2.1 Hello (VR) World!

- What do you know now that you did not know before doing this assignment?
    - I learned a lot from this assignment. First, I didn't know how to navigate and create objects in the unity. By following the tutorial, I was able to create planes and move scale them around in the scene. Second, I didn't know there's a thing called scene which you need to create inside of it. When I first open the project, I create the plane in the wrong place so that I had to start it over again. I find it to be very interesting that the plane is transparent from one side and solid on the other side. I think that make the creation process both hard as easy. It was hard because I had to navigate around to make sure I put the plane in the right position. It was easy because I can easily see what's happening inside of the room, the plane won't block my view.
    - After I learned adding objects and the scene, I learned how to set up for VR in the unity. I don't have a VR headset, so it was a big relief for me when I know that I can still create and test in unity without a headset. However, for somehow, when I first followed the YouTube video and set up the everything, all I see was backscreen in my game window, but the main window was displaying the right scene which was working correctly. I couldn't figure out what was wrong at first. But next day, when I open Unity again, it suddenly works correctly. I was really happy about that.
    - I have also find the hierarchy panel to be very helpful. This panel allows me to know what's all the objects in the scene and was easy to control them. I like how you could group and set an object as the parent by just drag them into different hierarchy.
    - Finally, I learned how to add script to an object. I have programmed in C# before, but I think it is more strict forward in Unity, instead of imaging abstract object, this is really object oriented programming.
- Was the assignment challenging? Was it fun?
    - Over all, this assignment was not challenging, except that I couldn't figure out why the gameplay view was not displaying correctly when I first set up the VR setups. It was very fun though, especially when I find out how easy it was to control my character to navigate in the room.
- Does the assignment seem useful? What doesn't seem useful?
    - I think the assignment seem to be really useful. As someone who had some experience of using C# and Blender, it was very quick and easy for me to get a overview and the basic concept from this tutorial.
- Have you learned anything unexpected?
    - Not really.
- Did you expect to learn something that you did not?
    - Not really.
- Have you become curious about anything new?
    - Yes, I am very curious of how the physics would work. Because now it looks like the camera is locked on a 2d space, which is reasonable because the player in the real world can't really jump up and down and climb a stairs or anything like that. But I think it's still something worth to explore.

- Have you learned anything *about* how you learn?
    - I typically like to learn by doing it. And this tutorial is just perfect for me. By following the tutorial and create a simple room, I was able to get myself familiar with Unity.
- How might this be related to your eventual class project?
    - This might related to my eventual class project by teaching me the fundamental knowledge of Unity. The eventual class project require us to build application using Unity, so it's important for me to learn and understand it at the beginning.
- How are your implementations related to in-class concepts?
    - My implementations related to in-class concepts in a way that I now understand better of how the rendering works. Like how it calculates the whole world moving, and only rendering objects within the view.
- What have we not done yet that you have seen in other VR experiences?
    - I have seen motion tracking and hand movement in other VR experience, more specifically, those motion tracking using a camera instead of a hand controller. I think those are very cool but we haven't covered how it works in class.

2.2 VR World++

- What do you know now that you did not know before doing this assignment?
    - In this assignment I learned about materials, shaders, textures, colliders, and triggers. I know most of them before because I know how to use blender. However, it's still interesting to learn how to use them Unity. I learned how to create a material, and how to apply the texture and the normal map to it. I like how convenient it is in Unity that you can apply the map or texture by just dragging it. I think that helps reduce a lot of work and eliminated potential confusions. I also learned we are able to changing the tilling and the metallic characteristic of a texture, which is also very easy to set up. And when I adjust the setting for one materials, the adjustment will immediately reflects to all the object that has this texture. It is like a global variable in programming.
    - For trigger zone part, I learned about the collider, empty game object, is trigger option and the rigid body. I learned the collider is in charge of detecting and handling object interaction. It can either be as a collider, which is like a solid object, and when it collide with other object, it will behave like what a collision will do in the real world. There's also another type of collider, which is when you check the option "Is Trigger" , in this case, the object won't collide with other object. But rather, it will be "triggered" when other object enters it. For this assignment we are only using the box collider, but I learned that from the video, that in the future, if I want to create a more complex mesh with collider attach to it. I could either use several different shape collider combine, which will roughly cover the object. But if I want it to be more precise, I would also have the option of "mesh collider", which will generate a collider based on my mesh shape. This method, however, is not as efficient as the former one, because it will generate a more complex shape, and the more complex the shape, the more calculations it need. I have also learned that in order for the trigger to work, the object that enters the trigger need to have a rigid body. The rigid body has a few properties. The

first is called “use gravity”, which will decide if the object will behave as if it’s under the influence of gravity: whether it will be falling down etc. The other property is called “is kinematic”, which will decide if force will be applying to it, when it is checked, the force and collisions won’t be working on it.

