Assignment 3 Documentation

Team

- Ripudaman Singh - 202054565
    - Implemented Crosshair improvements (visibility, contrast, bullet position, color opacity)
    - Added Difficulty Level selection
    - Implemented Invincibility with a delay for the Player Character
    - Adjusted projectile offset for consistency
    - Implemented Shoot Delay (cool down) for strategic gameplay
    - Modified Zombie AI acceptance rate
- Wasif Ibrar - 202149944
    - Created Win and Lose screens with options to respawn or return to the main menu
    - Added in-game pause menu
    - Designed and implemented the main menu screen with difficulty level selection
    - Added HUD with Player Health bar

Sources

Adding a Crosshair to the UE5 FPS Template + Basic Line trace

UE5 - Adding a Crosshair to the UE5 FPS Template + Basic Line trace (youtube.com)

How To Create UMG UI in Unreal Engine. For Main Menu, Pause Screen, Win and Lose screens.

(268) How To Create UMG UI in Unreal Engine - Main Menu - YouTube

Game Story

The current template lacks a detailed game story, so we thought of something to add to the atmosphere of the game. There has been a Zombie Apocalypse, and humanity has to fight back to survive in the outside world. For this, dedicated training centers have been established by the authorities to help humans survive in the outside world, The level that we have implemented can be seen as a tutorial level, or a “combat simulation area” in the terms of the game’s story. Here, the players will be taught all the basic controls and gameplay mechanics to enjoy the game. The player can test various weapons against the robots to simulate fighting against the zombies in a hostile environment, choosing different difficulty settings as their skills improve.

UX Improvements

Crosshair Improvement

Implemented and improved crosshair to enhance visibility and accessibility. Adjusted contrast, bullet position, and color opacity for a better gaming experience. Refer to ***FirstPerson/Blueprints/Crosshair_Widget*** section in the blueprints. Also adjusted projectile spawn position and angle to better align with the crosshair to perform a more consistent experience. Changes can be found under the “Adjusting projectile spawn position to better align with crosshair” label in ***FirstPerson/Blueprints/BP_Weapon_Component.***

Difficulty Level Selection

Added a difficulty level selection feature, aligning with Hodent's concept of "Engage-ability." Players can now choose a difficulty level that suits their skill, offering a more tailored and enjoyable gaming experience. Changes have been made in ***FirstPerson/Blueprints/BP_Game_Instance*** and an enum called ***Difficulty_Settings*** has also been made. Difficulty can be changed through the main menu through checkboxes, which in turn scale enemy health according to the setting selected. Code can be found in the “Set Difficult” function in ***FirstPerson/Blueprints/BP_Main_Menu.***

Hit Invincibility

Incorporated invincibility for the Player Character with a 1-second delay upon approaching enemies. This strategic element ensures a fair and challenging encounter and prevents multiple instances of damage in a very short period Also added brief invincibility to enemies for the same reason, that is, to prevent a single bullet to hit enemy multiple times. Changes have been made in ***FirstPerson/Blueprints/BP_FirstPersonCharacter*** and in ***ThirdPerson/Blueprints/BP_ThirdPersonCharacter***

Shoot Delay (Cool Down)

Implemented a shoot delay (cool down period) for the Player Character before they can shoot again, to add a strategic aspect to gameplay and prevent spamming to win instantly. Refer to the "Shoot cooldown code" label in ***FirstPerson/Blueprints/BP_Weapon_Component***

Zombie AI being able to actually attack the player

Modified the acceptance rate for Zombie AI pathing, ensuring more consistent interactions as the enemy can now come close enough to damage the player. Adjustments have been made in ***ThirdPerson/Blueprints/ZombieAI*.**

Win and Lose Screens

Added Win and Lose screens with options to respawn with the same settings or return to the main menu to change difficulty levels. Access these screens upon winning or losing the game.

In-Game Pause Menu

Included an in-game pause menu that allows users to resume, restart with the same settings, or quit the game. Activate the pause menu by pressing "p" during gameplay. Code can be found in ***FirstPerson/Blueprints/BP_FirstPersonCharacter*** under the "Game Pause Functionality" label, and the widget itself with the code for the buttons can be found in ***FirstPerson/Blueprints/BP_Weapon_Component***

Main Menu Screen

Designed a main menu screen with options to change difficulty levels, play the game, or quit. Users can access this screen when launching the game, or by going to it through the pause menu.

HUD with Health Bar

Added HUD with Player Health in the form of a health bar, conforming to the generally accepted colour scheme of green for healthy and red for damage.

UX Justification

Crosshair Improvement

The crosshair enhancements contribute to improved visibility and accessibility, aligning with Hodent's principles of "Readability" and "Perceptibility." The adjustments aim to provide a clearer and more user-friendly interface for players. Adjusting the projectile spawn position to align with the crosshair makes the game feel much more responsive and enhance the feel of the game.

Difficulty Level Selection

Adding a difficulty level enhances engageability by providing players with a more tailored experience. This improvement aligns with Hodent's concept of "Engage-ability," as players can choose a difficulty level that suits their skill level and “competence”, ensuring a challenging but enjoyable gaming experience.

Hit Invincibility

The implementation of invincibility with a delay adds a strategic element to gameplay, aligning with Hodent's concept of "Challenge." This ensures a fair encounter with enemies, allowing players to plan and strategize their moves effectively.

Shoot Delay (Cool Down)

The addition of a shoot delay introduces a strategic aspect to gameplay, aligning with Hodent's concept of "Engage-ability" and "Game Feel." Players must consider the cool down effect, adding depth to the shooting mechanic and making the overall experience more engaging.

