American International University Bangladesh

Computer Graphics

Course Code: CSC4118

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Project Report

[Space Shooter]

Under the Guidance of

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I. Group Member Details

Group Member Name	ID
1. MD SHADMAN SHAKIB ALAM	22-46262-1
2. TOUFIQ AHMED SHISHIR	22-46260-1
3. MD SABBIR SIKDER	22-46005-1
4. MD TANZIL RAYHAN	22-46300-1
Team Leader Name:	MD SHADMAN SHAKIB ALAM
Section:	C

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- **List of objects:**

[Here you have to explain the object of your project]

- **Functions to represent the objects:**
- **Output Screenshot:**

[You have to include the screenshot of the project output]

- **Demo Link:**

[You have to take a screen record video of your project and upload it in the one drive. Then give me access to rbiswas@aiub.edu and keep the link here.]

- **Uniqueness of your Project:**
- **Extra work:**

[Here, you may include the work that is not defined in your project proposal. Otherwise, you may remove it]

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Name & Id	Work Details
MD SHADMAN SHAKIB ALAM (22-46262-1)	Implemented core mechanics, managed assets, and collaborated on sprites.
TOUFIQ AHMED SHISHIR (22-46260-1)	Contributed to asset setup, code readability, and integrated libraries
MD SABBIR SIKDER (22-46005-1)	Implemented obstacles, optimized performance, and contributed to scoring.
MD TANZIL RAYHAN (22-46300-1)	Implemented sound, menus, and contributed to testing.

- **Remember: The report heading should be 14 and Paragraph body 12 in size. You have to justify the paragraph and use the font letter "Time New Roman".**
- **You can also add an extra section at your convenience**

Reference:

[You may include some website links that helped you to do the project.]

Introduction:

The proposed project involves creating an interactive game called "Space Shooter" with the OpenGL graphics framework. Players operate a human spacecraft in this dynamic outer space environment, tasked with removing extraterrestrial threats while avoiding collisions. The spacecraft can fire missiles at approaching alien craft, with each successful strike destroying an alien. The player's spaceship has three lives in the game, and its health depletes as it collides. Furthermore, "Space Shooter" has two separate difficulty levels, with the degree of difficulties constantly altering based on the level selected. The goal is to get the greatest possible score by destroying as many alien ships as possible while preserving lives. The game, which is intended for a wide audience, blends immersive graphics and active gameplay to create an exciting experience and visually appealing experience. With polished graphics and compelling gameplay, the project seeks to build a holding space-themed game that follows modern game production standards.

Motivation:

The "Space Shooter" project is a thrilling venture into the world of interactive gaming, driven by the powerful OpenGL graphics library. This immersive game invites players to embark on an exhilarating journey through the vastness of outer space, where they take command of a human spacecraft armed with the crucial mission of thwarting alien threats and skillfully navigating through a cosmic battlefield.

