**Proposal for MSE Capstone Project**

**Project Title: A High Mobility, Multiplayer, Platform Shooter**

**Student Name: Logan Larson**

**Faculty Advisor: Prof. Kenny Hunt**

**Date of Submission: 3/25/2022**

**A High Mobility, Multiplayer, Platform Shooter**

**Objective**

This project aims to develop a web-based multiplayer videogame that produces a competitive and fast-paced environment for players.

**Background**

Multiplayer videogames are in high demand with network programmers being the backbone of those games. The goal of this project is to develop my network programming skills and improve my game design and development skills overall.

**Current Project**

The current project focuses on developing a fast-paced shooter with a unique movement system.

The project will be a 2D side-view platform shooter. Players will operate in two different modes: combat mode and parkour mode. The combat mode will have limited movement but allow the player to shoot weapons and use combat-specific abilities. The parkour mode will allow the player to move at a higher speed and jump in every direction.

The movement system is what sets this game apart from others. There will be a strong emphasis on utilizing verticality when maneuvering around the map. With this, the player will be able to climb on any surface in the game like they are on the ground. This will increase the skill ceiling in the game that competitive players enjoy. The goal is to create a simple movement system that allows for creativity. The combination of these two things will create a low barrier to entry but high player retention as players can increase their skills with time.

In shooter games, the time to kill, map design, and movement system dictate the pace of the game. As the goal is to make a fast-paced environment, the game will implement a high time to kill, an open map design, and a fast movement system.

To start, the game will implement a casual matchmaking system, and as a stretch goal, a ranked matchmaking system. The casual matchmaking system will randomly place players in lobbies with a few filters such as player’s region and game mode selection. The ranked matchmaking system will be like the casual system except it will pit players of similar skill rating against each other instead of at random.

Another stretch goal would be implementing a profile system to keep track of players’ stats, in-game friends, and skill rating.

The project will be made in the Unity3D game engine which supports exports to WebGL. The back end will be developed in the .NET Framework because of the extensive documentation between Unity3D and .NET Framework and to keep a consistent programming language from the front end to the back end.

**Challenges**

The following are some of the challenges in this project:

* Creating a movement and combat system that enhances the player experience with a low barrier to entry and a high skill ceiling.
* Creating quality character animations for a dynamic environment.
* Designing unique maps with good flow and pacing.
* Player synchronization and other multiplayer issues that arise with network programming.
* Designing a matchmaking system that creates a fair and fun player environment.

**Project Schedule**

The following schedule is proposed by the student. The project development will be broken down into four phases. The first phase will consist of building the core gameplay mechanics such as movement, combat, and player animations. The second phase will consist of multiplayer aspects such as client to server synchronization and matchmaking. The third phase will contain all aspects of polishing the game such as refined sound and music design, menu design, map design, etc. The fourth phase will consist of real-time testing and fixes and the project report. Design diagrams will be created as and when the phases are being developed.

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| **Phase** | **From** | **To** | **Months** | **Credits** |  |
| Core gameplay and mechanics | Sep 01, 2022 | Feb 28, 2023 | 6 | 4 |  |
| Multiplayer aspects | Mar 01, 2023 | Oct 31, 2023 | 8 | 4 |  |
| Polishing aspects | Nov 01, 2023 | Feb 29, 2024 | 4 | 2 |  |
| Beta testing and project report | Mar 01, 2024 | May 31, 2024 | 3 | 2 |  |
|  |  | Total: |  | 12 |  |

**Resources**

The student will use his personal computer and free to use development tools to complete the project. The tools include:

* Unity3D – Game engine
* Aseprite – Sprite editor
* Visual Studio Code – Text editor
* Git/GitHub – Version control