**1. Title:**

**Escape Plan: A 2D Maze Game**

**2. Team Member List**

|  |  |
| --- | --- |
| **Name** | **ID** |
| SM Ashikullha Mhamud | 22-47477-2 |
| Tahsinul Islam Nishat | 22-47478-2 |

**3. Introduction**

The project aims to create a 2D game titled "Escape Plan" inspired by the classic Pacman game using C++ and the OpenGL graphics library. "Escape Plan" offers engaging gameplay through simple yet challenging mechanics. The primary objective of this project is to design a game environment where a player-controlled character navigates a maze, collects items, and avoids enemies.

The motivation for choosing this project stems from the timeless popularity of Pacman, which continues to serve as a benchmark for learning game development concepts. This project will enhance our understanding of graphics programming, collision detection, and real-time interaction in 2D environments. Furthermore, it allows us to explore OpenGL’s rendering capabilities in creating visually appealing and interactive applications.

This project builds upon basic principles of game design, incorporating improvements to gameplay mechanics, visuals, and features. By integrating modern development practices, "Escape Plan" aims to deliver an enhanced gaming experience while maintaining the nostalgic appeal of the original.

The scope of this project includes implementing core gameplay mechanics such as maze navigation, collectible items, and enemy AI, along with additional features such as score tracking, multiple levels, and special power-ups.

**4. Description of the Environment and List of Methods**

The development environment and tools used for this project are as follows:

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

The methods employed for this project include:

1. **Rendering and Animation**: OpenGL functions for drawing and animating 2D objects.
2. **Collision Detection**: Algorithmic implementation to handle player and enemy interactions with the maze walls and items.
3. **Input Handling**: Using GLUT to capture keyboard inputs for controlling the player character.
4. **Game Logic**: Implementing AI behavior for enemies, score tracking, and level progression.
5. **Resource Management**: Efficient use of textures, sounds, and memory to optimize performance.

**5. Feature Set**

The following features will be implemented in the game:

1. **Game Environment**

* Maze design with walls, pathways, and collectible items.
* 3 levels with increasing difficulty.

1. **Player Character**

* Smooth navigation using keyboard inputs.
* Collision detection with walls and items.

1. **Enemies**

* Simple position guarding behavior.
* Increasing difficulty with higher levels.

1. **Collectible Items**

* Coins or dots scattered throughout the maze.
* Power-ups granting temporary abilities.

1. **Game Mechanics**

* Score tracking based on collected items and remaining lives.
* Time tracking for level completion.

1. **Visuals and Graphics**

* Textures for walls, pathways, and characters.
* Animations for player and enemy movement.

1. **Sound Effects**

* Background music and sound effects for key events (collection, collision, etc.)

1. **User Interface**

* Start screen with options for new game, instructions, and exit.
* Pause and resume functionality.
* End screen displaying the final score.

**6. Conclusion**

This proposal outlines the development of "Escape Plan," a 2D game using C++ and OpenGL, focusing on recreating the classic arcade experience with modern enhancements. The project is expected to deepen our understanding of computer graphics, game design, and algorithmic problem-solving.

While the initial scope covers fundamental gameplay mechanics and features, potential future improvements include multiplayer functionality, online leaderboards, and advanced enemy AI. Limitations such as the complexity of real-time interactions and performance optimization will be addressed as the project progresses.

This project represents an exciting opportunity to combine creativity and technical skills in delivering a nostalgic yet contemporary gaming experience.