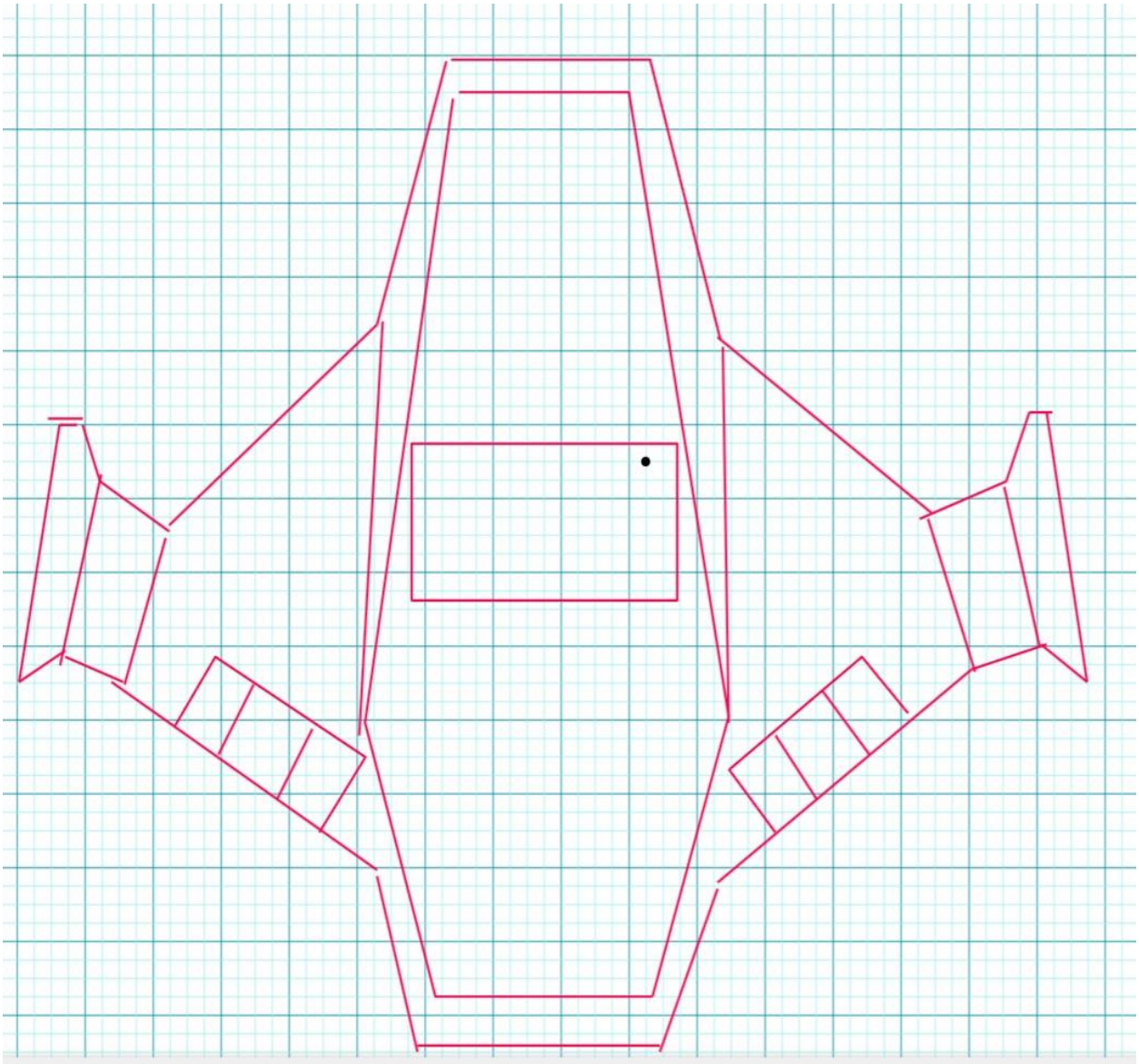
At the heart of the gameplay is the spacecraft's ability to shoot projectiles, providing players with a powerful tool to obliterate incoming alien crafts. Every successful hit translates to the satisfying destruction of an alien opponent, adding to the adrenaline-fueled experience. However, the challenge is not without risk, as collisions with aliens lead to a gradual depletion of the spacecraft's health, adding an element of strategy and urgency to the game.

The inclusion of a limited number of lives intensifies the stakes, urging players to balance offensive maneuvers with defensive tactics. The game further caters to a diverse audience by offering two distinct difficulty levels, ensuring an adaptable and engaging experience for both novice and seasoned gamers alike. The dynamic adjustment of challenges based on difficulty levels keeps players on their toes, contributing to the game's replay value.

With a visually striking design and fluid gameplay mechanics, "Space Shooter" aims to captivate players with its seamless fusion of immersive graphics and dynamic challenges. The project sets out to deliver an entertainment experience that meets contemporary standards in game

development, offering a polished and visually appealing space-themed game that promises to leave an impression on its audience. The "Space Shooter" project is not just a game; it is a voyage into the cosmos, inviting players to test their skills and embark on an unforgettable intergalactic adventure.

Diagram:



List of objects:

1.Spacecarft.

2.Number of bullets.

3.Number of obstacles.

4.Three signs of life.

5.Scorebar.

6.Background scenario.

7. Game Lavel

Functions to represent the objects:

I. Obstacle: There will be several obstacles; all of them fall from peak to bottom along with the Y axis from random point of X axis. This obstacle will vanish by hitting the bullets. The strength of the obstacles is the same. To destroy each obstacle two bullets are required.

