CMPE 491

Senior Project 1

“VR Project Blue”

(VR Video Game)

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1-Introduction

This report describes the proposed systems of VR PROJECT BLUE, including functional requirements, non-functional requirements, and pseudo-requirements. It outlines many important aspects of the project, such as decisions made regarding the game's scenario, system models, and interface design. The report offers an overview of the project's technical implementation, including details about its functional and non-functional requirements. It provides insights into the project's design and decision-making process, outlining the system models and interfaces used to create the game.

In this analysis report, we present an overview of VR PROJECT BLUE, its gameplay elements, scenario, and game design. VR PROJECT BLUE is an educational game that aims to provide a learning experience about cybersecurity. Our report includes detailed explanations of the proposed systems and their underlying mechanics to ensure that both customers and stakeholders can easily understand the project's technical aspects. We provide an Object and Class Model and interfaces to outline the coding part of the project. These topics explain the project's design, dynamic models, and Object and Class Models, offering answers to critical questions related to the project's technical implementation. Overall, this analysis report serves as a detailed and informative guide to VR PROJECT BLUE, providing insights into its gameplay, design, and technical implementation.

2-Proposed System

2.1-Overview

The proposed system of VR PROJECT BLUE contains the functional and non-functional features of the game, as well as the system models used to implement them. This includes a detailed explanation of the game's characters, scenario, gameplay mechanics, and interface design, among other relevant aspects. Providing an overview of the functional and non-functional aspects of the game, this proposed system makes clear the technical specifications and implementation details of VR PROJECT BLUE. Overall, this proposed system offers valuable insights into the technical and design aspects of VR PROJECT BLUE, providing a detailed analysis of the various features and system models used in the game.

2.2-Functional Requirements

1. Interactability: Allow the player to interact with objects – code segments in the game to play and simulate social hacking.
2. Hacking Scenarios: Simulate real-world hacking scenarios to test the player's knowledge and skills. These scenarios will be determined throughout the development of the game and will be formed from predetermined hacking challenges.
3. Feedback: Provide feedback to the player. Provide feedback to the player on their performance and progress throughout the game. This feedback could be a summary of mistakes and achievements of the player through each challenge/scenario.
4. Save and Load Functionality: An option for players to save their progress and resume the game later.
5. Gameplay Variation: Provide a variety of hacking challenges for the player to complete, such as password cracking or network intrusion.

2.3-Nonfunctional Requirements

1. Performance: The game should have low latency and high average frames per seconds to ensure a smooth and responsive player experience. (Latency less than 20ms and consistent frame rate of at least 90 fps)
2. Compatibility: The game should be optimized for performance, to ensure it runs smoothly on a range of hardware configurations. Here is a sample hardware requirement from another VR game:

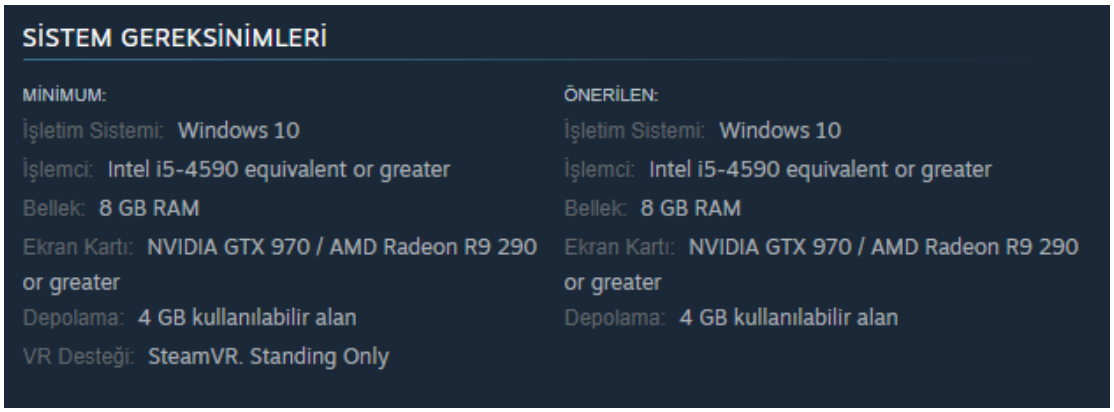


Figure 2.3.1: SUPERHOT VR [1]

3. Reliability: The game should be stable and reliable, with minimal downtime or crashes, so that players can enjoy uninterrupted gameplay.
4. Compliance: The game should comply with relevant laws and regulations [2][10], such as data privacy laws or age restrictions for certain types of content.
5. Bug-free: The game should be thoroughly tested to ensure that it is free of bugs and glitches that could detract from the player's experience.

