



# UNIT 3 – Bowling Alley (Virtual Reality)

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## Team 20:

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## Effort and Role played by Each team member

Name	Roll No	No. of hours	Role played
Piyush Atri	2020201009	18-20	Front end, Back end, Documentation, Mockup screen
Shikha Raghuwanshi	2021201055	18-20	Front end, Back end, Documentation, Mockup screen
Kaustuv Dash	2021202019	18-20	Front end, Back end, Documentation, Mockup screen
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Sourabh Patidar	2021201089	18-20	Front end, Back end, Documentation, Mockup screen

## Overview

In the Unit-3 project we were given the task of creating a Virtual Reality model of a Bowling Alley game in UNITY. UNITY is a real-time development platform used to develop 3D and VR models.

**Virtual Reality:** VR is an environment generated by computers which contains a VR headset wearing which makes the user immersed in a completely new environment. These surroundings appear to be real.

**Bowling Alley Game:** It is an indoor game which can be played by team or individuals which contains a lane that has 10 pins at the end of it and the player tries to knock down as many pins as possible by throwing a ball from another end of the lane. After some fixed attempts the final score will be calculated or the winner of the team will be declared.

In our model, when we start the VR headsets, a start menu screen is displayed to the user, and the player can select any option using the Controller. The player has to select the "Start" button to start the game. Once the game is started, the bowling alley view is visible to the player. The view contains the lane of bowling, a bowl on the side of the lane and 10 pins at the end of the lane. Using the controller, the player can hold the ball and throw it with a certain angle and force. When the ball hits the pins, an audio snippet of pins knocked plays and score is calculated using some score logic which gets displayed on the top of the screen. The player can see the button "Main menu" which will take the player back to the Main menu/Start screen. Again when the player selects the "History" button, the scores of the last 10 games are displayed in sorted order.

"Exit" button is provided which will allow the player to exit the game.

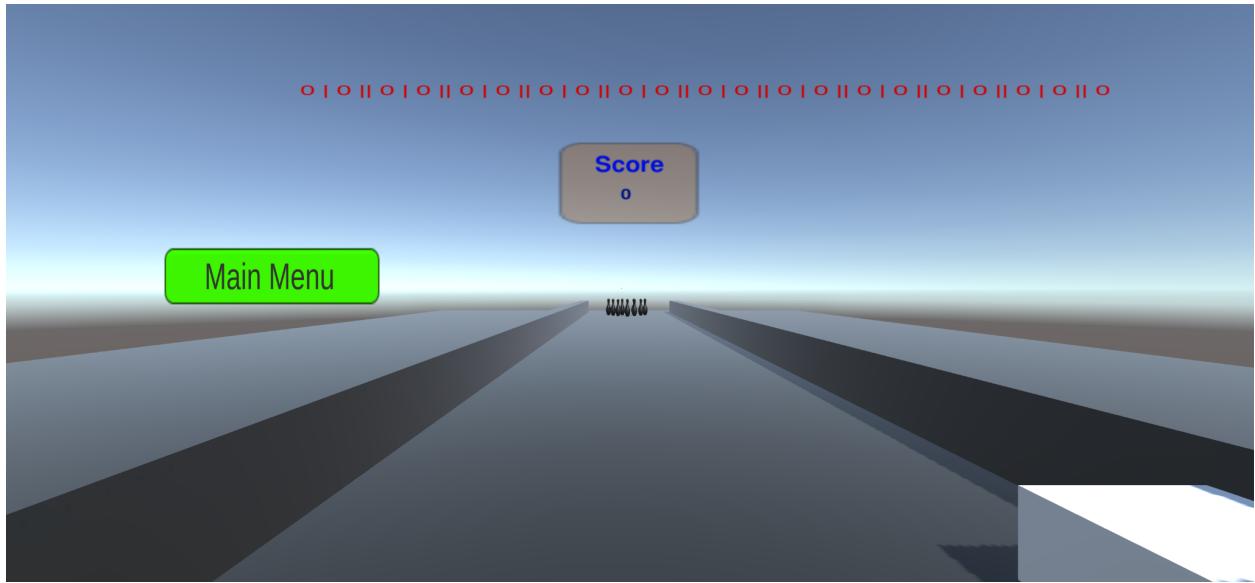
## Our Bowling Alley

After setting up the UNITY platform and installing all the required specifications, the program is stored in a .apk file and it can be connected to VR headset.

The first welcome screen to the player of the game is shown below. It consists of 3 buttons START, HISTORY and EXIT.

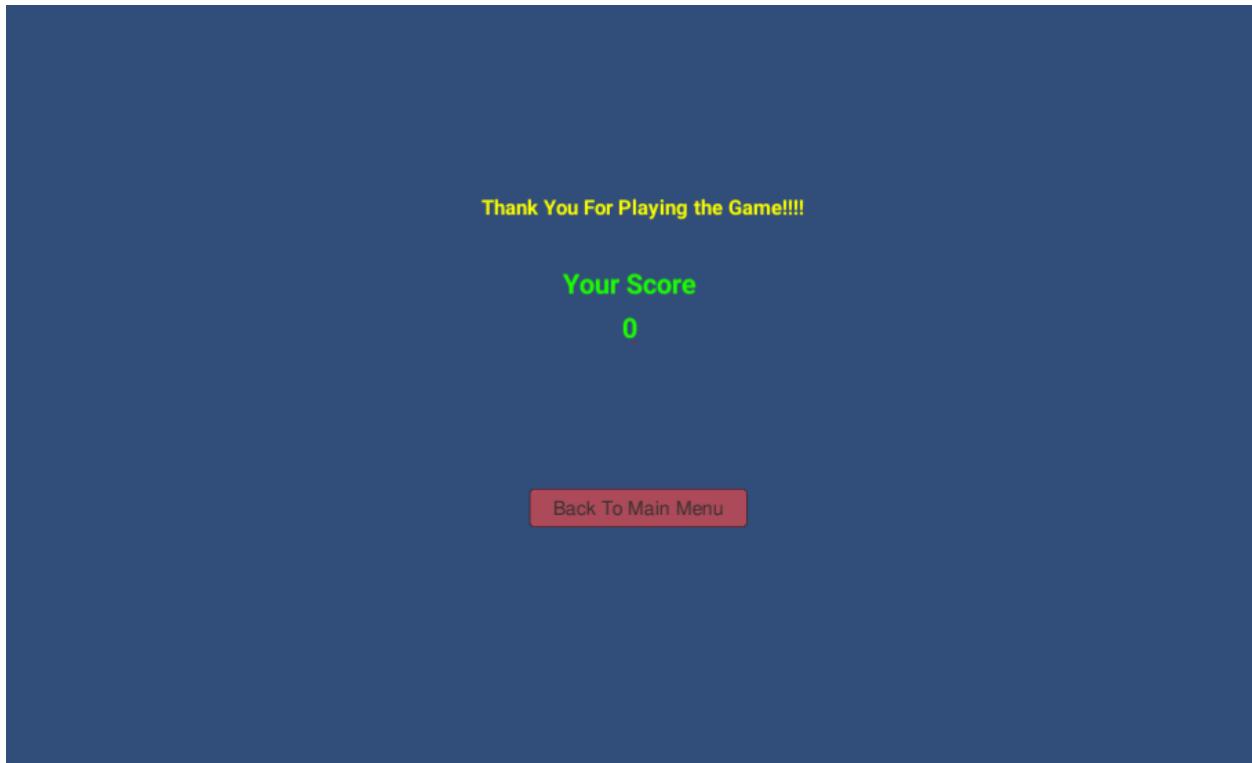


When the player selects START, the Game view is displayed which looks as below.



