**Networking Course Assignment**

**Game Design:**

The game is a basic mixture of Jazz Jack Rabbit and Smash Bros Ultimate. Players can collect spawned power-ups to increase their score and enhance their speed for several seconds. Falling off out of the map also increases the score of the other player:

Players: Players were designed as basic cubes which can jump, you can keep pressing the jump button and reach higher. They can taunt each other by pressing ‘E’ key. Collecting power-ups also increases the score.

Map: Map was designed as a 2D side-scrolling platform, like Smash Bros Ultimate.

Power-Up System: Players can collect Power-Ups to increase their speed for a short amount of time. They are spawning in one of the spawn points in the map randomly.

The game design is suitable for adding new power-ups with a bunch of different specifications.

**Instructions:**

Increase score by collecting power-ups. Red power-up will increase the speed for several seconds. Falling off from the platform will increase the score of the opponent.

Control Scheme: 'WASD' player movement. Press 'E' for taunt. Press 'Space' for jump, keep pressing down for higher jump.

**Technical Explanations:**

The player movement system is authorized by players locally, then via the network transform component, the transform information is sent to another player via server. Players are network objects and are spawned by Network Manager into the game.

The power-up objects are prefabs that are controlled by server. Only the host can spawn them through Pickup Manager script and send the related information to each player, because the host player is the server also.

I used C# events with the publish-subscribe pattern to handle the pickup collecting system. For taunt implementation, taunting player sends the request to the server via RPC and server sends back the response via EveryoneRPC to each player.

NetworkVariable<int> is used for keeping score for each player. Client is requesting to increase its score from server via RPC. In addition, if any of the players fell from the map, the server gets the required ClientID and get the related player back to the map.

**Struggles:**

It was a real challenge to understand networking concepts and blending them into the Unity 6 Netcode, so I read a lot to learn all the concepts like Server-Host-Owner-Client authorization, NetworkVariable, new RPC system in Unity 6 Netcode. So, I played a lot on my scripts to try different things and see the results.

I have an error which is not affecting any implementations in my game, there is a soft-synchronization failure on my client side, but all the systems are working flawlessly. I will research it to understand the reasons.

The assignment’s timeline was very cramped, so it was stressful to handle it, on the other hand I learnt on my own and build the game without any issues.

During the first week of the course, we could work on the assignment, however we spent the whole week reading documents and doing nothing about network coding, so I think it was the main struggle.

We should learn about dedicated server systems on the course, so I think it is a big mistake. Also, we didn’t learn about lobby systems and backend coding for networking systems that can be helpful for our career, however it was not possible in such a cramped time of the course planning.

**Reflections On the Development Process:**

I have seen that Network Programming is a branch that you need to spend a lot of time on it, so, I will improve myself on this area as a game programmer.

The course is very short, and we unfortunately skip the first week’s lessons, so I feel that we needed a longer course to understand the core concepts better.

I enjoy the development of myself in the time being, however, I felt like the course’s curriculum could be way better. I needed to learn almost everything by myself, and the lessons didn’t help me much because of the low number of lectures.

On the other hand, the assignment motivated me to improve myself in network programming discipline, so I am looking forward to getting the other course about that. I am going to work on my assignment, and I am planning to finish and add my game as a personal project in my portfolio.

So, I feel relieved and grateful for my big effort to finish the requirements and looking forward to the more.