2.4-Pseudo Requirements

1. Visuality: The game should have an appealing visual style that appeals to the target audience. Since our team doesn't contain any artist, we aim to see our sources for 3D models and find aesthetically compatible sets, so we can give more specific information about this.
2. Easter Eggs: The game should include Easter eggs or hidden features for players to discover.
3. Audio: The game should have nice and appealing audio effects in 3-dimensional propagation. Some of the effects will be found online and some will be created by us, the main issue here is that they will be compatible with each other. The decibels, pitches and those kinds of features will be determined in the testing period and will be determined by feedbacks.
4. Tutorial: The game should provide tutorials to help users understand how to play and navigate through the game.

2.5-System Models

2.5.1-Scenarios

Scenario: A player starts a new game.
Preconditions:

- The player has access to the game.
- The player has a device that can run the game.

Steps:

1. The player opens the game.
2. The player selects "New Game"
3. The game loads a new level and displays a tutorial for the first play.
4. If the player loads an existing game, the game loads scene of where the player left.

Scenario: Player pauses the game.
Preconditions:

- The player is inside the game.
- The player has a device that can run the game.

Steps:

1. The player pauses the game by tapping on the "Pause" button.
2. The pause menu opens.
3. The player taps on the "Settings" option.
4. The settings menu opens.
5. The player taps on the "Save Game" option.
6. The game is saved and a confirmation message is shown to the player.
7. The player exits the "Settings" menu and taps on the "Resume" option. The game continues.

Postconditions:

- The game is resumed from where it was paused.
- The player can quit the game by tapping on the “Quit Game” option in the pause menu.
- The player can close the pause menu by tapping on the “Close” button.

Scenario: Player controls the main character.
Preconditions:

- The player is inside the game.
- The player has a device that can run the game.

Steps:

1. The player controls the main character.
2. The main character can move in 3D.
3. The main character can sprint.
4. The main character can crouch (Third Dimension).
5. The main character can interact with objects
6. The main character can move some objects in 3D.

Postconditions:

- The main character moves where the player wants.
- The main character sprinted.
- The main character crouched.
- The player got interact with objects.
- The player changed the location of the object.

Scenario: Complete the mission
Preconditions:

- The main character has signed a contract to start a new mission.

Main Scenario:

1. The player analyzes the mission and determines what to do.
2. The player starts writing the requested code for the mission on the computer in the game.
3. The player finds the correct code block for the requested features of hack program.
4. The player drags and drops or selects the code block if it is correct the game will indicate.
5. After completing the code, the task can be finished.
6. If social engineering is not required, go to step 8 of Main Scenario.
7. If social engineering is required, go to Alternative Scenario.
8. Player completes the mission.

Alternative Scenario:

1. After completing the code, social engineering may be required to continue with the mission
2. The main character goes to a different location for the mission.
3. The player should applied expected social engineering skill for mission.
4. The main character should hide from security.
5. After completed expected action main character should get back to home.
6. Player completes the mission.