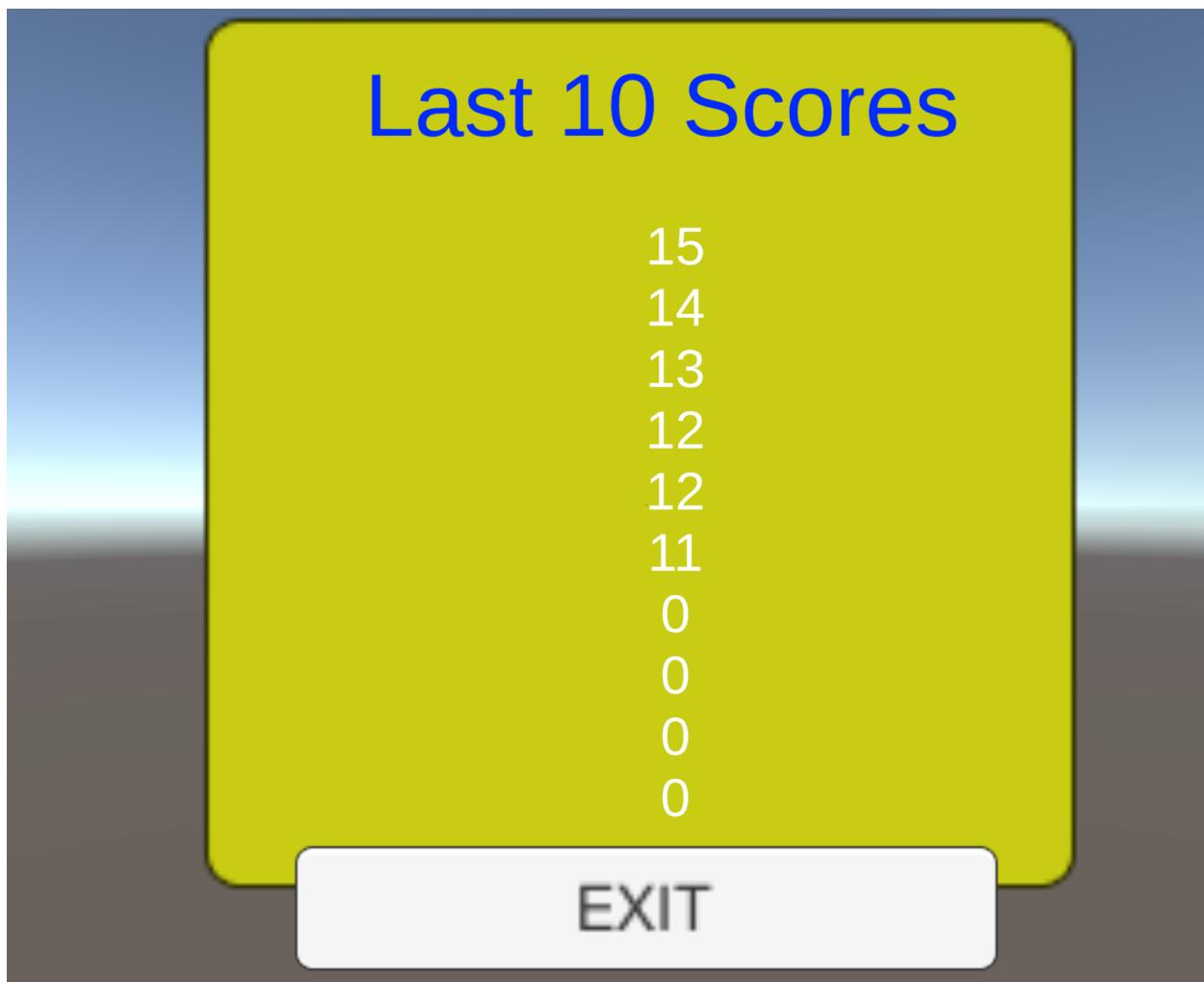
The game consists of a lane, pins and a ball. The player can pick the ball using the Controller and throw it with force and appropriate angle. Once the ball hits the pins, an audio will be generated and the score (pins knocked down along with some score logic calculation) will be updated. The pins will be reset after every two throws (1 round) and 10 such rounds are allowed in each game. Players can stop the game and go back to the main

menu anytime they want by clicking on the Main Menu button. After finishing all the rounds successfully, the Endgame prompt as below will be displayed to the player.



The final score of the player is displayed which will be stored for future reference as well. By selecting the "Back to Main Menu" button, the player will be redirected to the start screen again.

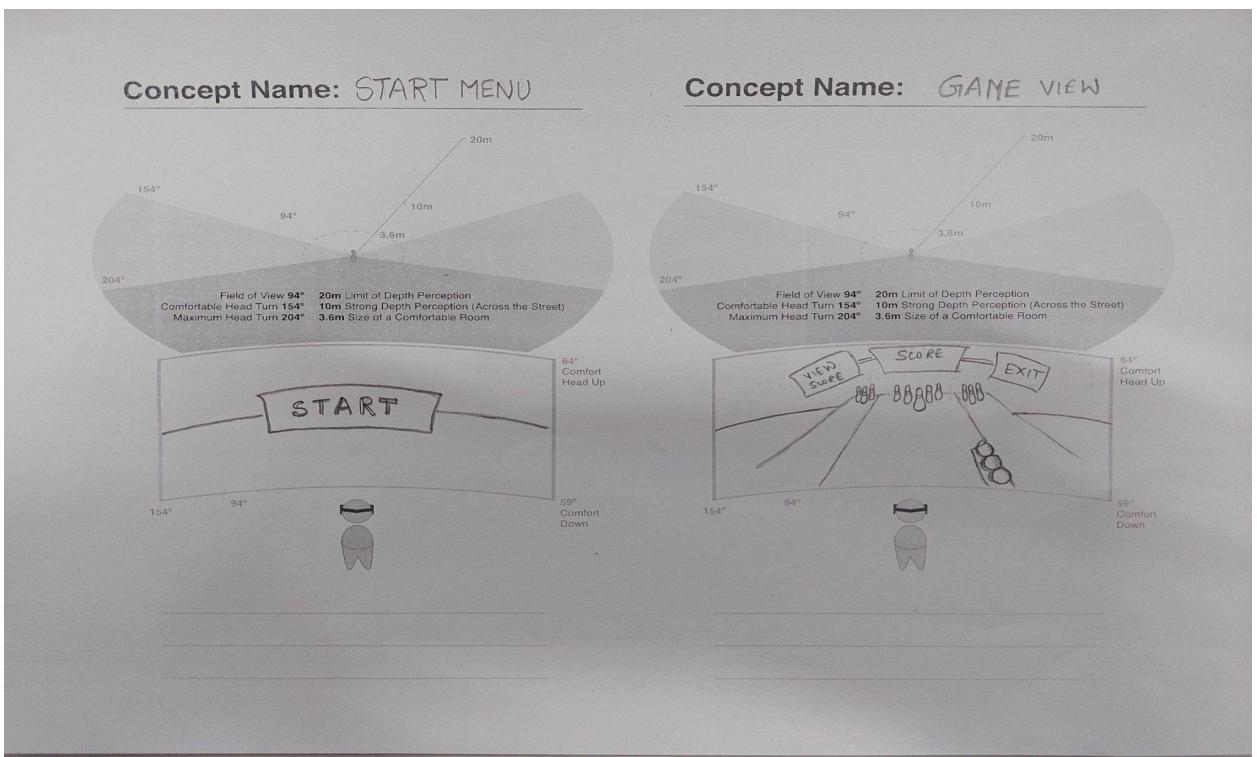
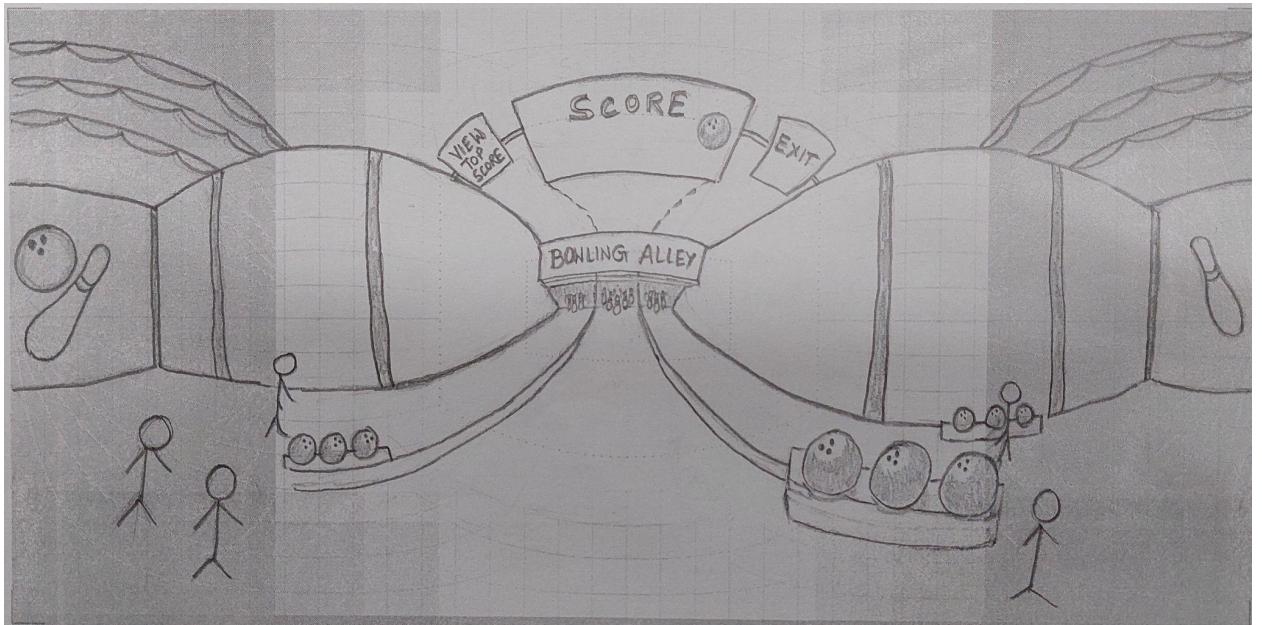
If the player wants to view the scores of the last 10 games, they can select the HISTORY option. By selecting which page as shown below will be displayed.

