Lab 6

**1. Netcode is a high-level networking library built for Unity to abstract networking logic. In Unity Netcode for GameObjects, synchronization of game state across clients and the server is crucial for a consistent multiplayer experience. List two different types of NetworkVariable that can be used, each with a use case.**

1a.

NetworkVariable<T> can hold in game int’s or floats such as the player’s current kills or ammo count. Can also hold NetworkVariable<Vector3> for player or enemy positions and NetworkVariable<Quaternian> for their rotations.

NetworkList<T> can be used it hold an online leaderboard or the match scoreboard. It can also hold a list of players on a certain team.

**2. In Unity Netcode for GameObjects, attributes are used to define how functions and variables behave in a networked environment. Please list and explain the purpose of five networking attributes available in Unity Netcode which can be added to member functions of Network Behaviour scripts.**

2a.

[ClientRpc] -> Function that when called excectues on all connected clients

[ServerRpc] ->Function called by client but excecuted by the server

[ObserveRpc] -> Function called when obj is observed by the client

[NetworkVariable] -> Declares a variable across all clients

[RpcParams] Paramter function that adds extra context to Rpc calls, such as specifying which client should receive the function call/message sent

**3. Unity Netcode for GameObjects provides a way to handle remote procedure calls (RPCs) for communication between the server and clients. Explain the roles of ServerRpc and ClientRpc in a networked game. Provide a specific example of how they can be used to facilitate interaction between players and the game environment.**

3a.

[ServerRpc] -> Function called by client but executed on the server

[ClientRpc] -> Function called by the server and executed to all clients

Example:

If a client walks into a pickup. The client will probably send data of what the picked up, then request the server to do something. If Mario ran into a coin and called pickUpItem() which is a ClientRpc, the client (Mario) would send a request and the server would update his score via a serverRpc like updateScore()

**4. Explain the role of the NetworkManager component in Unity networking.**

4a.

The NetworkManager is in charge of starting and stopping game sessions with functions like StartHost(), StartServer() and StartClient(). It is also in charge of connected the players after those functions have ran. It handles joining, disconnecting and session states.

Manages syncronising gameObjects so theyre all in the same spot for each player, and which player had autorituy over what object (Like weaposn, or bases, etc)