SHAHEED ZULFIKAR ALI BHUTTO
INSTITUTE OF SCIENCE AND TECHNOLOGY

Final Year Project Report

# Baraf Pani


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Date: 31st July 2023


Project Supervisor:

Adeel Karim


Submitted in the partial fulfillment of the requirements for the degree of

Bachelor of Science in Computer
Science in the

Faculty of Computing and Engineering Sciences

# Declaration of Authorship

We, Khizar Abdul Rahim (1912351) and Sharon Agita Massey (1912366), hereby declare that this report titled "Baraf Pani" and all the work presented in it are our original contributions. We confirm that we completed the entirety of this work during our candidature for a bachelor's degree at Shaheed Zulfikar Ali Bhutto Institute of Science and Technology (SZABIST). Any previously submitted work for a degree or qualification at SZABIST or any other institution has been explicitly mentioned.

In cases where we quoted from external sources, we provided proper citation and acknowledgment. However, aside from such quotes, the entirety of this report is our independent work. We have duly recognized all primary sources of assistance that contributed to the completion of "Baraf Pani."

Signed:

Khizar Abdul Rahim 1912351
Sharon Agita Massey 1912366

Date: 31st July’ 2023

# Acknowledgment

In the name of ALLAH the most beneficent and merciful who gave us the knowledge and courage to work on this research area.

The success and final outcome of this project required a lot of guidance and assistance from many people, and we are extremely privileged to have got this all along the completion of our project.

We would first like to thank our supervisor Sir Adeel Karim of the Computer Science faculty at Shaheed Zulfiqar Ali Bhutto Institute of Science and Technology. The door to his office was always open whenever we ran into a trouble spot or had a question about our research or writing. He consistently helped, cooperated, and motivated us throughout the research.

We would like to thank our teachers who guided us in the light of their knowledge and experience. We would also like to express our gratitude to our loving parents and family members who helped and gave us encouragement. Furthermore, we would also like to acknowledge with much appreciation the crucial role of the staff of SZABIST, who gave the permission to use all required equipment and the necessary materials to complete the project.

Finally, We would like to thank Shaheed Zulfiqar Ali Bhutto Institute of Science and Technology for providing us with such an inspiring environment. The quality education, the cooperative faculty members, and the challenging environment have always motivated and boosted the confidence level of each and every student who has been a part of Shaheed Zulfiqar Ali Bhutto Institute of Science and Technology.

# Project Description

Our project aims to deliver a nostalgic gaming experience that rekindles fond memories of classic outdoor games, inviting players worldwide to indulge in a fun and engaging pastime. We will achieve this by developing an online multiplayer game that draws inspiration from a beloved outdoor activity, seamlessly blending its essence with modern technology.

In this captivating game, players will find themselves in a virtual world where they take on the roles of either the Catcher or the Runners. The Catcher's objective is to track down and capture all the Runners within a given time limit, while the Runners must employ their agility and wit to evade capture until the timer expires. The gameplay will be designed to be exciting, immersive, and challenging, ensuring players experience pure enjoyment and excitement after a long day.

Visualizing nostalgia is at the heart of our endeavor, and we intend to bring the classic outdoor game to life by implementing cutting-edge graphics, stunning animations, and a meticulously crafted user interface. By seamlessly blending the old's charm with the new's advancements, we aspire to create an immersive environment that transports players back to cherished moments while incorporating captivating contemporary visual elements.

# Table of Contents

# Game Requirements Specification

**for**

# Baraf Pani

**Prepared by**

**Khizar Abdul Rahim - 1912351**

**Sharon Agita Massey - 1912366**

**SZABIST University**

**October 2022 - July 2023**

# 1. Introduction

## 1.1 Purpose

To design a game that revives the excitement and enthusiasm virtually with visuals that feel compelling and encourage players to socialize and play together to serve a positive role, improving mood and possibly better mental health.

## 1.2 Document Conventions

The font style used in this document is Times new roman. Font-size 12. Some requirements rely on other detailed requirements like the in-game tasks rely on the game mode, and some requirements have their priority like the rules and regulations.

## 1.3 Intended Audience and Reading Suggestions

Our Intended audience is every Desktop gamer from any age who has played this game before or is in the market to explore a new fun game to play with their friends. Our single gameplay needs at least 5 players at a time to start its round.
Our document contains the complete requirements of our game that include the game models such as MDA and Elemental Tetrad which defines the game mechanics, aesthetics, technology and the dynamics in our game project.

## 1.4 Product Scope

### 1.4.1 Objectives:

The scope of the product includes the development of a nostalgic game that aims to provide a fun and engaging experience for players worldwide. The game will incorporate elements from a classic outdoor game and leverage modern technology to create an online multiplayer experience. The primary objective of the game is for the catcher to catch all the runners within a given time to win, while the runners need to avoid being caught until the timer ends to claim victory.

- Nostalgic Experience: The game aims to evoke nostalgia and bring back memories of classic outdoor games that people used to play in their past. By recreating the essence of these games, the objective is to provide players with a sense of joy and relaxation after a long and stressful day.
- Global Connectivity: The game will be designed to connect players from different parts of the world. Through online multiplayer functionality, people will be able to play together and enjoy the experience regardless of their geographical location. This objective emphasizes the importance of social connection and enjoyment with loved ones.

### 1.4.2 Goals:

- Fun and Engaging Gameplay: The primary goal of the game is to create a gameplay experience that is entertaining, immersive, and enjoyable. The mechanics of the game, such as catching runners and avoiding capture, should provide excitement and challenge to keep players engaged.

- Visualizing Nostalgia: The game aims to utilize modern technology to visually represent the nostalgic outdoor game. By leveraging high-quality graphics, animations, and user interface design, the objective is to create an immersive environment that captures the essence of the classic game while enhancing it with contemporary visual elements.
- Online Multiplayer Experience: The goal is to develop robust online multiplayer functionality that allows players to connect and compete with friends, family, or other players worldwide. This objective emphasizes the importance of social interaction and fostering connections among players.
- Time-based Challenge: The game will incorporate a time-based challenge where the catcher has a specific duration to catch all the runners, while the runners need to survive until the timer ends to win. This goal adds a sense of urgency and strategic decision-making to the gameplay.
-

**1.4.3 Game module:**

- 1 Catcher Vs. 5/6 Runners

**1.4.4 Characters:**

- Catcher/Freezer
- Runner

**1.4.5 Rules**:

- The catcher has the power to freeze the runner
- The runner has to run away and stay away from the catcher
- the runner has the power to unfreeze their teammates after getting caught
- There will be a certain time limit to end the game
- The game can end if all runners are caught

## 1.5 References


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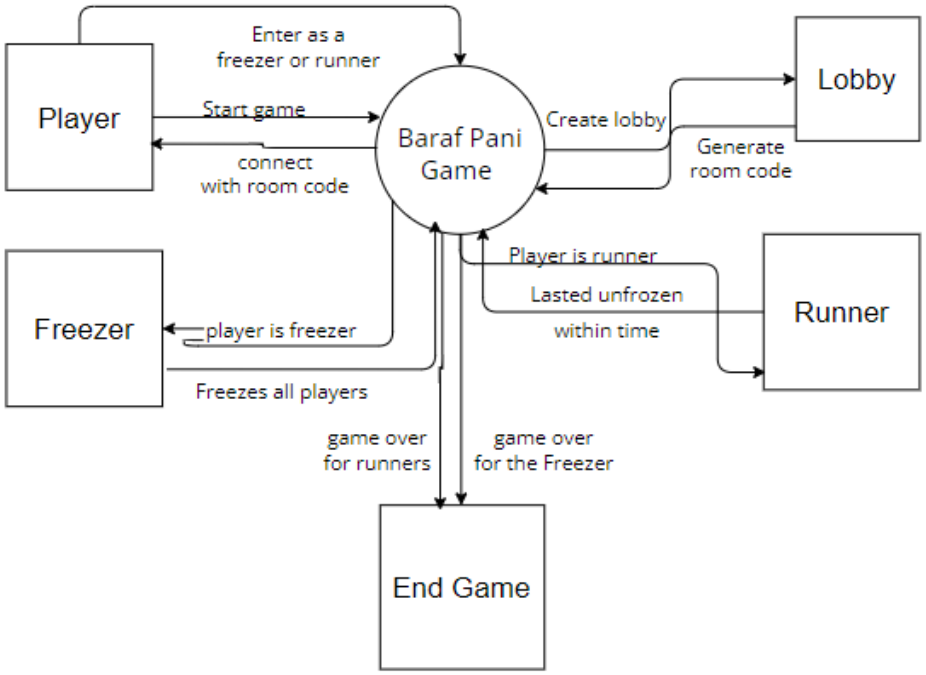
# 2. Overall Description

## 2.1 Product Perspective




## 2.2 Character Functions

- The Catcher
  - Has the ability to freeze the players on touch

- The Runner
  - Has the ability to unfreeze other runners
  - Will be running from the catcher in order to stay unfrozen

## 2.3 User Classes and Characteristics

### 2.3.1 Experienced Gamers:

- These users have prior experience playing online mobile or desktop games.
- They are familiar with basic game controls and mechanics.
- They can quickly adapt to new games and understand the objectives.
- They are likely to enjoy the challenge and competitiveness of the game.

### 2.3.2 New Users/Gamers:

- These users are new to online gaming or have limited experience.
- They may not be familiar with game controls and mechanics.
- They require a simple and intuitive interface to understand and navigate the game.
- They may need a practice mode or tutorial to learn the game mechanics.

### 2.3.3 Functional Requirements:

**1. Intuitive User Interface:**

- The game has a user-friendly interface that is easy to navigate.
- Buttons, menus, and icons are clear and visually distinguishable.
- The UI provides clear instructions and feedback to the users.

**2. Basic Controls:**

- The game has simple and easy-to-learn controls.
- Users can perform actions such as moving, catching, and avoiding using intuitive controls (e.g., arrow keys, mouse, touch controls).

**3. Practice Playground:**

- A dedicated practice mode is available for new users to learn the game mechanics.
- The practice playground provides step-by-step instructions and guidance on gameplay.
- Users can practice catching and avoiding in a controlled environment.

**4. Multiplayer Functionality:**

- The game supports online multiplayer functionality.
- Users can connect and play with friends or other players worldwide.
- Options for creating private rooms and joining public matches are available.

**5. Timer and Scoring System:**

- The game includes a timer to track the duration of each round.
- A scoring system is implemented to determine the winner based on the catcher's success in catching runners or the runners' ability to avoid capture until the timer ends.

### 2.3.4 Non-functional Requirements:

**1. Visual Appeal:**

- The game has visually appealing graphics and animations.
- The nostalgic elements and modern visual enhancements create an immersive and enjoyable experience for the users.

**2. Performance:**

- The game runs smoothly without any significant lags or delays.
- It is optimized to work on various devices (mobile, desktop) and different operating systems.

## 2.4 Operating Environment

- Any Windows or Macintosh machine having a normal GPU minimum 1GB is capable
- Any mobile device with the latest Android operating system with a minimum 2GB is capable but the higher the device specifications the better the performance and game experience the user will have.

## 2.5 Design and Implementation Constraints

- It is easy to render through unity
- Practice Round is prepared for new learners to get the gist of the game
- Mobile and Desktop compatible game

## 2.6 User Documentation

- Proper guidelines will be given regarding the application.
- It will provide proper GRS, GDD documents to understand the mechanics, technology, aesthetics, dynamics and the flow of the game.
- It will provide a video demonstration, if needed, to easily understand how this game works.
- A practice round will be provided at the start menu of the game so that the users can test and understand the controls and get the gist of our game.

## 2.7 Assumptions and Dependencies

- The game will be playable on both mobile / desktop systems.
- Users of the game will have enough information and education through the practice round.
- Users of both mobile and desktop will have the opportunity to play it will depend on the preference choices of the users on what platform they want to play.

# 3. External Interface Requirements

## 3.1 User Interfaces

The game is designed using numerous tools. The main tool that is being used is Unity where we can design the assets and develop the workings of the entire game.
Moreover, Adobe Photoshop / Adobe Illustrator will be used to design the basic GUI Scenes which compromises the main menu, game mode selection.

## 3.2 Hardware Interfaces

The game will be compatible for mobile users as well as desktop users.
We are testing everything on our desktop. That is why we are making a dual compatible game. That way our testing phase becomes easier and the players have a choice of preferences on whichever platform suits the best.

## 3.3 Software Interfaces

• Unity is a 2D/3D engine and framework that gives you a system for designing game or app scenes for 2D, 2.5D and 3D.
• Unity allows you to interact with them via not only code, but also visual components, and export them to every major mobile platform and a whole lot more—for free. (There's also a pro version that's very nice, but it isn't free.)
• Unity supports all major 3D applications and many audio formats, and even understands the Photoshop .psd format
• Unity allows you to import and assemble assets, write code to interact with your objects, create or import animations for use with an advanced animation system, and much more.• Unity is a 2D/3D engine and framework that gives you a system for designing game or app scenes for 2D, 2.5D and 3D.
• Unity allows you to interact with them via not only code, but also visual components, and export them to every major mobile platform and a whole lot more—for free. (There's also a pro version that's very nice, but it isn't free.)
• Unity supports all major 3D applications and many audio formats, and even understands the Photoshop .psd format
• Unity allows you to import and assemble assets, write code to interact with your objects, create or import animations for use with an advanced animation system, and much more.

## 3.4 Communications Interfaces

Unity has built in netcode for networking purposes.
Netcode is for gameobjects the next one is the multiplayer samples utility and the last one is just a little helper library which unity recommends which will help us test over multiple clients.

# 4. Game Features

## 4.1 Entering Lobby

Summary:
This use case allows the player to enter a lobby of players using a specific room code

- Actors
  Game Players, Either Catcher or Runner

- Preconditions

1. The user has to select the option of starting the game and enter a room code given by a friend or host a room.

- Basic course of events/happy path

| ❖ Actor action | ❖ System response |
|---|---|
| 1. The player selects the start game option on menu | 4. Enters a lobby of players |
| 2. The player hosts the room | |
| 3. Player enters a room code | |

- Alternative path (else path)

1. An event occurs where the player is practising their gameplay in a practice round and does not need to be in the lobby.

- Postcondition.

