B.Sc. Engg. Project

Project Title: Airplane Simulation Game

Group: 04

by

Tamima Nisat (ID: 19202103309)

Al Rifat Hasan (ID: 19202103311)

Tasnim Islam (ID: 19202103313)

Kaniz Farzana (ID: 19202103413)

Submitted to

Sweety Lima

Lecturer

Department of Computer Science & Engineering

Department of Computer Science & Engineering

Bangladesh University of Business & Technology (BUBT)

Dhaka 1216

Submission Date: March 06,2023

Acknowledgment

We would like to pay our gratitude to the Almighty Allah who created us with all the abilities to understand analysis and develop the process with patience. We are thankful to our project supervisor Sweety Lima, Lecturer, Department of Computer Science and Engineering , Bangladesh University of Business and Technology for her professional guidance and motivation during the work of this project which is a major part of it. Without her valuable support and guidance, this project could not reach this level of development from our point of view.

We would like to thank all the Faculty members, Department of CSE, Bangladesh University of Business and Technology for their valuable time spend in requirements analysis and evaluation of the project work. We would like to express our sincere and warm gratitude to all those who have encouraged us directly, provided mental encouragement and criticized our work in several phases during the development of this project and for preparing this project indirectly.

Abstract

Computer graphics have become a universal means of transmitting events and information. Make it an essential component of modern communication in a visually appealing way game. A combination of graphics and computer talent can help you with a variety of entertainment. A simulation game is one of the most important areas where computer graphics may be applied. In our project we have created an "Airplane Simulation Game" with computer graphics and simulation technologies. We have used openGL and C++. This project has both interesting features and visual effects.

The main goal of this project is to fly as far as possible and avoid obstacles.There are two types of obstacles in this game, Buildings and clouds. While playing the game, buildings and clouds will appear randomly one after another. The height of the clouds and buildings are also random. The user can not know which object and which height will appear next. So he/she has to concentrate on the game continuously. The game will end if the plane hits obstacles or falls on the ground. The level of the game will increase after passing every 50 meters. The score of the user and the level number will appear in the below of the game window. The user can either start the game directly, if he knows how the game works or has played it before, by clicking in the box with "Play" option. Otherwise, he can view the instruction as to the game works by clicking on the "Instruction" button. If the player has changed his mind to play the game sometime later, he can click on "Exit" button which terminates the game. When the player hits on the Instruction button, another page which describes how the game works appears.The game can be restarted whenever the user loses. Users can pause the game, Press the "p" button on your keyboard this game is easy to play and exciting. Overall, this project demonstrates the capabilities of using computer graphics and simulation technologies to create an engaging and entertaining game experience.

Declaration

We declare that the project title, **Airplane Simulation Game** and the work presented in it our own.we confirm that:

We,hereby declare that the discussion entitled,**Airplane Simulation Game** being submitted by us towards the partial fulfillment of the requirement for the course of Computer Graphics Lab,Department of Computer Science and Engineering is a project work carried by us under the supervisior of Sweety Lima Mam and have not been submitted anywhere else.We will be the responsible if any mistake found there .

Tamima Nisat 19202103309	Al Rifat Hasan 19202103311	Tasnim Islam 19202103313	Kaniz Farzana 19202103413

Copyright

Dedication

Dedicated to our parents, teachers, friends and who loved us for all their love and inspiration.

Certificate

This is to certify that Copyright by Tamima Nishat (ID: 19202103309),Al Rifat Hasan (ID: 19202103311),Tasnim Islam (ID: 19202103313) and Kaniz Farzana (ID: 19202103413) were belong to the department of Computer Science and Engineering, have completed their Project on **Airplane Simulation Game** satisfactorily in partial fulfillment for the requirement of Bachelor of Science in Computer Science and Engineering of Bangladesh University of Business and Technology in the year 2023.

Supervisor
Ms.Sweety Lima
Lecturer
Department of Computer Science and Engineering
Bangladesh University of Business and Technology

Approval

A Project on **Airplane Simulation Game** is submitted by Tamima Nishat (ID: 19202103309),Al Rifat Hasan (ID: 19202103311),Tasnim Islam (ID: 19202103313) and Kaniz Farzana (ID: 19202103413) under the department of Computer Science and Engineering of Bangladesh University of Business and Technology is accepted in partial fulfillment of the requirements for the degree of Bachelor of Science in Computer Science and Engineering

---

Supervisor
MS. Sweety Lima
Lecturer
Department of Computer Science and Engineering
Bangladesh University of Business and Technology

Chairman
Md. Saifur Rahman
Assistant Professor & Chairman
Department of Computer Science and Engineering
Bangladesh University of Business and Technology

Contents

List of Figures

Chapter 1

Introduction

1.1 Introduction

Airplane Simulation Game is a mini project in computer graphics with OpenGL ,which is a simple,realistic and interesting.

In this project, an airplane is under the control of the user. The user has to avoid obstacles and fly the airplane. How much distance has been crossed and the point of the user will be shown below. When the airplane hits the incoming object, the game ends.we will use input devices like a mouse and keyboard to interact with the program. All instruction are given in this project, how to play the game. So any one can play the game easily.

1.2 Motivation and Objective

The objective of the project is to build a game using OpenGL and c++, which uses the airplane as a tool for this game. The Computer Graphics game Project uses OpenGL implementation to run the airplane through the scene avoiding obstacles.. As the airplane hits the incoming object, the game ends.

1.2.1 Project Description

A simulation game is one of the most important areas where computer graphics may be applied. In our project we have created an "Airplane Simulation Game" with computer graphics and simulation technologies. We have used openGL and C++. This project has both interesting features and visual effects.

