CS 426 PROJECT PROPOSAL

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1. Game Overview

Our game is a multiplayer Unity 3D arena brawler where at least 2 players race towards the center of an arena to gather weapons and then fight in a free-for-all combat until only one remains. The game combines fast-paced action with strategic weapon selection, as players choose between swords, axes, shields, and other weapons to gain the upper hand. The arena will feature various obstacles and traps to add more dynamic elements to the fight.

2. Game Mechanics

The core mechanics involve racing, weapon collection, and melee combat. Here's an outline of the game loop and mechanics:

a. Game Loop

Players spawn in an arena and rush towards the middle to grab different weapons. They engage in a battle to death. Game continues until only 1 player remains.

b. Combat System

Players can perform light, heavy and ranged attacks available for different weapons. Incoming attacks can be blocked and a successful parry might acquire the upper hand.

c. Weapon Types

Current weapons in discussion are swords with a speed/damage balance, axes for higher damage but slower swing, shields for blocking, arrows for range attacks.

3. Technical Challenges

Network latency and synchronization is the primary challenge for an online game. Hit registration and physics synchronization is another important aspect as well. We want to include dismemberment for a satisfactory experience so achieving that is a grand challenge on its own.

4. Assets & Other Resources

We’re planning to create our own assets in terms of models, textures and audio as well as utilizing free assets from Unity Asset Store.

5. Libraries Used

- Photon Pun 2 for networking.
- Cinemachine for smooth and dynamic camera controls
- Unity Input System for handling player input with modern and legacy devices.
- Photon Voice(Optional) for integrating voice chat.
- ProBuilder for prototyping and designing the arena layout

6. Performance Analysis

To ensure that the game runs smoothly across different setups we concluded on the following performance metrics. These are tentative and can change during the development of the game as.

a. Physics Object Count:

We will measure the impact of increasing the number of interactive objects in the arena (e.g., destructible barrels, traps) on frame rate and player experience.

b. Network Performance

We will test the game's performance under various network conditions, focusing on latency, packet loss, and bandwidth limitations.

c. Effect of Special Abilities on Performance

We will analyze the impact of power-ups and special effects (e.g., explosions, speed boosts) on CPU/GPU usage