- Was the assignment challenging? Was it fun?
    - I think this assignment is somewhat challenging, especially for the trigger zone part. At first I didn’t know in order for the trigger zone to be working, the XR origin, which is the player, had to has a rigid body. I create an empty object which has a rigid body attach to it, and set this empty object as a child object of the XR origin. But this XR origin will just keep falling down. So I unchecked the “use gravity” and checked the “is kinematic”, however, I discover the empty object is not following the player’s camera, this means, even though the camera may enter the trigger zone, as long as the empty with the rigid body is not, the zone won’t be triggered. Luckily, eventually I find out I had to hold down shift for the empty object to follow the camera.
    - Even though this part was kind of challenging for me, over all it was very fun.
- Does the assignment seem useful? What doesn’t seem useful?
    - This assignment seems to be useful. I could image the mechanic and the appearance would be a crucial part for the final project. This assignment helps me to learn the basic of how to apply texture and material, which essentially teach me the foundation of building the appearance of the object in Unity. The triggering and the dropping sphere is also important because it teaches me how to make the player interact with the environment. I don’t think there’s anything that aren’t useful in this assignment.
- Have you learned anything unexpected?
    - No, everything is expected.
- Did you expect to learn something that you did not?
    - I didn’t expect to learn the “is trigger” part. I thought it would be more complex for an object to detect its interaction with other objects, turns out, it’s super easy in Unity.
- Have you become curious about anything new?
    - I am curious about how to make to make a UV map in Unity. Like how to I make sure my texture is applying to exactly I want it to be on an object. I am also curious about other functionality of the rigid body and the collider. I wonder how to apply the physics to the player. And what other building in function—such as the “Is Trigger” option—does a collider has.
- Have you learned anything *about* how you learn?
    - I learned that a video is more effective to me when come to learning a new software like this. Video is just more intuitive and more straight forward. But when reading a document, sometimes I am just not sure if I am doing right without more image as reference.
- How might this be related to your eventual class project?
    - This might be related to my eventual class project because it teaches me how to create and add texture, and it teaches me how to add mechanism to Unity. In my eventual project, our group decide to make a forest immersion experience where the player could go explore and interact with the forest. In this case, knowing how

to apply texture and material allows me to build the forest, build the environment eventually. And knowing how the mechanism works helps me to allow the player to interact with the environment. For example, if I want to make a scene where when the play walk under a tree, the apple will drop off, I now know how to make it by using a trigger zone.

- How are your implementations related to in-class concepts?
    - The implementations related to the in-class concepts of sensory stimulation. For example, when the user enter the trigger zone, the sphere will drop. Which means the world depends on the user.
- What have we not done yet that you have seen in other VR experiences?
    - We have not using the hand controller to do anything so far. I think it would be interesting to learn how we can use the hand controller. Or even just use the laser light that comes from the hand controller to do something.

2.3 The VR Room

- What do you know now that you did not know before doing this assignment?
    - In this assignment, I learned how to import a model that I created, how to add my own texture picture, how to make skybox, and how to build a more complex system that allows different objects to interact with each other using codes.
    - In this assignment, I first build a house in blender, and then I imported in Unity. But I found there's a difference between how unity and blender rendered object. For example, when I build a plane in blender, both side looks solid. But when I imported in to Unity, Unity automatically render the plane as the plane in Unity, which one side is solid, and the other side is transparent. After discover that, I had to change all the plane on my model in Blender to solid box. Second, I learned how to add my own texture picture to Unity. Which is very easy, I just simply add my the texture picture into the project folder. Then drag them on to new materials. Third, I learned how to create skybox. I find this to be a very interesting idea, that instead of a 360 degree picture, we can use six images, to form a box, which is the sky. I find that concept to be very interesting, and I was glad that I learned it.
    - I also learned how to use code to help different objects work together. Although I had some experience of programming with C#, as well as have the understanding of object oriented programming. This "Real" object oriented programming was still something new and fun for me to explore. When I was building the cat chasing game. At first I just think writing script that attach to each object, which will allows them to do their own work. However, while I was building it, I find out I had to have some way to control all of them. Which link back to what I learned in software practice class, the MVC: model, view and controller structure. In the end, I had to build a empty object to be the controller to help everything works together.
- Was the assignment challenging? Was it fun?
    - I think the logic of the cat light game was somewhat challenging. Because I had to figure out how to let the collider notice the text object to increment the score. I also need to find out a way for all those light to work with each other so that only one of them will be appear at a time. This was challenging, but at the end I figure

it out by creating an empty game object that has the script of a controller. Which will be keep track of the game progress and notice other object to update.

- Does the assignment seem useful? What doesn't seem useful?
    - This assignment was really useful. Because it allows me to practice building a VR game from scratch. It's very different when I am following a tutorial than I am building it by myself. When I am following a tutorial, I don't need to think about the big picture, I just need to do it. But when I am building it by myself, I had to plan first, which I think is an important skill to practice. So overall, this assignment seem to be very useful.
- Have you learned anything unexpected?
    - I didn't expect to build a game from scratch, even though its' a very simple one. So I had to "learn" how to plan and build a game from scratch, which isn't what I expected.
- Did you expect to learn something that you did not?
    - I was expected to learn more about the interaction between the hand controller with the environment, but we did not learn that.
- Have you become curious about anything new?
    - I become very curious about how to use the hand controller to interact with the environment. I am also curious about improving the XR simulator. I am wondering if there's an way for me to build the XR origin with the rigid body, not having an empty game object that has a rigid body attach to it. Because it's kind of hard to control the camera when you have to holding "shift" to make sure the empty object is following you all the time.
- Have you learned anything about how you learn?
    - I learned that if I build something from scratch, it's a good review for all the new skill set I have learned.
- How might this be related to your eventual class project?
    - This might related to my eventual class project because this assignment give me the opportunity to practice planning a VR game, which is very essential. We need to figure out what code structure we want, and what kind of modeling preference we want to follow. I learned there will be many details in the final project that we better figure them out as early as possible.
- How are your implementations related to in-class concepts?
    - My implementations related to in-class concepts of the world fidelity. When I add the skybox and make the directional light matches the sky light, I was creating a very high fidelity world. I was trying to designed to simulate the real world.
- What have we not done yet that you have seen in other VR experiences?
    - We haven't doing anything with the hand controller so far, which I am very excited to learn in the future.