Zombie AI Pathing Improvement

Adjusting the Zombie AI acceptance rate contributes to "Consistency" and "Predictability" in gameplay, as mentioned by Hodent. This modification ensures more reliable interactions between the player and the AI, improving the overall user experience. Players expect the enemies to actually be able to attack them if the player stands still for too long, and we have implemented that feature.

Win and Lose Screens

The inclusion of Win and Lose screens with respawn and main menu options enhances the overall experience by providing clear feedback on game outcomes. This aligns with Hodent's principle of "Feedback," ensuring players understand the consequences of their actions.

In-Game Pause Menu

The addition of an in-game pause menu improves "Accessibility", “User Interface” and "Player Control." Players can now pause the game and choose between various options, enhancing their control over the gaming experience. They are also free to step away from the screen for a moment if they need without losing their progress.

Main Menu Screen

The creation of a main menu screen with difficulty level selection and play options improves the overall "Navigation" and "User Interface" aspects of the game. This aligns with Hodent's principles of creating an engaging and user-friendly experience.

HUD with Health Bar

The Health Bar implements the principle of “Informative signs” and “Feedback”, to better inform the player about the state of the system and provide them with visual feedback about their status.

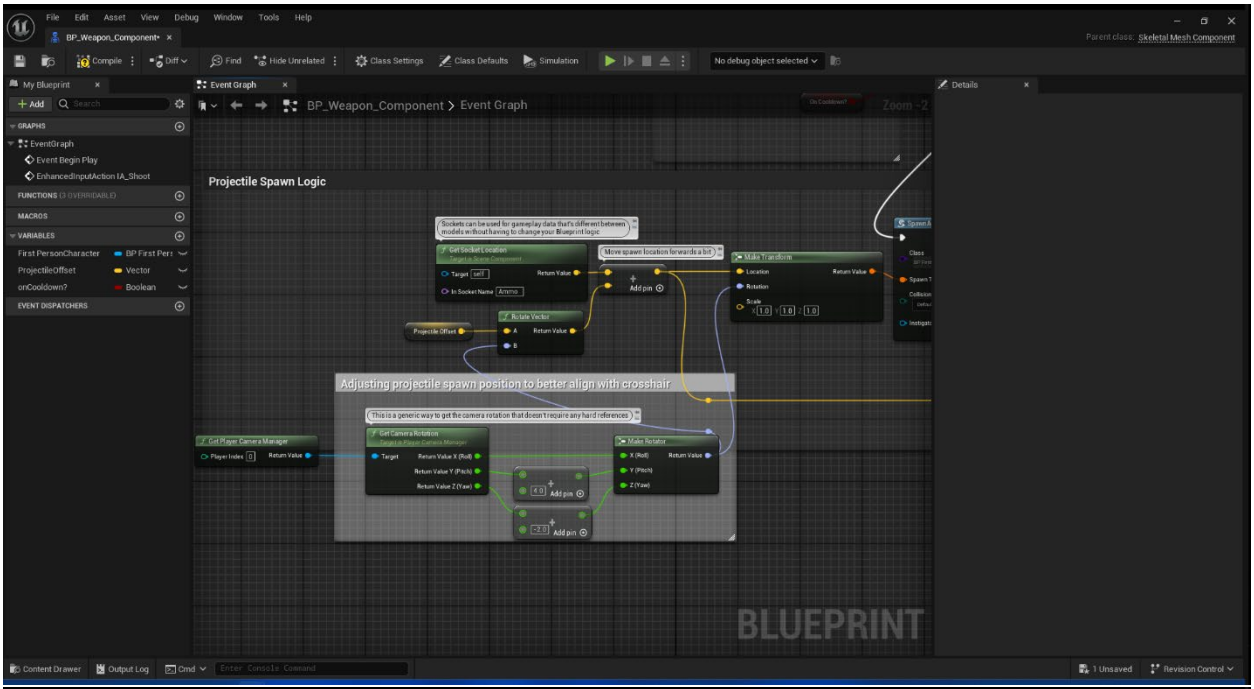
UX Testing

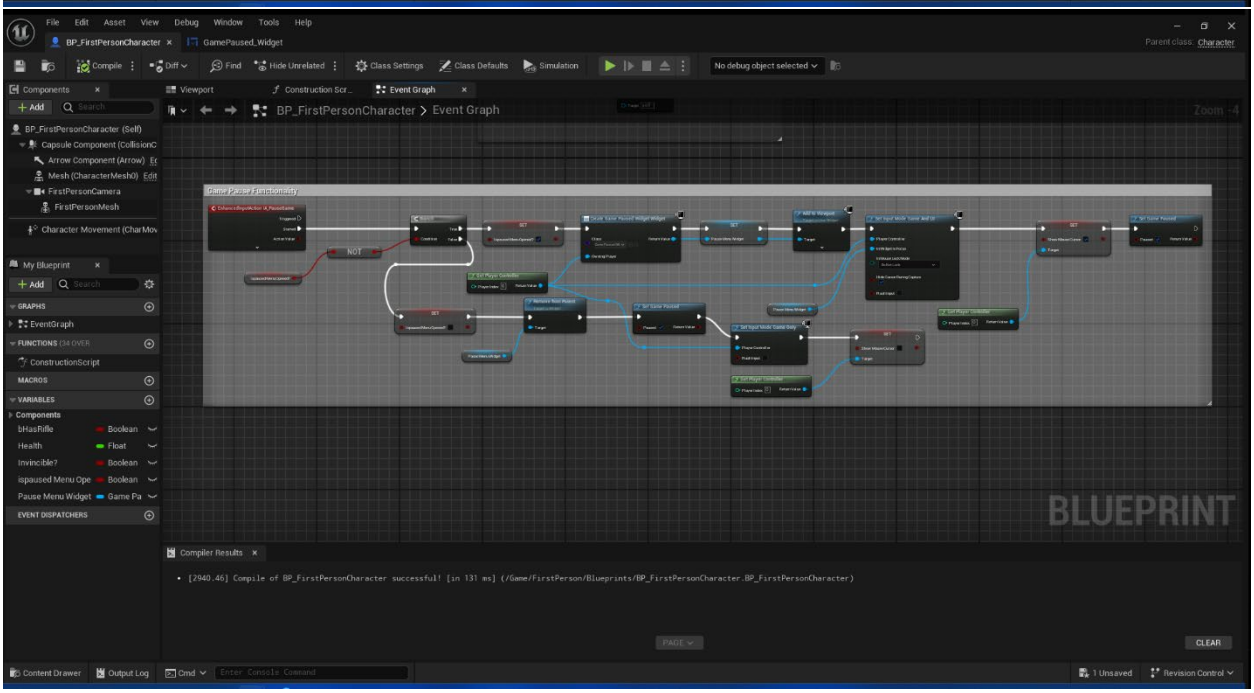
Conducted user testing with a non-classmate player to gather feedback on the UX improvements. The player tester experienced the game without any prior knowledge of the changes. Observations and conclusions are detailed below:

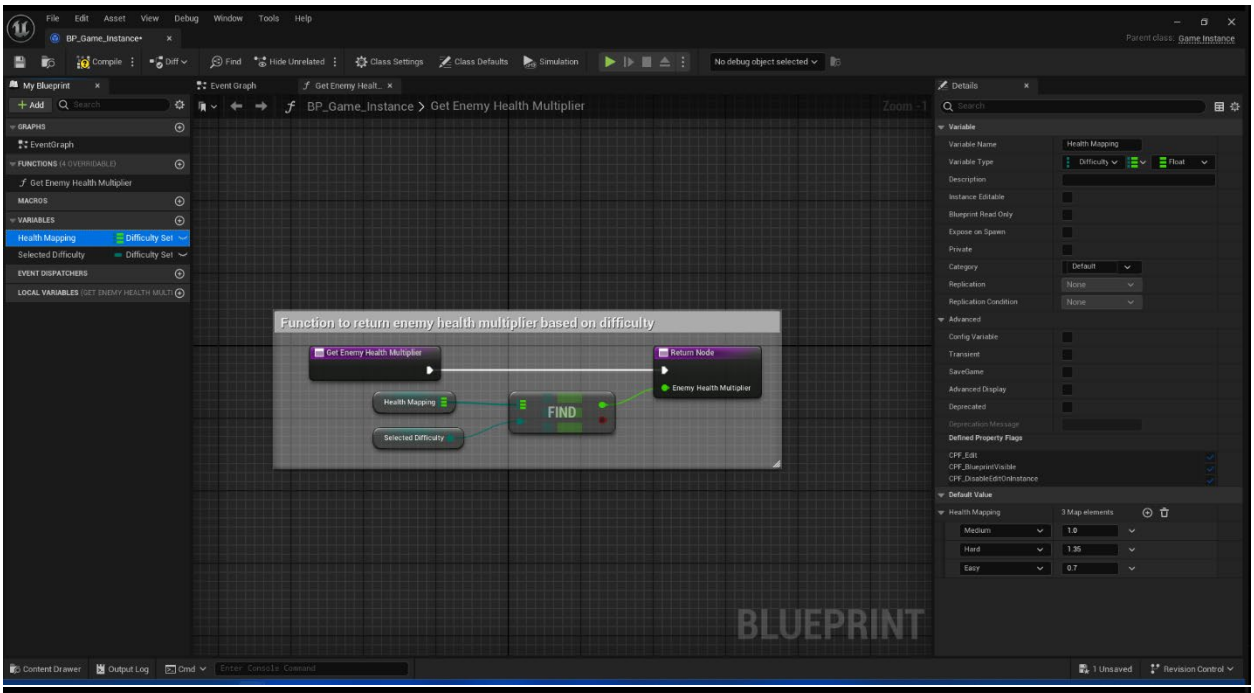
1. **Crosshair Improvement**
    - Feedback: The player appreciated the clearer crosshair, mentioning improved visibility and better alignment with the shooting mechanic. They appreciated the contrast of the red colour, but found it too distracting, so we adjusted the transparency of the crosshair to be less jarring.
    - Success: The crosshair improvements were well-received and positively impacted the player's experience.
2. **Difficulty Level Selection**
    - Feedback: The player found the difficulty level selection useful, allowing them to tailor the game to their skill level.
    - Success: The addition of difficulty levels contributed to a more engaging and enjoyable gaming experience.
3. **Hit Invincibility**
    - Feedback: The player acknowledged the strategic value of the invincibility with a delay, allowing for better planning during encounters. We added this feature as the tester reported that sometimes the enemy would die too quick, as the same bullet would hit them multiple times. For similar reasons, we added hit invincibility to the player as well, to prevent unfair damage. The projectile spawn location was also adjusted to prevent the projectile from spawning in the hitbox of the enemy and getting stuck.
    - Success: The strategic element added depth to the gameplay, enhancing the overall user experience.