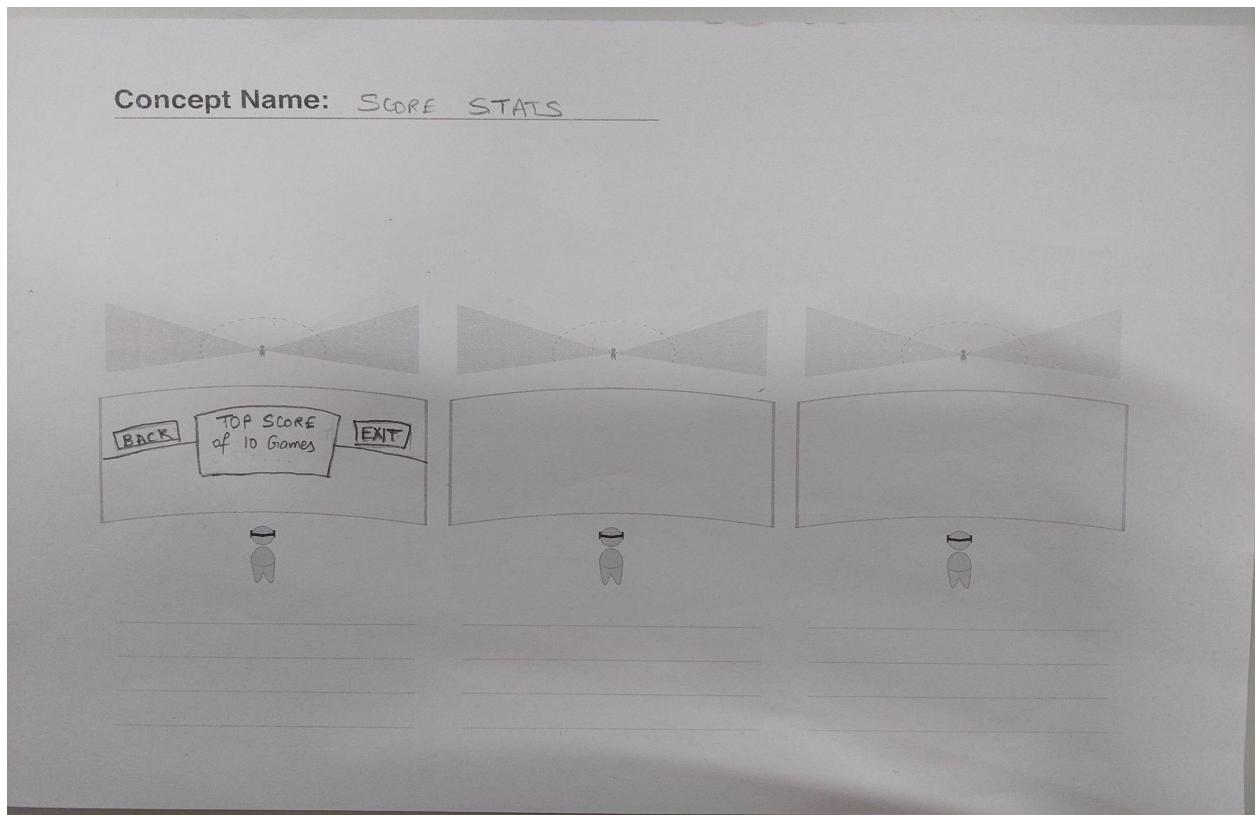


The scores of the last 10 games are displayed.

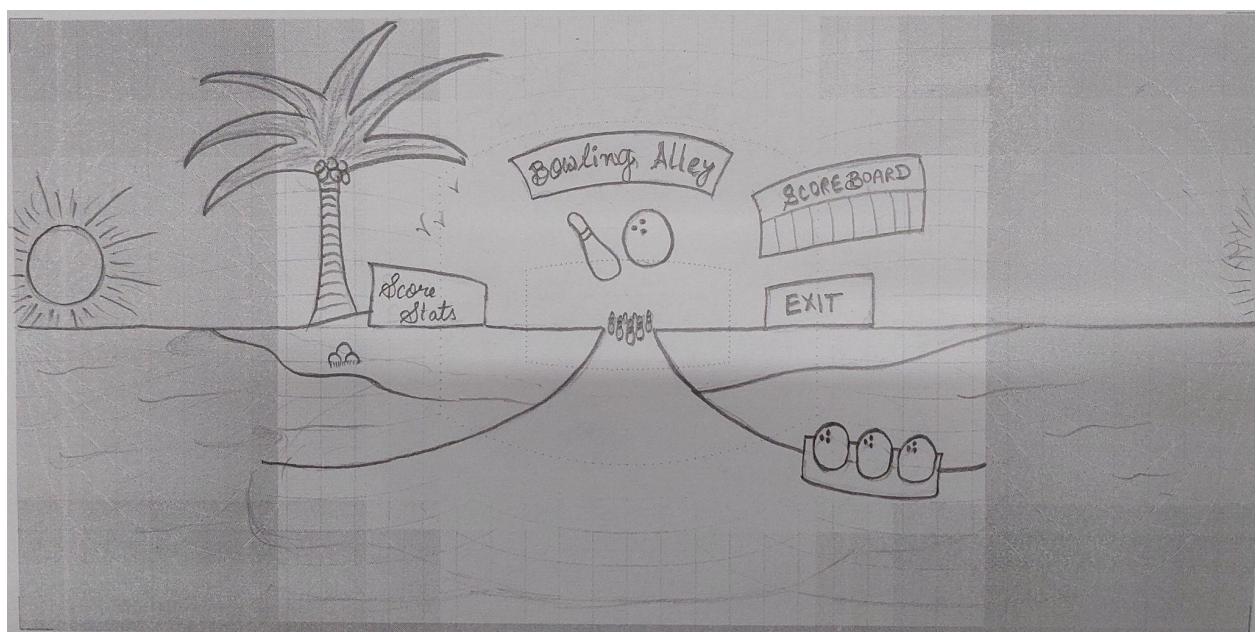
## VR Mockup Screens

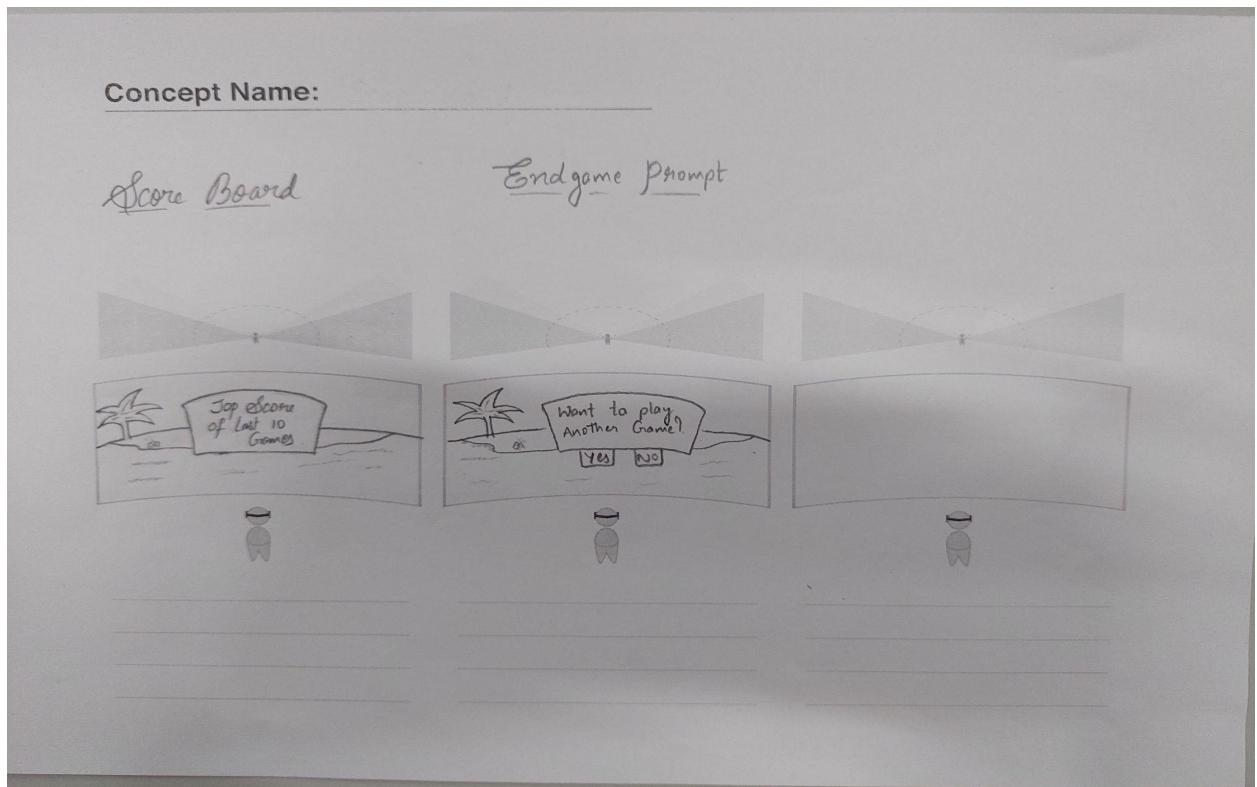
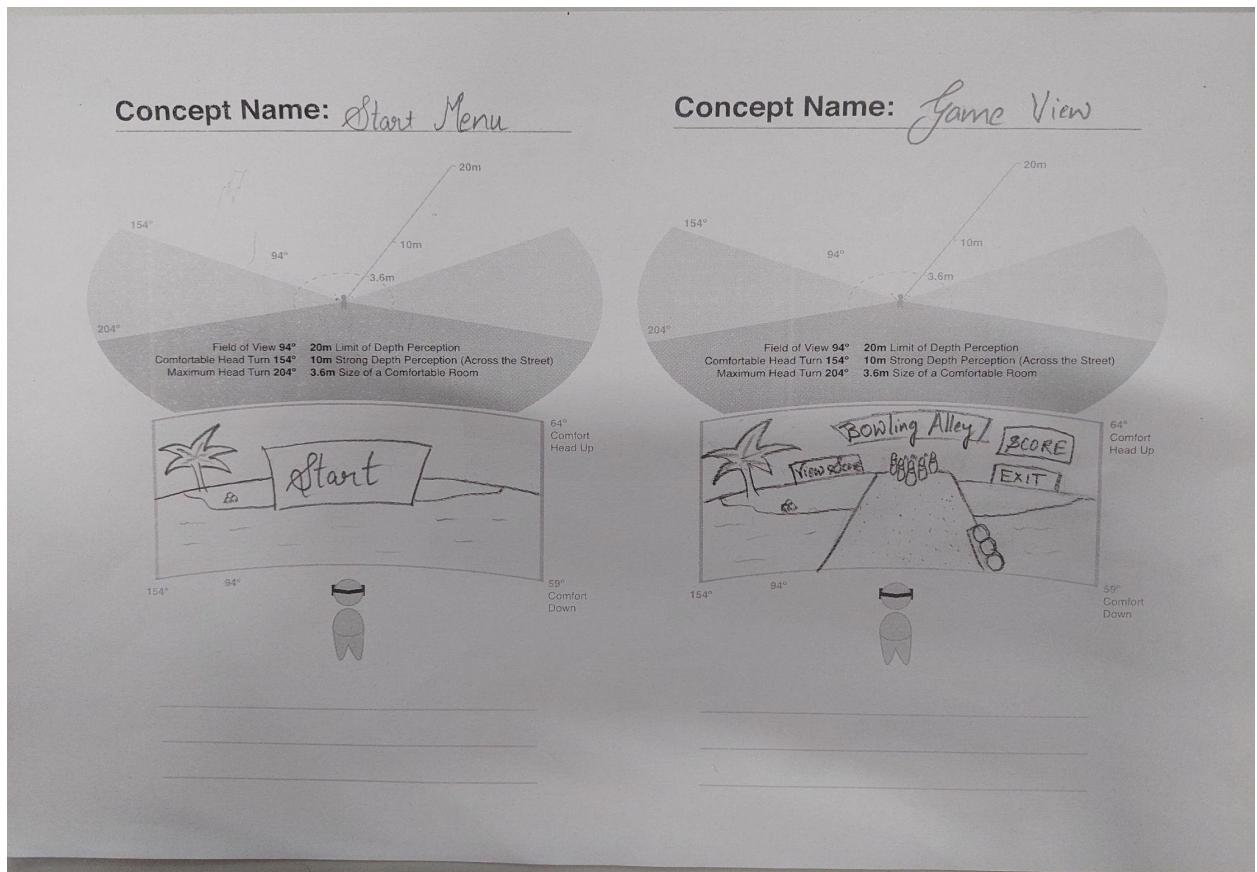
Mockup Screen I



