
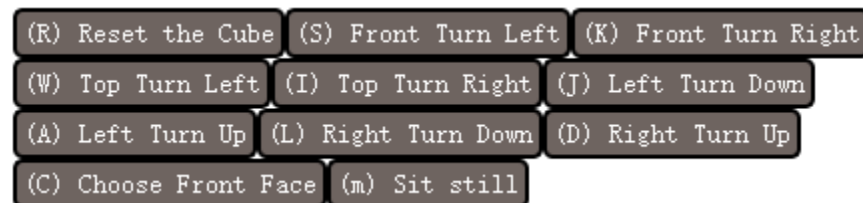
User interface
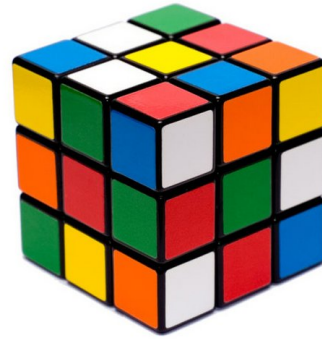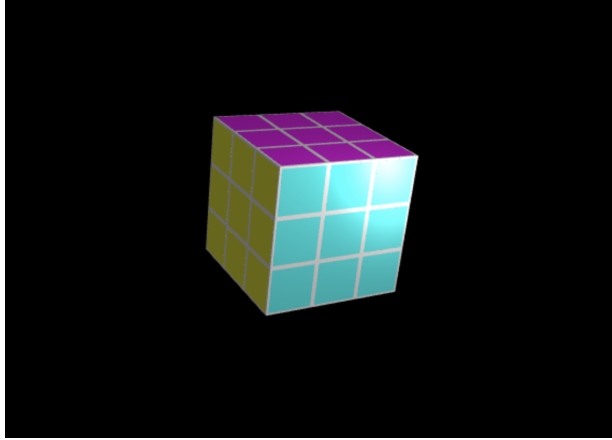
Mouse Control: Drag-picking System

Key Control:

Key	Action
Reset the Cube(R)	Resetting the color of the Rubik's Cube
Front Turn Left(S)	Rotating the front face counter-clockwise
Front Turn Right(K)	Rotating the front face clockwise
Top Turn Left(W)	Rotating the top face clockwise
Top Turn Right(I)	Rotating the top face counter-clockwise
Left Turn Down(J)	Rotating the front left face clockwise
Left Turn Up(A)	Rotating the front left face counter-clockwise
Right Turn Down(L)	Rotating the front right face clockwise
Right Turn Up(D)	Rotating the front right face counter-clockwise
Choose Front Face(C)	Look at the origin front face

Button Control:

(R) Reset the Cube (S) Front Turn Left (K) Front Turn Right
(W) Top Turn Left (I) Top Turn Right (J) Left Turn Down
(A) Left Turn Up (L) Right Turn Down (D) Right Turn Up
(C) Choose Front Face (m) Sit still

Display Window:

Additional Features

- Shadow (shadow map);
- Reflection (sky box);
- Textures and stylized shaders (change pipeline of vertex shader and fragment shader);

Technical challenges

- Like solving a real Rubik's Cube when the player frequently treats different faces as the front face, we want our code to detect and change the front face when the user moves the camera;
- Give each Rubik's cube a random color at the beginning while making sure it can be solved;
- Ensure the stability of the animation when the Rubik's Cube is rotating;
- How to shade 1 cube's faces with different colors;
- How to perverse rotations(instead of rotating periodically).