Network Assignment Report

This report is about my struggles and hardships from the networking assignment in Unity Netcode for Gameobjects. This assignment gave me a lot of headaches and I was struggling hard and long with it. This being thanks to the fact that I had never worked with networking before. Lets get into exactly what I was struggling with and what was hard to understand.

1. **Authority**

Getting the right authority was something I had a LOT of trouble with. Understanding how you structure code to get the right authority to trigger was not something that easily came to mind. An example of this was my **Quick Chat** function. I made a quick chat that works by the having each player have the same three pre-determined quick chat messages that you can send by clicking either key 1, 2 or 3 on the keyboard. For this to work I had to first check if we are a local player and that we are focused on the application. Then we check for Input from either key 1, 2 or 3. Then if they are met we first call a function that is a Client to Server Rpc. This function in return calls for a Server to Client Rpc that in return calls for the function that changes the text box that corresponds to the player we are focused on. In this function we check what Client Id we have as a final check to see what player we are. It was very confusing to learn how you know what makes it server authority and what makes it client authority.

1. **Synchronization**

Getting stuff to sync between the host and the secondary client was a difficult task. Getting synchronization to work was what took the longest time for me to complete and I needed a lot of help to even be able to relatively understand it and complete it. Some examples of synchronization tasks that took a LOT of time was first the aiming. I used a mouse position based aiming system that has the player ship rotate to fast the direction of your mouse cursor. Getting only the ship of the client you are focused on to follow was a real struggle. This task took me several days to complete and I ended up having to look a lot on youtube, at documents and ask both classmates and mentors for help.

A second example are the bullets. The hardest part about the bullets was the fact that they first wouldn’t show up on the non-host client. Just getting it to show up for the second client took about 2 days. However, after some googling and some help from our mentor I was able to fix it. The second problem I had with the bullets was the fact that they wouldn’t move. This I’m embarrassed to say took me about 1 and a half days to figure out. It ended up not even being an synchronization issue but the fact that I used transform.forward instead of transform.up. After switching one for the other it finally worked.

1. **Game State**

The server authoritative game state was my biggest struggle out of everything. This was also the task that took the longest to complete. It took me roughly a week if not more to get it to fully work. What made it so hard to complete was the synchronization. What I tried to do was have a prefab was the result screen where it would just show either “WINNER” or “LOSER” depending if you won or not. This was supposed to be a prefab that consisted of a background and a text block. This text block would show different text on both clients. The winning client would have “WINNER” and the losing client would have “LOSER”. I wanted to achieve this by spawning in the prefab containing these when one of the players died. I was working on it for roughly 5 days before I had to give up due to time running out. What I instead went with was having the text and background always be loaded in. However, the text block would just get an empty text and the backgrounds alpha value would be set to 0, making it invisible. When a player then died, the background would get its alpha value set to 1 and the text block would get the corresponding text. This result screen would be the same on both clients. Just getting this functionality to work took me around 3 days to figure out.

In conclusion, this assignment was very hard for me and took a LOT of time and effort to complete. Learning how authority works between clients and server was something new and challenging. Figuring out how to synchronize gameobjects and text between clients was a struggle but the game state was even more of a struggle. This assignment has taught me a lot about networking in Unity and in games overall.