II. Bullets: The bullets will spread from the spacecraft. The bullets will move from bottom to pick along with the Y axis toward the obstacles.

III. Spacecraft: Spacecraft can move entire windows. The movement of spacecraft will be controlled by mouse cursor. Besides this the spacecraft can shoot bullets. Spacecraft is fired by pressing the right button of mouse. By the collision between spacecraft and obstacle the spacecraft will lose one of its lives. After the three collisions the game will be over.

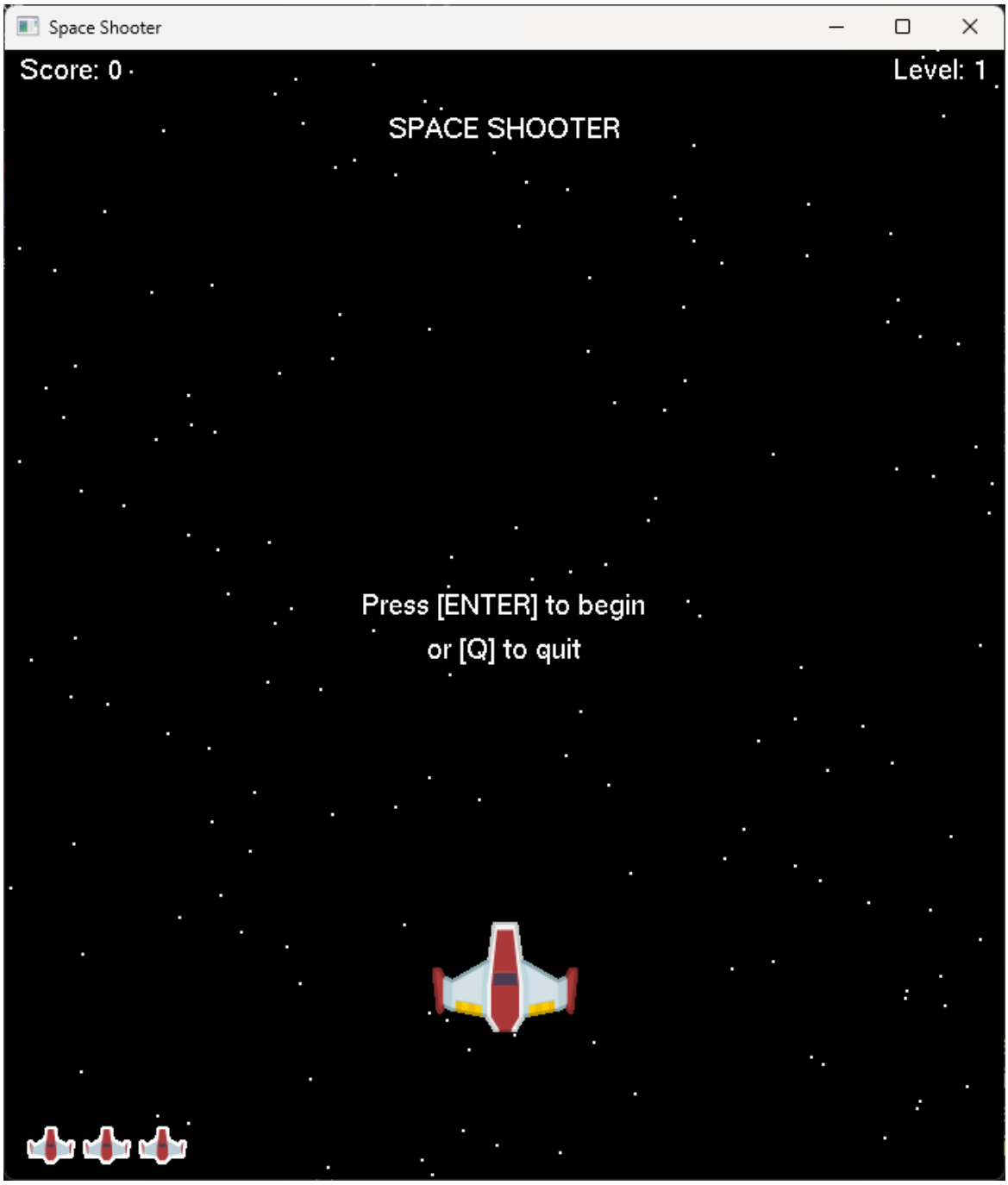
IV. Three signs of life: There will be three signs of small aircraft at the bottom-left conner it will represent the amount of life of the player. Each life will disappear by each collision of spacecraft.