1. The player has entered a lobby of players using a room code.

- Author and date

1. Sharon Massey - 11-13-2022
2. Khizar Abdul Rahim - 11-13-2022

- Exceptions

1. The room code is invalid or expired.
2. The room is full of players

## 4.2 Running

Summary:
This use case allows the player to run around the map in the game

- Actors

Game Players, Either Catcher or Runner

- Preconditions

1. The user must be in the game in either team, standing on the map.

- Basic course of events/happy path

| ❖ Actor action | ❖ System response |
|---|---|
| 1. The Player uses keys to move and press shift or toggles upward | 2. The player is able to run around the map |
| | |

- Alternative path (else path)

1. There occurs an event where the player is walking.
2. There occurs an event where the player is frozen.
3. There occurs an event where the player is idle.

- Postcondition.
  1. The player has entered the game as a runner or freezer

- Author and date
  1. Sharon Massey - 11-13-2022
  2. Khizar Abdul Rahim - 11-13-2022

- Exceptions

1. The internet ping is low, or the player has a bad internet connection.
2. If the player is not in the lobby or game
3. If the key is not pressed down

## 4.3 Freeze Players

Summary:
This use case allows the catcher to freeze runners on the map in the game

- Actors
  Game Players, Catcher
- Preconditions
  1. The user must be in the game as a catcher.
- Basic course of events/happy path

| ❖ Actor action | ❖ System response |
|---|---|
| 1. The catcher interacts with a runner | 2. The runner immediately freezes |
| | |

- Alternative path (else path)
  1. There occurs an event where the runner runs away from the catcher.
  2. The catcher does not interact with any runner.

- Postcondition.
  1. The catcher has caused the runner to be frozen.

- Author and date
  1. Sharon Massey - 11-13-2022
  2. Khizar Abdul Rahim - 11-13-2022

- Exceptions
  1. The internet ping is low, or the player has a bad internet connection.
  2. If the player is not present in the game.
  3. The player is a runner and cannot freeze players.

## 4.4 Unfreeze Players

Summary:
This use case allows the runner to unfreeze other runners on the map in the game

- Actors
  Game Players, Runner
- Preconditions
  1. The user must be in the game as a runner.
- Basic course of events/happy path

| ❖ Actor action | ❖ System response |
|---|---|
| 1. The runner interacts with a frozen runner | 2. The runner immediately unfreezes |

- Alternative path (else path)
  1. There occurs an event where the catcher catches the runner.
  2. The runner does not interact with any other frozen runner.

- Postcondition.
  1. The runner has successfully unfrozen his fellow runner.

- Author and date

1. Sharon Massey - 11-13-2022
2. Khizar Abdul Rahim - 11-13-2022

- Exceptions
  1. The internet ping is low, or the player has a bad internet connection.
  2. If the player is not present in the game.
  3. The player is a catcher and cannot unfreeze players.

## 4.5 End Game

Summary:

This use case tells us how the game ends.

- Actors
  Game Players, Catcher or runner
- Preconditions
  1. The user must be in the game in either team
- Basic course of events/happy path

| ❖ Actor action | ❖ System response |
|---|---|
| 1. The catcher freezes all runners | 2. The game is over for the runner team |
| 3. A runner survives unfrozen within time | 4. The game is over for the catcher |

- Alternative path (else path)
  1. There occurs an event where the game hasn't started

- Postcondition.
  1. Either the catcher or the runners have won the round.

- Author and date
  1. Sharon Massey - 11-13-2022
  2. Khizar Abdul Rahim - 11-13-2022
- Exceptions
  1. The internet ping is low, or the player has a bad internet connection.

## 4.6 Win Game

Summary:

This use case tells us how the game is won.

- Actors
  Game Players, Catcher or runner
- Preconditions
  1. The user must be in the game in either team
- Basic course of events/happy path

| ❖ Actor action | ❖ System response |
|---|---|
| 1. The catcher freezes all runners | 2. The catcher wins |
| 3. A runner survives unfrozen while the timer runs out | 4. The runners win |

- Alternative path (else path)
  1. There occurs an event where the game hasn't started.

- Postcondition.
  1. The catcher or the runners have won the round.

- Author and date
  1. Sharon Massey - 11-13-2022
  2. Khizar Abdul Rahim - 11-13-2022

- Exceptions
  1. The internet ping is low, or the player has a bad internet connection.

## 4.7 Character Selection

Summary:

This use case allows the player to select a character from a pool of five available characters before starting the game.

- Actors
  Game Players
- Preconditions
  1. The player must be in the game room.
- Basic course of events/happy path

| ❖ Actor action | ❖ System response |
|---|---|
| 1. The player navigates to the character selection screen. | 2. The available characters are displayed.. |
| 3. The player selects one character from the pool. | 4. The selected character becomes the player's avatar for the game |

- Alternative path (else path)
  1. The player does not select a character within the time limit.
  2. The player's chosen character is already selected by another player.

- Postcondition.
  1.The player has chosen a character for the game.

- Author and date
  1. Sharon Massey - 2023
  2. Khizar Abdul Rahim - 2023

- Exceptions
  1. The internet ping is low, or the player has a bad internet connection.
  2. The player is not in the game room.

## 4.8 Network Multiplayer (Netcode)

Summary:

This use case describes how the game utilizes netcode for online multiplayer functionality.

- Actors
  Game Players, Network Server
- Preconditions
  1. The user must be in the game in either team

2. Player must have strong internet connection.

- Basic course of events/happy path

| ❖ Actor action | ❖ System response |
|---|---|
| 1. The player selects the multiplayer option. | 2. The game establishes a network connection with the server. |
| 3. The players' actions and movements are synchronized across all clients. | 4. The players can interact with each other in real-time. |

- Alternative path (else path)
  1. The server connection fails.
  2. There is a significant delay in network synchronization.

- Postcondition.
  1. The players can interact and play the game together in a multiplayer environment.

- Author and date
  1. Sharon Massey - 2023
  2. Khizar Abdul Rahim - 2023

- Exceptions
  1. The internet ping is low, or the player has a bad internet connection.
  2. The server capacity is reached, preventing additional players from joining.

## 4.9 Interaction with Environment

Summary:
This use case allows the player to interact with the game environment, such as jumping and hiding behind objects.

- Actors
  Game Players
- Preconditions
  1. The player must be in the game scene

- Basic course of events/happy path

| ❖ Actor action | ❖ System response |
|---|---|
| 1. The player presses the jump button/key. | 2. The player character performs a jump action, allowing them to reach higher areas or evade obstacles. |
| 3. The player moves their character towards an object or surface suitable for hiding. | 4. The player character takes cover behind the object, becoming less visible to other players. |

- Alternative path (else path)
  1. The player attempts to jump but is obstructed by a barrier or ceiling.
  2. The player tries to hide behind an object, but the object is too small or not suitable for cover.

- Postcondition.
  1. The player can perform actions to navigate and strategize within the game environment.

- Author and date
  1. Sharon Massey - 2023
  2. Khizar Abdul Rahim - 2023

- Exceptions
  1. The player's character is frozen and unable to perform actions.
  2. The game environment lacks suitable objects or surfaces for hiding or jumping

## 4.10 Quit Game

Summary:
This use case allows the player to exit the game and return to the main menu or close the game application.

- Actors
  Game Players
- Preconditions

1. The player must be in the game scene or main menu

- Basic course of events/happy path

| ❖ Actor action | ❖ System response |
|---|---|
| 1. The player selects the quit game option. | 2. A confirmation dialog appears asking for confirmation to quit the game. |
| 3. The player confirms the action. | 4. The game application closes, or the player returns to the main menu. |

- Alternative path (else path)
  1. The player cancels the quit game action.
  2. The player tries to quit the game while in the middle of a game session without saving progress

- Postcondition.

1. The game is successfully exited, and the player returns to the main menu or closes the game application.

- Author and date
  1. Sharon Massey - 2023
  2. Khizar Abdul Rahim - 2023

- Exceptions
  1. None.

# 5. Other Nonfunctional Requirements

## 5.1 Performance Requirements

The improved version of the game will have enhanced performance compared to the current version. The game should run smoothly with minimal loading times and responsive controls.
It should be optimized to handle a large number of players simultaneously without significant lag or performance degradation.
The game should be able to handle increased complexity and scale as more nostalgic games are added to the collection.

## 5.2 Safety Requirements

As the game does not collect any personal data from users, there are no specific safety requirements related to data privacy.
However, appropriate measures should be taken to ensure the game does not pose any physical or psychological harm to the players.

## 5.3 Security Requirements

Since the game does not require any personal or sensitive information from the players, there are no specific security requirements.
However, basic security measures should be implemented to protect the game's infrastructure from unauthorized access or malicious activities.

## 5.4 Software Quality Attributes

Portability:

- The game should be portable, allowing users to download and run the game on different platforms and devices.
- The game should support major operating systems, such as Windows and macOS.

Reusability:

- The game's code should be modular and well-structured to facilitate code reuse.
- Components or modules of the game should be designed to be easily integrated into future game versions or other similar nostalgic games.

Reliability:

- The game should undergo extensive testing to ensure its reliability and stability.
- Bugs and issues should be identified and resolved promptly to provide a seamless gameplay experience.

Availability:

- The game should be readily available for users to download and play.
- It should be easily accessible through online platforms or app stores, preferably free of charge.

## 5.5 Business Rules

The game will be distributed as an executable (EXE) file for desktop users.
Players can download the game file and run it on their desktop systems to start playing.
No additional personal information or registration is required to play the game.

# 6. Other Requirements

# Appendix A: Glossary

Catcher: The player tasked with freezing or capturing the runners in the game. Their goal is to catch all the runners within a specified time to win.

Runner: The players who need to avoid being caught by the catcher. They must unfreeze other players and save themselves from being caught until the timer runs out to win.

Map: The virtual playground or environment where the game is played. It serves as the setting where players navigate, strategize, and interact with each other during gameplay.

Nostalgic Game: A game designed to invoke feelings of nostalgia by recreating elements or experiences from the past. It aims to bring back memories and emotions associated with classic outdoor games that people used to play in their childhood or earlier times.

Online Multiplayer: A mode of gameplay that enables multiple players to connect and interact with each other over the internet. It allows players from different locations to play together in real-time, either competitively or cooperatively.

Practice Mode: A gameplay mode specifically designed to help new users or inexperienced players learn and become familiar with the game mechanics. It provides a controlled environment where players can experiment, practice catching and avoiding, and receive step-by-step instructions and guidance.

Scoring System: A system implemented in the game to track and calculate the performance or progress of the players. The scoring system determines the winner based on predefined criteria, such as the number of caught runners by the catcher or the successful survival of runners until the timer runs out.

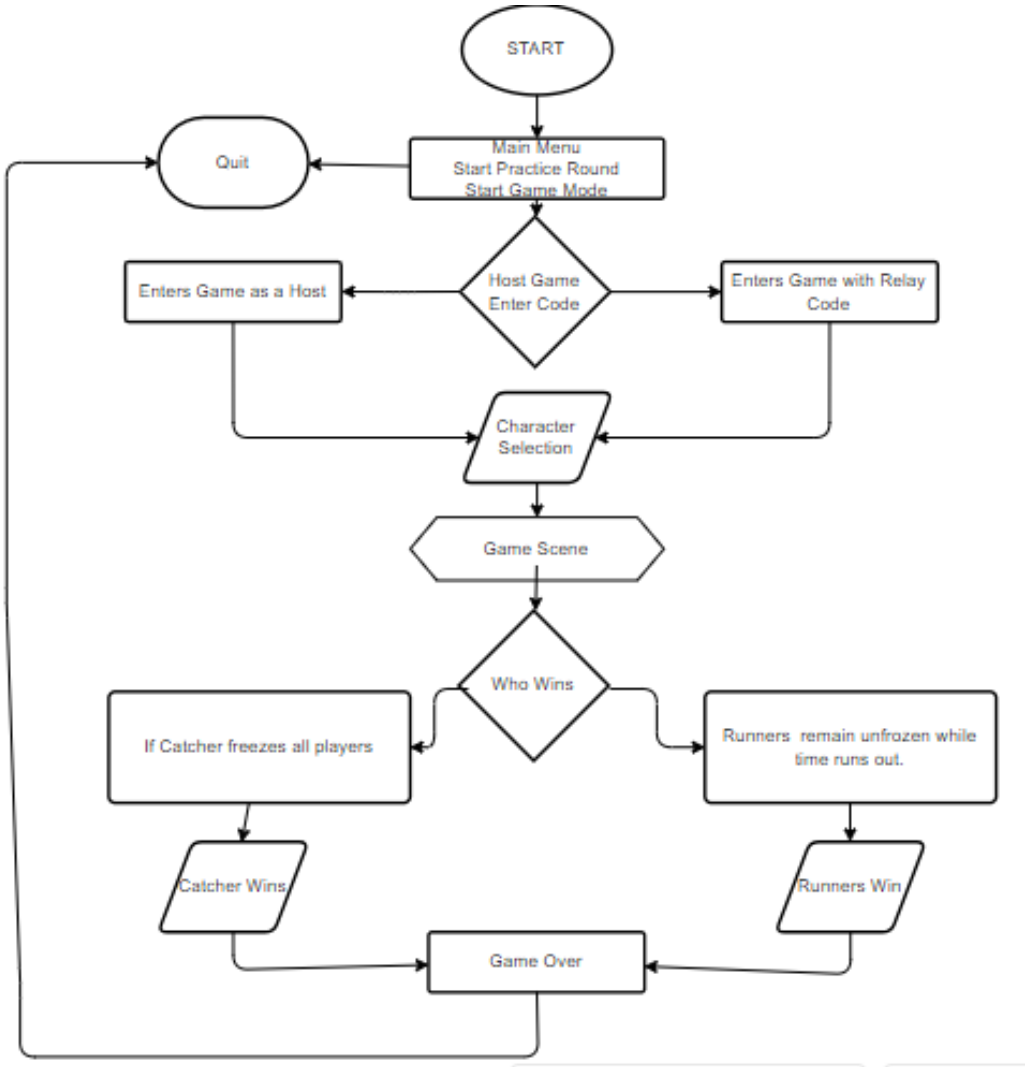
User Interface (UI): The visual and interactive elements of the game that users interact with, including buttons, menus, icons, and instructions. The user interface provides a means for players to navigate the game, access features, and receive feedback or information during gameplay.

Visual Appeal: The aesthetic quality and attractiveness of the game's graphics, animations, and overall visual presentation. Visual appeal contributes to the immersive and enjoyable experience of the players, combining nostalgic elements with modern visual enhancements.

Modularity: The design principle of breaking down the game's components or functionalities into separate and independent modules. Modularity allows for easier code reuse, maintenance, and flexibility in adding new features or integrating components in future versions.

