

Cap Stone Project Submission

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Versions:

- GoogleVR SDK version 1.70.0
- Unity version 2017.2.0f3 Personal

For this project, I have built a complete project under the theme: Emotion! The task was to create an experience that makes someone feel an emotion, whether that be fear, sadness, or joy! I opted for fear and joy in the life of rabbits.

I started by planning all of the tasks I wanted to complete in a Pre-Production document. After I completed the pre-production document, I realized that there were tasks that are too complicated or could be achieved by similar means. At that time, I carried out a scope reduction on my pre-production document.

Both of these tasks – the creation of the Pre-Production document and it's re-visitation to reduce the scope helped immensely to refocus on the tasks that were achievable with the knowledge I had or some further study as you headed into development.

My Pre-Production document is included in this submission.

Achievements:

In addition, I've earned points by completing various achievements to score at least 500 points in each of the 3 main categories:

- Fundamentals – **600 points** achieved [500 points required]
- Completeness – **750 points** achieved [500 points required]
- Challenges – **750 points** achieved [500 points required]

A detailed breakdown of the achievements are included in this submission.

Rubric notes:

General Requirements:

Target platform:

The project targets mobile platforms and was developed and tested on a Pixel 2 device.

Good VR

Pre-Production and Scope Reduction

I have included a document that lists all ideas that were desired for the project during my pre-production brainstorm with this submission. The included list was scoped in terms of feasibility and each item marked as doable or marked as removed from the scope of your project.

Maintain Target Device Framerate

On the target device, the project maintains a consistent high frame rate. On Cardboard, the project must maintain 60 FPS. For the Oculus Rift or Vive, the project must run at 90 FPS.

Must use Anti-Aliasing

For mobile VR, the experience must use MSAA 2x. For PC VR, the experience must use MSAA 4x.

Use at least 3 spatial audio clips

The project must include at least 3 spatial audio sources using either the Oculus, Vive, or GVR spatial audio SDK. This does not include ambient sound.

Must be an interactive experience

The project is an interactive experience for the user and requires user input to explore the environment and interact with it.

Experience must convey an emotion

I attempted to use scale to convey the sense that the viewer is in fact also a rabbit. The ability to run along with the distressed rabbit as he encircles the forest helps associate with it. I believe the experience conveys emotions. First of all empathy with the distressed rabbit and secondly joy when the imprisoned rabbit is freed and the two are reunited. **[Include this in the readme file]**

A build of your VR experience

A full build has been included in my submission.

A link to a video walkthrough of your VR experience running on the device in your README.txt

Your submission should include a link to a video (5 minutes maximum) that records a walkthrough from start to finish of the experience on device.

Achievements:**A link to a 5-minute video explaining all achievements that are built in your README.txt**

Project submission contains a link to a video (5 minutes maximum) of all achievements that you have built and the sum of all the achievements in each category is at least 500 points.

A README.txt file that contains the list of all achievements that have been completed.

My submission includes a README.txt file that contains the list of all achievements that I built.

Achievements

Fundamentals: [Completed 600 points in this category]

1. Scale achievement (100 points) - Completed

Correctly use scale to make the user feel small or large relative to another object. If the user is supposed to be a giant, then the user should feel tall. If the user is supposed to be an ant, they should feel small. Or if they should feel about human height, then use another object to communicate a sense of scale disparity.

2. Animation achievement (100 points) - Completed

Create an animation, either via scripting or a tool like Mecanim, to bring your scene to life.

3. Lighting achievement (100 points) - Completed

Use a mix of baked and real-time lighting to add realistic shading to each scene.

4. Locomotion achievement (100 points) - Completed

Create a locomotion system that is appropriate to your experience. For example, if you are building a museum, waypoints might be appropriate. If you are building a climbing experience, then a grabbing and pulling mechanic would be appropriate.

5. Physics achievement (100 points) - Completed

Simulate Physics forces in your experience. For example, depending on your experience, you may want to simulate gravity.

6. Video Player achievement (100 points) - Completed

(2x if Lighting achievement is also completed)

Create a video (does not have to be 360) and play it at some point during your experience.

Completeness: [Completed 750 points in this category]

2. Diegetic UI achievement (250 points) - Completed

Instead of adding a lot of text to your scenes, represent interface elements naturally so users intuitively find things for themselves. They should not be told what to do, they should easily figure out how to do it.

4. AI achievement (250 points) - Completed

Create some simple AI using a navigation system or an algorithm like Birds Flocking.