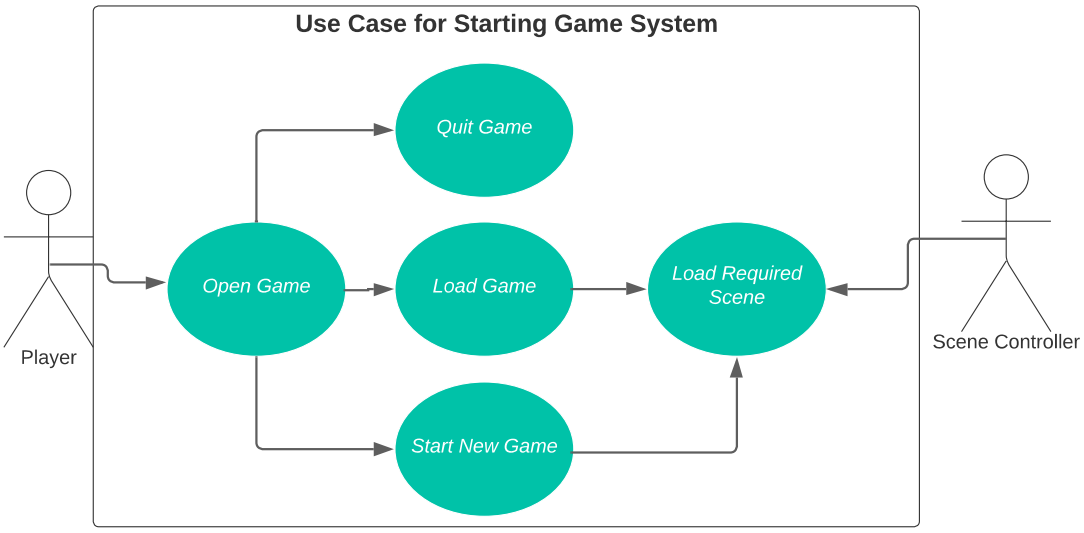
Exceptional Scenario:

1. The main character is caught by security of the place to be hacked during the mission.
2. The main character must start over from step 1 of Alternative Scenario.

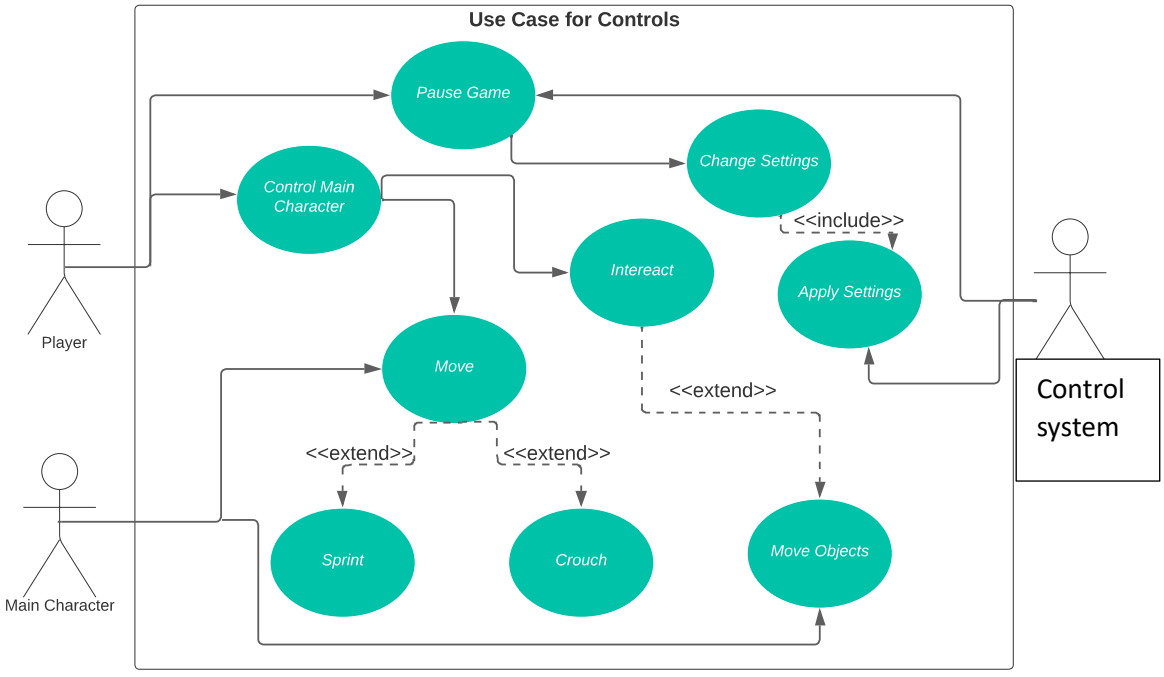
Postconditions:

- The main character has completed the mission

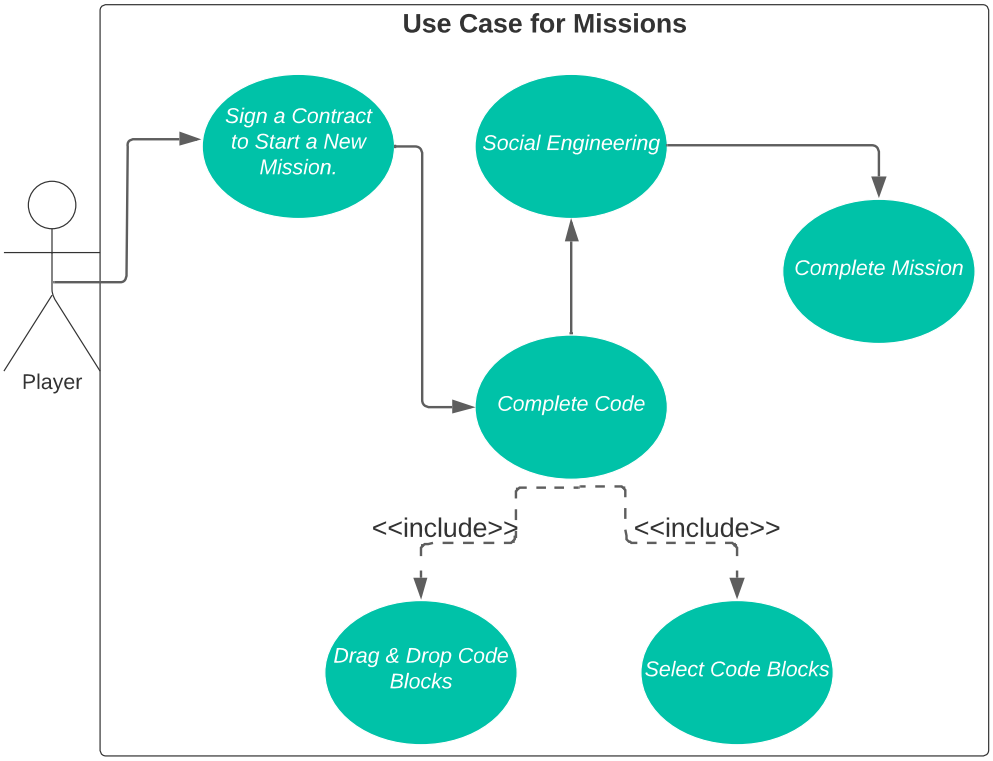
2.5.2-Use Case Model



Player opens the game and starts the starting game system. Player can close the game, load saved game and starts a new game. Scene controller will load required scene for player.