# Appendix B: Analysis Models

**Game Flowchart:**




# Appendix C: To Be Determined List

- Battle Royale Feature
- Teleportation
- Skins for Characters
- In-App Purchases
- Secret Hiding places in Maps

# Game Design Document

## for

# Baraf Pani

**Prepared by**

**Khizar Abdul Rahim - 1912351**

**Sharon Agita Massey - 1912366**

**SZABIST University**

**October 2022 - July 2023**

# 1. Introduction

## 1.1. Game Name

Baraf Pani

## 1.2. Tag line

Kyon ki baraf bhi khabhi pani tha!

## 1.3. Team

Sharon Agita Massey - 1912366
Khizar Abdul Rahim - 1912351

## 1.4. Date of the last update

2nd of July of the year 2023

# 2. GameOverview

## 2.1. Game Concept

Our game is an entertaining nostalgic game for all ages. The game concept is simple: one catcher and at least five runners. The catcher's job is to freeze all the runners, and the runner's job is to stay away from the catcher. When the catcher catches a runner, the runner freezes in the position they have been caught. If the catcher catches the runner, the other teammates have a chance to unfreeze them by tagging them. The game ends when the catcher catches all the runners or if the runners survive.

## 2.2. Target Audience

Our Intended audience is every mobile / Desktop gamer of any age who has played this game before or is in the market to explore a new fun game to play with their friends. Our single gameplay needs at least 5 players at a time to start its round.

## 2.3. Genre(s)

Adventure and survival game

### 2.4. Game Flow Structure

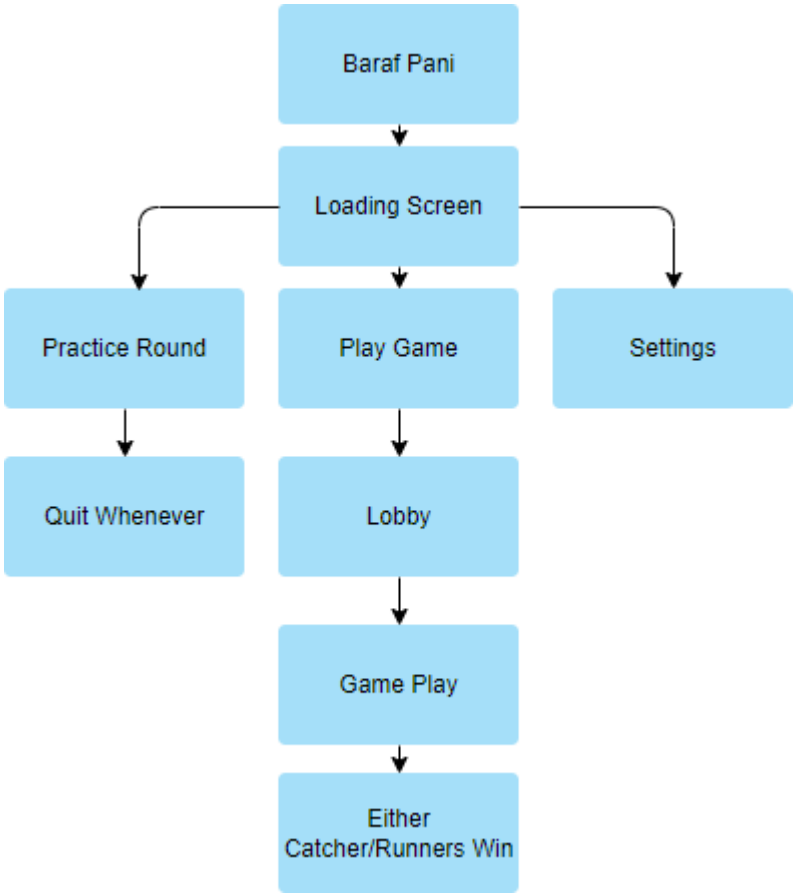



*Figure 1. Game Flow Structure*

### 2.5. How does the player move through the game?

When the player enters the game, they have the option to either choose to be a host or enter a room code. They can then select a character and proceed to the game scene. In the game scene, players spawn and one of them is designated as the catcher, who possesses the power to freeze other players. The remaining players must survive and unfreeze each other until the clock runs out.

### 2.6. Look and Feel – What is the basic look and feel of the game? What is the visual style?

The basic look and feel of the game is in 3D. The map and its various assets are based on real textures to give a real-world feel, and the visual style is obtained in subtle colors, rendering 3D- objects and characters.

## 3. Gameplay

### 3.1. Objectives

To design a game that revives the excitement and enthusiasm virtually with visuals

that feel compelling and encourage players to socialize and play together to serve a positive role, improving mood and possibly better mental health.

### 3.2. Game Progression

It is a win-lose game. The user's team will either win or lose. Given the circumstances, the Runners team will win by staying unfrozen within the time limit. While the catcher will win if he freezes, all the runners or the runners fail to collect all the stones in the given time limit.

### 3.3. Play Flow

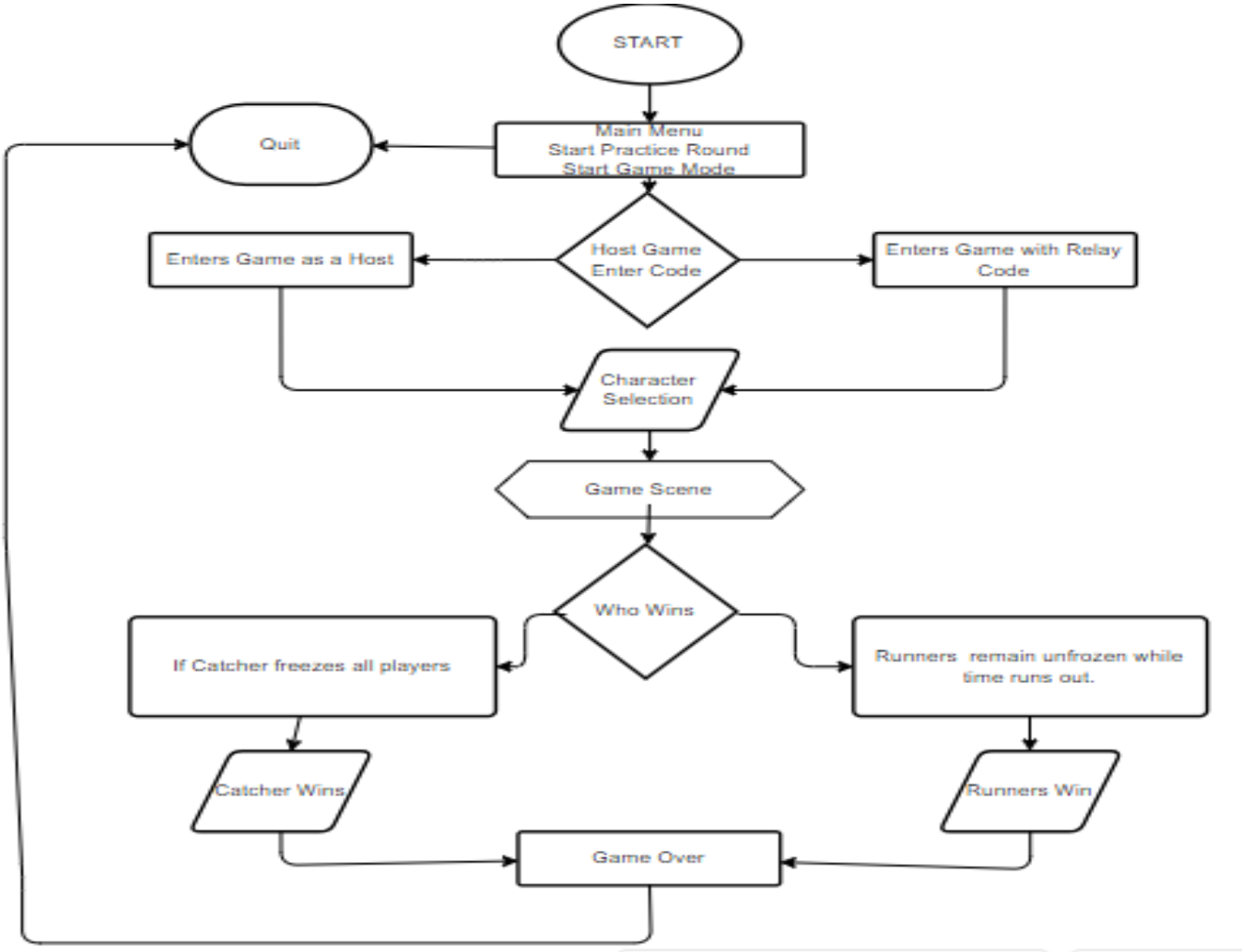



*Figure 2. Game Play Flow*

### 3.4. Mission/challenge Structure

The mission of this game can be seen from both ends. The player/runner's end and the catcher/freezer's end. The runner's mission is to survive for a given amount of time by not being frozen by the catcher and helping fellow runners unfreeze. The catcher's mission is to catch and freeze all runners before the clock runs out.

## 4. Mechanics (Key Section)

### 4.1. Rules – What are the rules of the game, both implicit and explicit.

*Table1. Rules Table*

| Explicit Rules | Implicit Rules |
|---|---|
| 1. Runners who have been frozen more than three times will die if a fourth freeze move occurs.<br>2. Catcher cannot stand idle and wait next to a frozen player. | 1. Once a running game is exited, all gameplay will be lost. |

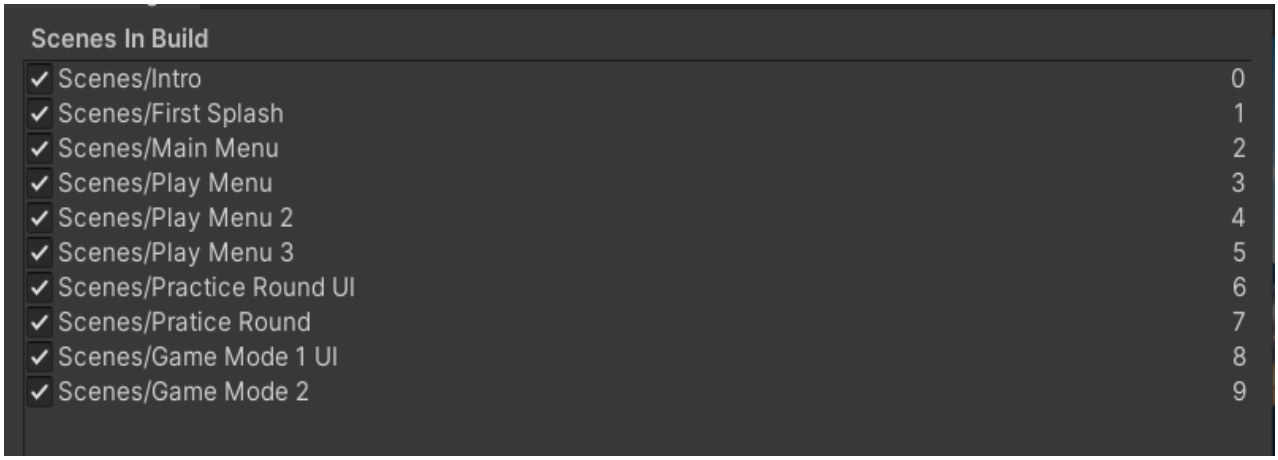
### 4.2. Model of the game universe. Think of it as a simulation of a world. How do all the pieces interact?

All the pieces of our model world interact to display a single scene of a beautiful scenery-based and or theme-based map. Players will find the game universe in a simultaneous manner. It is a world where running around hiding from the catcher is made fun vice versa for the catcher.

### 4.3. Character movement in the game

A single character in the game will be able to walk around and sprint when needed. The character can jump over obstacles and possess the power of freezing and/or unfreezing the player, depending on the player's dynamics.

### 4.4. Screen Flow -- How each screen is related to every other and a description of the purpose of each screen




**Intro Scene:**

In this introduction scene a loading screen consisting of the games logo and theme appears. It references the feel of the game and creates anticipation for it.

**First Splash Scene:**

This Splash screen consist of an image representing the game's name and over all feel. Here the user can click or enter any key to go to the next scene.

**Main Menu Scene:**

Main menu scene displays the play and exit button, which further proceeds' to the different game modes and maps and the exit, is for exiting the game.

**Play Menu Scene:**

Here the play menu displays an option for the practice round, where by clicking the button the UI proceeds towards the practice round UI scene.

**Play Menu2 Scene:**

Here the play menu2 displays an option for the first game mode round which is the game mode1 map and actual game play, where by clicking the button the UI proceeds towards the game mode 1 UI scene.

**Play Menu3 Scene:**

Here the play menu3 displays an option for the second game mode round which is the game mode2 map and actual game play, where by clicking the button the UI proceeds towards the game mode 2 UI scene.

**Practice Round UI:**

After clicking the play practice round button on the play menu scene this scene/screen shows which confirms the player if he/she wants to continue with practice round or not. If they decide to go with it the practice, round map is displayed and the player enters the game scene.

**Practice Round:**

Here the player is familiarized with the gaming controllers and a general feel of the overall game. This is mostly a testing purpose round for our actual game modes and different maps.

**Game Mode 1 UI:**

Here the player will enter a lobby scene and connect with potential players and after the host of the game selects the start game button. The game with multiple online players will show on a virtual world of that particular game mode map1 where the game play takes place.

**Game Mode 2:**

Here the player will enter a lobby scene and connect with potential players and after the host of the game selects the start game button. The game with multiple online players will show on a virtual world of that particular game mode map2 where the game play takes place.

