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|  | American International University-Bangladesh  Faculty of Science and Technology  Department of Computer Science  CSC 4118 Computer Graphics |

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| **Final Term Project Evaluation** | **Semester:** Fall 2024-2025 | **CO Assessed:** CO4 and CO5 | **Total Marks:** |
|  | | | |

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| --- | --- | --- | --- | --- |
| **Project Name: Escape Room** | | | | |
| **Student Name: Tahsinul Islam Nishat** | | **ID: 22-47478-2** | **Section: J** | **Group No: 10** |
| **Obtained Marks:** | **Part-A** | **Part-B** | **Part-C** | **Total** |
|  | **CO4:**  **CO5:** |  |  |  |

**Evaluations: Part: A – OBE**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CO4: Creates** interactive computer graphics programs using OpenGL. | | | | |
| **Requirement fulfilment (5 marks)** |  |  | **Total Marks** | |
| **Validation (5 marks)** |  |  |  | |
| **Verification (5 marks)** |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **CO5 [PO-i-1]: Perform as an effective individual in multi-disciplinary settings in solving computer science and engineering problems.** | | | |
| **Critical Thinking**  **(5 marks)** |  |  | **Total Marks** |
| **Focus on the Task [Self-directed] (5 marks)** |  |  |  |
| **Reflection**  **(5 marks)** |  |  |
| **Quality of the Work**  **(5 marks)** |  |  |

**Part:B – Implementation**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Design (10 marks)** | **Unsatisfactory (2.5)** | **Satisfactory (5)** | **Good (7.5)** | **Very Good (10)** | **Obtained Marks** |
|  |  |  |  |  |

|  |  |  |
| --- | --- | --- |
| **Animation (10 marks)** | **Total Number of Animations Implemented** | **Obtained Marks** |
|  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Mouse and Keyboard Interaction (10 marks)** | **No. of Mouse Interaction** | **No. of Keyboard Interaction** | **Obtained Marks** |
|  |  |  |

|  |  |  |
| --- | --- | --- |
| **Scene Transition (5 marks)** | **Change of events in individual scenario** | **Obtained Marks** |
| * **Yes** * **No** |  |

**Part:C – Viva and Report**

|  |  |
| --- | --- |
| **Viva (20 marks)** | **Obtained Marks** |
|  |

|  |  |
| --- | --- |
| **Report (10 marks)** | **Obtained Marks** |
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| --- | --- |
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| **Final Term Project Evaluation** | **Semester:** Fall 2024-2025 | **CO Assessed:** CO4 and CO5 | **Total Marks:** |
|  | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Project Name: Escape Room** | | | | |
| **Student Name: SM Ashikullha Mhamud** | | **ID: 22-47477-2** | **Section: J** | **Group No: 10** |
| **Obtained Marks:** | **Part-A** | **Part-B** | **Part-C** | **Total** |
|  | **CO4:**  **CO5:** |  |  |  |

**Evaluations: Part: A – OBE**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CO4: Creates** interactive computer graphics programs using OpenGL. | | | | |
| **Requirement fulfilment (5 marks)** |  |  | **Total Marks** | |
| **Validation (5 marks)** |  |  |  | |
| **Verification (5 marks)** |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **CO5 [PO-i-1]: Perform as an effective individual in multi-disciplinary settings in solving computer science and engineering problems.** | | | |
| **Critical Thinking**  **(5 marks)** |  |  | **Total Marks** |
| **Focus on the Task [Self-directed] (5 marks)** |  |  |  |
| **Reflection**  **(5 marks)** |  |  |
| **Quality of the Work**  **(5 marks)** |  |  |

**Part:B – Implementation**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Design (10 marks)** | **Unsatisfactory (2.5)** | **Satisfactory (5)** | **Good (7.5)** | **Very Good (10)** | **Obtained Marks** |
|  |  |  |  |  |

|  |  |  |
| --- | --- | --- |
| **Animation (10 marks)** | **Total Number of Animations Implemented** | **Obtained Marks** |
|  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Mouse and Keyboard Interaction (10 marks)** | **No. of Mouse Interaction** | **No. of Keyboard Interaction** | **Obtained Marks** |
|  |  |  |

|  |  |  |
| --- | --- | --- |
| **Scene Transition (5 marks)** | **Change of events in individual scenario** | **Obtained Marks** |
| * **Yes** * **No** |  |

**Part:C – Viva and Report**

|  |  |
| --- | --- |
| **Viva (20 marks)** | **Obtained Marks** |
|  |

|  |  |
| --- | --- |
| **Report (10 marks)** | **Obtained Marks** |
|  |

# Computer Graphics Project Final Report – “Escape Room”

**1. Introduction**

The project "Escape Plan" is a 2D maze-based game developed using C++ and OpenGL. Inspired by the classic Pacman, this game introduces enhancements while maintaining a nostalgic gameplay experience. Players navigate through a maze, collecting items and avoiding obstacles to progress through multiple levels. The project provides an opportunity to explore graphics programming, collision detection, and interactive gameplay development.