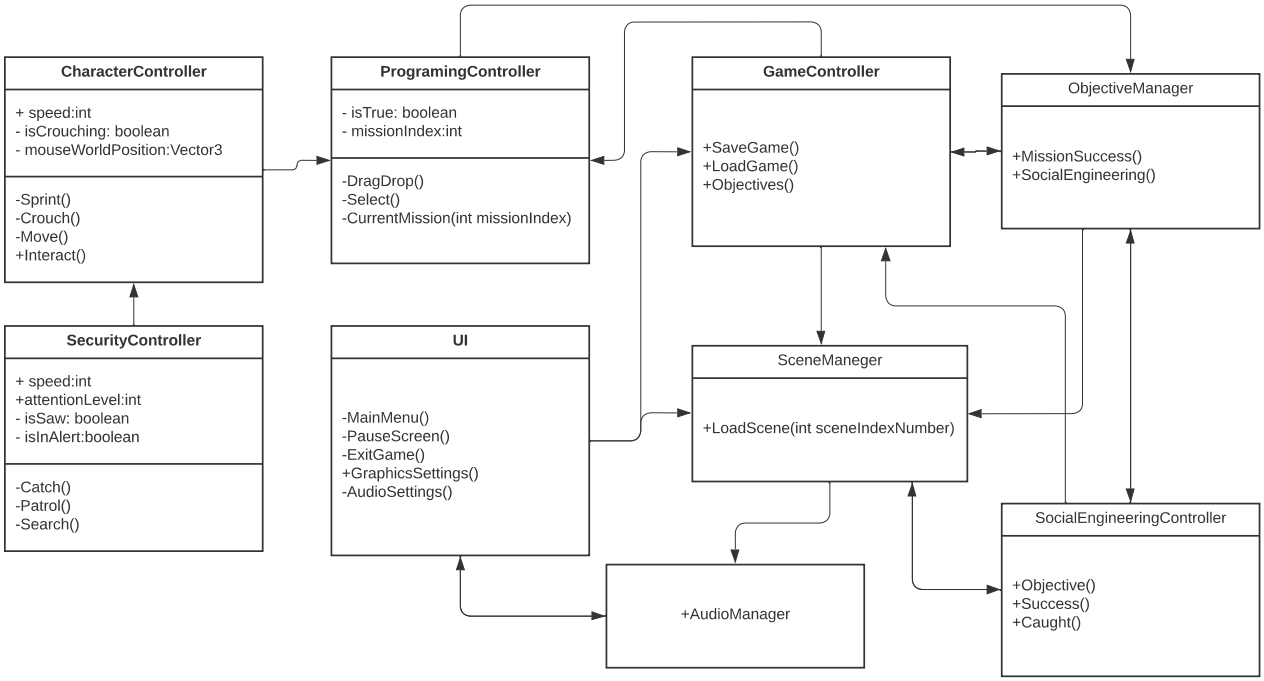


Player can control main character. Main character can sprint or crouch. The main character can move objects. The player can interact with objects. In addition, the player can pause the game and change the settings if player wants. The control system will pause the game and if the player changes the settings it will apply these settings.

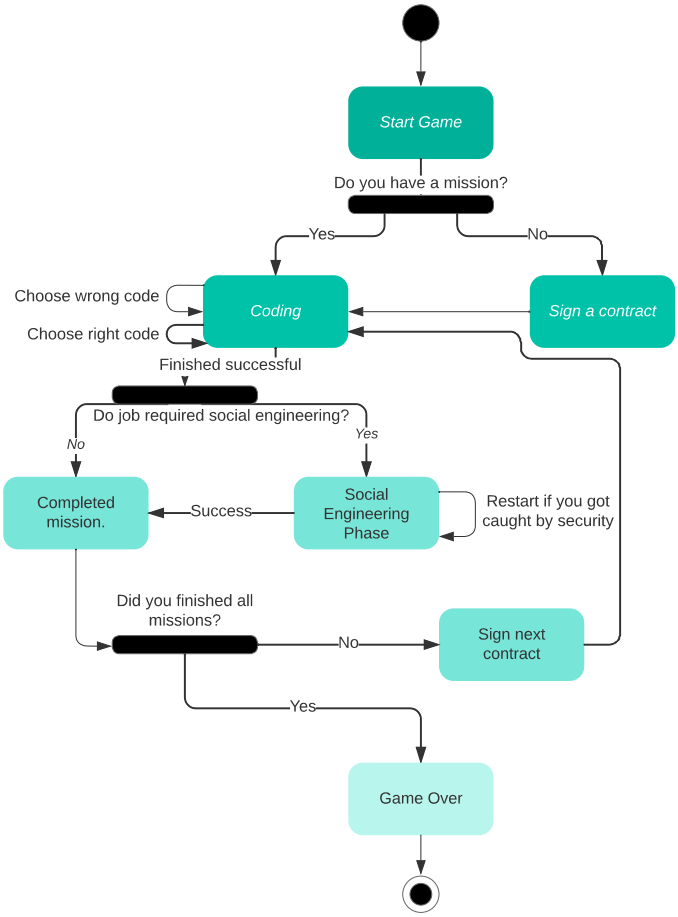


The player starts this process by signing a contract to start a new mission. Writes the correct code with drag-drop and select operations to complete the code. Then it completes the task by taking care of the social engineering part.

