Project Deliverable F

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# Introduction

In this deliverable we discuss our prototype, how we tested it, and the results that we’ve obtained. We have analyzed our results and have begun planning for our second prototype. Our prototype is a very good starting point for our project, and we look to improve upon it going forward.

# Prototype Test Plan Outline

The process of prototyping is to develop a representation of a specific aspect or all of a project, to allow feedback and learn more about the project. Prototyping during different stages of our design process is essential as it allows us to gain more insight on how our project should work and highlights any fault in our design. The general objective for this prototype is thoroughly understanding our problem better as well as reducing the uncertainty and risks associated with it. Implementing our initial concepts and getting valuable feedback from potential users can give us a performance evaluation defining the overall functionality of our design.

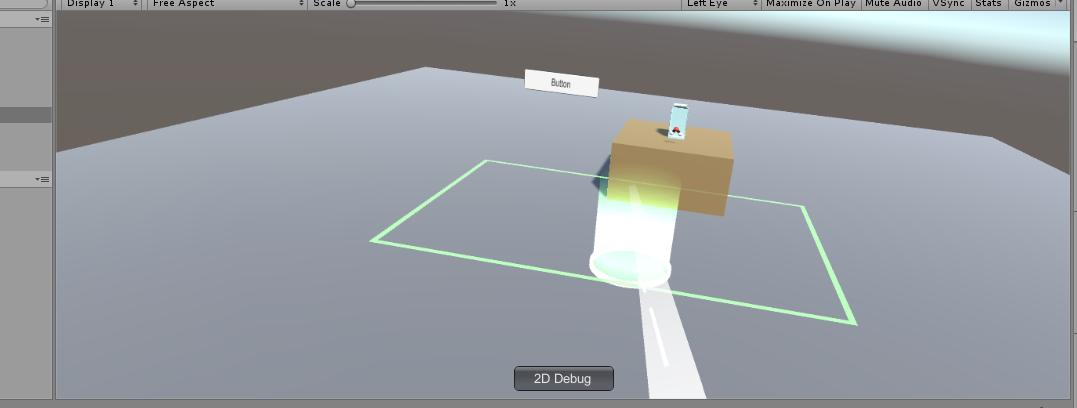
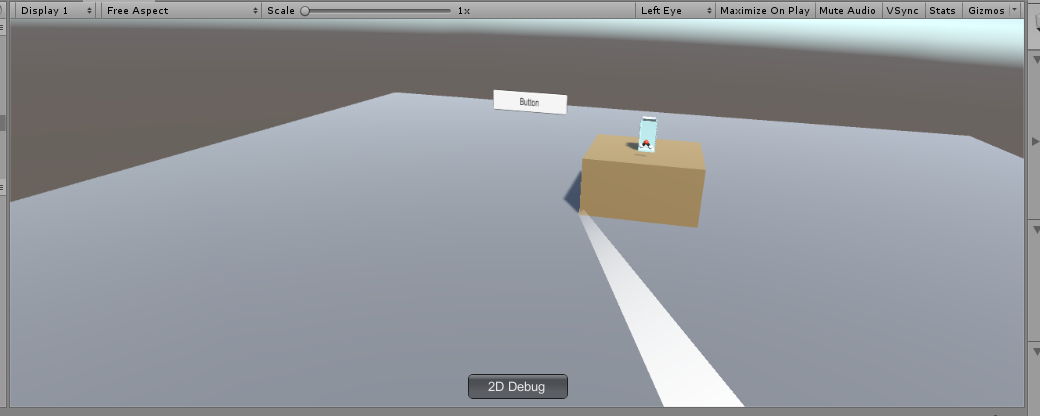
One of our main objectives from this prototype is to reduce the initial uncertainties we had. We worked extensively to develop detailed sketches which show exactly what objects and functions should be implemented in each scene. Through this prototype, we learn to use the basic functions of Unity to create the general environment for 3 specific scenes in our game. We also tried to develop focused transitions which are an essential part of our game as it requires multiple transitions between different stages such as the macroscopic level and the microscopic level during a reaction process. We specifically chose transitions as it may be harder to master, and in order for this game to be successful aesthetically, we must ensure the main transition is smooth as it builds an illusion where the user jumps to transition between different dimensions, hence increasing interactivity. Most of our results are from student feedback, as our program is aimed at student users. Since our prototype is mostly qualitative, our results are also qualitative. The users’ feedback was based on their ease-of-use, the aesthetic appeal of our environments and a smooth transition. These results describe essential aspects of our design and therefore the results from this prototype will be a huge factor in determining our next steps. It will help us decide on our areas of improvement, evaluate what works for our design, as well as make any necessary changes to our initial concepts.

We developed a physical and focused prototype for our first prototype. We chose a physical prototype considering we are all new to the Unity software and it was important for us to test our comfortability with this software. We wanted to find an overall estimation considering the amount of work needed with the software to determine the amount of scenes, the level of detail and the number of components we would realistically be able to implement within each scene. Moreover, our decision on working for focused scenes were so we had a general grasp of the overall environment in each scene, which would give us a vague idea of what our final designs would look like. The implementation of attributes of the product, specifically the transitions helped us clear specific uncertainties about our product. We can later on build on the initial environments more precisely on our upcoming prototypes to get us closer to our final goal for the design. The information being measured through this prototype includes the amount of scenarios, different view-points and the amount of interactable objects within each environment. We also measured a timeline required to be able to implement all aspects of our design process. Our prototype has been well observed in its different aspects and initial concepts by other students and their direct feedback has been recorded precisely.

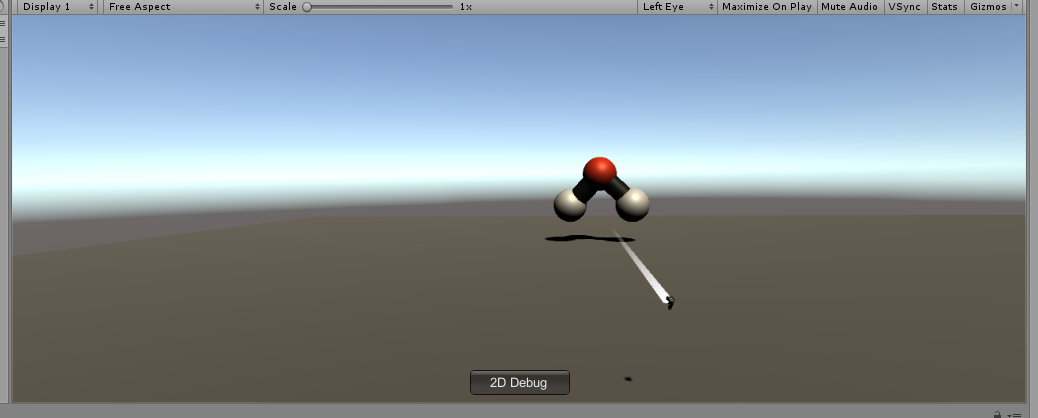
The materials used for this prototype were free, pre-made objects from the Unity Asset Store and CGtrader, therefore this prototype was low cost, and the approximate cost for this prototype is $0. As mentioned before, the work required for this prototype includes designing 2 specific environments with 2 scenes in each, one for the macroscopic and one for the microscopic. We chose particular objects to be included in these scenes and manipulated other factors such as the sky and correct molecules. We tested the software’s limitations on our visuals and tried to create smooth transitions through coding in C#. This testing is done with relation to our interpreted needs, to ensure that we are meeting those criteria. We also tested the gamification aspects of the game, to ensure that we will keep our users engaged.One of our scenes is in a hot air balloon which will ultimately be interactive where the user can manipulate it’s pressure, volume and temperature in ideal situations. Second, there will be a melting ice-cube in scene 2 along with the microscopic environment inside the ice-cube where the molecules are manipulated by the user later on.

Two students participated and each test only took about 15 minutes per student. The dependencies for the testing portion were the actual software objects and code which needed to be implemented before the testing part began as the functionality of that is what the feedback is on. The results are required by March 1st, so we have enough time to re-evaluate and change any defective portion of this game.