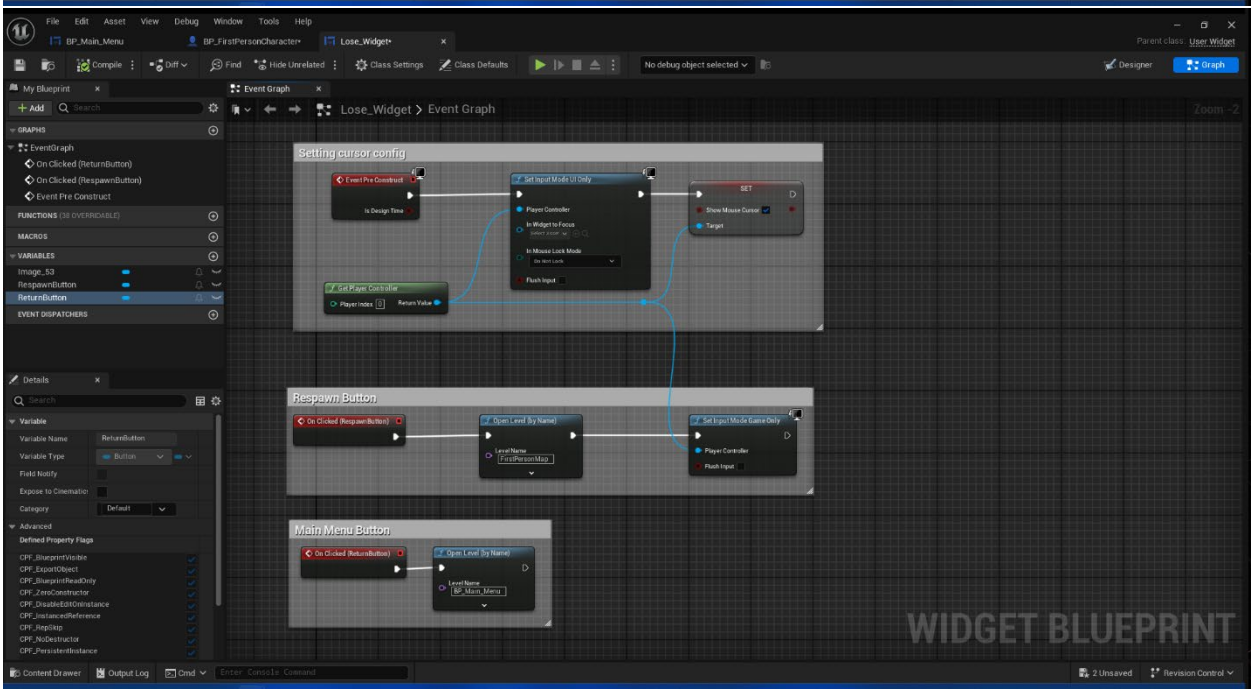
4. **Shoot Delay (Cool Down)**
    - Feedback: The player appreciated the shoot delay as it added a tactical aspect to shooting, making encounters more challenging. Initially, we set the delay to 1 second, but found it made the gameplay not very enjoyable, so we adjusted it to 0.5 seconds instead.
    - Success: The cool down effect contributed to a more engaging and immersive gaming experience.
5. **Win and Lose Screens**
    - Feedback: The player found the win and loss screens clear and informative, providing a satisfying conclusion to the game. They also appreciated the ability to change difficulty settings before restarting the game to tailor their experience.
    - Success: The feedback screens positively contributed to the overall user experience.
6. **In-Game Pause Menu**
    - Feedback: The player appreciated the ability to pause the game and access various options, enhancing overall control. They also liked that they would not lose progress if they had to step away for something.
    - Success: The in-game pause menu improved accessibility and player control.
7. **Main Menu Screen**
    - Feedback: The player found the main menu screen intuitive, with clear options for changing difficulty levels or starting the game. The tester also appreciated the background screen, saying it added to the atmosphere of the game.
    - Success: The main menu screen contributed to a more user-friendly and navigable experience.

