**American International University Bangladesh**



**Computer Graphics**

**Course Code: CSC4118**

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**Project Report**

**[Train Station]**

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1. **Introduction:**

This project presents the design and implementation of a simple 2D railway animation using OpenGL and GLUT. The system features a moving train, animated clouds, and day/night transitions with corresponding visual effects. A station, building, and tree are added to enrich the environment. The program demonstrates core concepts of computer graphics such as the use of primitives, raster algorithms, transformations, and frame-based animation. Keyboard and mouse inputs allow interactivity, including toggling between day and night and controlling train movement. The project successfully integrates theoretical concepts into a practical animated scene.

1. **Project Graph :**

A blue and white drawing of a train

Description automatically generated

1. List of objects assigning an object ID – Make a list of the objects that will be included in your project. MUST follow the following listing pattern.

|  |  |  |
| --- | --- | --- |
| SL# | Object ID | Object Name |
| 01 | ID 1 | Sky |
| 02 | ID 2 | Sun |
| 03 | ID 3 | Clouds |
| 04 | ID 4 | Ground |
| 05 | ID 5 | Station |
| 06 | ID 6 | Railway Lines |
| 07 | ID 7 | Train |
| 08 | ID 8 | Building (left) |
| 09 | ID 9 | Tree (right) |

1. List of Functions To Represent Objects- Each object must be represented by a function. MUST follow the following listing pattern-

|  |  |  |
| --- | --- | --- |
| SL# | Object Name | Function Name |
| 01 | Sky | drawSky2() |
| 02 | Sun | sun() |
| 03 | Cloud | Cloud(offsetX, offsetY), drawCloudparts() |
| 04 | Ground | ground() |
| 05 | Station | station() |
| 06 | Railway Lines | line() |
| 07 | Train | train() |
| 08 | BuildingLeft | buildingLeft() |
| 09 | TreeRight | treeRight() |
| 10 | Circle Drawing | Plot\_point(), Circle(cx, cy, r) |

1. List of Animation Functions with ID – These should be functions that are used to add animations like- object movement, mouse, and keyboard interaction, change of scenarios and so on. MUST follow the following listing pattern-

|  |  |  |  |
| --- | --- | --- | --- |
| SL# | Animation Function ID | Animation Function | Object/Scene |
| 01 | A1 | updateTransition(int) | Updates train horizontal |
| 02 | A2 | updateCloud(int) | Moves cloud |
| 03 | A3 | handleKeypress() | Toggles (keyboard input) |
| 04 | A4 | handleMouse() | Start/Stop train (mouse input) |
| 05 | A5 | Display()/displaytrain() | Composes scene each frame |

1. **Conclusion:**

The project successfully demonstrates a 2D animated train scene with day/night effects using OpenGL. It combines raster algorithms, geometric modeling, and animation techniques with user interaction. Despite limitations, the project serves as an effective demonstration of fundamental computer graphics concepts.