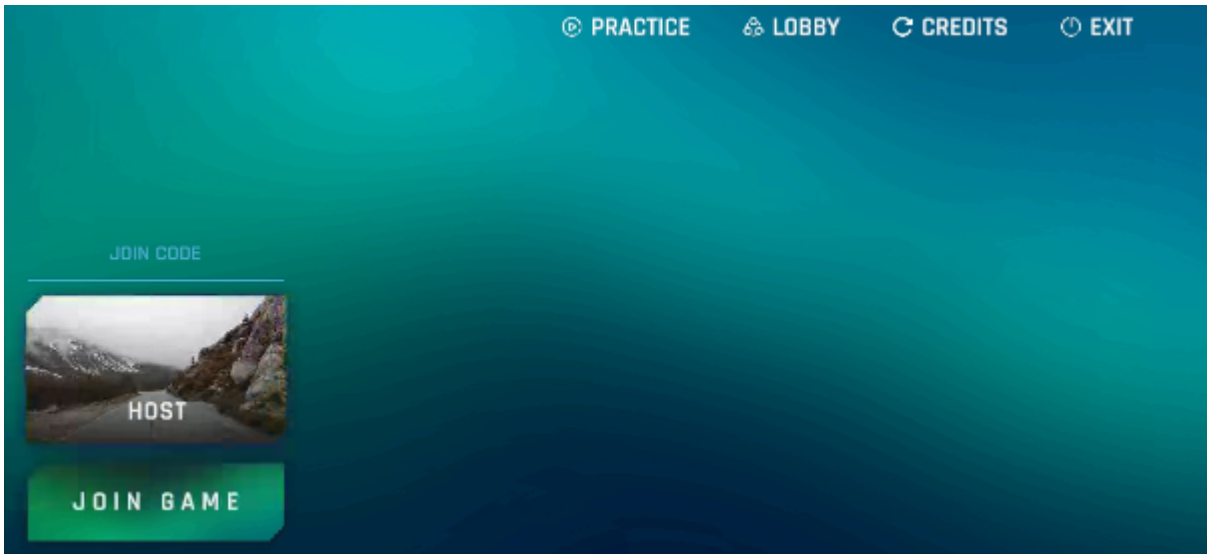
# 5. Story and Narrative

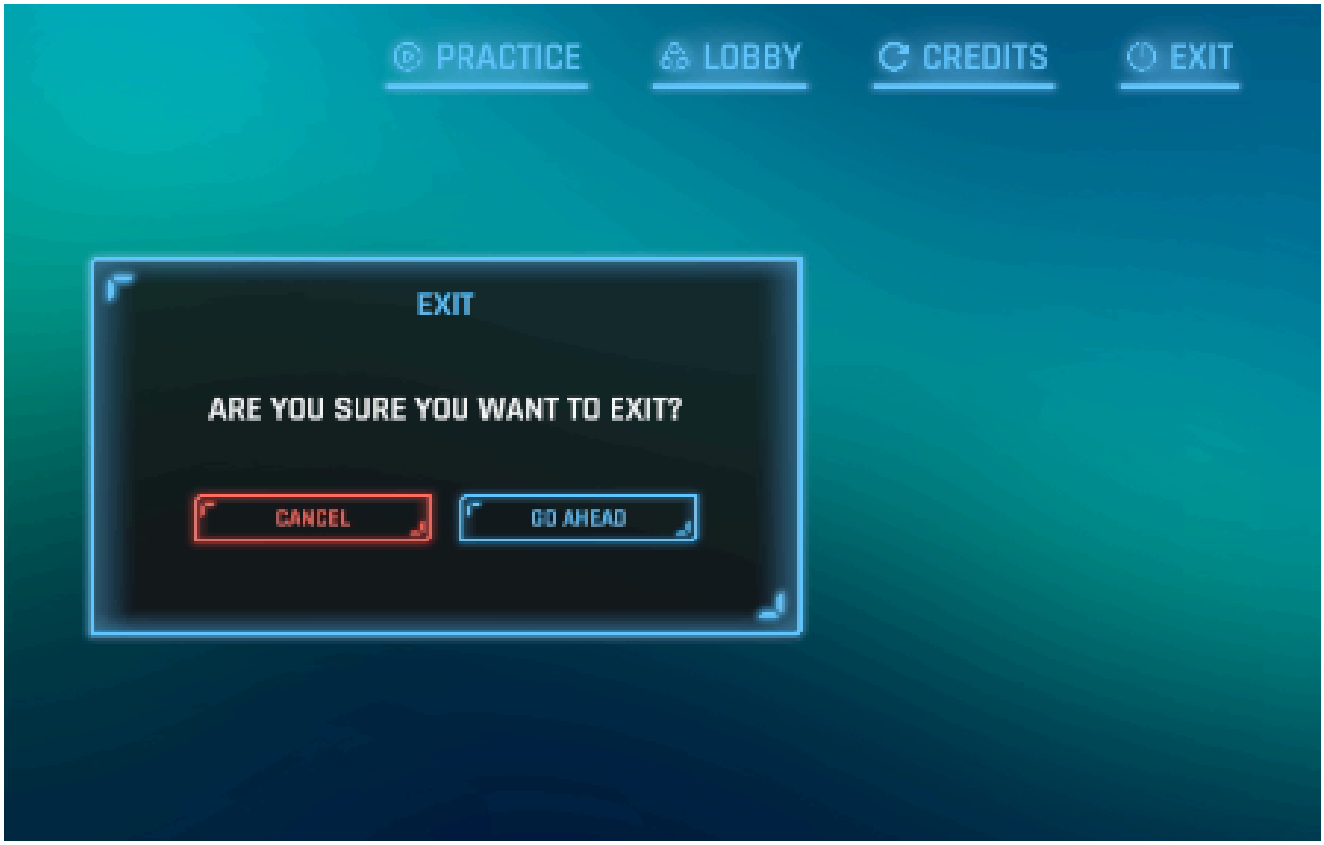
## 5.1. Back story

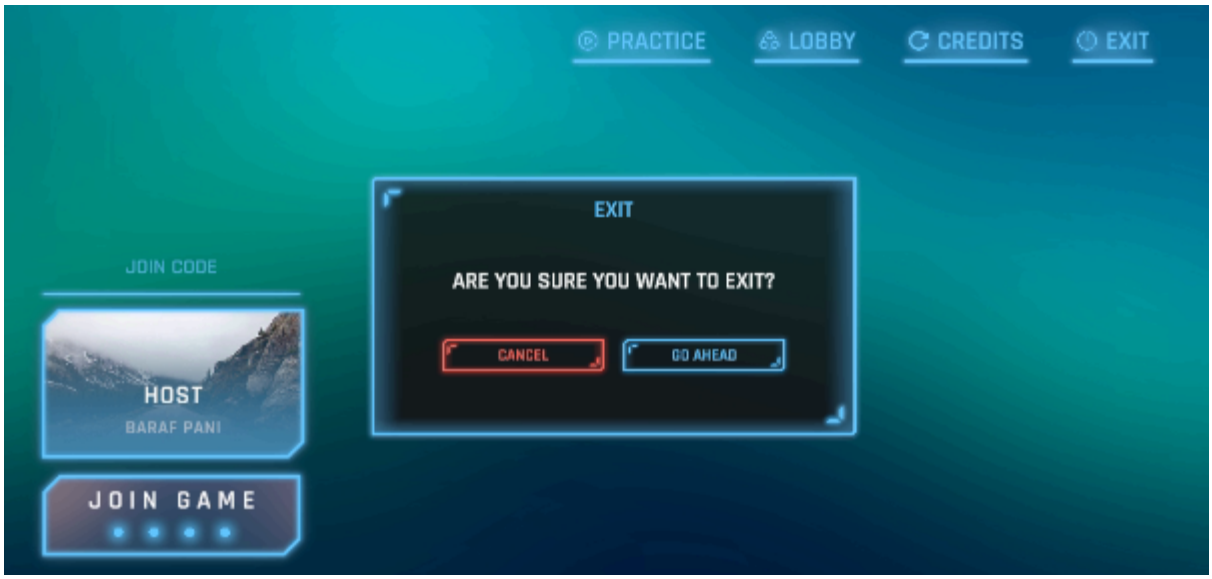
The Backstory of our game is related to almost everyone's childhood. As Pakistani Children, almost all of us have grown up playing this exciting outdoor game. For us to revive the game of Baraf pani indoors and virtually is what this game is all about.

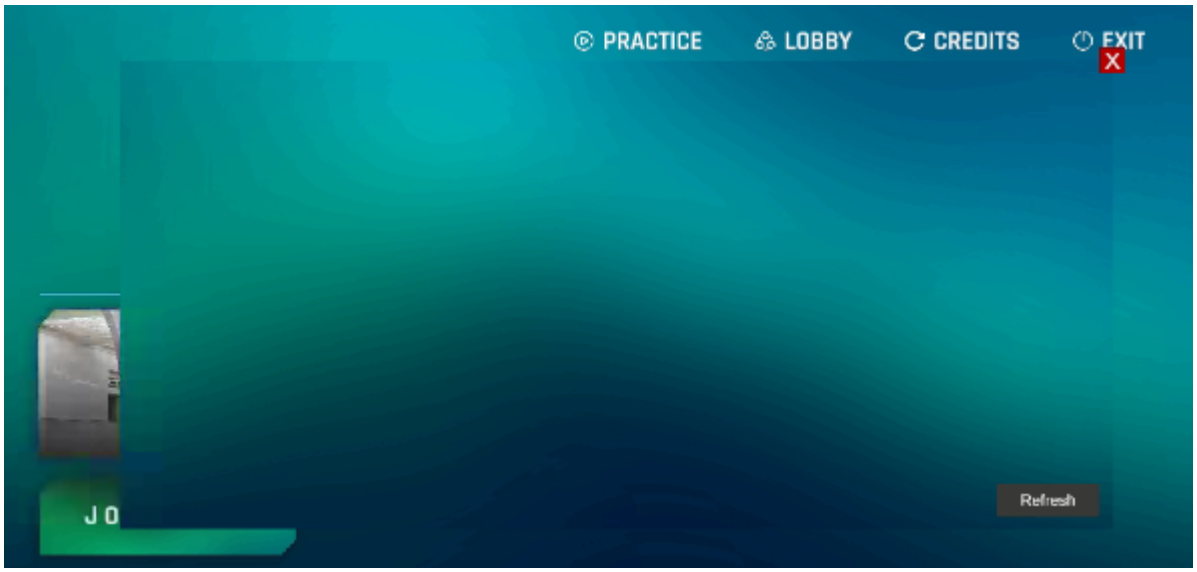
The game's narrative is that a team of four to five people gathers, and then one is selected to be a catcher, which gives he/she the ability to freeze players. While the other players are runners, which means they must run and hide from the catcher not to get frozen. But the bright side to the players is that they can unfreeze each other, which makes the game exciting and difficult enough for the catcher

## 6. Visual System

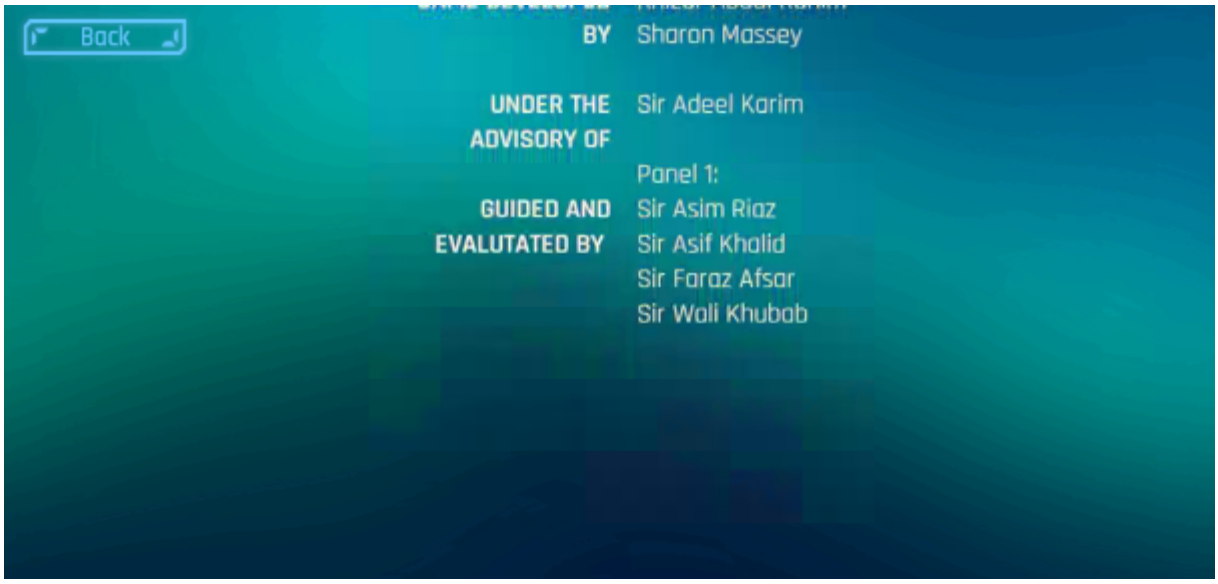


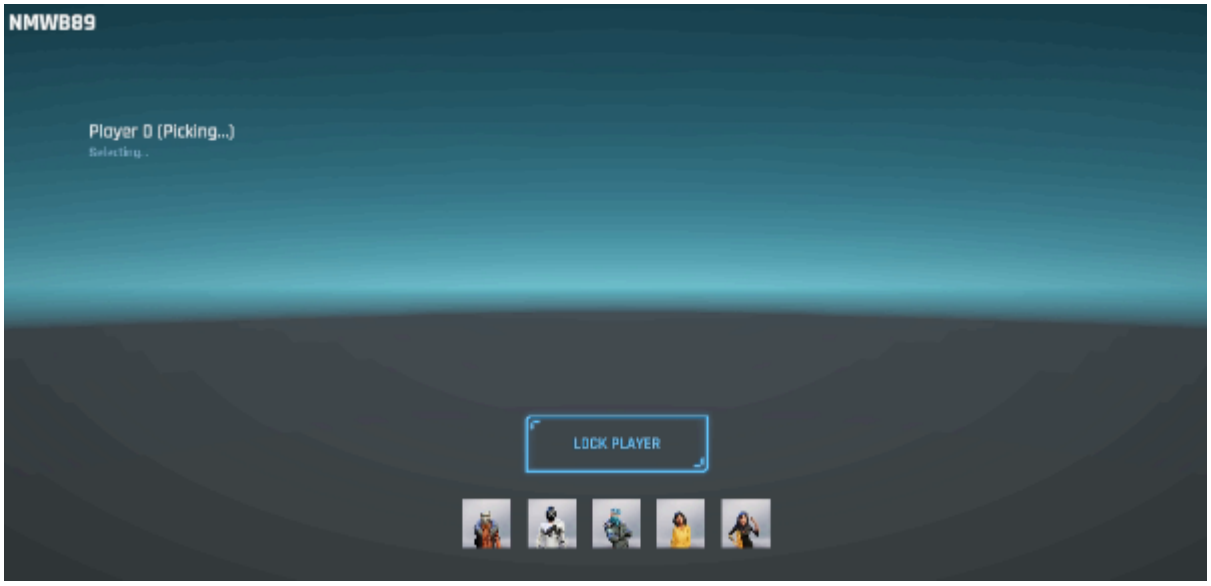




PRACTICE
LOBBY
CREDITS
EXIT
JOIN CODE
HOST
BARAF PANI
JOIN GAME
EXIT
ARE YOU SURE YOU WANT TO EXIT?
CANCEL
GO AHEAD


PRACTICE
LOBBY
CREDITS
EXIT
Refresh


Back
SZABIST UNIVERSITY
DEPARTMENT OF COMPUTER SCIENCES
GAME DEVELOPED BY
Khizar Abdul Rahim
Sharon Massey
UNDER THE ADVISORY OF
Sir Adeel Karim
GUIDED AND EVALUTATED BY
Panel 1:
Sir Asim Riaz
Sir Asif Khalid
Sir Faraz Afsar
Sir Wali Khubab


Back
BY
Sharon Massey
UNDER THE ADVISORY OF
Sir Adeel Karim
GUIDED AND EVALUTATED BY
Panel 1:
Sir Asim Riaz
Sir Asif Khalid
Sir Faraz Afsar
Sir Wali Khubab


NMWB89
Player 0 (Picking...)
LOCK PLAYER


ATLAS
LOCK PLAYER


FROSTBITE
LOCK PLAYER


NOVA
LOCK PLAYER


RAVEN
LOCK PLAYER


SHAGUFTA
LOCK PLAYER

### 6.1. Control System – How does the game player control the game? What are the specific commands?

The control system of this game is handled by the unity input system. We have used both the old and the new input system, where all the necessary buttons of the keyboard and touch actions on an android device are recognized.

