The Floating Institute Final Milestone

1. Individual group member contributions, including new tools researched

Arthur: I worked on the main hub of the floating Institute, which serves as part of the final level in the questline [00FinalLevel]. It features the concourse area, couple of rooms (such as an office and lab space) that serve to fit any type of purpose so that the rooms attached to it can feel like it is a part of my level no matter the room's purpose. It also has a directorial office and board room for the final area that the players must head to. The hub is combined with Georgi and Aidan's room to make a long and difficult level for the players to win against. Two tools I researched were how to modify stats for enemies and weapons, which were implemented in the level.

Aidan: I was in charge of working on the design of the exterior, interior, and enemy layout in the first and second floor rooms. My rooms were connected to Arthurs main hub build. The rooms in both levels were designed to be similar to that of the regular in-game institute base. But it was designed to have a lot of enemies and have a variety of rooms like the sleeping quarters, the lab, engine rooms, etc. to make it seem more realistic and natural while giving the players a challenge by working their way through the waves of enemies throughout the floors.

Angel: I worked on creating the outside of the institute hideout, specifically making the area become a floating Island. The Island would float high up in the air, leaving a crater below the island and having the player find a way to go up to the island. The reason the player would need to go up to the island is to enter a church that will go to Miguel's area. One tool that I had to research and use when creating the island was navmesh as it became an important tool near the end of creating the level.

Miguel: I worked on the church level for the game. The abandoned church would've acted as a secret entrance to a laboratory that is under the church. It also would have been used as a camp as well. I researched how terminals worked and how to edit them

Evan: I worked on creating an isolated Bio Sciences lab. I was solely responsible for the design, layout, interior, and enemy placement of this lab. This lab is hidden underneath the boston commonwealth, and is meant to be the nexus point for players. Here a player can find the exact location of The Floating Institute.

Seth: I worked on creating three smaller areas in the open world area of the Commonwealth. The three locations are three small unique enemy camps the player can visit. All three locations are spread out through the East Boston town that's nearby the Brotherhood of Steel Airport and Angels floating island.

Georgi: I joined this project a bit later in the semester. Before that I was working on another Fallout mod called Ashen Vale, where I focused on learning custom meshes with Blender, NifSkope, and B.A.E. (Bethesda Archive Extractor) to edit meshes, collisions, and buildings. For the Floating Institute, we didn't really need custom meshes, so my role became level design, optimization, and technical support. I worked on the third floor of the Institute interior and built several different room variations there. I also spent a lot of time fixing problems after we merged everyone's cells together, such as door links, room bounds, portals, and lighting. My main priority was to future-proof the level so it would run better and not break visually when the whole team's work was finally combined.

2. How each of the required techniques were used

Arthur: To start, I used the basic building functions to build out my level, altering the size and locations of assets to fit my needs. I modified terminals to display the texts shown that can allow the players to get a good idea of the worldbuilding and serves as one of the main objectives in the final level. The modification of enemies were used to make the combat harder, but they were lost during the merge. Finally, the use

Aidan: There were no new tools I used, I just had to look up the ones taught in class again like how to select and deselect a whole group and certain items.

Angel: With the navmesh tool, I used it to give a platform for the NPC to stand on as they would need to stand on the island rather than going through the floor and being below the island.

Evan: I utilized many premade assets from fallout in order to design my level. My lab is based on the pre-existing biosciences and other Institute labs in the game. I studied these existing vanilla fallout labs and created some design rules I needed to follow. Allowing me to fully flesh out my level into a populated space. I also used techniques from a tutorial to link my creation kit cell to the boston area.

Miguel: All I did was tinker with the terminals to see how they worked, and once I figured out how they work, I would let the others know how to make terminals.

Seth: I used the assets that were already available in the Creation Kit to design locations that fit in with the Fallout 4 world, and designed them to be different from one another with different enemies to provide unique challenges.

Georgi: At the start, Aidan and I each made our own versions of how the room template could look, and after some discussions and feedback from Arthur we decided to use Aidan's floor plan. I then set up the custom interior cell, placed models and NPCs, reverse engineered how the wall explosion effects work, and applied an Institute lighting template so the space matched the rest of the base. I used load doors and XMarkerHeading markers to connect my floor and Aidan's

rooms to Arthur's hub and to other areas, so the player can move smoothly between spaces. I also spent a lot of time working with room bounds to control what the game draws at one time, and I used console commands like coc and tgm to quickly test the level and catch visual problems.

3. Challenges that were overcome

Arthur: Something weird that kept happening was some of my assets would disappear or turn into other assets. My first method of trying to fix it was to just exit out of creation kit so the progress would revert to its original form. But after a while, I noticed that this would only happen if I was copying and pasting a group of assets (like 4 chairs and a table), so I had to stop copy pasting entirely and the problem no longer persisted.

Aidan: Those techniques were used to overcome the challenges I was faced with. The challenges I was faced with were the second floor rooms were all shifted/slanted, so when designing the interiors, everything on the left walls were off and half of it would stick through the walls. Luckily, I had kept a spare copy of the exterior layout off to the side before I started designing it, but I used the ctrl +click technique to be able to select all the exterior layout of the floor and had to deselect certain objects from it as well. That saved me a lot of time and headaches to try and figure out how to fix all of it without having to restart it all.