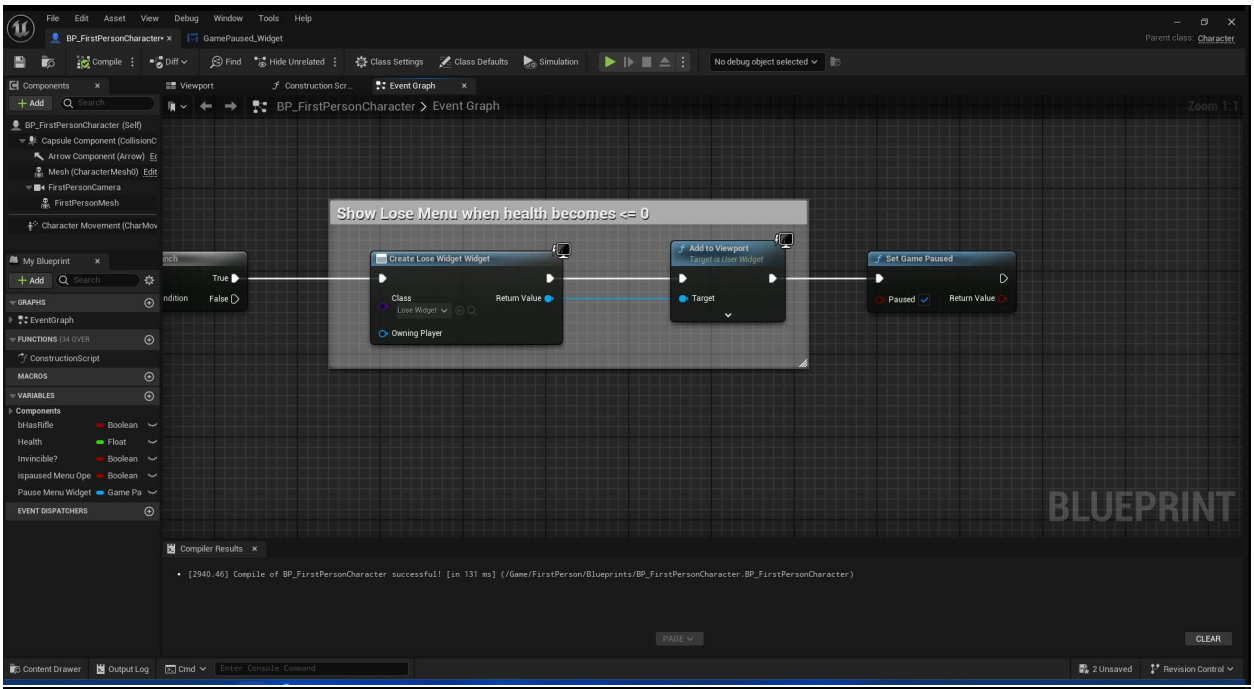
Code Appendix

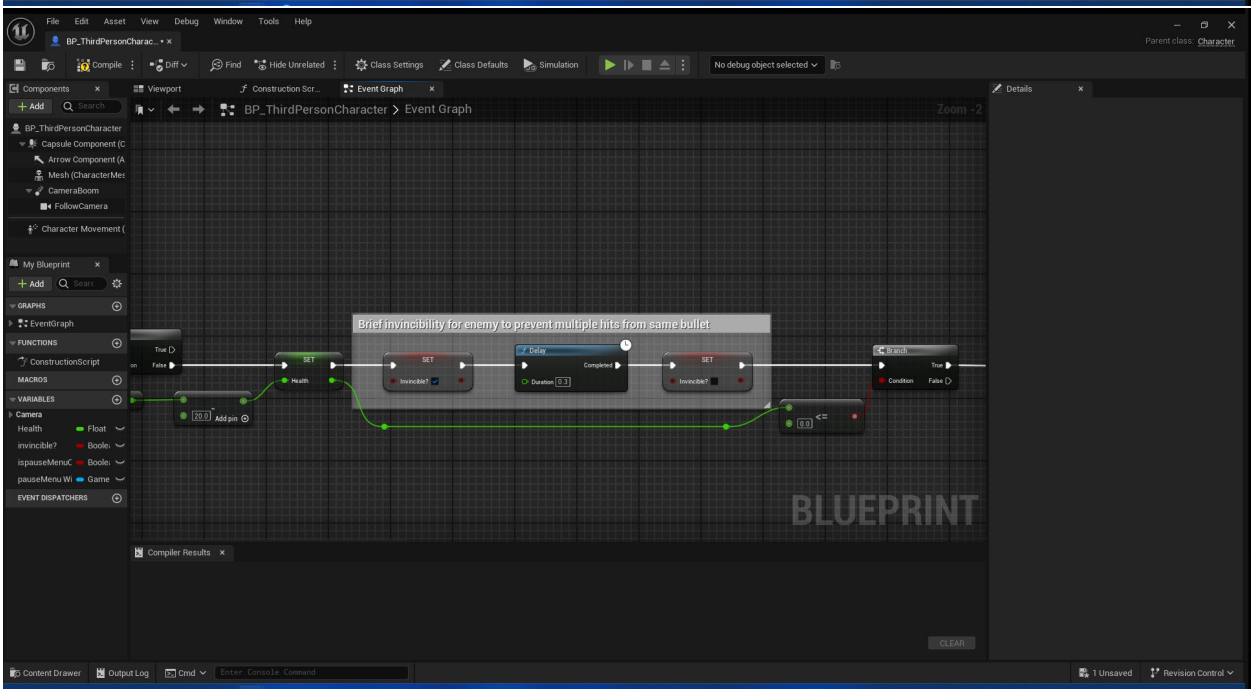


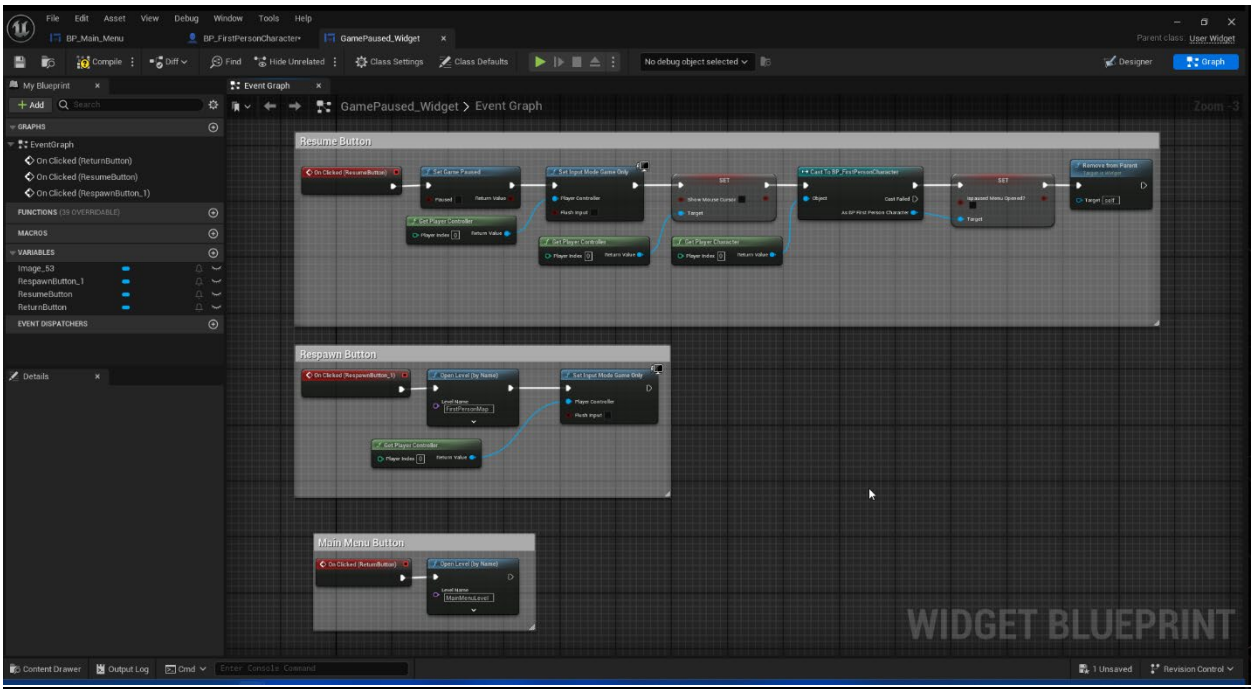


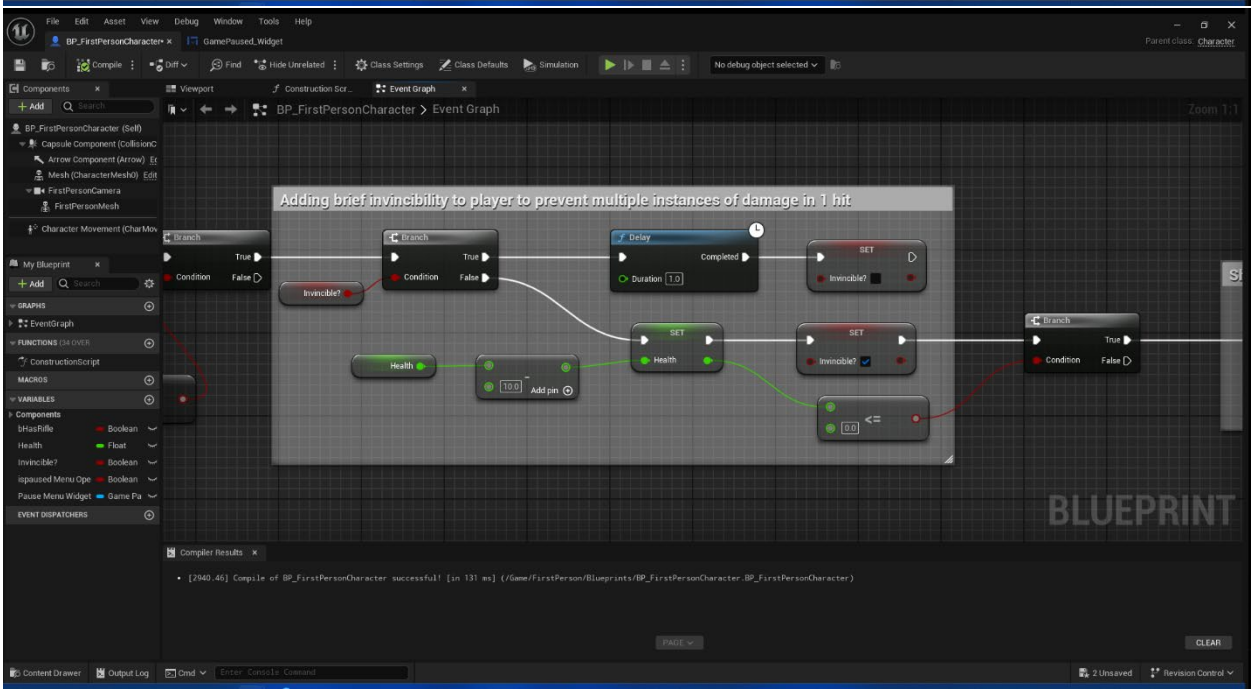

BP_Game_Instance
Get Enemy Health Multiplier
Function to return enemy health multiplier based on difficulty
Get Enemy Health Multiplier
Return Node
Enemy Health Multiplier
Health Mapping
Selected Difficulty
FIND
BLUEPRINT