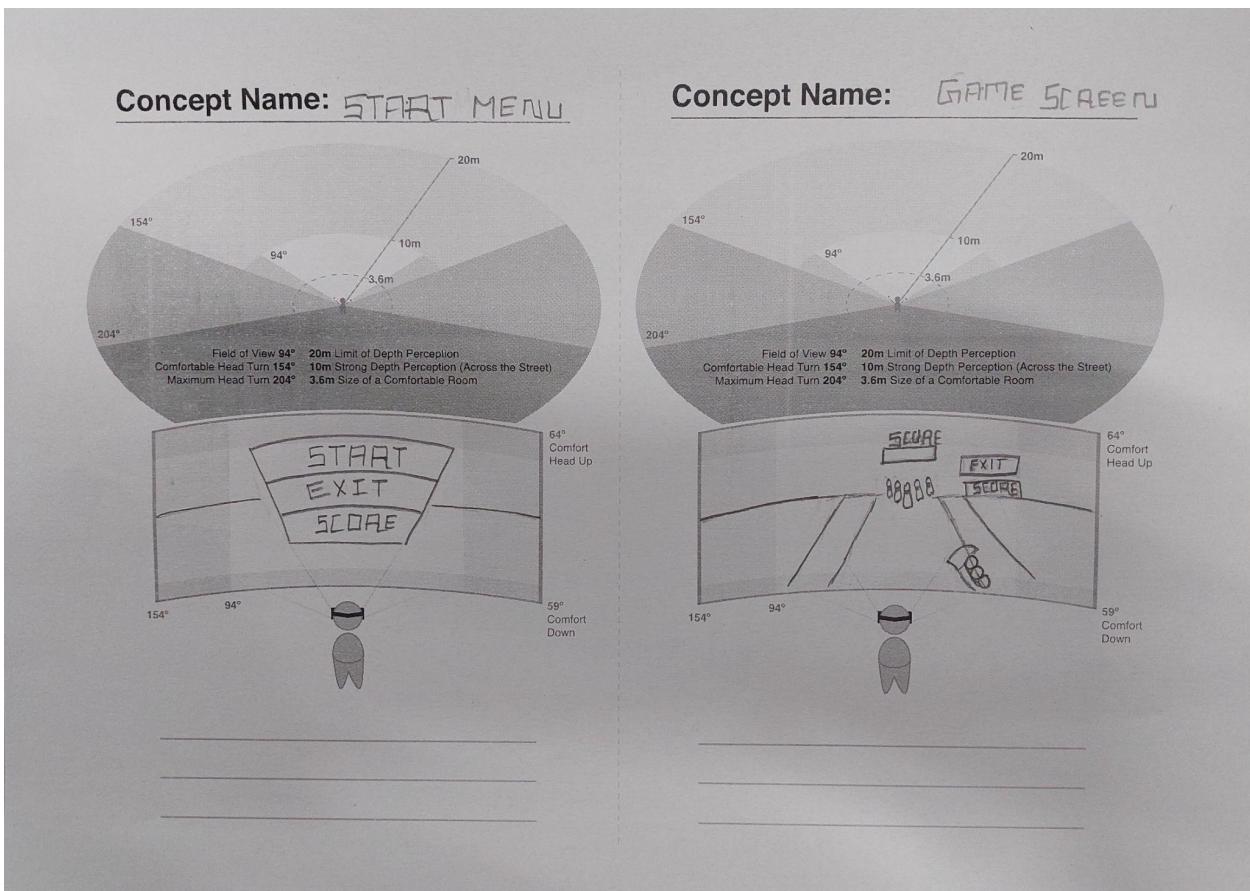
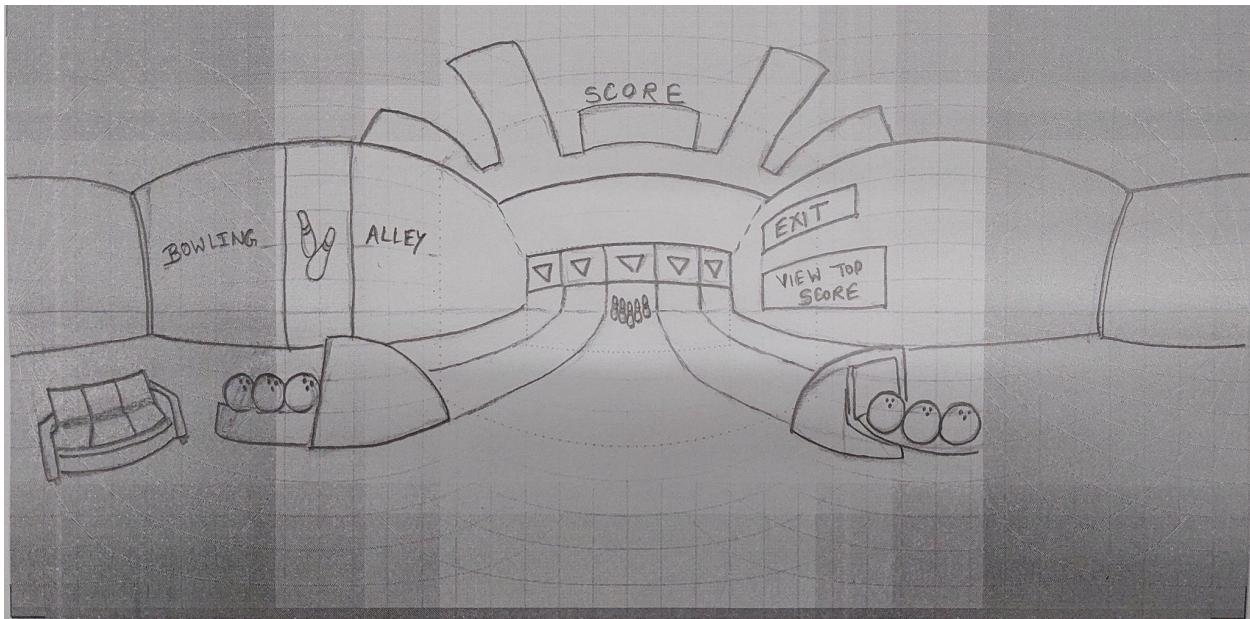