2.5.3-Object and Class Model



2.5.4-Dynamic Models



2.5.5-User interface- Navigational Paths and Screen Mock-ups

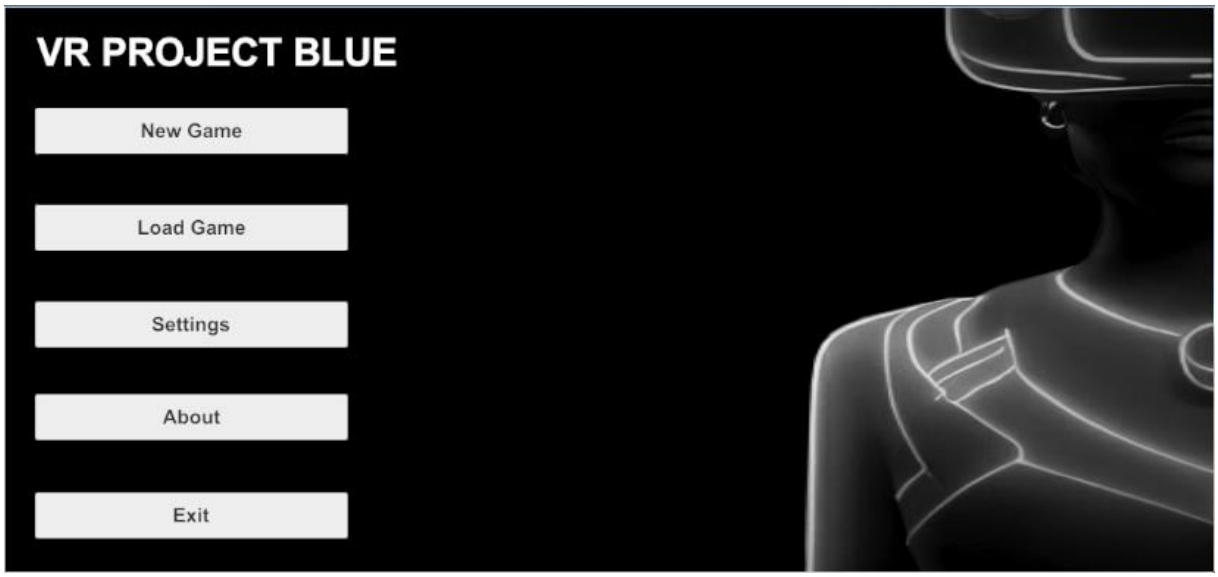


Figure 2.5.5.1: Mockup of VR Project Blue's Home page. This image was created using Unity.

Figure 2.5.5.2: Mockup of VR Project Blue's Settings page. This image was created using Unity