Scenario 1: Water

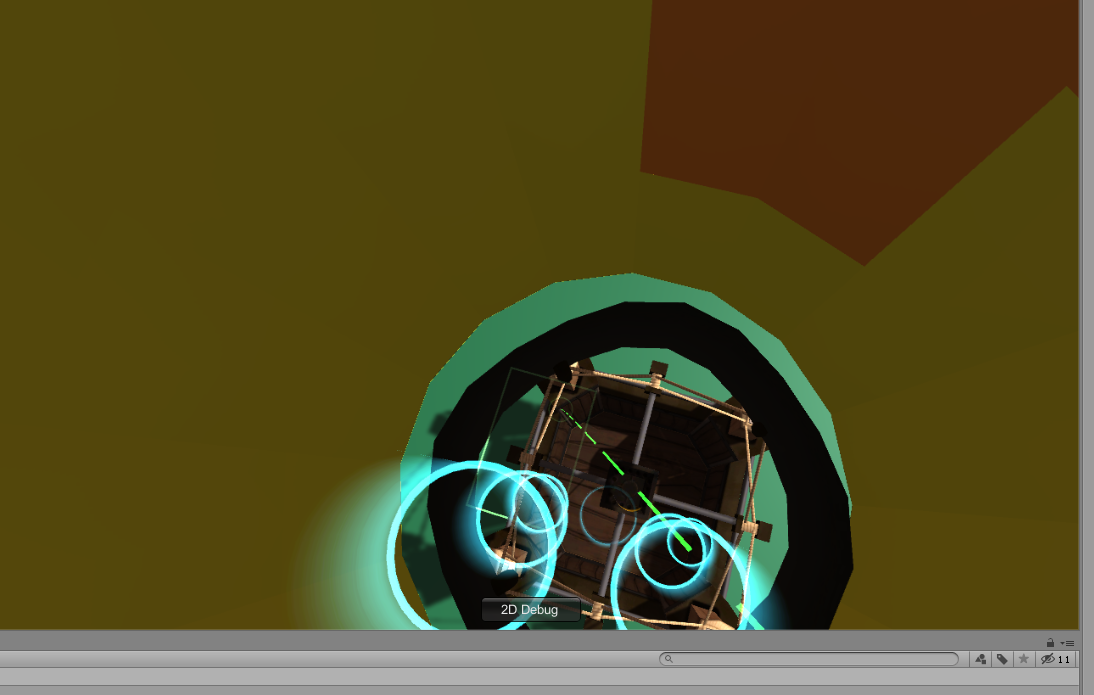


*Macro*



*Micro*

Scenario 2: Hot Air Balloon



Analysis

Through our testing, we verified that our choices for the environments in the game are suitable for the purpose of conveying the difference between the macroscopic and microscopic realms. Our scenarios were found to enhance the distinction between the two environments.

The simplifications made to the prototype allowed us to ensure that the backbone of our product is working well before adding more complicated elements. Not including other aspects of the game, such as interactive elements and lesson objectives, lessened the possibility of experimental noise in our feedback, as there were a few targeted aspects for people to comment on. We found our assumption that the teleportation aspect of the game would be easy to design was proven false in our prototype, which allows us to adjust our scheduling to compensate for the extra time the mechanism will need, as it is crucial to navigation and general game play.

The prototype has allowed us to measure our ability to code and design for Unity against our plans for the game, ensuring that all of the elements we have planned are within our team’s ability. It was also an opportunity to alter our ideas for the environments based on what is actually available within the Unity software.

# Feedback

We tested our product with people who could be potential users, which are students of the university. They provided us with some very helpful feedback that we are using to help make our product better. Some feedback that was given, is that the users liked the way we were treating this product as a game. The gamification aspect made it much more enjoyable to play, and held their attention. The testers pointed out that the teleportation aspect was confusing, and hard to use so they suggested making it more user friendly. They also mentioned that there wasn’t much to interact with in the game, but that wasn’t our main focus for this prototype. The user enjoyed how they were able to go between the microscopic world, and the macroscopic world easily, and how the game controls were intuitive. We plan to use the received feedback to develop our next prototype.

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# Results

We were successful in implementing our visual sketches through the environment and objects included in each phase. Our surrounding objects, the sky and plane were all effective in conveying the user’s environment. We were advised to further improve on our teleportation portion as it is not yet as smooth as we would like, and in future prototypes, add in more interactive objects. Considering this is our first prototype, the process of creating a general environment where all our scenes and interactions take place was successful. In this case, we developed a low fidelity prototype, suitable for an initial vague representation of our final product. We successfully experimented with several codes until our transition from Macro to Micro levels was smooth. Since this portion is extremely important in our final game, getting the general transportation right reaffirmed our concept of constant movement between the two realms so the chemistry is easier to understand for our users. Overall, although there is a lot to improve on our project transitions and many more interactive parts to be added in future prototypes, our objectives were successfully met and we were able to get an overall idea for our environments and transition between different dimensions smoothly.

# Conclusion

In conclusion, this prototype helped us understand the problem much more, and helped us understand what is feasible for our team to accomplish. We have created a vague representation of what the final product will look like, and have received some very helpful feedback from our testers. Moving forward we are looking for ways to implement this feedback into future prototypes, and are happy with the direction that our team is moving in.