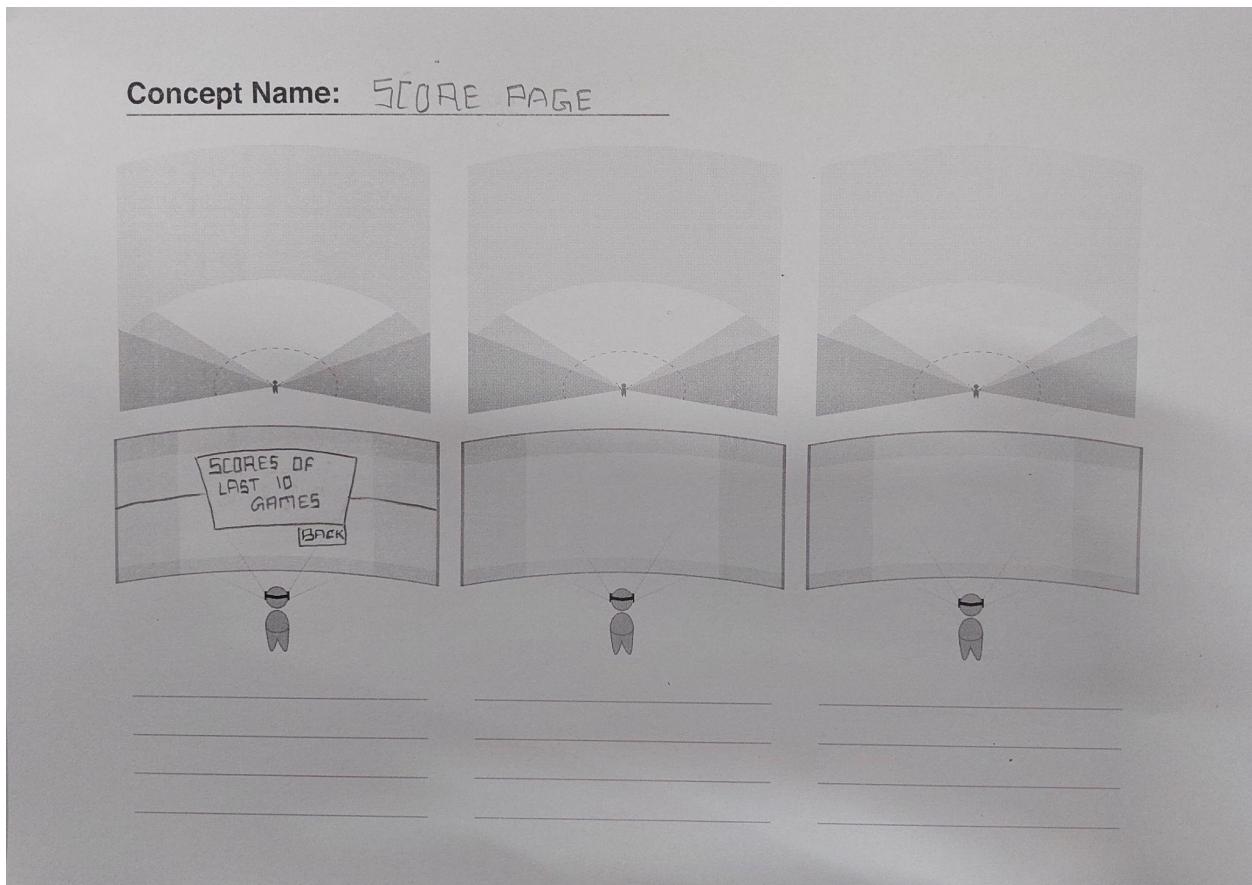
Mockup Screen II



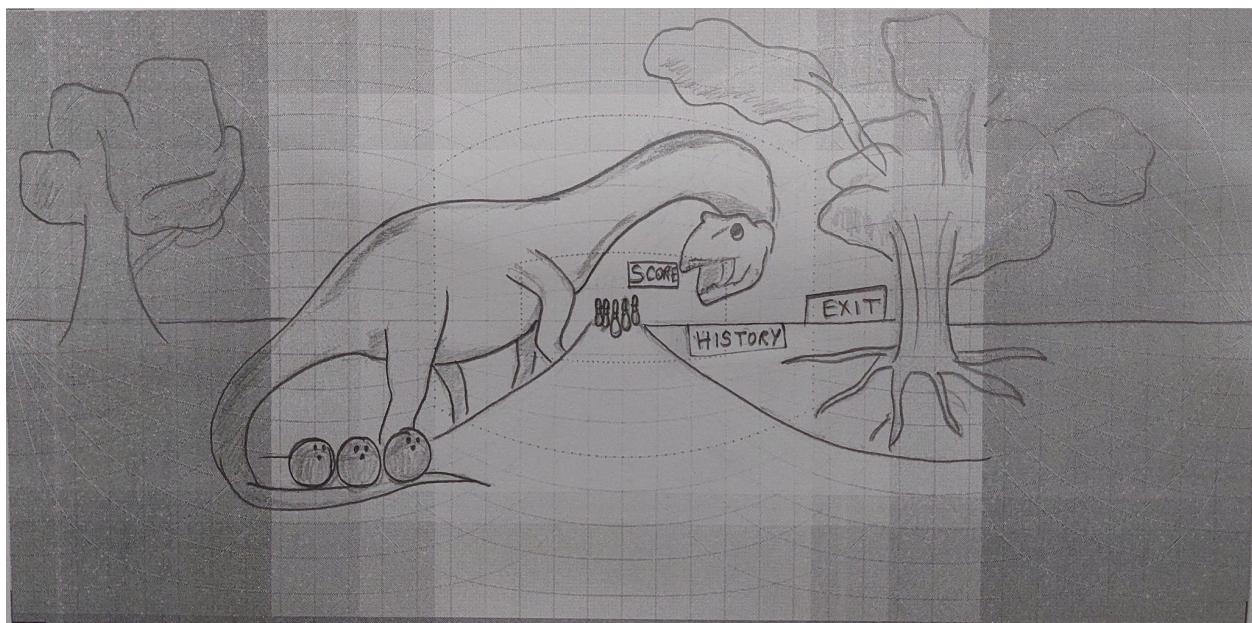


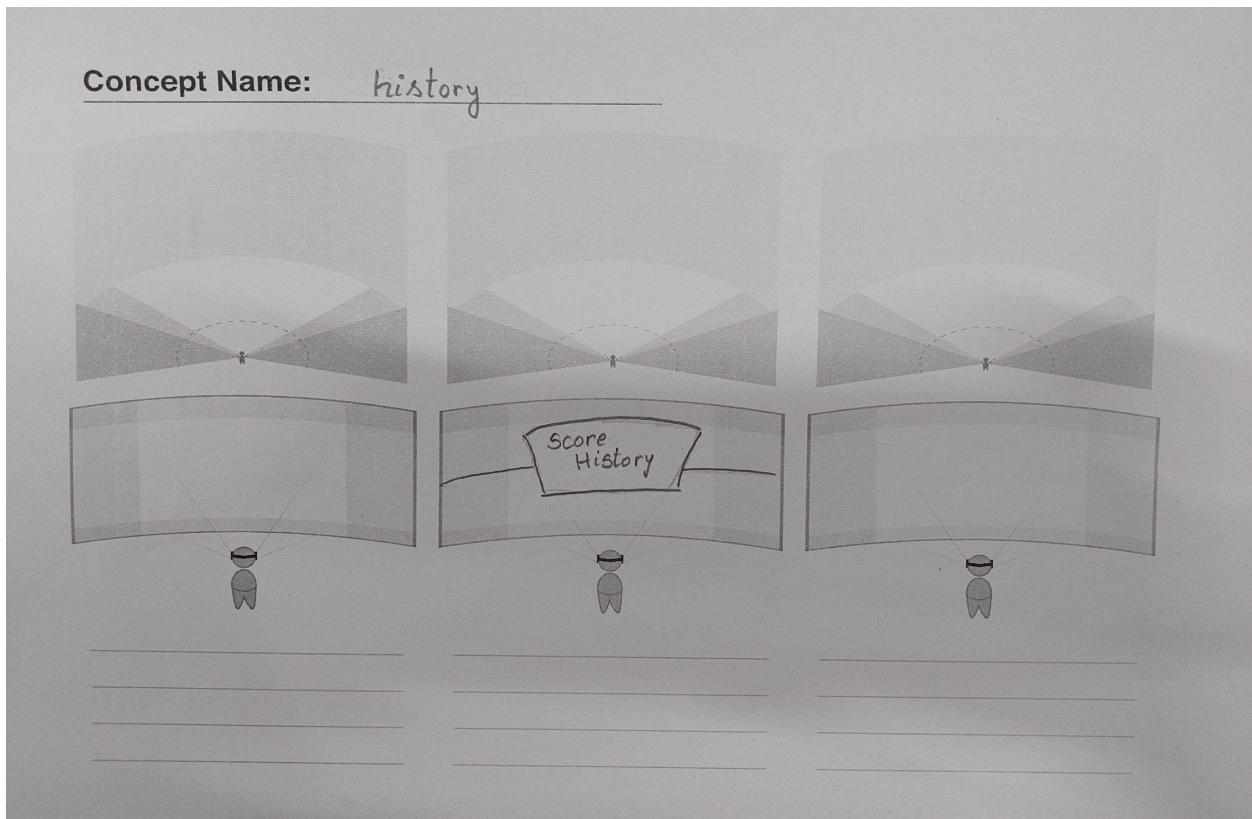