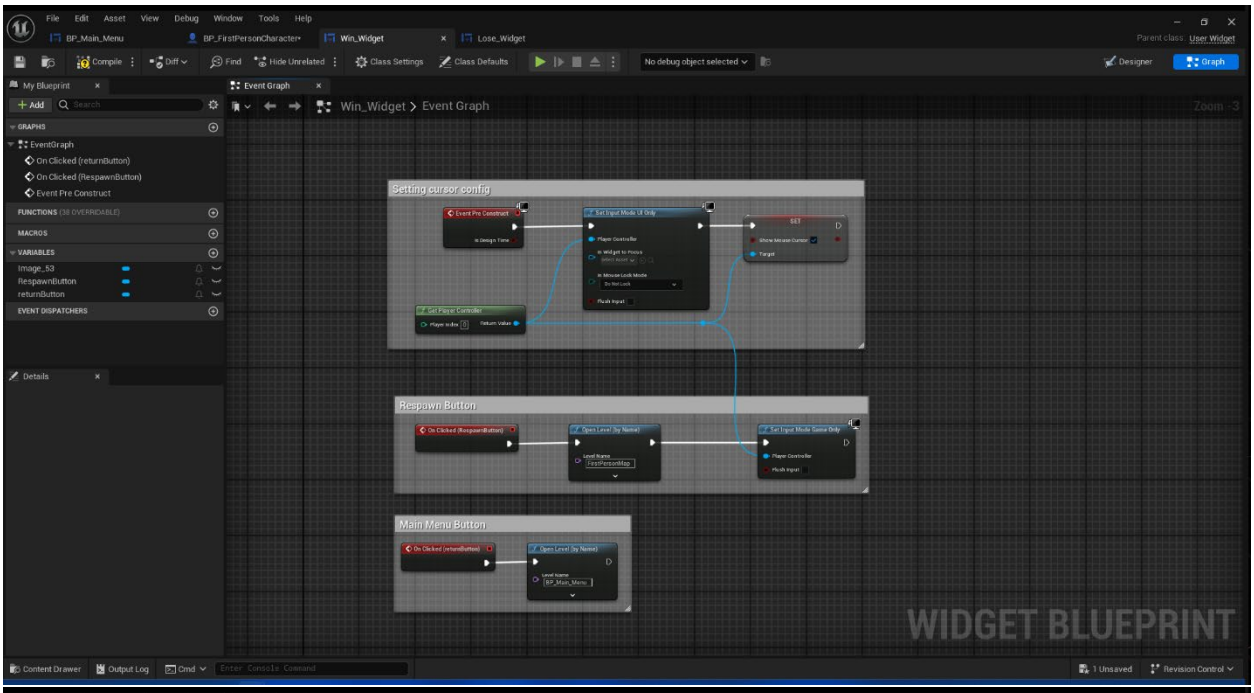

BP_Main_Menu
BP_FirstPersonCharacter
Lose_Widget
Lose_Widget > Event Graph
Setting cursor config
Respawn Button
Main Menu Button
WIDGET BLUEPRINT

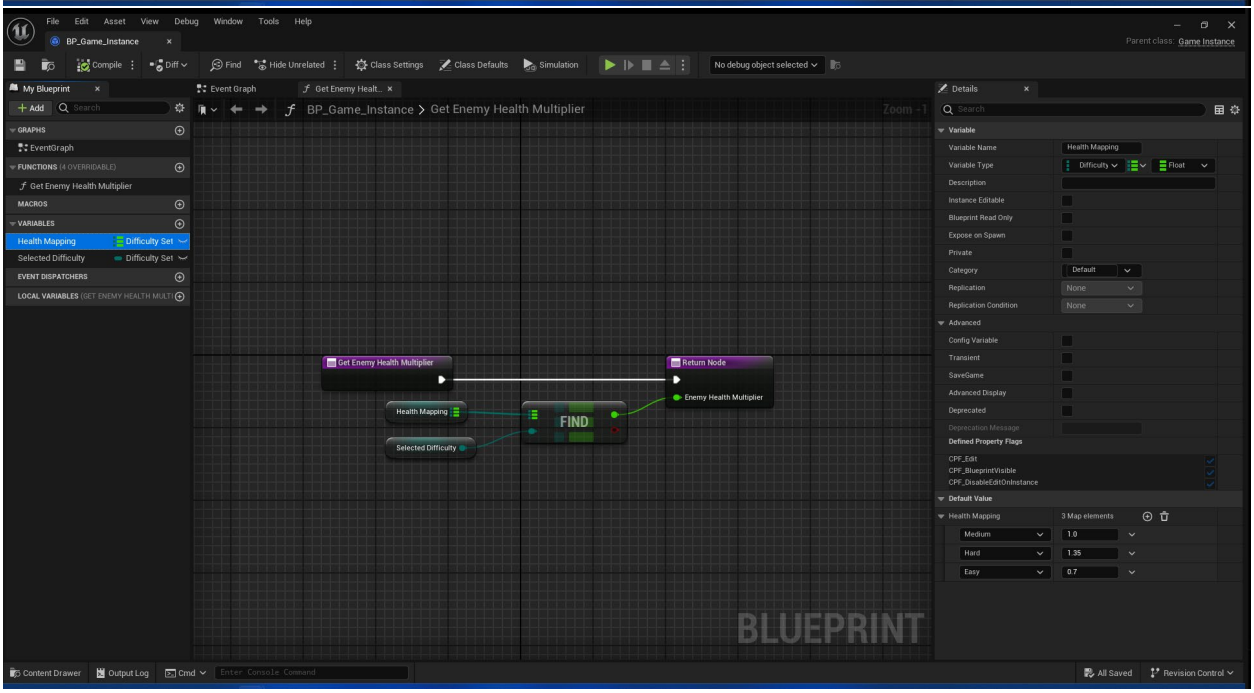

Show Lose Menu when health becomes <= 0
Create Lose Widget Widget
Add to Viewport
Set Game Paused
BLUEPRINT