Angel: Something that became a big challenge was having a trigger that would make the land shake and have the area float up into the air. I created a code from a tutorial that would activate when a button is pressed which did not work when I did it. In the end, I decided to talk to my group members about this issue and come with an agreement to remove the levitation part and replace it.

Evan: I had a lot of time constraints in my personal life. I had to work on my lab in short bursts due to my lack of time. Designing my level piece by piece, room by room, allowed me to incrementally make new design choices I wouldn't have thought of before taking a break. Overall, allowing me to make a level that feels like it was meticulously planned and put together.

Miguel: I was confused with how the elevator would look like. At first I thought I got it but when I got it wrong, I spent an entire Friday fixing it so that it fits the next cell. I was able to finish it thanks to my peers.

Seth: Back when the semester started, my computer did not originally have enough space to download Fallout 4 at all, and I was struggling to find enough apps / files to delete to make space for it. Eventually I got the storage, but then my hard drive kept running out of room which stopped me from using Fallout and Creation Kit, until I deleted stuff again. So I had to

meticulously delete files regularly to make enough room to run Creation Kit, while also working around other time constraints.

Georgi: Most of my challenges were technical. Merging my levels and Aidan's into Arthur's main ESP had a learning curve because of duplicate FormID errors and other warnings. The combined result was a very heavy cell with lots of doors, NPCs, and models. While trying to prevent performance problems, especially for future merges, I accidentally created an even bigger issue for my work: a major visual bug where the level turned into a hallucinogenic "abyss" with stretched colors and broken graphics. After a lot of reverse engineering and some semi-educated guesses, I traced this back to conflicts with room bounds and portals. Once I fixed those, the scene became stable and visually clean again. It's also worth mentioning that I joined the project later in the process, so I had to figure out a lot on my own, but Arthur was very helpful in getting me up to speed.

4. Aspects of the project that the group is particularly proud of

Arthur: I have two parts that I'm particularly proud of, the first was the first time I was able to experience my own level in Fallout 4. Since it finally felt like my actions inside creation kit were actually seen and felt inside a gaming environment. The second was seeing the floating institute in game, since I felt like I saw the vision in my head in "live action."

Evan: I was proud of the fact that most of our levels come together into what looks like an actual part of the vanilla fallout experience. Each area follows similar design philosophy from the base game and is able to stand out while looking like it belongs within the world.

Miguel: I was proud of being able to experience Fallout 4 for the first time and working with my teammates. I never got to experience this game back then and thanks to this class, I was able to experience it. I am also proud of being with this amazing team and professor because this was a really fun class.

Seth: I like how a team of people was able to come together to build a greater project that connects together seamlessly and feels like it fits within the Fallout world.

Georgi: I'm happy that I was able to join the project later and still make a real impact on how stable and playable the final level is. I built my own areas, set up proper lighting, and tried to keep everything feeling smooth and consistent. I'm especially happy that I was able to track down and fix the "abyss" visual bug caused by problems when I added the room bounds and portals. It was very rewarding to work on optimizations, knowing that more people with different PC builds can play our level, and it gave me peace of mind that my teammates could merge their levels into the game without noticeable performance drops.

5. Strategies used for keeping run time under control

Arthur: The main strategy I had to keep run time under control was during the planning phase. I already knew that this would be the longest "game" I've made since there are so many parts to it. So I structured it in a way where the quest would start with two medium length levels, followed by one short length level, a resting point, and one long final level. The two medium length levels were longer because some parts took place in the Commonwealth (open world), so walking around added runtime to it, which could easily be cut by teleporting players around instead of making them feel immersed. As for the final level, I sectioned off the level into 2 parts: the main hub, and the rooms that are part of the overall building. A failsafe of if the level was too long was to cut out certain rooms or areas in the main hub if players felt that it was too repetitive.

Georgi: My main strategy for keeping run time under control was to think about optimization while I was building, not just at the end. I tried to avoid large, empty rooms and instead used teleport doors to move the player between important areas, which keeps the level feeling big without forcing the game to draw everything at once. I also heavily experimented with room bounds and portals so the engine wouldn't render the entire Institute floor in every frame. When those caused visual bugs, I tested different setups and overhauled my initial bounds until I found a stable solution. I also paid attention to how many NPCs, lights, and high-detail models were in each area, so the scene stayed readable and didn't become a performance hog.

6. Techniques for creation of assets

No new assets were created as all assets were taken from Fallout 4's creation kit, but there are items and characters that were taken and modified for the level's purpose. Arthur took the standard Institute Pistol and modified it to be more powerful in every way possible (increased fire rate, more ammo, etc.). As well as modified the attributes of NPC's, changing outfits, weapons, health, etc.

7. Credit any assets and tutorials used and how you modified your assets/code from the original

No assets or code was taken from any tutorials. But tutorials were used to figure out how certain parts creation kit functioned:

Linking cells: https://www.youtube.com/watch?v=qKbOLdzC6-k
Terminals: https://www.youtube.com/watch?v=ZIWI7jalt9o
Enemy customization: https://www.youtube.com/watch?v=Ipgx3xmzEaw
Navmesh: https://www.youtube.com/watch?v=T_wJhG2zHqw
https://geckwiki.com/index.php/Bethsoft_Tutorial_Navmesh