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**AMERICAN INTERNATIONAL UNIVERSITY–BANGLADESH (AIUB)**

**Dept. of Computer Science**

**Faculty of Science and Technology**

**CSC4118: COMPUTER GRAPHICS**

**Spring: 2024-2025**

**Section: [O]**

**Group No: 07**

**Project Report On**

**Project Name [City View]**

|  |  |  |
| --- | --- | --- |
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# Introduction

This project is an animated city and nature scene created using OpenGL (GLUT) in C++. The scene combines multiple elements such as sky, river, trees, buildings, vehicles (cars, buses, trains), boats, clouds, airplanes, and animated fishes in the river. It includes dynamic day-night transitions, rain, and lightning effects, providing an immersive, lively city environment.

**Technologies used:**  
 C++  
 OpenGL (GL, GLUT)  
 Windows Platform (Win32)

# Project Graph

|  |
| --- |
|  |

The project works on a 2D coordinate system with approximate coordinate ranges:  
 X-axis: 0 to 100  
 Y-axis: 0 to 90  
  
Main vertical layers:  
 River (Y: 0–20)  
 Road and lower ground (Y: 20–50)  
 Rail track (Y: 44–50)  
 Buildings, trees, and sky (Y: 50–90)  
  
Dynamic objects like cars, buses, trains, planes, and clouds move within this coordinate framewor

# List of Objects Assigning an Object ID

|  |  |  |
| --- | --- | --- |
| **SL#** | **Object ID** | **Object Name** |
| 1 | OBJ1 | River |
| 2 | OBJ2 | Sky |
| 3 | OBJ3 | Border & Dividers |
| 4 | OBJ4 | Rail Path |
| 5 | OBJ5 | Tree |
| 6 | OBJ6 | Buildings |
| 7 | OBJ7 | Stars |
| 8 | OBJ8 | Sun & Moon |
| 9 | OBJ9 | Clouds |
| 10 | OBJ10 | Plane |
| 11 | OBJ11 | Plane2 |
| 12 | OBJ12 | Train 1 |
| 13 | OBJ13 | Train 2 |
| 14 | OBJ14 | Car |
| 15 | OBJ15 | Bus |
| 16 | OBJ16 | Fish (Various Colors) |
| 17 | OBJ17 | Boat |
| 18 | OBJ18 | Rain |
| 19 | OBJ19 | Splashes |
| 20 | OBJ20 | Lightning Bolt |

# List of Functions To Represent Objects:

|  |  |  |
| --- | --- | --- |
| **SL#** | **Object Name** | **Function Name** |
| 1 | River | drawRiver() |
| 2 | Sky | drawSky() |
| 3 | Border | drawBorder() |
| 4 | Rail Path | drawRailPath() |
| 5 | Tree | drawTree() |
| 6 | Buildings | drawBuilding(), drawBuildingTop(), drawBuildingSide(), drawSideBuildingTop() |
| 7 | Windows | drawWindow(), drawWindowGrid(), drawSideWindow(), drawSideWindowGrid() |
| 8 | Doors | drawDoor1(), drawDoorGrid() |
| 9 | Plane | drawPlane() |
| 10 | Clouds | drawCloud() |
| 11 | Red Car | drawRedCar() |
| 12 | Megenda Bus | drawMegendaBus() |
| 13 | Blue Bus | drawBlueBus() |
| 14 | Mini Car | drawMiniCar() |
| 15 | Train 1 | drawTrain() |
| 16 | Train 2 | drawTrain2() |
| 17 | Boat | drawBoat() |
| 18 | Fish | drawRedFishLeft(), drawYellowFishLeft(), drawGreenFishLeft(), drawOrangeFishRight(), drawBlueYellowFishRight() |
| 19 | Stars | drawStars() |
| 20 | Sun & Moon | drawSun(), drawCrescentMoon() |

# List of Animation Functions with ID

|  |  |  |  |
| --- | --- | --- | --- |
| **SL#** | **Animation Function ID** | **Animation Function** | **Object/Scene** |
| 1 | ANM1 | updateClouds() | Clouds |
| 2 | ANM2 | updatePlane() | Plane |
| 3 | ANM3 | updateTrain() | Trains |
| 4 | ANM4 | updateCars() | Cars, Buses |
| 5 | ANM5 | updateFishAnimation() | Fishes |
| 6 | ANM6 | updateBoat() | Boat |
| 7 | ANM7 | updateRain() | Rain |
| 8 | ANM8 | updateLightning () | Lightning |
| 9 | ANM9 | drawDayScene() | Day Scene |
| 10 | ANM10 | drawNightScene() | Night Scene |
| 11 | ANM11 | drawDayRainScene() | Rainy Day Scene |
| 12 | ANM12 | drawNightRainScene() | Rainy Night Scene |

# Contribution

|  |  |  |  |
| --- | --- | --- | --- |
| **Member Name** | **Implemented Functions** | **Implemented Animation Functions** | **Percentage of Contribution** |
| Mohsin Ibna Hossain | All drawing functions | All animation functions | 100% |

# Conclusion

This project successfully integrates various static and dynamic objects to simulate a lively urban and natural environment using OpenGL. Features like day-night transitions, weather effects, and multiple moving vehicles provide realism and an interactive feeling. The project also demonstrates strong modular design principal, using separate functions for each object and animation.