The main goal of this project is to fly as far as possible and avoid obstacles.There are two types of obstacles in this game. Buildings and clouds. While playing the game, buildings and clouds will appear randomly one after another. The height of the clouds and buildings are also random. The user can not know which object and which height will appear next.

So he/she has to concentrate on the game continuously. The game will end if the plane hits obstacles or falls on the ground. The level of the game will increase after passing every 50 meters. The score of the user and the level number will appear in the below of the game window. Whenever the user loses he can restart the game. The user can pause the game. Instruction to play the game has been given. The game is easy to play and interesting.

Chapter 2

Methodology

2.1 Algorithms

2.1.1

Algorithm of the game:

1. First, print the instructions of the game.
2. Initialize GLUT display properties.
3. Implement display() function and pass it in glutDisplayFunc().
    a. This function checks for the activeness of various states and acts upon that.
    b. If gameEndStatus is true, it calls gameEnd() function that draws a background image, draws a small airplane with proper scaling, prints game stats etc.
    c. If the welcomeFlag is true, it calls the welcome() function that initializes the welcome screen.
    d. If the instruction flag is true, it initializes the instruction manual page.
    e. If the abtFlag is true, it initializes the about page.
    f. If the pause is true, the game is paused with a background.
    g. If there is a building currently in the window and the plane hit the it, we set gameEndStatus as true and invoke gameEnd()
    h. If there is a cloud currently in the window and the plane hit the it, we set gameEndStatus as true and invoke gameEnd()

i. If we hit the boundary, we set gameEndStatus as true and invoke gameEnd()
j. If we crossed a score multiple of 50, we increase the level and speed.
k. If the value of the booster is less than or equal to the BOOSTER_MAX value, we increase the booster value.
l. If the building or cloud has gone outside the screen, we initialize a new building or cloud.

4. Implement the functionality of various mouse events in mouse() and pass it in glutMouseFunc() so that it can listen to the mouse events asynchronously and act accordingly.
5. Implement the functionality of various key-pressing events in keyPressed() and pass it in glutKeyboardFunc() so that it can listen to the keypress events asynchronously
6. Implement the functionality of various key-release events in keyUp() and pass it in glutKeyboardUpFunc() so that it can listen to the key-release events asynchronously and act accordingly

Chapter 3

System Requirement

3.1 Software

3.1.1 CodeBlocks

Code::Blocks is a free, open-source cross-platform IDE that supports multiple compilers including GCC, Clang and Visual C++.

Code::Blocks supports multiple compilers, including GCC, MinGW, Digital Mars, Microsoft Visual C++, Borland C++, LLVM Clang, Watcom, LCC and the Intel C++ compiler. Although the IDE was designed for the C++ language, there is some support for other languages, including Fortran and D. A plug-in system is included to support other programming languages. Code::Blocks is being developed for Windows and Linux and has been ported to FreeBSD, OpenBSD and Solaris. The latest binary provided for macOS version is 13.12 released on 2013/12/26 (compatible with Mac OS X 10.6 and later), but more recent versions can be compiled and MacPorts supplies version 17.12.

Figure 3.1: CodeBlocks)

3.2 GLUT Libarary Functions:

- GLUTLEFTBUTTON.
- glutInitDisplayMode.
- glutInitWindowSize.
- glutInitWindowPosition.
- glutCreateWindow.
- glutDisplayFunc.
- glutPostRedisplay.
- GLTRIANGLES.
- GLPOLYGON.
- GLLINE.
- glClear.
- GLLINE.
- glColor3f.
- glColor3ub.
- glFlush.
- glRectf.
- glBegin.
- glEnd.

- glVertex2d.
- glPushMatrix.
- glTranslatef.
- glPushMatrix.
- glPopMatrix.
- glLineWidth.
- glutPostRedisplay.

3.2.1 Hardware Requirements:

- Intel(R) Core(TM) i5-82657U CPU @ 1.60GHz 1.80 GHz.
- Microsoft(R) Windows(R) 10 Home Single Language(64 bits).
- 20GB of RAM.
- 2.5GB of available hard-disk space for installation.
- Additional free space required.
- 1920x1080 display.
- QuickTime 10.xsoftware recommended.

3.3 Languages

3.3.1 C/C++

C is a high-level programming language that was developed in the mid-1970s. It was originally used for writing Unix programs, but is now used to write applications for nearly every available platform. Compared to most previous languages, C is easier to read, more flexible (can be used for a wide variety of purposes), and more efficient at using memory.

Figure 3.2: C/C++)

C++, pronounced "C plus plus," is a programming language that was built off the C language. The syntax of C++ is nearly identical to C, but it has object-oriented features, which allow the programmer to create objects within the code. This makes programming easier, more efficient, and some would even say, more fun. Because of the power and flexibility of the language, most software programs today are written in C++.

Chapter 4

Conclusion

4.1 Future Scope

- We are also adding some new features to make it more attractive.
- Add more options like Top scores and Reward Option.
- Add multiplayer option and Player Profile.
- Add level maps,limited Life option.
- Add Environment and Jet choose option.

4.2 Conclusion

This Computer Graphics is designed for all and We tried our best to solve the problem with the guidance of our beloved faculty but still we are trying to improve and this is lagging from different facilities as nothing is perfect, we are on way to its perfection.
To complete the project, we will build a game using OpenGL and c++ using planes as the tools of the game. In the Project computer graphics game, you must fly a plane, avoid dangers, and refuel. Running out of fuel ends the user's game, just like hitting an incoming object.

4.3 References

- www.youtube.com
- www.tutorialspoint.com
- www.geeksforgeeks.org