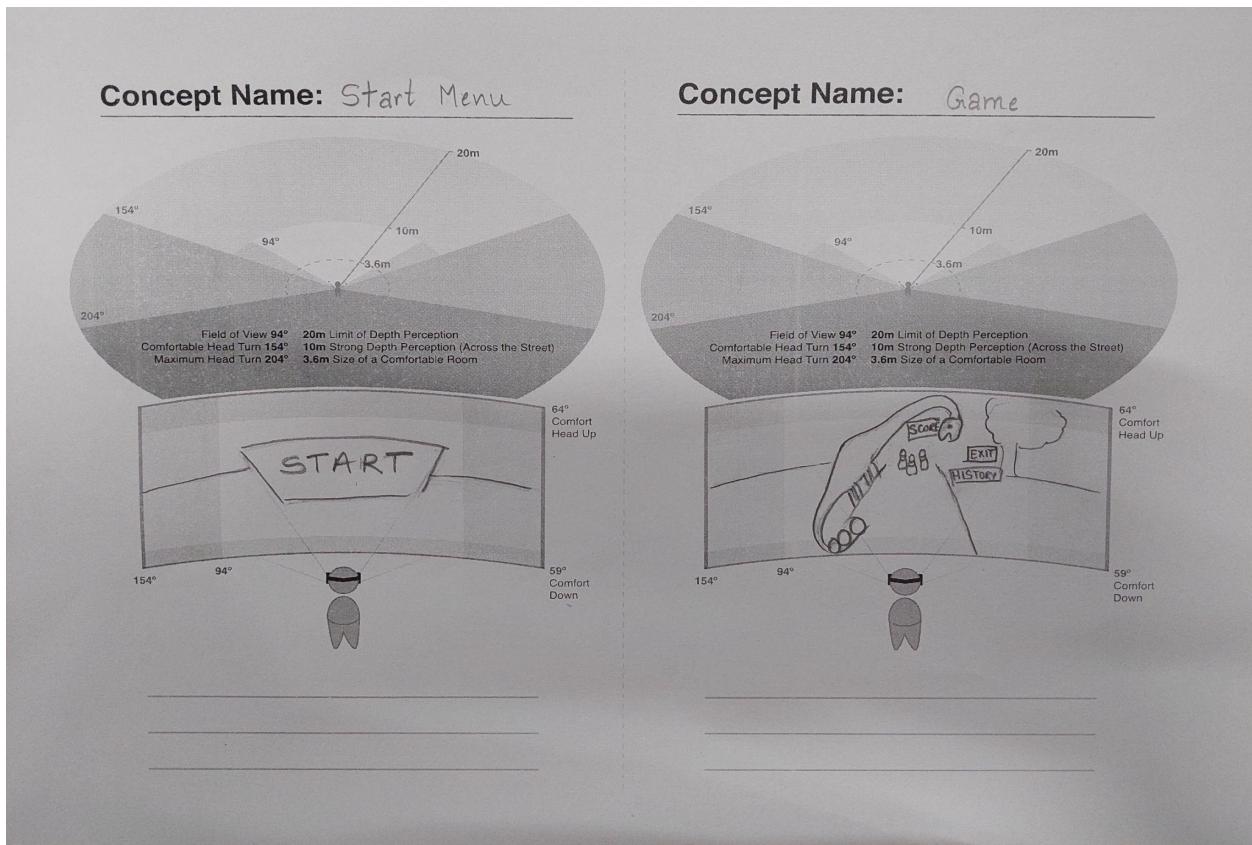
## Mockup Screen III



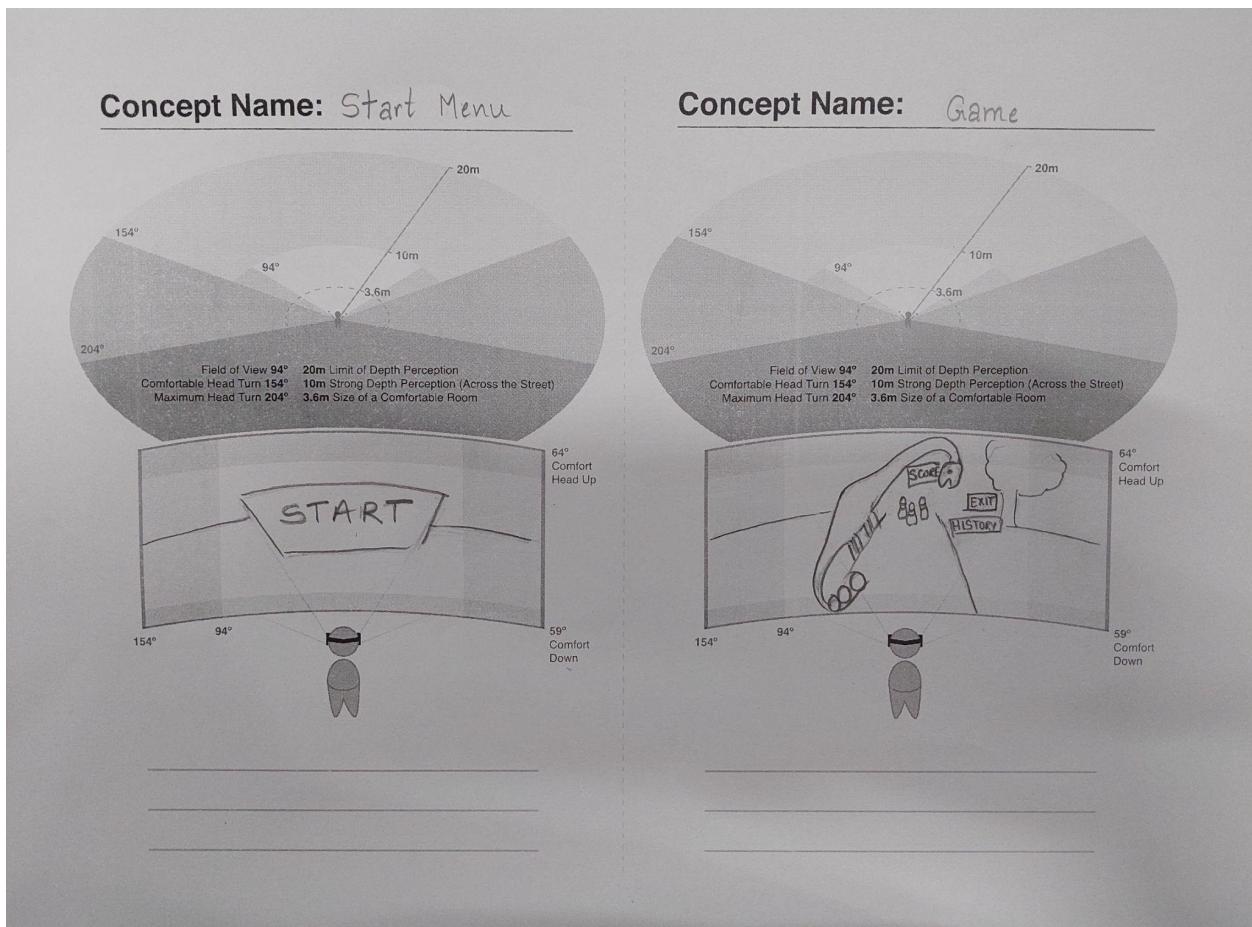
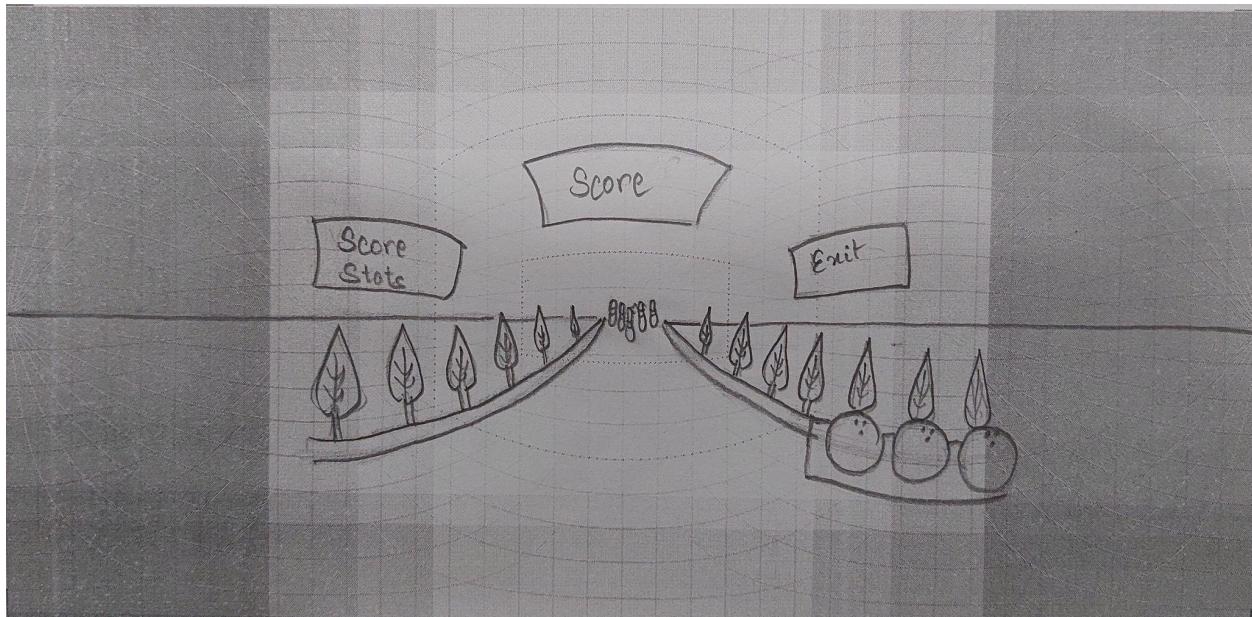