To control their single player, a user must first play the practice round to understand the input actions and respective keys used by the keyboard. If the user is an android device player, a touch action pad and triggered joystick, which toggles 360 is displayed along with the power, move and sprint actions available.

WASD keys to move forward, backward, right and left respectively.

Arrow keys up, down, right and left to move respectively.

Tab button for using existing power (Freeze/Unfreeze ability).

Space bar key to jump respectively.

Shift key to sprint while walking respectively.

Mobile Touch Action Pad to move, rotate, jump, power and sprint respectively.

## 7. Appendices

The following list presents the diagrams that should be included at appropriate places

*Table2. Included Diagrams*

| | |
|---|---|
| Statechart Diagram | Expresses possible states of a class (or a system) |
| Activity Diagram | Describes activities and actions taking place in a system |
| Sequence Diagram | Shows one or several sequences of messages sent among a set of objects |
| Collaboration Diagram | Describes a complete collaboration among a set of objects |
| Use-case Diagram | Illustrates the relationships between use cases |
| Deployment Diagram | A special case of a Class Diagram used to describe hardware within the overall system architecture |
| System Block diagram (Hierarchy Diagram) | A diagram showing the major components of the system with its interconnections and external interfaces |

**State chart Diagram:**

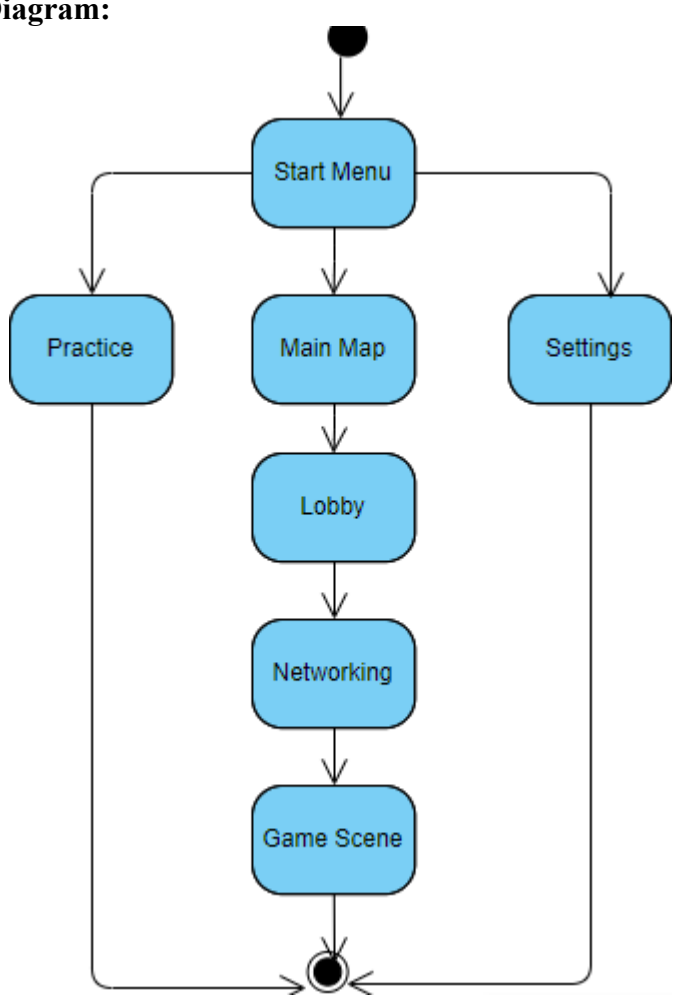



*Figure 3. State Chart Diagram*

**Activity Diagrams:**

Entering Lobby

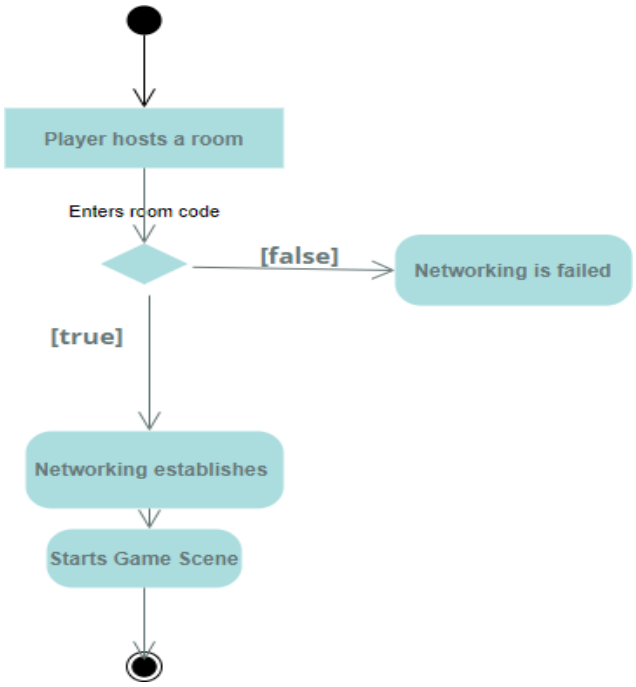



*Figure 4. Activity Diagram 1*

Running

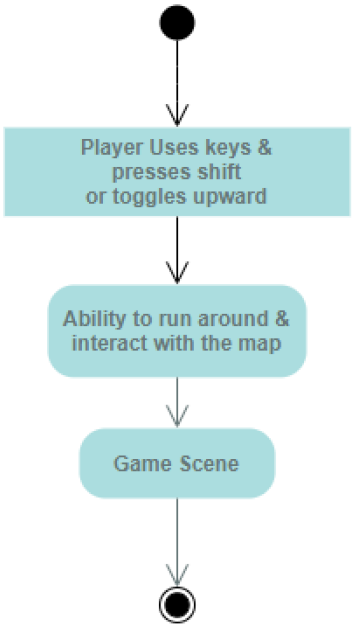



*Figure 5. Activity Diagram 2*

Freeze Players

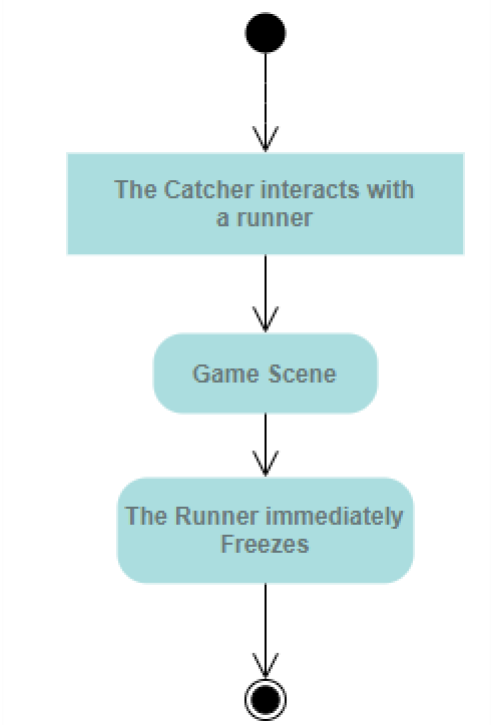



*Figure 6. Activity Diagram 3*

Unfreeze Players

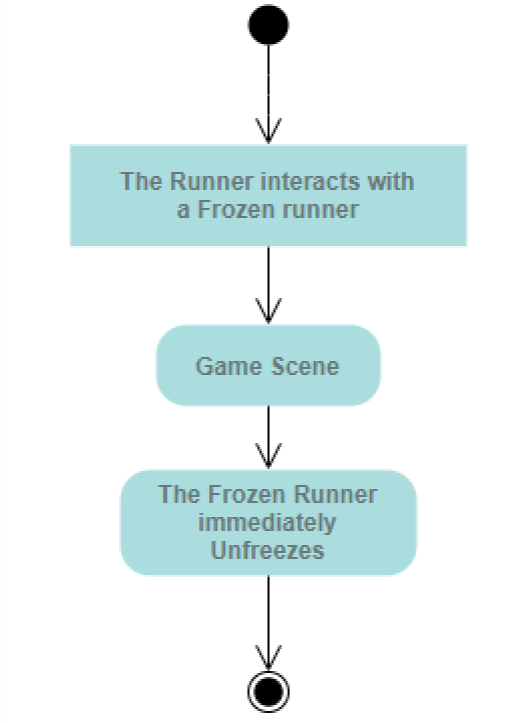



*Figure 7. Activity Diagram 4*

Win/Loss Case

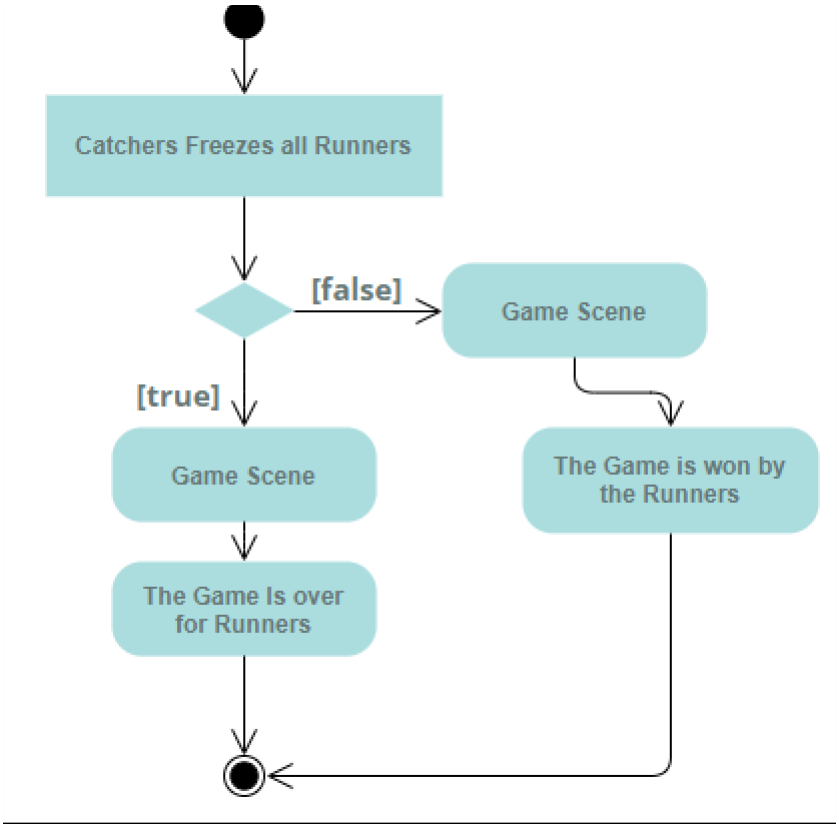



*Figure 8. Activity Diagram 5*

Character Selection

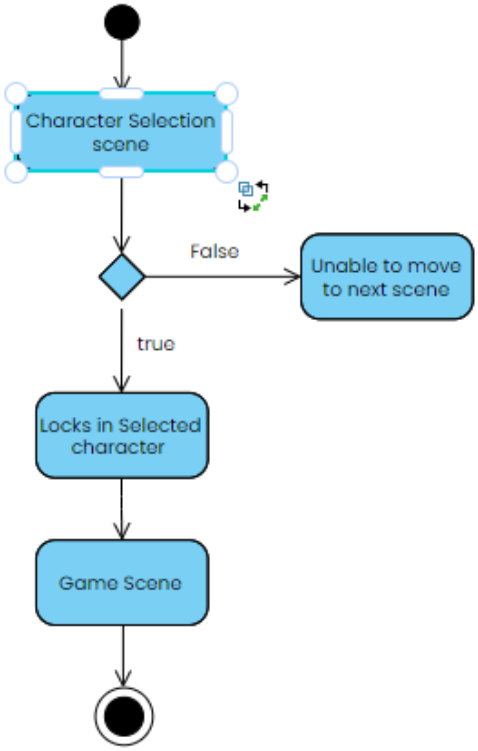



*Figure 9. Activity Diagram 6*

Interaction with Environment

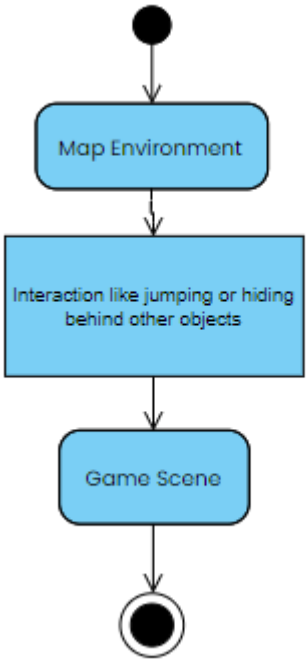



*Figure 10. Activity Diagram 7*

Networking Multiplayer (Netcode)

