Misr University for Science and Technology

Faculty of Information Technology

Computer Graphics (Cs 402)

Project Documentation

Trace - The Cube

We're so Proud to present to you our little Cube game. In this documentation we are going to discuss the designing and programming process of our simple OpenGL video game.

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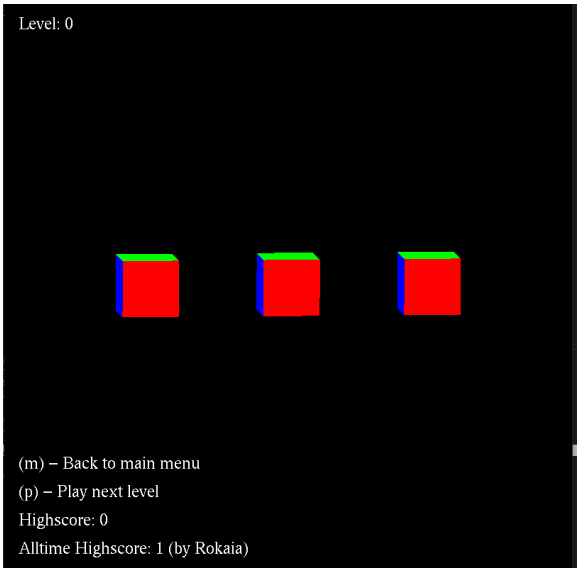
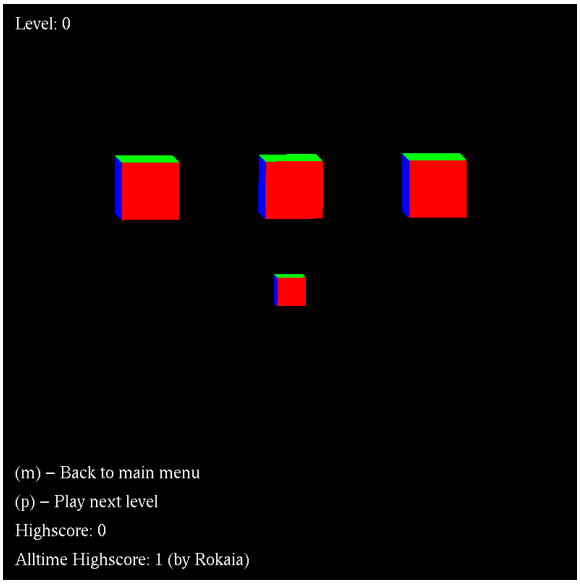
Project Overview:

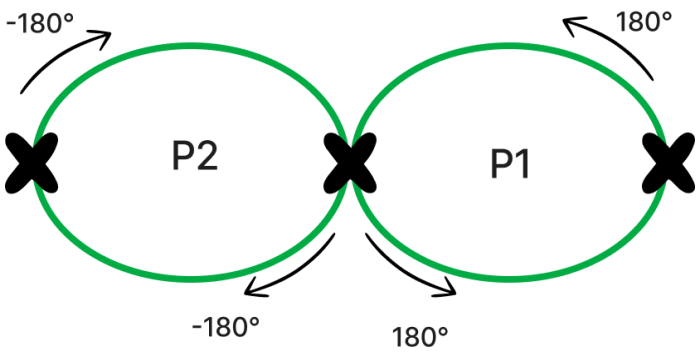




Trace the Cube is a simple video game made based on a shell game concept in which three or more identical containers (In our case Cubes) are placed face-down on a surface. A small object (The small cube) is placed beneath one of these containers so that it cannot be seen, and they are then shuffled by the system in plain view.The players are invited to bet on which container holds the object (The small cube).If the player guesses right.Then he gains a point and transferred to the next level where the game gets harder and harder.The player loses when he guesses incorrectly as he couldn't trace the cubes.

Problem Statement The main problem was How to make make the cubes rotate and how we could show the rotation process after some discussions and analyzing we reached to this solution which is

Selecting Two points and make them the center of the rotating process (P1,P2) as the center cube could rotate around one of the points randomly to reach the location of the left or right cube in which they rotate as well to replace the rotated center cube and become the new center and the process go over and over again. The animation in openGl helped us to highlight the process to make the gaming process clear and enjoyable.



Discussing The Used OpenGL Functions:[1][2]

- <GL/glut.h> : (glut) the openGL library that's been used throughout the project.
- glutInit(&argc, argv) : glutInit is used to initialize the GLUT library.
- glutInitDisplayMode( ):The *initial display mode* is used when creating top-level windows, subwindows, and overlays to determine the OpenGL display mode for the to-be-created window or overlay.
- glutInitWindowSize( ): To set the *initial size*.
- glutCreateWindow("Trace the Cube") :creates a new Window
- glEnable(GL_DEPTH_TEST): enable or disable server-side GL capabilities

  if enabled, do depth comparisons and update the depth buffer. Note that even if the depth buffer exists and the depth mask is non-zero, the depth buffer is not updated if the depth test is disabled.
- glutMainLoop(): glutMainLoop enters the GLUT event processing loop.
- glutPostRedisplay(): marks the current window as needing to be redisplayed.
- glLoadIdentity(): replaces the current matrix with the identity matrix.
- glRotatef(): multiply the current matrix by a rotation matrix
- glScalef :multiply the current matrix by a Scale matrix
- glutTimerFunc( ): glutTimerFunc registers a timer callback to be triggered in a specified number of milliseconds.
- glTranslatef: multiply the current matrix by a Translation matrix
- glClearColor( ) : selects the color of bitplane
- glClear( ): sets the bitplane area of the window to values previously selected by glClearColor
- glMatrixMode(GL_PROJECTION) : Applies subsequent matrix operations to the projection matrix stack.
- glLoadIdentity(): return the transformation matrix to identity matrix
- glOrtho(-2.0, 2.0, -2.0, 2.0, -2, 2); // Clipping vol. multiply the current matrix with an orthographic matrix
- glMatrixMode(GL_MODELVIEW): sets the current matrix mode which applies subsequent matrix operations to the modelview matrix stack.
- glColor3f( ) : Applies subsequent matrix operations to the color matrix stack.
- drawText(-1.9, -1.5, "(p) - Play next level ") : draws the text.
- glutKeyboardFunc( ): sets the keyboard callback for the current window.
- glutSwapBuffers() : promotes the contents of the back buffer of the layer in use of the current window to become the contents of the front buffer.

[1] https://www.opengl.org/resources/libraries/glut/spec3/node1.html
[2] https://docs.gl/

Implementation:

The code is downloaded on github you can view the source code through this link https://github.com/nourgaser/Trace-the-Cube

Project Screenshots: