Prototype I and Customer Feedback

Hannah Hamda Omer

Marie-Gabriella Nishimwe

Lucas Remigio

Taha Odabasi

March 2nd, 2025

Abstract

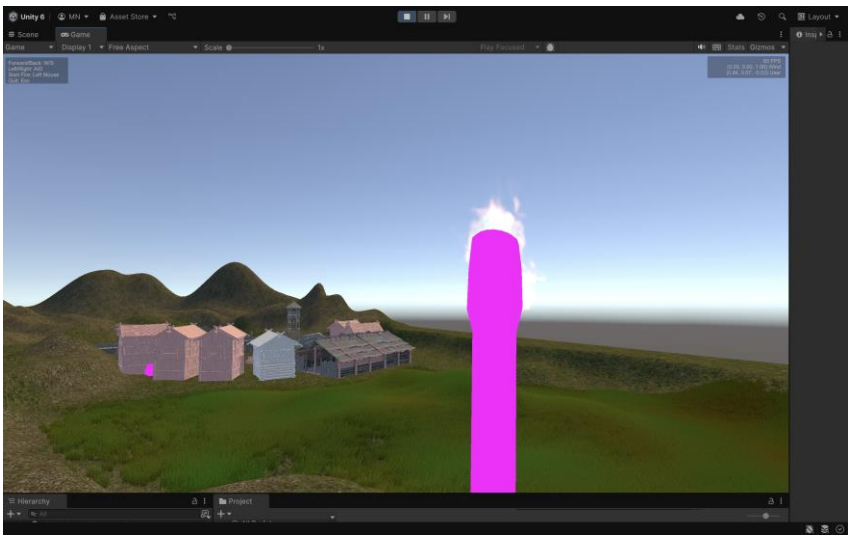
This is report showcases a

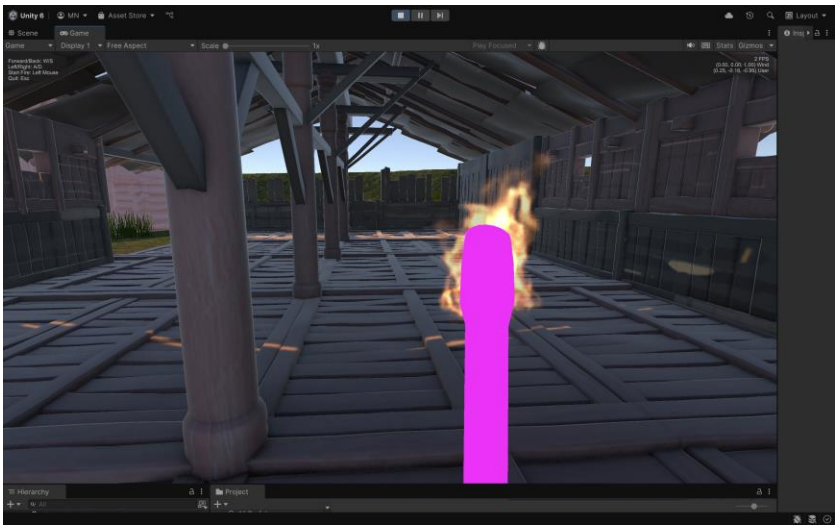
Table of Contents

1. Introduction:

In this document, our group presents our initial prototype and outlines the feedback we received from the client on our group concept. This report analyzes each prototype component and risk, describes how each risk will be managed, and describes the prototype's tests to determine its strengths and weaknesses and what should be changed for the next one. Along with the information provided about the prototype, this deliverable also provides an explanation of the feedback received from the client and how our group will use this assessment to inform our decisions on future prototypes and eventually our final product.

2. Protype I:





With this first prototype, our goal is to test a simulation environment for its performance measurement. We used a demo of a village, where we had to set up the environment to start testing it. The first test was a visibility test where we had to observe its details by exploring the environment and rate it from one to five. This prototype needs to have a rating of 3 to pass. As we can see on the screenshots, the environment has adequate imagery. It contains different materials and textures that have great detail in them. Another positive factor is that the nature around the structures also has different shades and textures, which makes it more life-like. This environment over all is more simple but has a lot of great detail, which gives it a rating of 4.To continue, we tested the environment's degree of freedom. In the game mode, we tested what the user could and could not do. If the user is not able to interact with the simulation, the environment fails. In the screenshot, we see that the user could go as far out as possible from the village and still be able to see some details. Though not shown in the screenshot, in the gaming mode the user has the option to left- click and start a fire with their torch, and the fire would spread. Based on these observations the environment has a good amount of freedom implemented. The last test implemented had the goal of timing how long it took for the environment to load. The gaming mode had to load under 5 seconds toe had to load under 5 seconds in order to pass the test. We tested this three times to see if there were any improvements. After loading the gaming mode, we found that it took the environment, on average three seconds to load. Overall, this environment has a simplistic yet functional component.

3. Component Analysis

1-) VR Headset:

-Functionality: Ensures smooth and low latency on VR

-Durability: Can withstand prolonged use without any overheating

-User Interaction: Comfortable fit, clear display and easy to wear it

2-) Hand tracking system:

- Hand Tracking System Functionality: Accurate real-time tracking of hand movement. Durability: Sensors function correctly after repeated use. User Interaction: Minimal lag and easy adjustment for different hand sizes.

3-) User Interface:

Functionality: Menus and interactive elements function as intended.
Durability: Software is crash-free.
User Interaction: Easy navigation with prompt feedback

4. Prototype Planning and Risk Management:

Project Planning:

	Task	Description	Date	Group Member
Simulation Prototype I	**Team Meeting**	Team Meeting to go over our plan, deliverables, task allocation and prototype.	**March 2nd**	All Group Members
	Deliverable F	Prepare document and apply customer feedback.	**March 2nd**	All Members with Specific Parts for Each Member
	Design	Design product as per design criteria and concept.	**March 2nd**	All Members with Specific Parts for Each Member
	Testing/Debugging	Test simulation and debug.	**March 2nd**	All Members with Specific Parts for Each Member
	Team Meeting		**March 9th**	All Members with Specific

Simulation Prototype II		Team Meeting to go over our plan, deliverables, task allocation and prototype.		Parts for Each Member
	Deliverable G	Prepare document and apply customer feedback.	**March 9th**	All Members with Specific Parts for Each Member
	Re-Design	Re-design product as per design criteria and concept.	**March 9th**	All Members with Specific Parts for Each Member
	Testing/Debugging	Test simulation and debug.	**March 9th**	All Members with Specific Parts for Each Member
Simulation of Prototype III	**Team Meeting**	Team Meeting to go over our plan, deliverables, task allocation, prototype and presentation.	**March 23rd**	All Members with Specific Parts for Each Member
	Deliverable H	Prepare document and apply customer feedback.	**March 23rd**	All Members with Specific Parts for Each Member
	Re-Design	Re-design product as per design criteria and concept.	**March 23rd**	All Members with Specific Parts for Each Member
	Testing/Debugging	Test simulation and debug.	**March 23rd**	All Members with Specific Parts for Each Member
Design Day	**Deliverable I**	Present Project at Design Day	**March 26th**	All Members with Specific Parts for Each Member
	Deliverable J		**March 28th**	All Members with Specific

Project Presentation		Present Project to class and professor.		Parts for Each Member
User Manual	**Prepare Document**	Prepare user manual guide for the simulation and final project for future users.	**April 4th**	All Members with Specific Parts for Each Member

Test Number	Probable critical issue	Test Objective (why)	Test Description (what)	Analysis Method (how and when)	Determine Measurables	Metrics
1	The software mechanics work smoothly	Performance Measurement	Wilfire spreading simulation: testing fire effect over a small environment	Measure how fast the fire effect spreads over the span of one minute, at different speeds. If the fire effect does not spread it fails	Speed of fire spreading	m/s
2	User is able to move and touch things	Performance Measurement	User interaction test: Basic mouvement and controlling functions will be placed and tested	User(i.e. the tester) will have to look around and pick something up. If the user is unable to do so, the protoype fails.	The silumation's ability for interactivenes s	pass or failed
3	Graphics and Audio realism	Performance Measurement	Visual and audio test:	Implement fire sounds and burning trees	rating of 1 to 5 of realistic visual and audio	pass or failed

	Testing Results	Interpretation and Feedback
1	Fire effect spreads semi-smoothly and at the chosen speed	Pass (Fire effect was proportional to function/speed given)
2	The user is able to pick an object up and put it down	Pass
3	the average result is 3 or 4	Pass but could be improved

Component	**Test Criteria**	**Testing Method**	**Expected outcome**	**Testing Outcome**
Vr Headsets	**Latency and accuracy**	**Measure delay and frame rate**	**Clear visuals**	**Succesful**
Hand Tracking system	**Tracking precision**	**Check hand movement accuracy**	**Accurate tracking with minimal delay**	**Succesful**
User interface	**Ease of navigation**	**Evaluate user feedback**	**Smooth and intuitive interface**	**Succesful**

For the first prototyping test plan of our project, we want to put in tests that would prove that the core idea of our concept functions well. To do this, this prototyping test run will be to verify that the main subsystems of our simulation work well. We will be testing the core mechanics, the user interactivity and the realism of the simulation. These are meant to be performance management tests, which will test the programs' functionalities. The first test will be a fire effect test in which we will examine how effectively the prototype can recreate the spreading of fire. The second will test the degree of freedom the user would have and the user's ability to interact with the simulation. We will do this by testing if the

user is able to pick an object up. The last will measure how realistic the visual and audio component of the prototype are. We will test this by implementing different backgrounds and audios like fire burning or strong winds and examine how real they look and sound. Thes prototyping tests will be basically testing the whole system but on a much smaller scale and the tests will be more focused on the three aspects mentioned above.

Risks and Uncertainties in the Project:

- Winter storms and planning to meet on campus for meetings can be difficult given the season. There is uncertainty with the ability to meet in person in cases such as these.
- The team has varying coding capabilities, and everyone is new to using unity. Building the simulation will require patience and learning.
- There is uncertainty with being able to develop a project that meets the clients desired needs.
- There is risk in the simulation working properly during our design day.

Risk Mitigation for Project Development:

- We can mitigate this risk by utilizing hybrid methods to meet and to meet after our classes and labs if we need to make up missed time.
- We can help each other learn and use our different abilities in learning to make up for others lack in skill. Also using tutorials to help us with our work.
- By asking more questions to the client we can mitigate this risk and work closely to the desired product.
- By practicing in various locations and testing the product in different settings, we can mitigate this risk.

4. Conclusions and Recommendations:

References

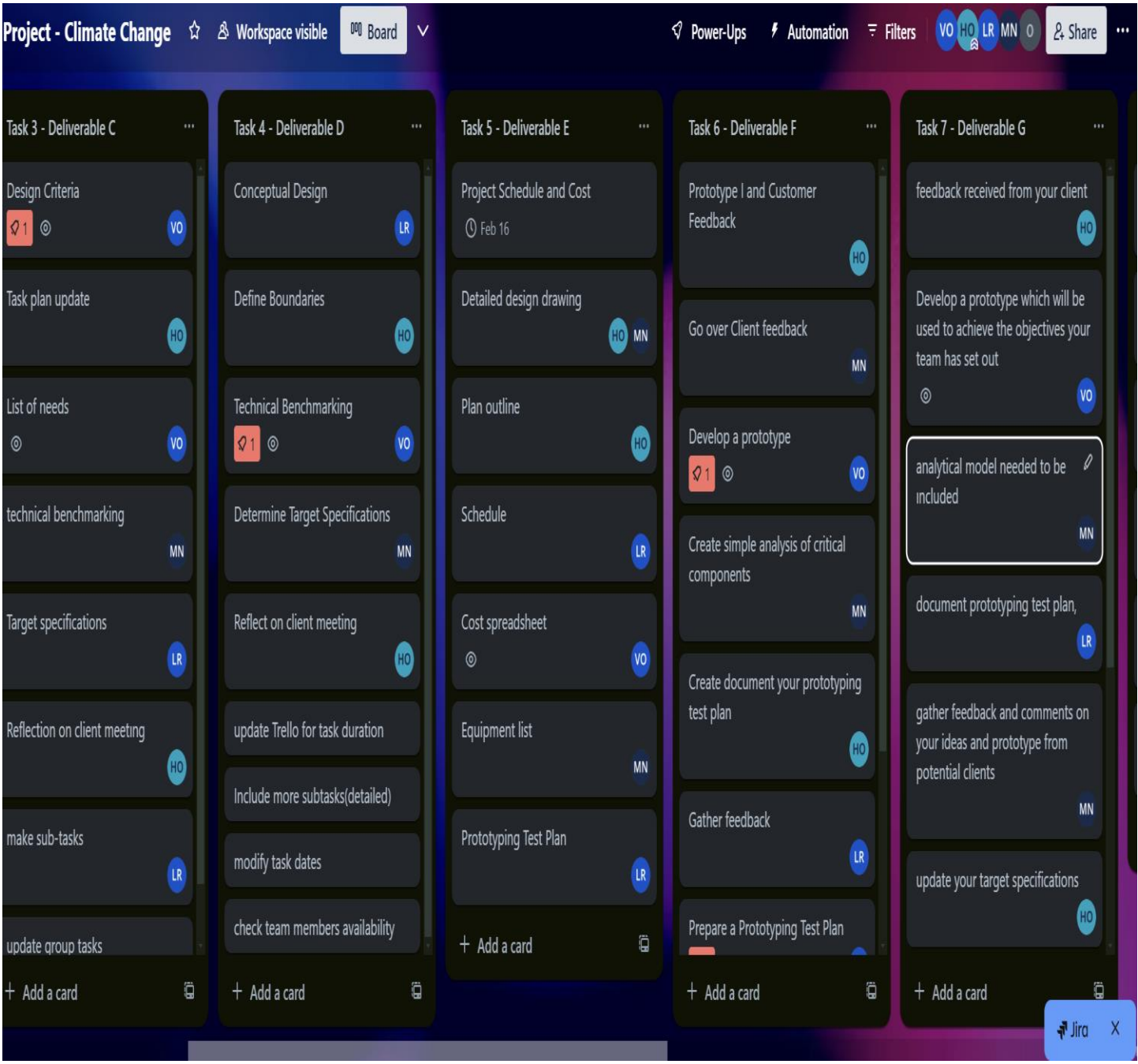
Global temperature. (2023). The Global Climate 2011-2020: A Decade of Accelerating Climate Change, 8–11. https://doi.org/10.18356/9789263113382c004