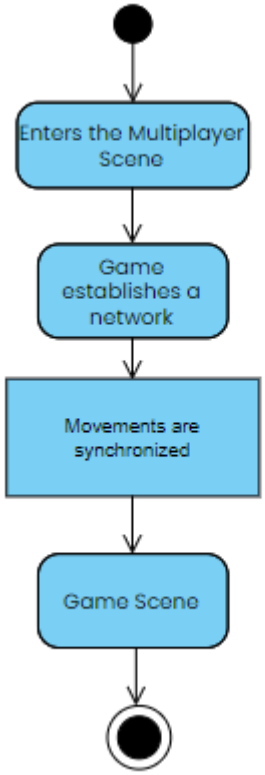



*Figure 11. Activity Diagram 8*

Quit Game

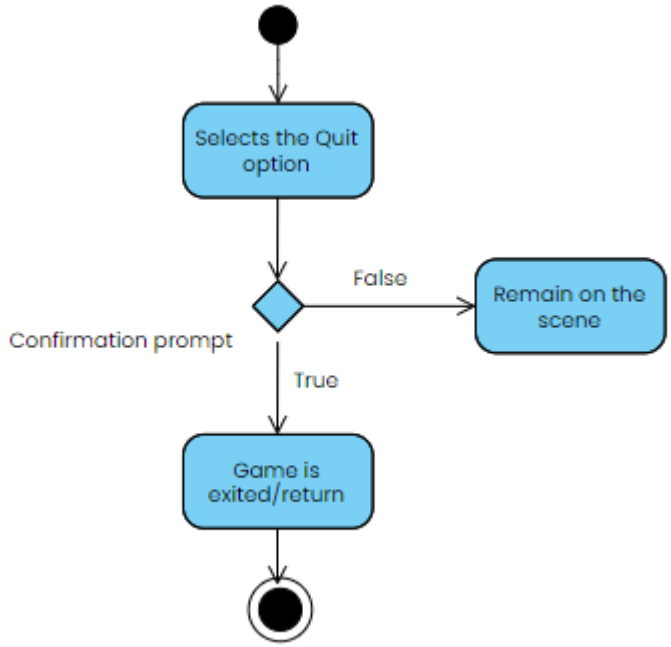



*Figure 12. Activity Diagram 9*

**Sequence Diagrams:**

Entering Lobby

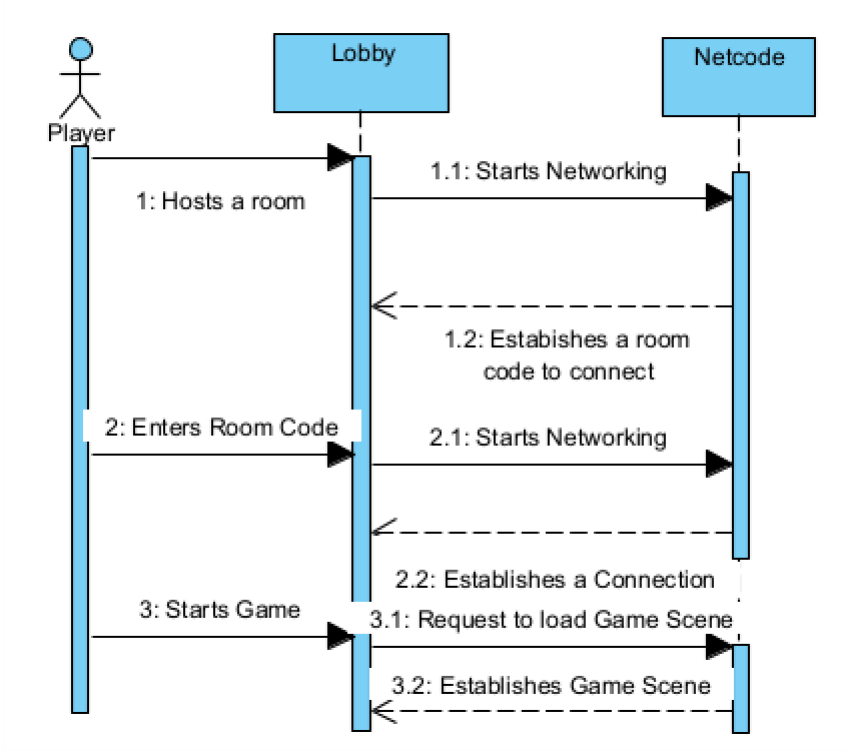



*Figure 13. Sequence Diagram 1*

Running

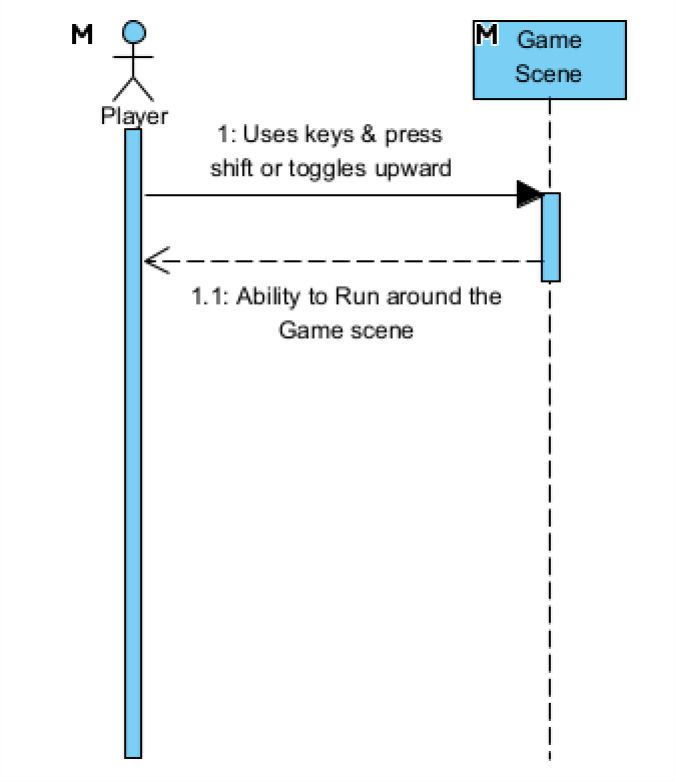



*Figure 14. Sequence Diagram 2*

Freeze Players

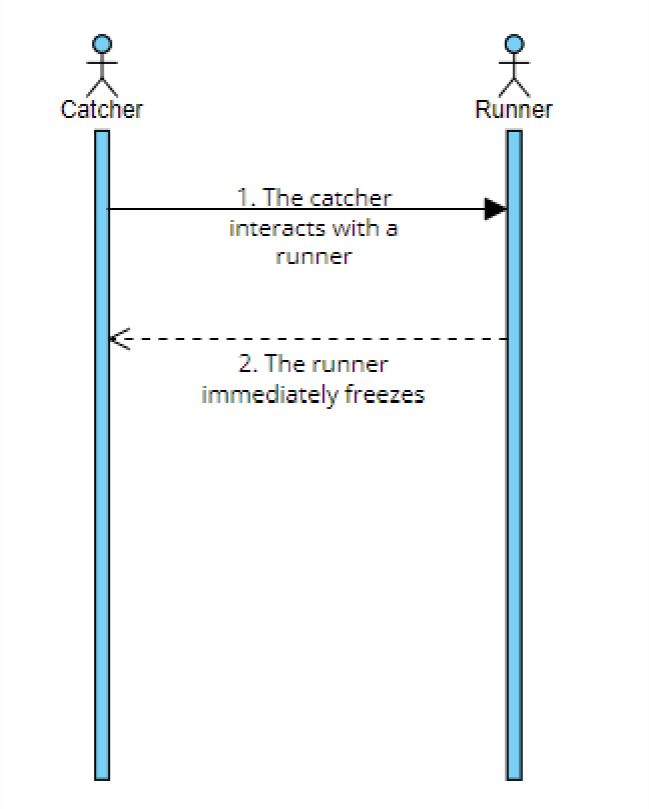



*Figure 15. Sequence Diagram 3*

Unfreeze Players

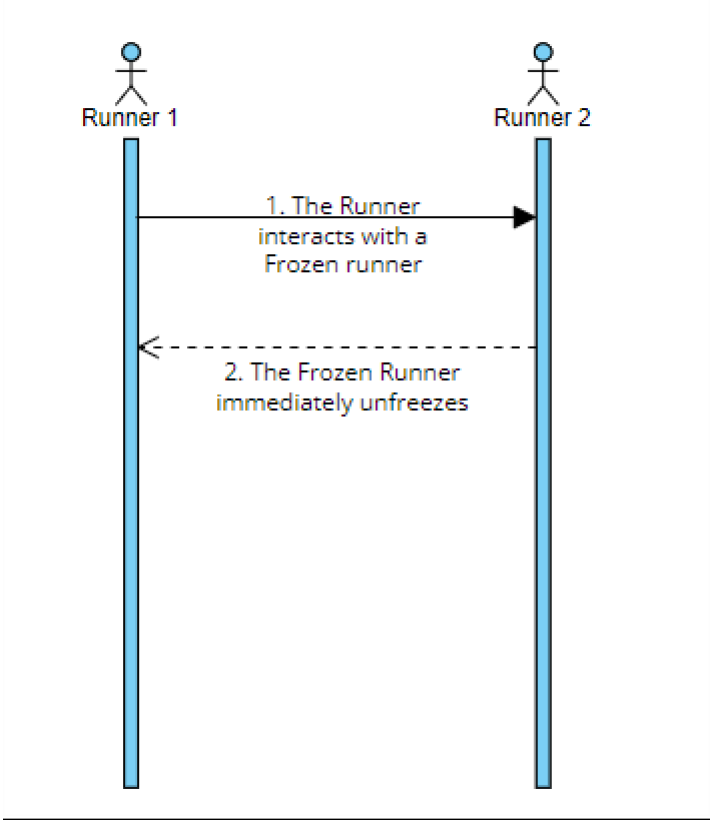



*Figure 16. Sequence Diagram 4*

Win/Loss Case

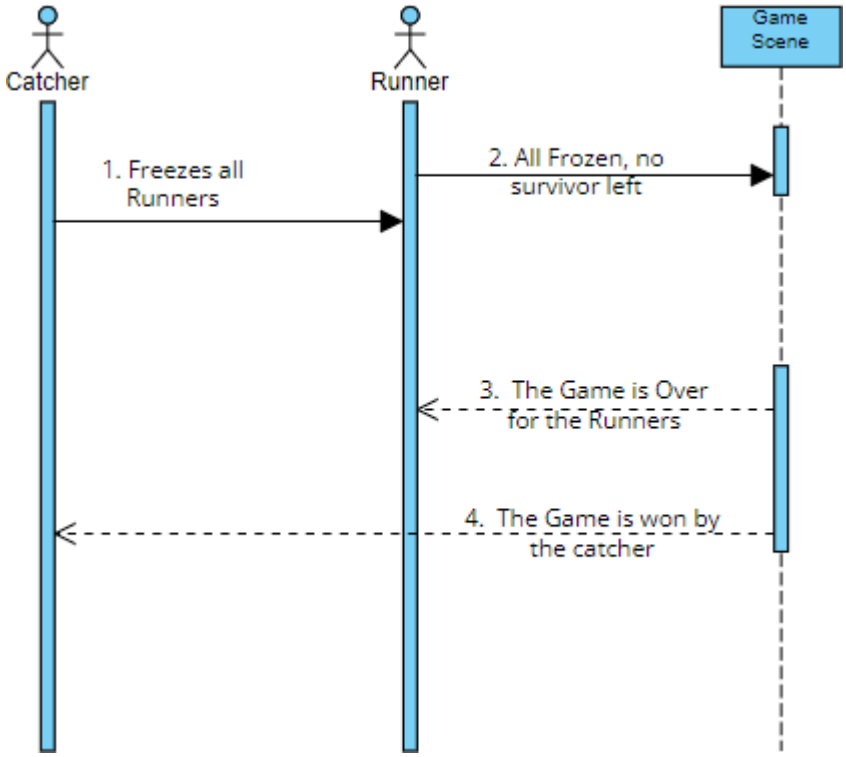



*Figure 17. Sequence Diagram 5*

## Character Selection

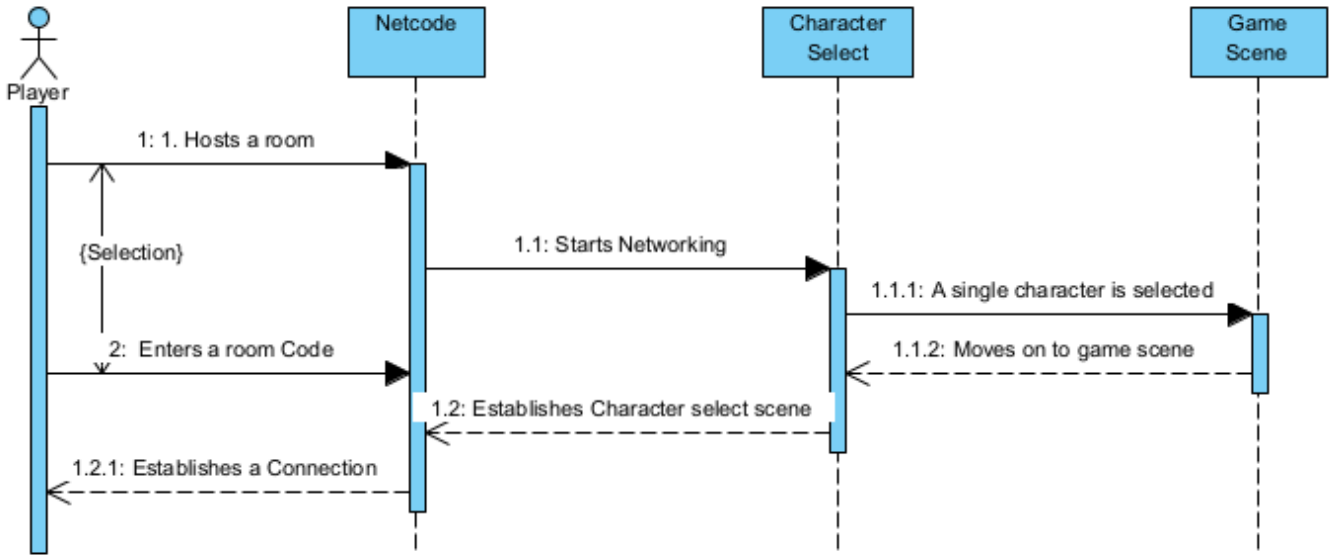



*Figure 18. Sequence Diagram 6*

