

Degree Project Progress

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- **About Project**

- It's a team vs team multiplayer FPS game in VR.
- Core game loop
 - A player hosts a game.
 - Other players join the game (Players can choose their start weapons)
 - Start the game
 - Game ends if either "match time runs out" or "one of teams meets required score"
 - Go back to lobby
- **Project link (UE 4.26)**
 - https://github.com/bskyyun12/FG_DegreeProject

- **What am I focusing on the project?**

- My main focus is to learn about how to make a **Multiplayer** FPS in Unreal Engine mainly in C++.
- I also want to spend time on learning about VR and want to adapt it on this project.

- **What is my current skillset?**

- My latest C++ project.
 - <https://github.com/bskyyun12/NeuralNetwork>
 - Neural Network Implementation from the scratch with Eigen3.
 - Multilayer with partially implemented convolution neural network.
- My latest group project in Unreal Engine.
 - <https://www.gwangyeong.com/badhareday>
 - 4 weeks cross discipline project, 3 programmers
 - My contributions are described in the link above.
- Multi-player game experience
 - Made a simple multiplayer racing game using Online Subsystem Steam

- <https://www.gwangyeong.com/multiplayergame>
- 4 weeks network programming in Unreal course at Futuregames

- **Define all the milestones week by week.**

- Week 1:
 - Research and gather resources and references about multiplayer games and VR games.
- Week 2:
 - Implement base multiplayer and a character with an animation.
 - What to test => Clients choose a team -> spawn the team character in the correct base -> Check all characters are replicating properly
- Week 3:
 - Implement base weapon and projectile mechanisms. (edit: projectile -> line trace)
 - Implement separate arms/weapon scripts; one for client(display for each clients), one for replication(display for other clients)
 - Implement simple game loop; win/lose/restart
 - What to test => Check the arms/weapon animation from a local view and from other clients' views -> shoot and kill other player -> respawn
- Week 4:
 - Set up the online subsystem
 - Set up a dedicated server or steam
 - Finish implementing weapon scripts; ammo, reload, recoil, pickup, weapon swap.
 - What to test => Weapon's functionality and its replication, test with friends!
- Week 5:
 - Lobby polish
 - HUD(HP, AP, Ammo, Kill log)
 - Scoreboard (User K/D)
 - Hit & damaged feedback(visual, sound)
- Week 6:
 - Add knife and grenade
 - Weapon slots + weapon swap between slots
 - Different TP anims for holding different weapon
 - Improve game loop. Win 3 rounds to victory?
 - Change team each round
- Week 7, 8:
 - ~~VR implementation~~
 - More game feature? Or networking feature?
- Week 9, 10:

- Play test, Bug fixes and polishing the project.
- Upload the projects into my portfolio?
- Prepare the degree project report assignment from Futuregames.

- **Weekly Progression**

- Week 1 (March 1st ~ March 5th)
 - Looked through my old network assignment from Futuregames
 - Read through RPC functions
 - Watched some network tutorials
 - Planning weekly schedule

- Week 2 (March 8th ~ March 12th)
 - Base setup for GameMode, PlayerController, Character
 - “TeamSelection” widget
 - Players now can choose a team to join the game

- Week 3 (March 15th ~ March 19th)
 - Base setup for Weapon, Gun
 - Base setup for firing logic and effects.
 - Base setup for damaging logic
 - “GameOver” widget
 - Players now can kill other players

- Week 4 (March 22nd ~ March 26th)
 - Online Subsystem Steam
 - Lobby system
 - Weapon reloading and ammo
 - Players now can host a session, find sessions and join a session
 - Players now can choose a team in a lobby and are required to press “Ready” button to start the game

- Week 5 (March 29th ~ April 2nd)
 - Base setup for Grenade
 - Fixed the issue that the third person can't join the session
 - Players now can choose start-weapons in a lobby.
 - Players now can swap, drop and pick up weapons.
 - Players now go back to lobby when the game ends.

- Week 6 (April 5th ~ April 9th)
 - Grenade trajectory
 - Players now can throw a grenade
 - Learned about what GameState and PlayerState do in network projects, so I started refactoring whole project using the GameState and the PlayerState.

- Week 7 (April 12th ~ April 16th)
 - Refactored whole project and now everything is nicely separated. Specially, It's a lot easier to deal with players' data which can now able to access from the PlayerState.
 - Now the game has "Death Match" mode instead
 - Basic HUD setup

- Week 8 (April 19th ~ April 23rd)
 - Players now can chat.
 - Players now can check Kill/Death status in the scoreboard.
 - Now the game will end if the match time runs out or one of the team meets required score.
 - Played this project with my friends and it went pretty okay!
 - Finished preparing degree project presentation.
 - (Not related to this project) Made a vehicle movement that replicates pretty good to practice more network programmings in UE4.

- Week 9 (April 26th ~ April 30th)
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- Week 10 (May 3rd ~ May 7th)

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- **Evaluation**

- A description of your work process
 - Check the “Weekly progression” above
- Did you reach your set goals?
 - Yes, I reached my main goal which is to make a multiplayer FPS game. I couldn’t get a VR equipment so I couldn’t get to work with VR.
- Did your time estimate last?
 - I estimated the time including VR implementation but then I cut the VR implementation later so I had to adjust my plans. Everything went fine at the end and giving up on VR was a good decision since I was already quite overwhelmed with multiplayer problems.
- What new skills and knowledge did you gain?
 - Now I'm quite familiar with RPC and replication in UE4.
- What challenges did you have to overcome?
 - On 6th week, I learned about multiplayer convention for common classes (GameMode, GameState, PlayerController, PlayerState, ...), Then I realized that I didn’t even use the GameState and the PlayerState at all. The game was working fine and I was able to do everything through PlayerController. But I wanted to learn more “proper” way to code because I will be working in a team. So I had to refactor whole project for a week and that made me very depressing.