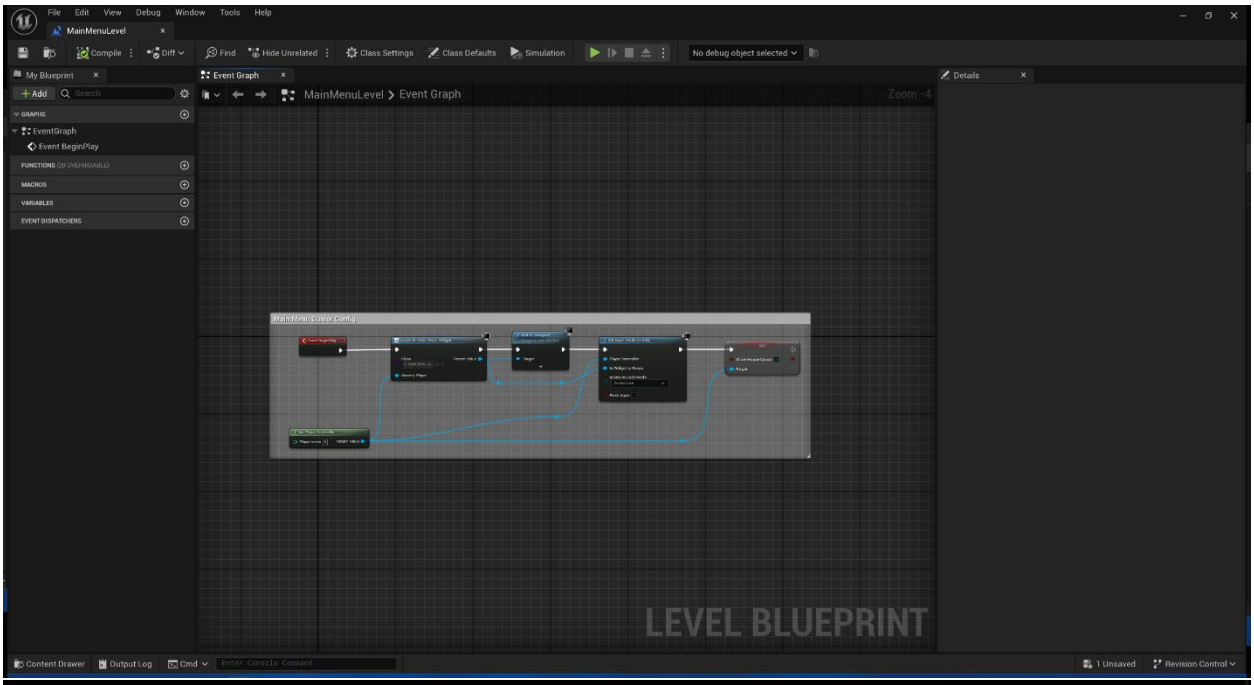

Brief invincibility for enemy to prevent multiple hits from same bullet
BLUEPRINT

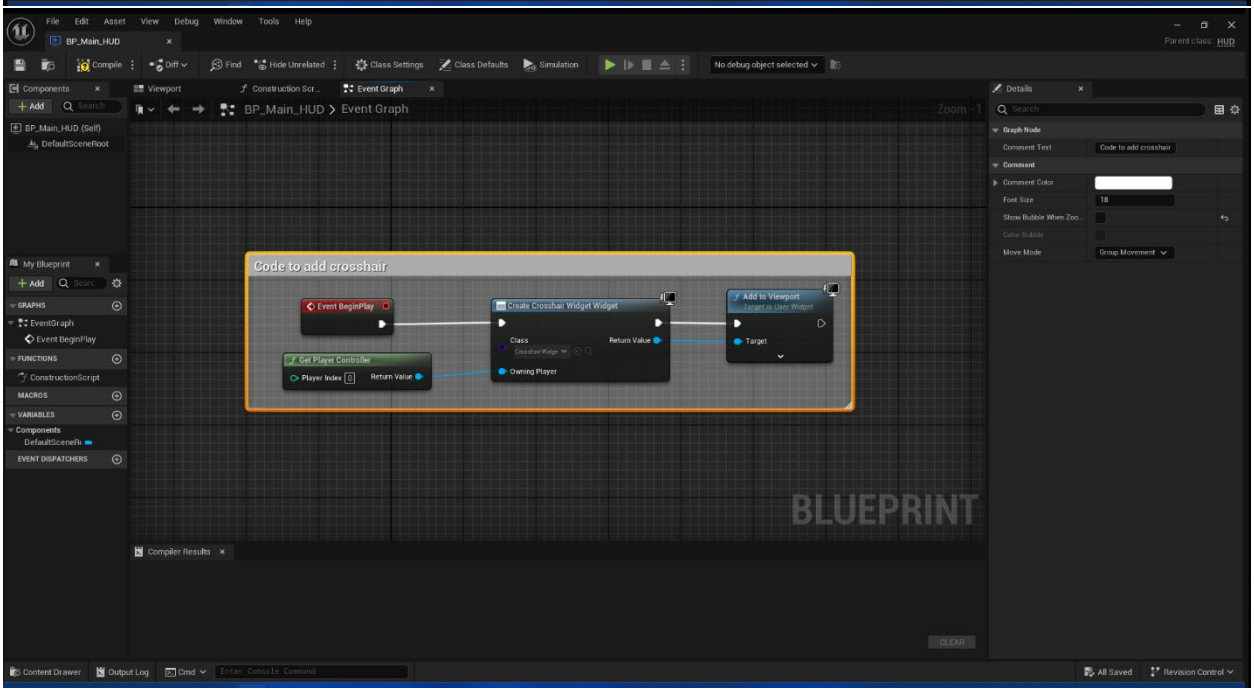

GamePaused_Widget > Event Graph
Resume Button
Respawn Button
Main Menu Button
WIDGET BLUEPRINT


BP_FirstPersonCharacter > Event Graph
Adding brief invincibility to player to prevent multiple instances of damage in 1 hit
BLUEPRINT


Win_Widget > Event Graph
Setting cursor config
Respawn Button
Main Menu Button
WIDGET BLUEPRINT


BP_Game_Instance > Get Enemy Health Multiplier
Get Enemy Health Multiplier
Return Node
Health Mapping
FIND
Selected Difficulty
Enemy Health Multiplier
BLUEPRINT


LEVEL BLUEPRINT


Code to add crosshair
Event BeginPlay
Create Crosshair Widget Widget
Add to Viewport
Get Player Controller
BLUEPRINT