6. Photogrammetry achievement (250 points) - Completed

Create your own custom model using Photogrammetry. This will involve taking several pictures of an object and then using a software to transform those pictures into a 3D model. There are plenty of PC or mobile apps that you can use to accomplish this.

Challenges: [Completed 750 points in this category]

1. Speech Recognition achievement (500 points) - Completed

Use the microphone for input and use Speech to Text solutions as means to cause events in your world.

2. User Testing achievement (250 points) - Completed

(2x if you completed 750 points in Completeness)

Complete at least 2 User Tests and show the notes in your video about what you learned from each test.

Pre-Production and Scope Reduction

Description:

For my capstone project I will be creating an interactive experience set in a forest where a rabbit - in a distressed state is running frantically around the forest desperate to find and free his rabbit companion who has been trapped in the forest.

For much of the study I've done for the later modules of this course, I've been sitting at a desk which has two very cute cartoon bunny rabbit models. Their presence inspired me to involve them in the final capstone project.

[Insert picture of rabbit models here]

To begin the experience the viewer will find themselves in a forest clearing. Very suddenly a rabbit will run past them and as he passes by he can be heard to be distressed. He will stop and ask for help to get across a river to rescue his rabbit friend who he is sure is trapped in the forest on the other side of the river. His friend has been captured and imprisoned by an evil forest witch. A hidden code in the forest must be found and used on a keypad located by a river a river. On successfully entering the code stepping stones are revealed and the river can be crossed by the viewer and the distressed rabbit so that they can free his caged friend on the other side.

Features and dependencies:

1. 3D models and animations – reference images

- a. Distressed rabbit
- b. Gloomy forest
- c. Lava flow
- d. Flowing river
- e. Imprisoned rabbit
- f. Twilight skybox
- g. Suspended lanterns

2. Game Loop:

- a. AI controlled rabbit encircling the forest
 - i. **Revised:** In searching for a suitable rabbit model to use I discovered a Unity asset Malber animations. Still a go!
- b. Interaction with the distressed rabbit
 - i. **Revised:** I've opted to forgo direct speech interaction with the distressed rabbit and instead use the speech recognition to say the incantation to open the imprisoned rabbit's prison.
- c. Speech recognition for talking with distressed rabbit
 - i. **Revised:** I've opted to forgo direct speech interaction with the distressed rabbit and instead have the rabbit deliver an audio message when the viewer walks to the large tree stump.
- d. Display of video message from the techno witch
 - i. **Revised:** On opening a chest in the forest a video screen will emerge and play a message
- e. Sounds of imprisoned rabbit calling for help
 - i. **Revised:** Still a go!
- f. Appearance of stepping stones
 - i. **Revised:** I opted to use a retracting prison wall to reveal the imprisoned rabbit and forgo the stepping stones. This would count against the animation Rubric still and reduce the computational overhead for the necessary effects required for running water or lava.

- g. Moving the boulder to allow the rabbit to dig up the code
 - i. **Revised:** In order to include the video player rubric I'm replacing the boulder movement concept with a treasure chest that when opened reveals a video screen to play a video to reveal the incantation to open the prison.
 - h. Freeing the imprisoned rabbit
 - i. **Revised:** The rabbit will be freed by the opening of a retractable wall and not engaged. Still a go!
 - i. Hints to guide the player towards the right areas
 - i. **Revised:** I will use suspended lanterns to act as a cue to the viewer where an action can be carried out or will occur.
3. **Other Effects:**
- a. Full Moon illumination
 - i. **Revised:** Still a go!
 - b. Suspended lanterns for additional atmospheric lighting and to provide cues at action areas
 - i. **Revised:** Still a go!
 - c. Spatial sound effects for crickets owls and night time noises
 - i. **Revised:** Still a go!
 - d. Use of a particle effect as a reward when the code is found
 - i. **Revised:** Still a go!
 - e. Procedural navigation to have the distressed rabbit follow a determined path around the forest
 - i. **Revised:** Will use baked lighting with light probes to avoid complexities and help performance as opposed to volumetric lights
 - f. Photogrammetry of the rabbit models that inspired this interaction
 - i. **Revised:** I experimented with photographing the rabbit models that were my inspiration to recreate them as Unity prefabs. I found that their surface being somewhat reflective presented a difficulty in ensuring uniform lighting throughout their photography. The point map created was insufficient for processing further. Instead I opted to use a set of 45 pictures of a tree stump **[insert reference]** which were shot with natural good conditions.