## Network Multiplayer (Netcode)

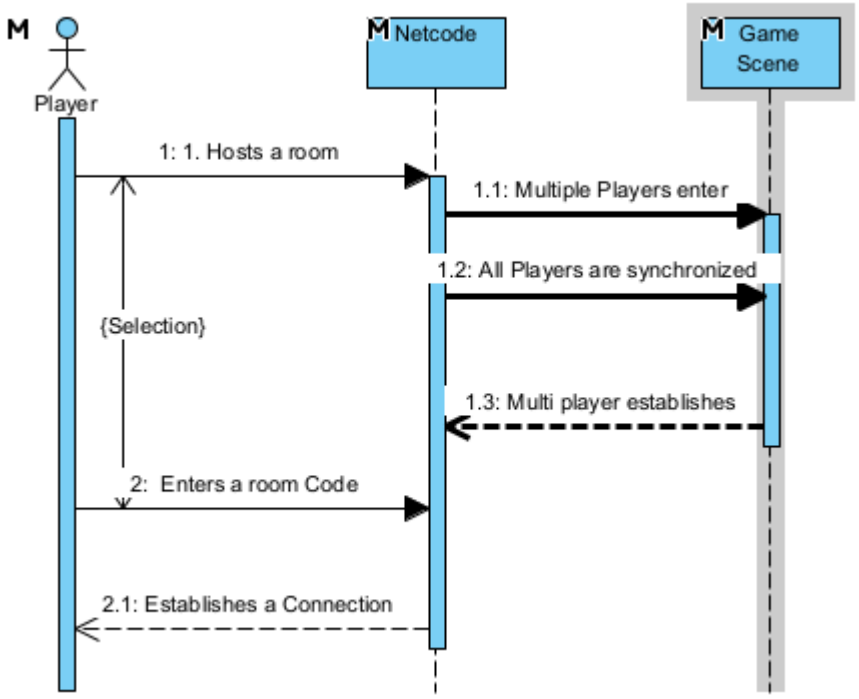



*Figure 19. Sequence Diagram 7*

## Interaction with Environment

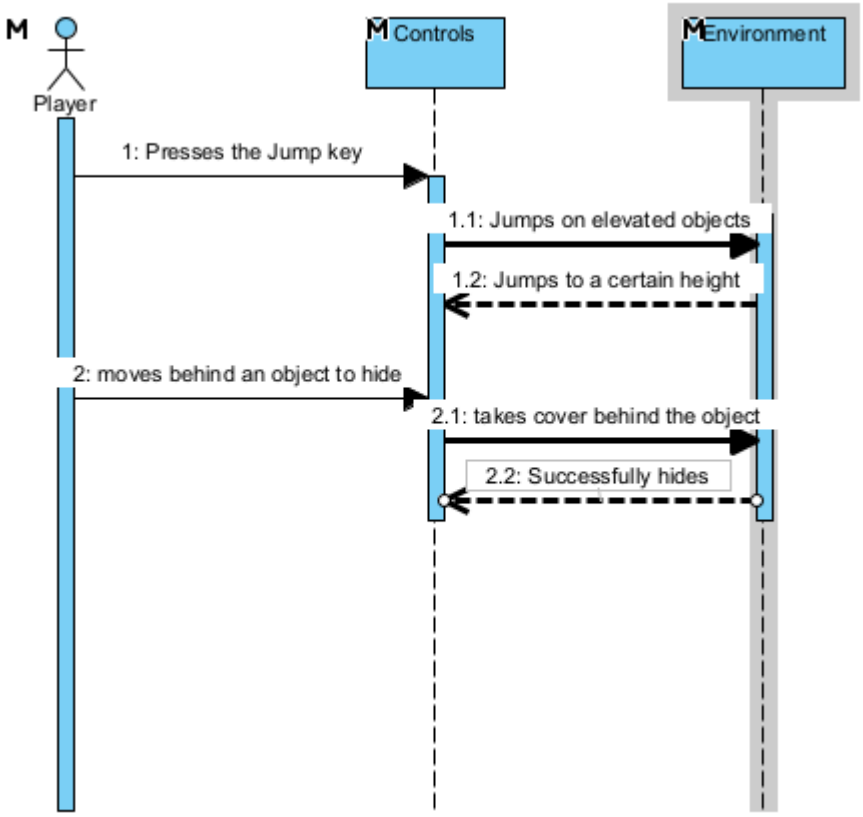



*Figure 20. Sequence Diagram 8*

## Quit Game

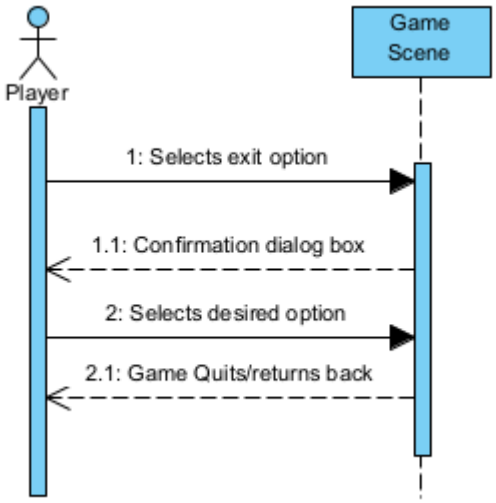



*Figure 21. Sequence Diagram 9*

**Collaboration Diagrams:**

Entering Lobby

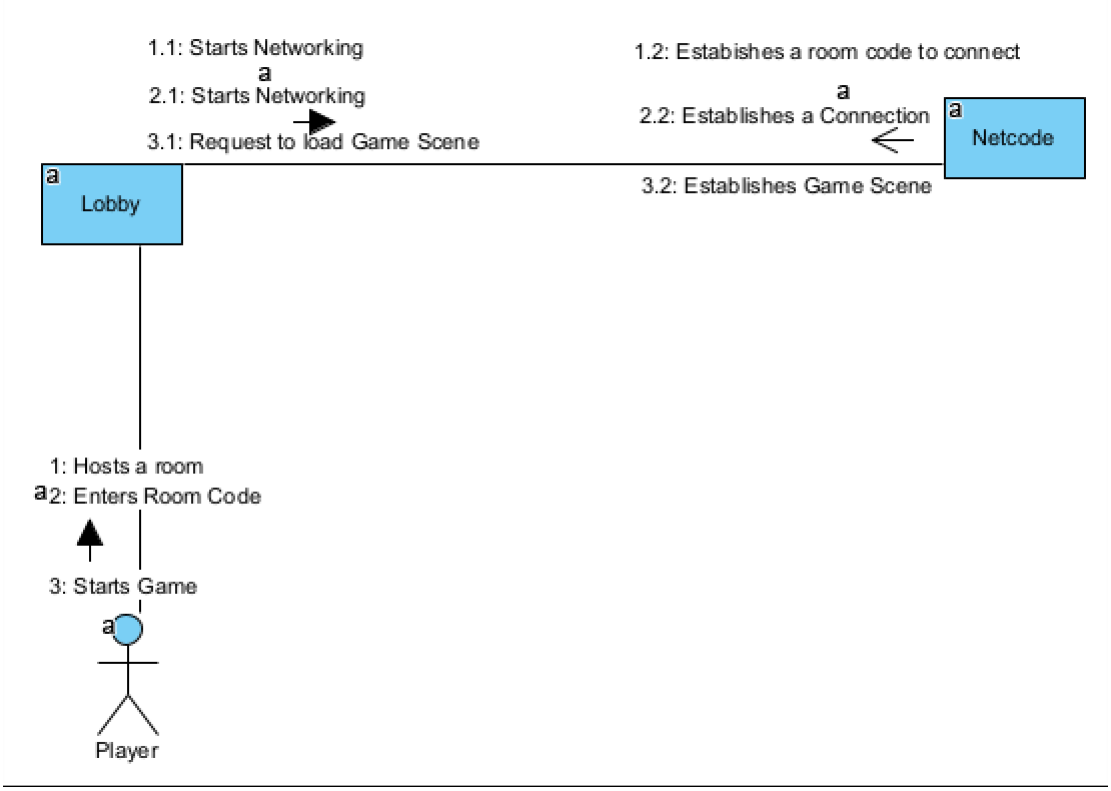



*Figure 22. Collaboration Diagram 1*

Running

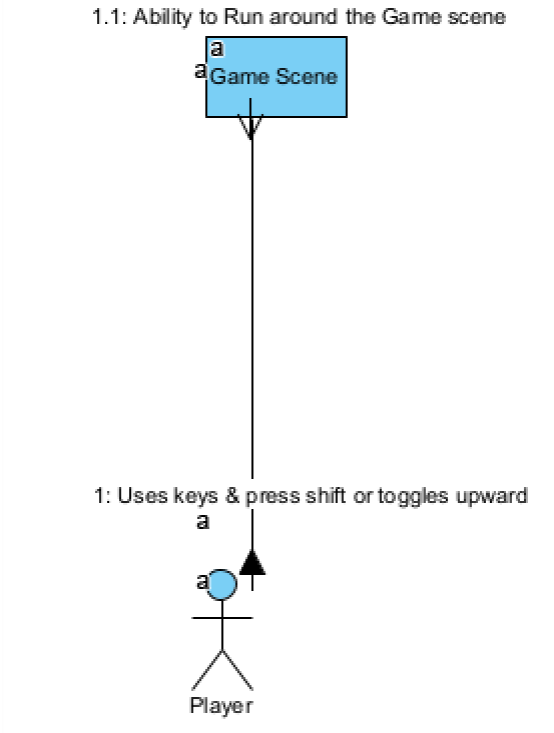



*Figure 23. Collaboration Diagram 2*

## Freeze Players

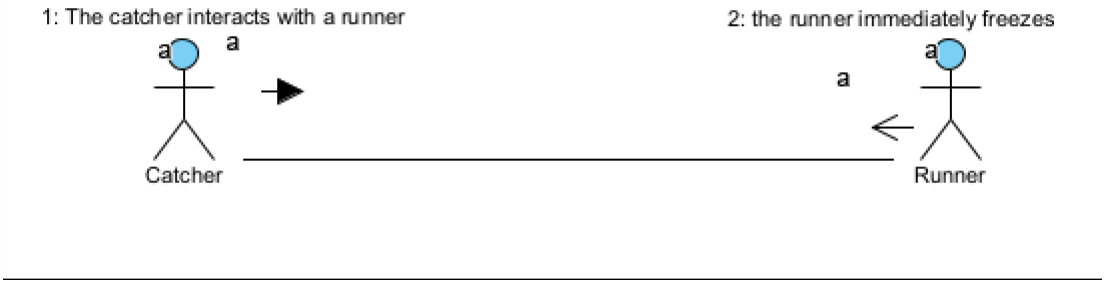



*Figure 24. Collaboration Diagram 3*

## Unfreeze Players

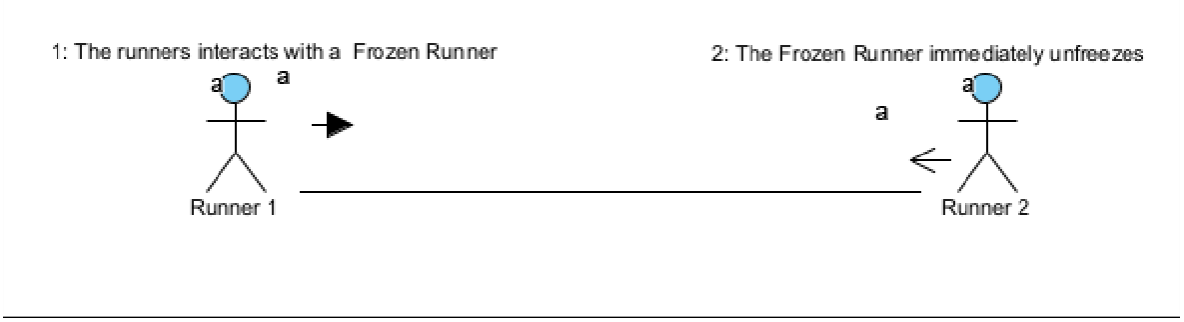



*Figure 25. Collaboration Diagram 4*

## Win/Lose Case

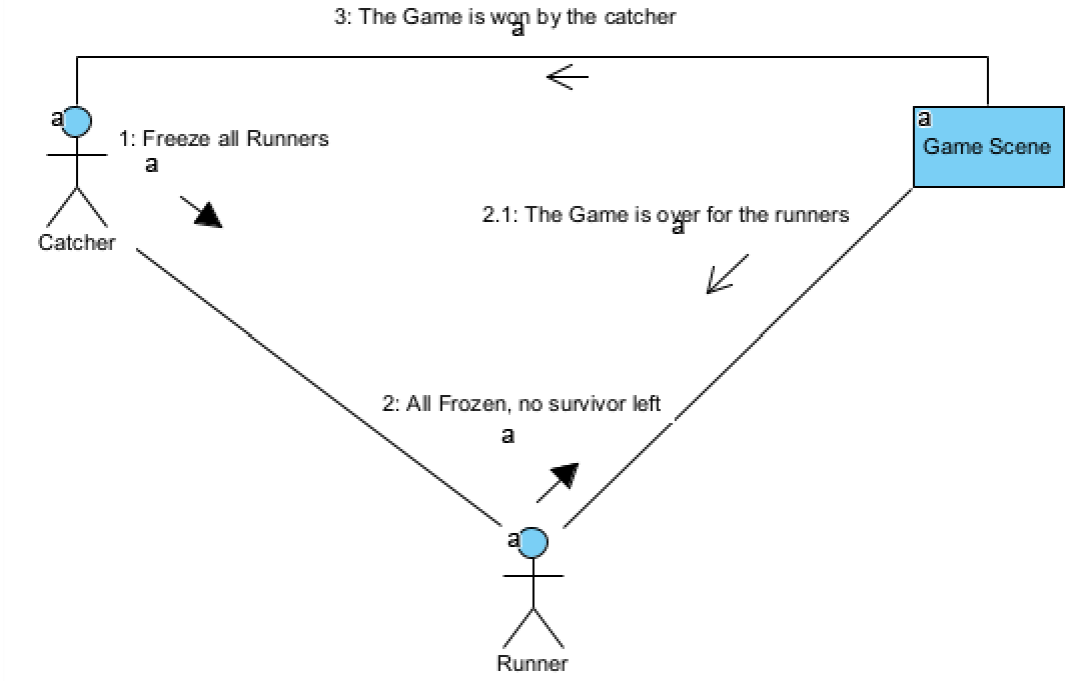