Country brief: Canada - the limits of livability - the emerging threat of smoke impacts on health from forest fires and climate change. (n.d.-a). Climate Change and Law Collection. https://doi.org/10.1163/9789004322714_cclc_2021-0021-133

McGuire, B. (2022). *Hothouse Earth: an inhabitant's guide*. Icon Books.

Trello Management

Task	Team member	Notes
Introduction	Hannah	Client Feedback and improvement
Abstract	Hannah	Summary of project purpose and objectives
Task Planning and Risk Management	Hannah	Outlined uncertainties and risks
Prototype I Development	Marie-Gabriella	Each member creates their own simulation story idea
Why, What, When	Marie-Gabriella	
Design Criteria Explanation	Taha	Time, Sound Effects, and Graphics considerations for their idea
Prototyping Plan 2	Lucas	Updated prototype planning for prototype 2
Budget	Lucas	Updating budget for protype 2
Final compilation & Editing	Group Effort	Review for consistency and clarity
Task table & Trello Screenshot	Hannah	Summary of who did what, with proof from Trello


Project - Climate Change
Workspace visible
Board
Power-Ups
Automation
Filters
Share
Task 3 - Deliverable C
Design Criteria
Task plan update
List of needs
technical benchmarking
Target specifications
Reflection on client meeting
make sub-tasks
update group tasks
Add a card
Task 4 - Deliverable D
Conceptual Design
Define Boundaries
Technical Benchmarking
Determine Target Specifications
Reflect on client meeting
update Trello for task duration
Include more subtasks(detailed)
modify task dates
check team members availability
Add a card
Task 5 - Deliverable E
Project Schedule and Cost
Feb 16
Detailed design drawing
Plan outline
Schedule
Cost spreadsheet
Equipment list
Prototyping Test Plan
Add a card
Task 6 - Deliverable F
Prototype I and Customer Feedback
Go over Client feedback
Develop a prototype
Create simple analysis of critical components
Create document your prototyping test plan
Gather feedback
Prepare a Prototyping Test Plan
Add a card
Task 7 - Deliverable G
feedback received from your client
Develop a prototype which will be used to achieve the objectives your team has set out
analytical model needed to be included
document prototyping test plan,
gather feedback and comments on your ideas and prototype from potential clients
update your target specifications
Add a card
Jira