Michael Hoover
CSCI 4920
December 11, 2020

Labyrinth in the Sky

What are you most proud of about yoru game?
I am most proud of the concept and how I was able to take my idea from a conceptual stage and implement most of it in a game. I really wanted to get a game working where the player could change the rotation of the entire level and I was unsure in the beginning if I was going to be able to do this. I managed to create switches that can move individual platforms in the game and I thought developing the mechanisms to rotate the entire level would be difficult. It was a challenge. I encountered a bug with gimbal lock that was a substantial hurdle. Basically, after one or two rotations the level structure started rotating in strange ways. This is because the axis had been 'flattened' after rotation. This meant that I could not use many of the functions that are prebuilt into Unreal Engine 4 for movement and rotation. This made things particularly difficult as far as achieving a smooth rotation. In the end I had to build a function that rotated the level a small degree at a time and repeated it for 60 frames. There were many technical difficulties in figuring this out. But I'm glad I was able to complete it in the end. And although the game is in rough form I am really excited about how the mechanics work and believe thatI can continue to improve on the game in the future.

I am also excited about some of the asset design I was able to do. I ended up learning and using Blender to model the assets. It was interesting to learn the software and I was excited to find a robust online community to help me along. To be honest, the levels look much better in Blender as far as color and lighting. When I imported them into the Unreal Engine the materials look a bit washed out and dull. I wasn't able to fine tune the lighting in order to fix this, though I am confident I can improve the look in the future. One difficult thing that came up when importing the level structures from Blender was the collision mapping in Unreal Engine. My game depends on a dynamically calculated navigation mesh to determine where the player can move as the level rotates and platforms move during gameplay. This wasn't a problem for the meshes I built in the Unreal Editor, but when I wanted to use Blender because I found it to be a far more intuitive and easy modeling software, upon importing into Unreal it put s default collision boundaries on the mesh that were far to simple. Basically it was struggling with the convex hull of the envelope and made a giant block. This meant the player wasn't able to move through many parts of the level. I had to adjust this to make the collision more precise so that the navigation mesh would map to the surfaces I wanted the player to move through. I really enjoyed the art design process of building the levels and I wish I had more time to make them look interesting and to improve my design skills.

What changes did you make to your original game design and why?
To be honest I didn't make major changes to the game play for technical reasons. Most of the problems I encountered I was able to fix, such as issues with gimbal locking and the collision of the level. There is still an issue in that sometimes the rotation of the level tosses the player

character in the air and restarts the level even when the player didn't really make a mistake. Unfortunately I was unable to correct this mistake in this version. I don't think the gameplay needs to change but the underlying mechanics need some adjusting. What I want to do is momentarily attach the player pawn to the level structure, or in other words make the level structure a parent to the pawn, during rotation so that the pawn stays in the same place relative to the level structure. I managed to do this however it creates another problem in that it prevents the pawn from remaining upright. Essentially, the pawn rotates with the level, so that when the rotation is finished the pawn is not right side up. So the solution isn't to change the gameplay so much as it is to figure out how to code the mechanism so the pawn remains in the same location relative to the level structure but is allowed to rotate freely and independently of the level rotation. I was unable to find a solution for this iteration of the game but I do think it is possible to fix.

What did you learn from your play testers and what did you change because of it?
My play tester had two major criticisms. One was that the levels in my functional minimum looked pretty lame. This was an assessment I agree with. This feedback was a big reason why I started looking into blender. Honestly I found Blender to be easier to work with than 3ds Max or Maya, so that is the direction I chose. The levels were boring so I tried to design some things that looked a bit more interesting. The first level has a sort of medieval theme to it that I'm really happy with. Again, the materials look better in Blender so I still need to figure out the light settings that will make the colors more vibrant in Unreal. The second level has a sort of pueblo theme.

The second criticism was that it was difficult to see the entire level and therefore make a plan to solve the puzzle. The second level turned out to be more challenging and confusing than I thought it would be. So I did my best to simplify the level. This also meant reducing the level in it's expanse so that it would fit into the screen and the player could get a better view. I think to further address this issue in the future it would be nice to have more freedom with the camera. For instance a zoom-in and zoom-out feature would be helpful.

What would you do next if you had more time?
Obviously the priority has to be correcting the problems with the physics that throw the player off the level. It would be a huge improvement as far as the playability of the game and is the most frustrating wart on the project at the moment.

Also, I would definitely build more levels. I truly started to enjoy designing stuff in Blender. I found a number of interesting tutorials online that I want to explore. I think it's possible to make some challenging puzzles with the underlying gameplay mechanics that I have set up. So I want to expand the game and get more involved into the art design of the project.

It would also be nice to experiment with adding other elements to the game. I have brainstormed ideas like adding in enemies that chase you through the level or adding tools that help you move through the levels and solve problems. I don't know if these things would add to the experience or make the game feel too cluttered but it would be nice to be able to try them

out.

What would you do differently next time?
I'm not sure I would do too much differently. Overall I am happy with the progress I was able to make this semester. I have learned so many exciting things in this class. Obviously, if I could go back I would spend more time wrestling with the physics problem that plagues my game right now. My inability to fix it is the greatest weakness of the project at this point. Knowing now the challenge that it turned out to be I would have tried to tackle it earlier which would have afforded me more time to do research and implement possible solutions.