**2. Problem Statement/Literature Review/Background**

Classic arcade games like Pacman have long been used as a reference point for learning game development. These games offer a balance of simplicity and challenge, making them ideal for studying interactive graphics and game mechanics.

The "Escape Plan" project builds upon these concepts, focusing on gameplay mechanics while leveraging OpenGL for rendering. By implementing features like efficient collision detection and object animation, this project aims to create an engaging gaming experience.

**3. Objective of the Project**

The primary objectives of this project include:

* Developing a 2D maze game with engaging mechanics.
* Implementing collision detection for player movement and interactions.
* Designing multiple levels with increasing difficulty.
* Enhancing user experience through animations.

**4. Methodology/System Implementation Method**

**Development Environment & Tools:**

* **Programming Language:** C++
* **Graphics Library:** OpenGL
* **Development Tools:** Code::Blocks IDE, MinGW, OpenGL
* **Operating System:** Windows 11
* **Additional Libraries:** FreeGLUT for window management and input handling

**Implementation Techniques:**

* **Rendering & Animation:** OpenGL functions are used to draw and animate 2D objects. Ex:
* *void* *move*() {
* *float* *newX* *=* *x* *+* (*movingRight* *?* *speed* *:* *-speed*);
* *if* (*canMove*(*newX*)) {
* *x* *=* *newX*;
* } *else* {
* *movingRight* *=* *!movingRight*;
* }
* }
* *void* *draw*() {
* *glPushMatrix*();
* *glTranslatef*(*x*, *y+center*, 0.0*f*);
* *glScalef*(0.8*f*, 0.8*f*, 1.0*f*);
* ... ... ...
* }
* **Collision Detection:** Algorithmic implementation for handling player and enemy interactions with maze walls and collectibles. Ex:
* *bool* *checkCollision*(*float* objX, *float* objY, *float* size *=* *center*) {
* *return* (*player*.*x* *<* objX *+* size *&&* *player*.*x* *+* *CELL\_SIZE* *>* objX *&&*
* *player*.*y* *<* objY *+* size *&&* *player*.*y* *+* *CELL\_SIZE* *>* objY);
* }
* **Input Handling:** GLUT captures keyboard inputs for controlling player movements. Ex:
* *void* *keyboard*(*int* key, *int*, *int*) {
* *switch* (key) {
* *case* GLUT\_KEY\_UP: *player*.*move*(0, *CELL\_SIZE*); *break*;
* *case* GLUT\_KEY\_DOWN: *player*.*move*(0, *-CELL\_SIZE*); *break*;
* *case* GLUT\_KEY\_LEFT: *player*.*move*(*-CELL\_SIZE*, 0); *break*;
* *case* GLUT\_KEY\_RIGHT: *player*.*move*(*CELL\_SIZE*, 0); *break*;
* }
* *glutPostRedisplay*();
* }
* **Game Logic:** Score tracking and level progression are implemented. Ex:
* *void* *displayScore*() {
* *glColor3f*(0.0*f*, 0.0*f*, 0.0*f*);
* *glRasterPos2f*(10, *ROWS* *\** *CELL\_SIZE* *-* 40);
* string *scoreText* *=* "Score: " *+* *to\_string*(*score*);
* *for* (*char* *c* : *scoreText*) {
* *glutBitmapCharacter*(GLUT\_BITMAP\_HELVETICA\_18, *c*);
* }
* }

**5. Significance of the Project**

* **Educational Value:** Enhances knowledge in computer graphics and game development.
* **Practical Application:** Demonstrates real-time rendering and collision detection.
* **User Engagement:** Provides an interactive and challenging gaming experience.
* **Future Enhancements:** Potential for multiplayer functionality, more levels and improved visual effects.

**6. Conclusion**

"Escape Plan" successfully integrates fundamental game development principles with some basic enhancements. The project demonstrates key concepts in graphics programming and collision detection. While the current scope covers essential gameplay mechanics, future improvements can expand its complexity and user engagement.

**7. Referencing**

<https://github.com/ping543f/Computer-Graphics--OpenGL-GLUT>

<https://www.geeksforgeeks.org/getting-started-with-opengl/>

**8. Screenshots of the System**

A screenshot of a computer

AI-generated content may be incorrect.

Screenshot 1 : The Home Screen Of the application that supports mouse interaction.

|  |  |
| --- | --- |
| A screenshot of a video game  AI-generated content may be incorrect. | A screenshot of a video game  AI-generated content may be incorrect. |
| Screenshot 2 : First Level of the game with a moderate maze map. | Screenshot 3: Second Level of the game with more difficult and complex maze map. |