V. Score bar: There will be a score bar at left top of the window. For each destroy player will get three points.

VI. Background scenario**:** There will be a background scenario. The background scenario will contain several stars that will fall from the top to the bottom of the window.

VII. Game Level: There will be 2 primary game levels. At top-right corner there will be the label which will indicate the current game level.

Output Screenshot:



Demo Link:

Section_C_Group_No_09 Project[Space Shooter Game] Link

Uniqueness of Project:

I. **Player Life Indicators:** The game displays player life indicators at the top-right corner, represented by heart sprites. This feature provides a visual representation of the player's remaining lives, making it easier for players to track their progress.

II. **Score System:** The game includes a scoring system where players earn points for destroying obstacles. The scoring mechanism adds a competitive element, encouraging players to aim for higher scores and creating a sense of achievement.

III. **Menu System:** The game incorporates a menu system with options to start a new game, exit, and restart after a game is over. This structure enhances the user experience by providing clear navigation and options.

Extra work:

In this project we implement various components and functionalities. And those components caries a vital role in this project some Extra works in this project

1. **Game Loop:**
   Implement a game loop using GLUT functions like `glutDisplayFunc`, `glutIdleFunc`, and `glutTimerFunc` to manage the flow of the game.
2. **User Input:**
   Capture user input for controlling the spaceship. Use functions like `glutKeyboardFunc` or `glutSpecialFunc` to handle keyboard input and for mouse handling events use glutPassiveMotionFunc() and glutMouseFunc().
3. **Rendering:**
   Design and render spaceships, alien ships, missiles, and other game elements using OpenGL primitives and textures.
4. **Collision Detection:**
   Implement collision detection algorithms to check for collisions between the player's spaceship, missiles, and alien ships. Adjust your health and live accordingly.
5. **Score System:**
   Develop a scoring system to keep track of the player's performance. Update the score based on the number of aliens destroyed.
6. **Game Over and Restart:** Display a game over screen when the player runs out of life. Allow the player to restart the game.
7. **Sound Effects and Music:** Integrate sound effects and background music to enhance the gaming experience. Use GLUT functions or external libraries for audio.

Conclusion:

In conclusion, the "Space Shooter" project is a compelling and visually captivating gaming experience that takes players on an intergalactic journey filled with excitement and challenges. Through the power of the OpenGL graphics library, the game offers a seamless blend of immersive visuals and dynamic gameplay. Players find themselves at the helm of a human spacecraft, armed with the task of eliminating alien threats and mastering the art of navigation in a cosmic battlefield.

The strategic balance between offensive and defensive maneuvers, coupled with the risk of limited lives and dynamic difficulty levels, ensures an engaging and adrenaline-pumping experience for a broad audience. The game's polished graphics and adaptable challenges align with contemporary gaming standards, promising a memorable and entertaining space-themed adventure.

"Space Shooter" stands as a testament to the creative possibilities within the realm of interactive gaming, providing players with a thrilling escape into the wonders of outer space. As the spacecraft's projectiles pierce through the cosmic abyss and the challenge of survival unfolds, the project seeks to leave an indelible mark on gamers, offering an experience that transcends the boundaries of traditional gaming. With its immersive design and dynamic features, the "Space Shooter" project invites players to embark on an interstellar quest, proving that the allure of space exploration extends far beyond reality.

Future Work:

I. Will include more levels in the game
II. More obstacles & objects to level up the complexity of the game
III. The objects will shoot bullets after level up
IV. It will be harder to destroy the objects after level up

Reference:

[1]. Game Assets - Space Shooter Redux · Kenney

[2]. Winning Soundtrack - Video Game Win, Royalty-Free Track - Envato Elements

[3]. Bitmap Image Loading - stb/stb_image.h at master · nothings/stb (github.com)

[4]. Playing Audio – mmsystem.h and libwinmm Windows native.