*Figure 26. Collaboration Diagram 5*

## Character Selection

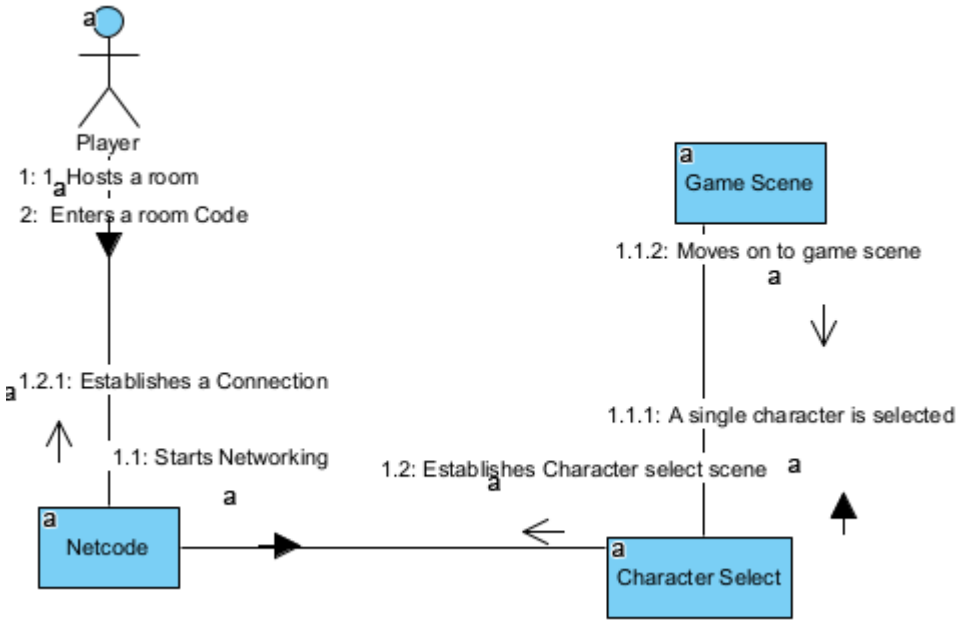



*Figure 27. Collaboration Diagram 6*

## Network Multiplayer (Netcode)

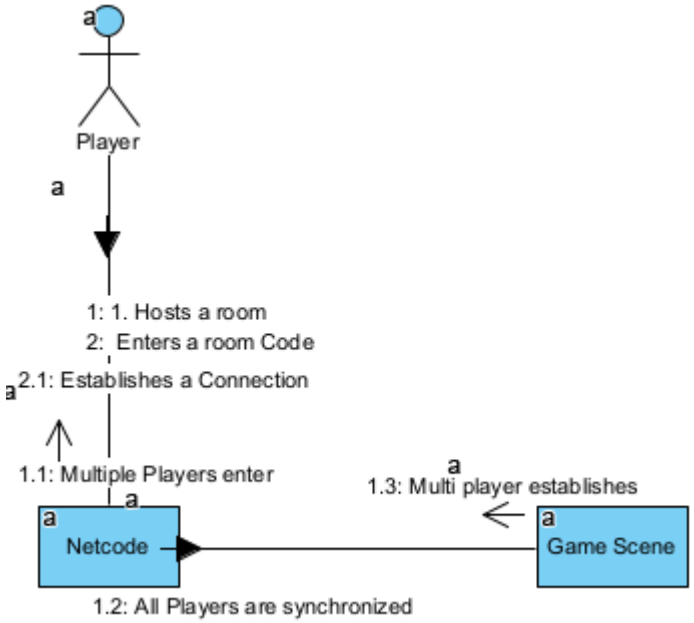



*Figure 28. Collaboration Diagram 7*

Interaction with Environment

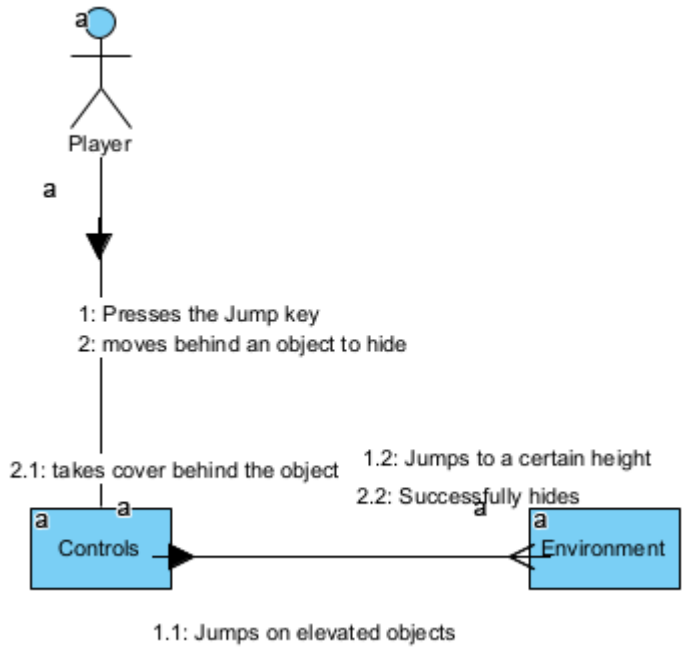



*Figure 29. Collaboration Diagram 8*

Quit Game

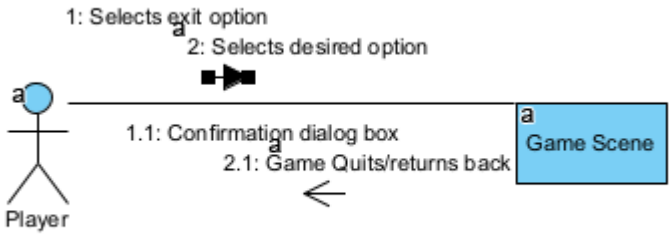



*Figure 30. Collaboration Diagram 9*

## Use-Case Diagram

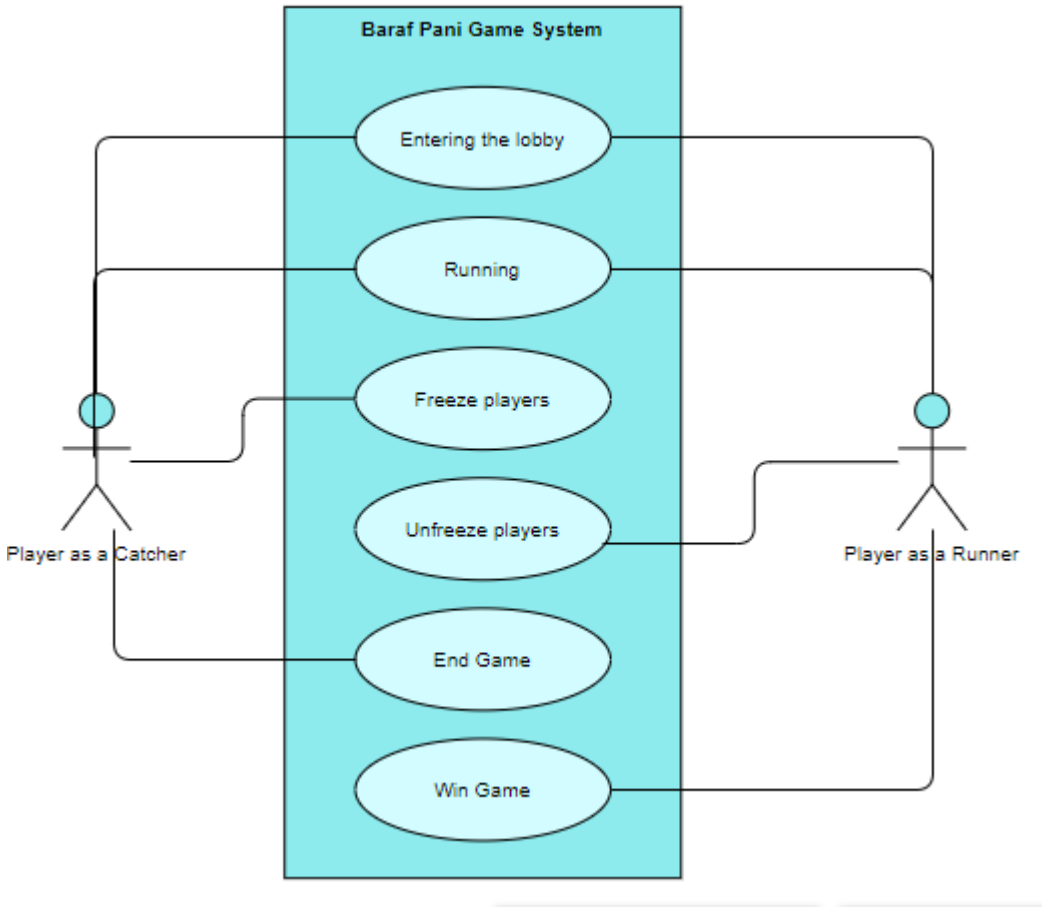



*Figure 31. Use Case Diagram*

## Deployment Diagram

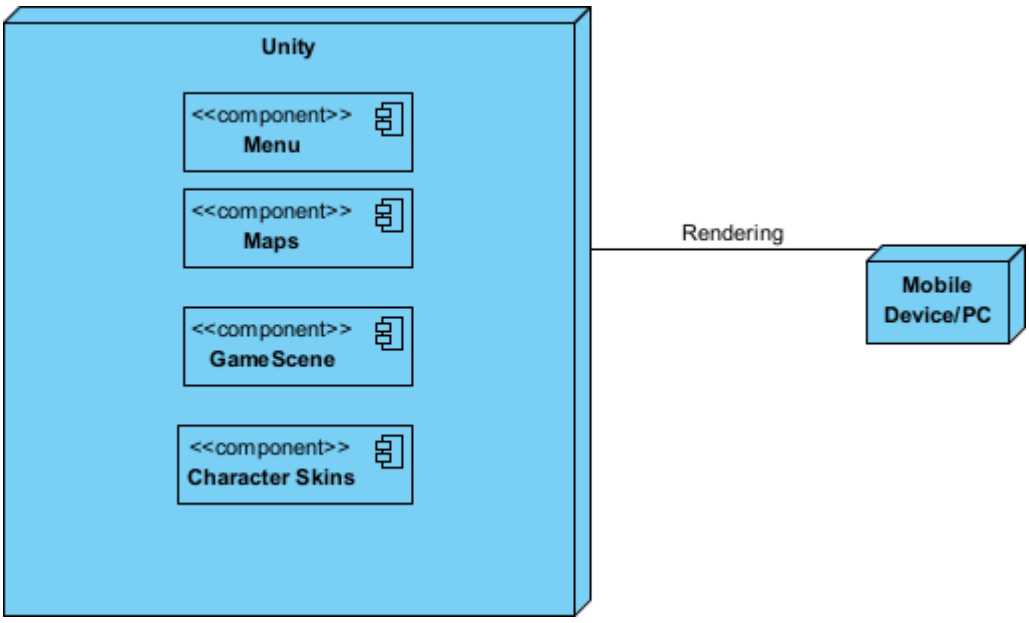



*Figure 32. Deployment Diagram*

## System-Block Diagram

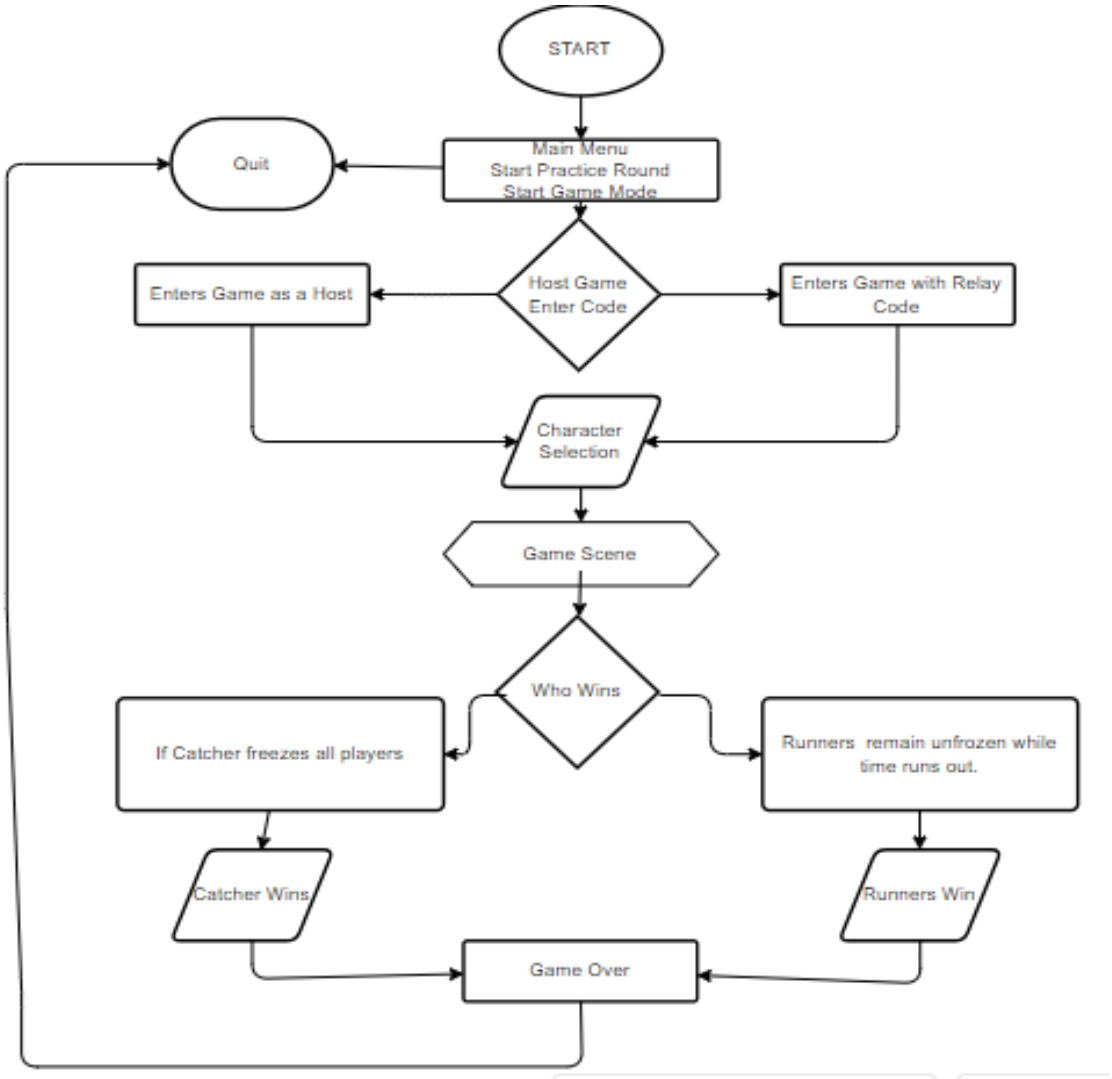



*Figure 33. System Block Diagram*