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UNIVERSITY OF INFORMATION TECHNOLOGY AND SCIENCES

Project Report

Department: Computer Science and Engineering(CSE)

Course Title: Computer Graphices Lab

Course Code: CSE-362

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1. Introduction

This project is a **2D computer graphics animation** created using OpenGL (GLUT).
It simulates an **urban city environment** with high-rise buildings, roads, moving cars, pedestrians, birds, clouds, and a day-night transition.
The project demonstrates core computer graphics concepts, including **2D rendering, transformations, animation, and user interaction**.

2. Objectives

To design a realistic urban city environment with buildings, roads, and trees.

To animate moving cars and walking pedestrians.

To animate birds flying across the sky and clouds drifting naturally.

To implement a **day-night toggle** using keyboard input.

To demonstrate the use of OpenGL primitives, timers, transformations, and animation techniques.

3. Project Description

The animated urban scene contains:

Urban City Area

High-rise modern buildings with windows and realistic design.

Road and Traffic

A road with lane markings.

Two sports cars move along the road simulating traffic flow.

Pedestrians

People crossing the street with walking animation.

Sky and Clouds

Clouds drift slowly across the sky, creating a natural sense of motion.

Birds

Small birds fly across the upper sky, adding life to the scene.

Day-Night Mode

Pressing the ‘T’ key toggles between day and night.

Sun or moon appears depending on the mode, and the sky color changes accordingly.

4. Technical Features

Programming Language: C / C++

Graphics Library: OpenGL (GLUT)

Shapes Used: Triangles, Quads, Circles

Animation:

Clouds, birds, cars, and pedestrians move continuously.

`glutTimerFunc()` controls the animation.

Interaction:

Keyboard input via `glutKeyboardFunc()` toggles day-night mode.

Modular Design:

Separate functions for buildings, cars, people, birds, trees, and circles.

5. Scene Description

Sky and Day-Night Mode

Blue sky with the sun in daytime, and dark sky with the moon at night.

Cloud Animation

Clouds drift across the sky slowly to simulate natural movement.

Birds

Birds fly across the upper sky, giving life and motion to the scene.

Buildings

Tall, modern buildings with windows create a realistic urban city view.

Road and Cars

Two sports cars move along the road, simulating traffic.

Pedestrians

People walk across the road with simple animations, enhancing realism.

6. Expected Output

A smooth, animated 2D urban city environment.

Dynamic elements like moving cars, walking pedestrians, flying birds, drifting clouds.

Interactive day-night toggle via keyboard input.

Realistic and lively urban scene for visualization and demonstration.

7. Conclusion

This project successfully demonstrates fundamental computer graphics concepts:

2D animation, geometric primitives, transformations, timers, and user interaction.

A realistic simulation of an urban city environment

An educational example of OpenGL-based animation and scene design.