CS 352
Computer Graphics

SIMULATING CAR DRIVING EXPERIENCE

Overview:

We plan to model a car structure with keyboard and mouse functionalities to move the car. The viewer will be allowed to roam around using keyboard controls and enjoy the view.

Features:

1. 3d geometric transformation
2. 3d viewing
3. keyboard and mouse accessibility
4. Camera controls, translational and rotational(3-axis)
5. using key and mouse inputs etc.
6. Texture+color: Textures mapped to cars, objects(roads, walls) and clouds, with the blue background colour for sky and cars with different colours.
7. Shading: Shading over the car body, Lighting by Sun, (optionally trees and simple house structures)
8. Text: Text overlay detailing controls, etc.
9. Animation: Moving cars.
10. Camera Movement: Camera movement using a keyboard to help drive the car.

Tech Stack:

Primary Tools
○ GLUT as OpenGL window framework
○ C++ ○ Image libraries for textures
○ BMP files as textures

Instructions:

Controls are:

1. Up key - to move camera forward
2. Down key - to move camera backward
3. Left key - to rotate camera to the left
4. Right key - to rotate camera to the right
5. t - top view
6. a - to move left
7. d - to move right
8. w - to zoom in
9. s - to zoom out
10. i - to show or hide instructions
11. q - quit

If you wish to move the car, press ’m’

1. Up key - to move car forwards
2. Down key - to move car backwards
3. Left key - to rotate car to the left
4. Right key - to rotate car to the right

Components of the project:

This project has cars, roads, parking lot, houses and walls as components built using OpenGL libraries GLUT and functions.

To construct a car, we have used OpenGL functions like GL_LINES, GL_POLYGON, GL_QUADS. This can be found in drawcar() function in the car.cpp file.

A display list is constructed for each of these objects. These display lists are used every time a car has to be constructed. So, to create the 9 cars in the parking lot the “carr_display_list “ is called 9 times from within a loop and are translated each time by suitable values to place them correctly. Also, one additional car is constructed which can be moved around. This can be found in renderScene() function in the main.cpp file.

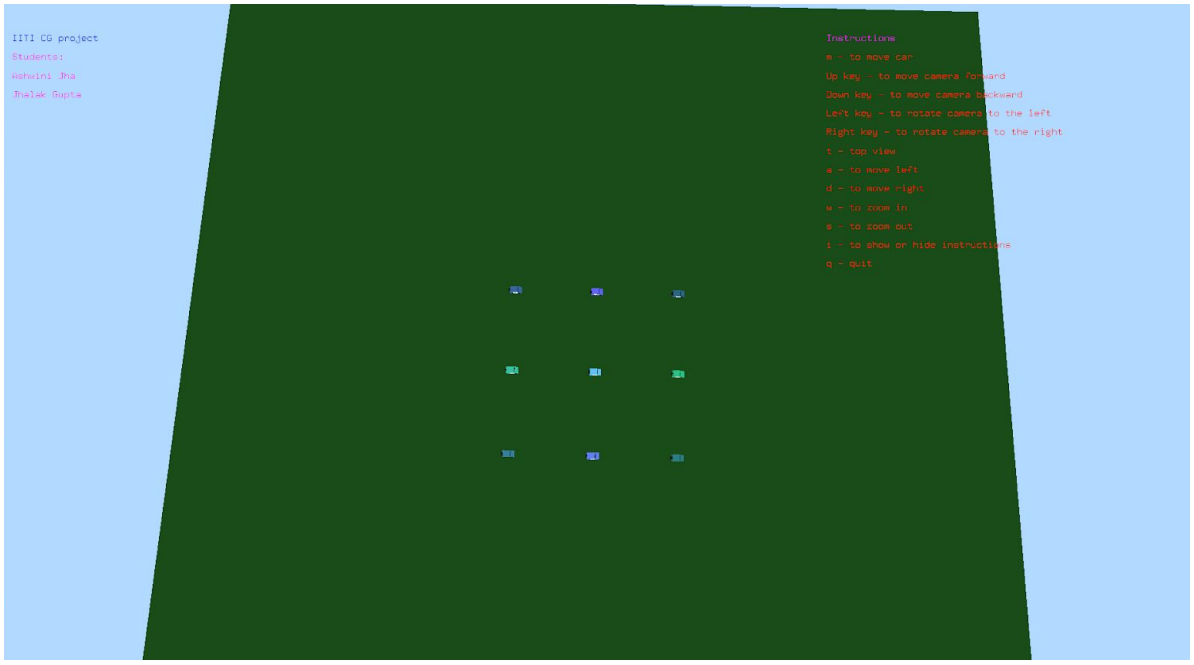
For movement of camera GluLookAt() function is used.

Keyboard keys are used in inputKey() and moveCar() functions in the main.cpp file.

Screenshots:

Initial Scene:

Top View:



Movement of Car:

Future Work:

Better visualizations are to be done by adding houses and trees etc.
Textures and shadow are also to be added.
Changes are to be done to improve the user experience.
Reflection on glasses due to sunlight also to be added.