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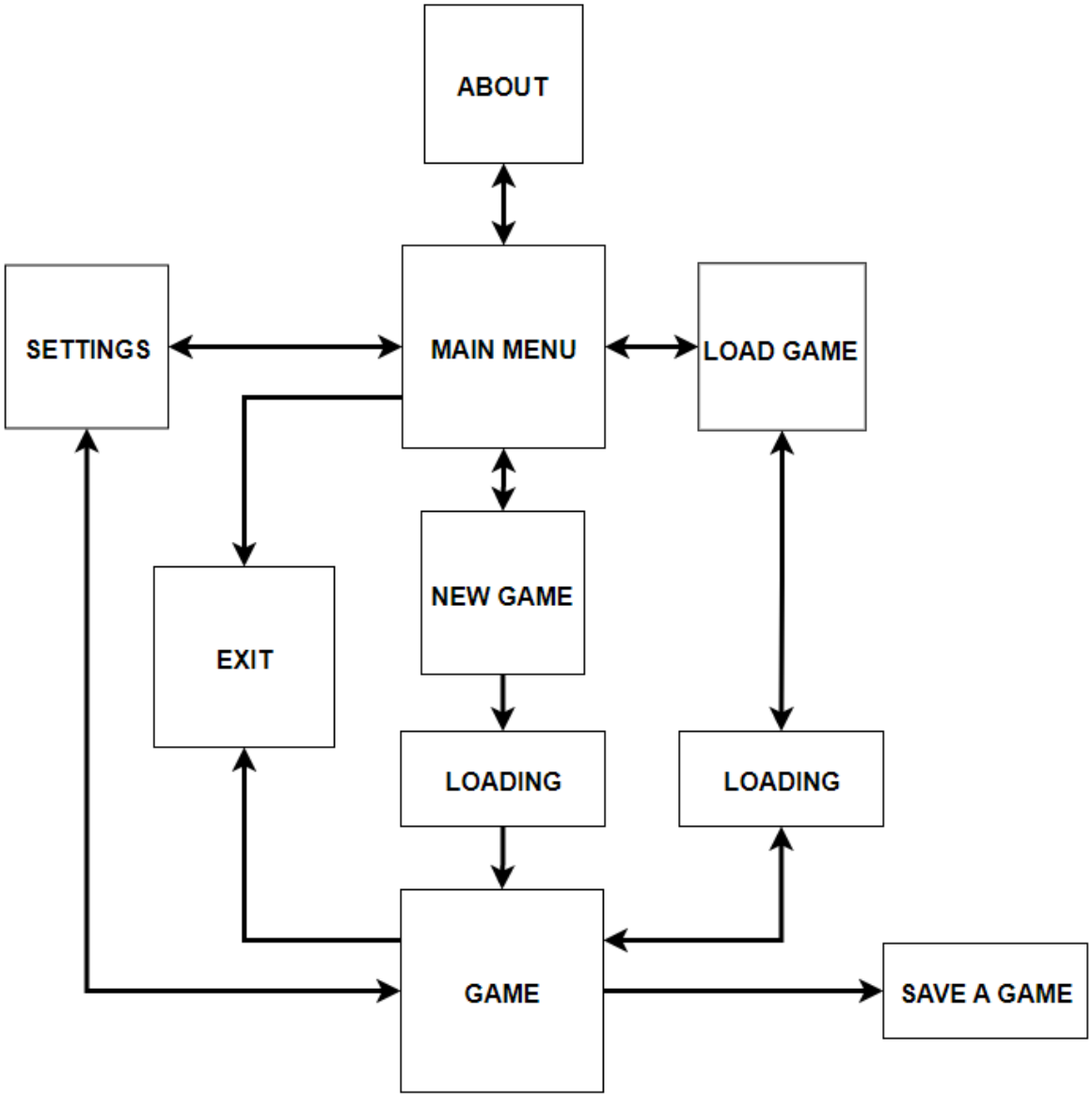
Figure 2.5.5.3: Mockup of VR Project Blue's About page. This image was created using Unity.

As a reference for interface

We take the game called Hacknet as a reference. Below is an example gameplay interface of the game called Hacknet.

Figure 2.5.5.4: This image belongs to the game Hacknet [4]. Hacknet is developed by Team Fractal Alligator. The game called Hacknet was published by Fellow Traveler.

Navigational Path



3-Glossary

Serious Game: Serious games [5] are games that have a specific purpose, not just entertainment. It is designed to educate, train, or raise awareness about a particular topic, such as skills development.
System Models: System modeling [6] allows us to examine a system from different perspectives, thereby helping us better understand its structure and function.
Navigational Path: A navigation path [7] is a route through screens that a player follows when using a software product.
Social Engineering: Social engineering refers to all techniques for revealing certain information or performing a certain action for illegitimate reasons by speaking or physical intervention with a target.
Social Hacking: Social hacking [8] is the use of hackers using various methods such as phishing and scaring by taking advantage of people's weaknesses.
Player: The player is the real person playing the game.
Main character: The character that the player controls in the game.
Contract: Agreement in which the main character accepts the quest to begin the quest. It has no connection to the real world.
Mission: Mission that the player has to complete in the game.
Pause Screen: The menu that pauses the game and appears in the game that the player uses to change the settings, exit the game, save the game or take a break from the gaming in real life.
Vector3 [9]: struct in Unity Engine. This structure is used throughout Unity to pass 3D positions and directions around. It also contains functions for doing common vector operations.

4-References

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