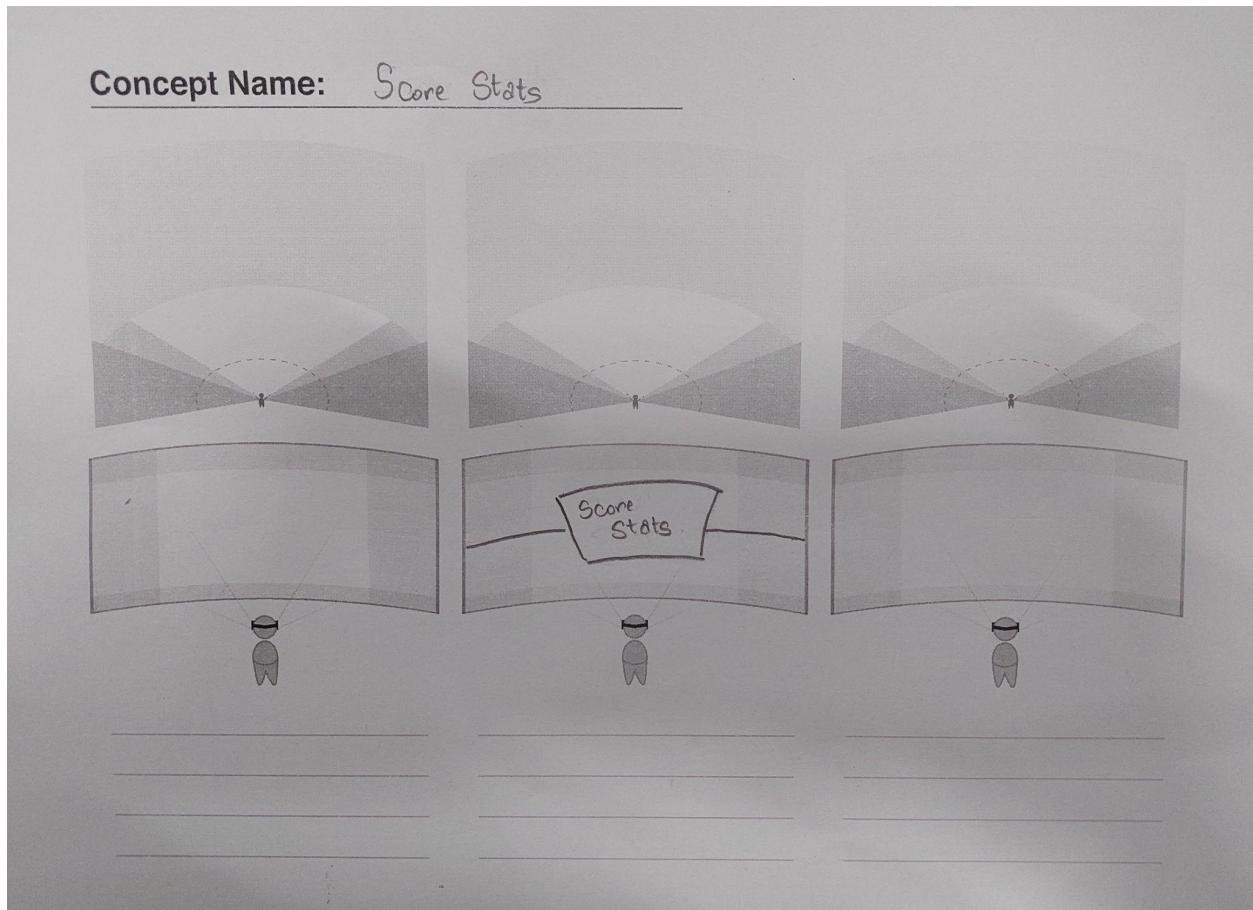
Mockup Screen IV



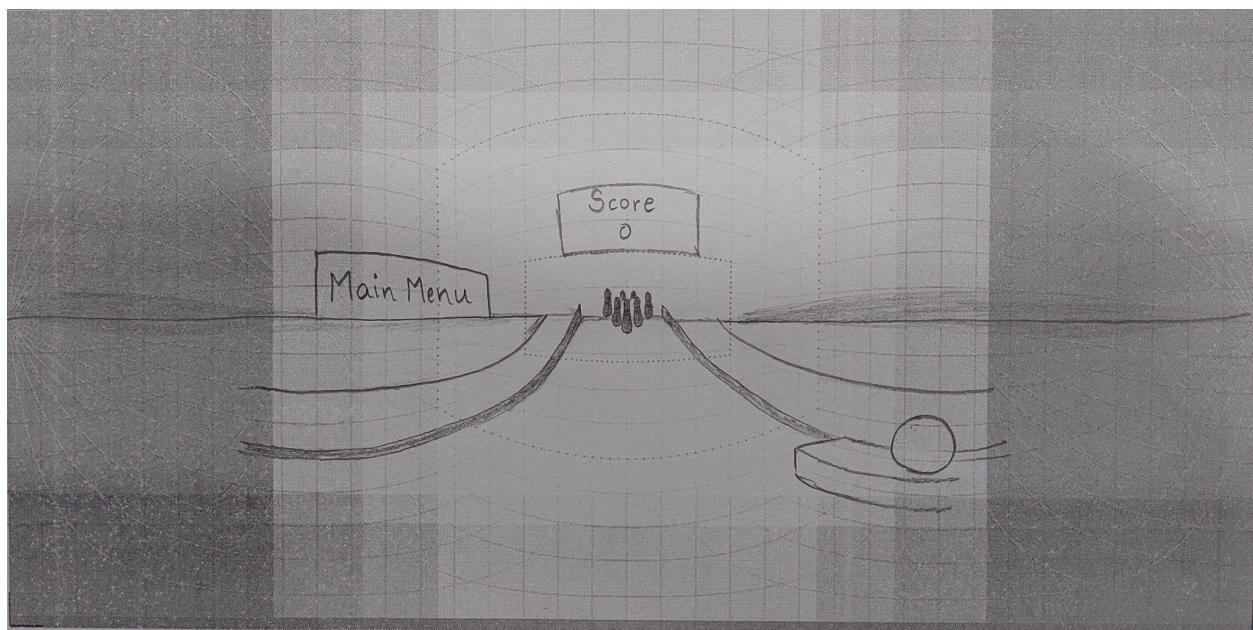


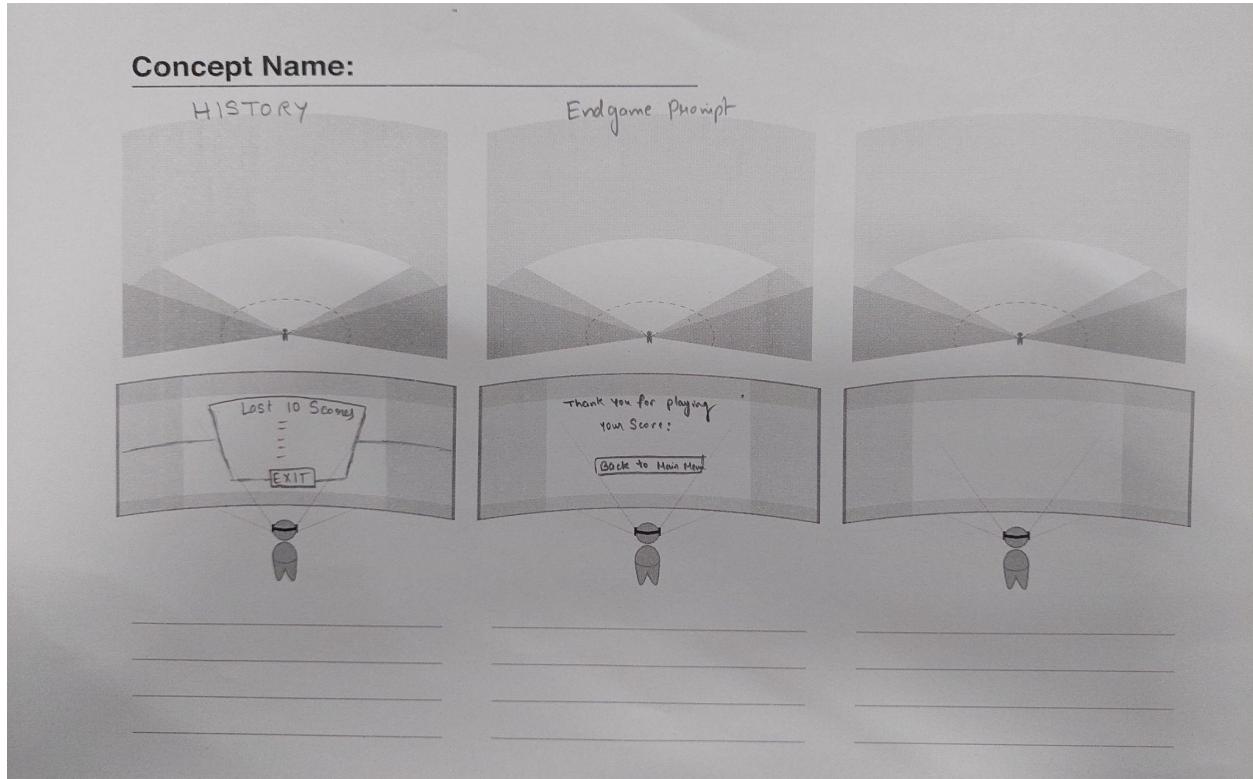
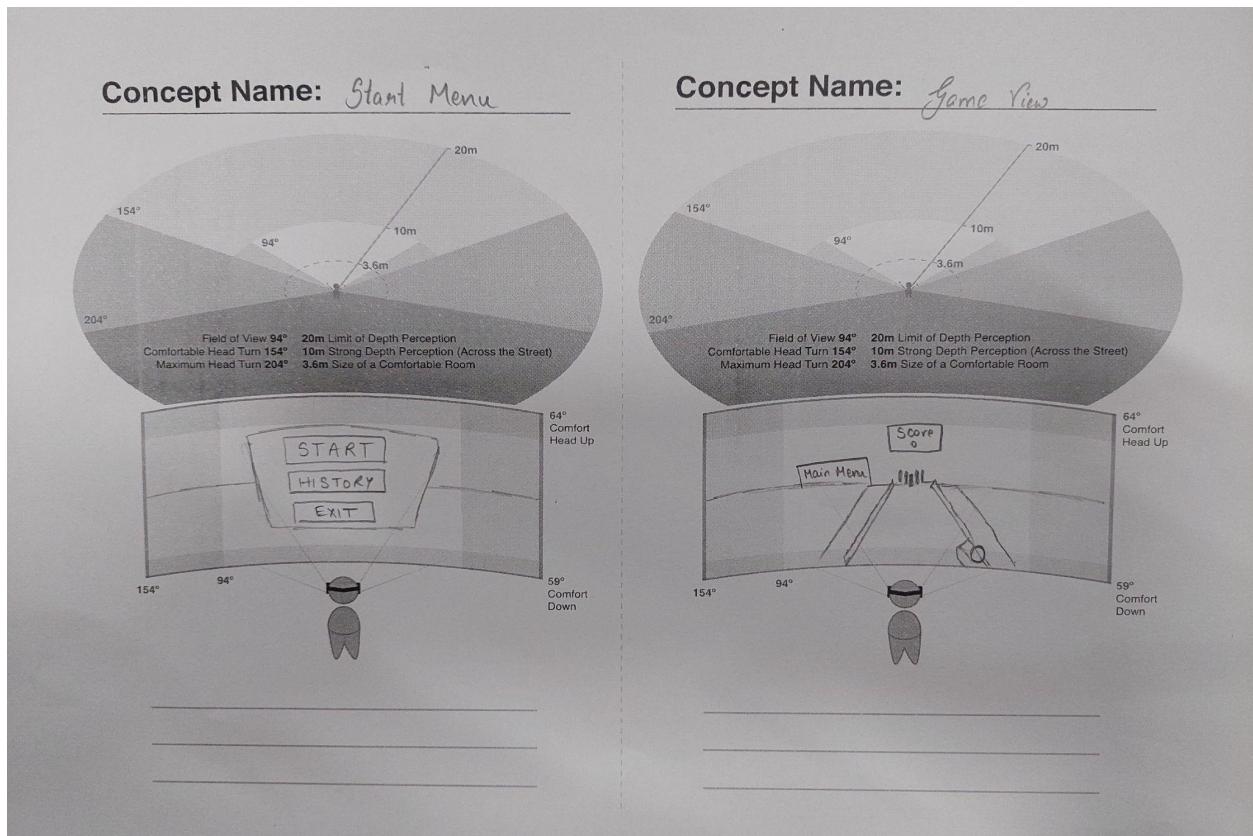
## Mockup Screen V





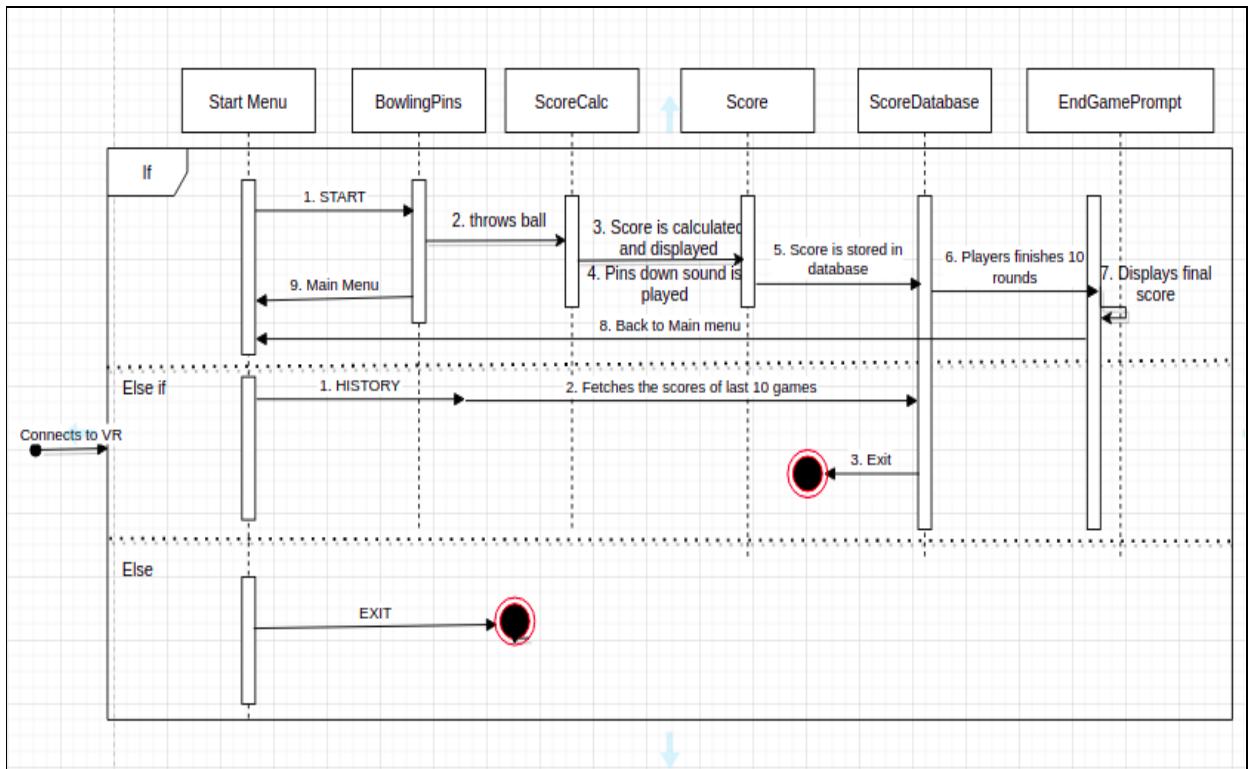
Final Mockup Screen





## Flow of Events

### Sequence Diagram



### Summary of flow

S. NO	EVENT
1.	The user will get the Start Menu with options : Start game, History and Exit.
2.	With the game start, the player will enter the bowling alley with 10 pins and bowl on the lane side.
3.	The player will pick the ball using the controller and throw the ball.
4.	When the ball hits the pins, audio sound is generated and the score is calculated and displayed on the top of the screen. The calculated scores will then be stored in the database.



5.	On clicking the Main menu, the player will go back to the start screen.
6.	History option will display the top 10 scores, all the scores will be fetched from the database.
7.	The endgame prompt will display the final score at the end of the game.
8.	Back to Menu will take the player back to the Start Screen main menu
9.	Exit button will end the game.

## Static Characteristics

**Start Menu:** The menu that appears first to the player while starting the game.

**Bowling Lane:** The lane in the game view on which ball is thrown.

**Score box:** The box in which the score is getting displayed.

**Game Menu:** The main menu button displayed in Game view.

**Background:** The sky and ground in the background.

**Ball Stand:** The stand on which ball is placed.

**End game menu:** The back to menu button in Endgame prompt.

## Dynamic Characteristics

**Pins:** The pins in the bowling alley scene that get knocked down.

**Ball:** The ball that the player throws to knock down the pins.

**Score value:** The score is calculated dynamically and gets updated on the scoreboard.

**History:** The last 10 scores of the player in sorted order.

**Endgame prompt:** The Endgame prompt displayed on the screen that gives the final score of the match.

## References

1. <https://www.youtube.com/watch?v=MX6b7bS8JxY>
2. <https://unity.com/learn>
3. <https://www.youtube.com/watch?v=Z0Z7xc18CcA&list=PLX2vGYjWbI0S9-X2Q021GUtoITqbUBB9B>
4. <https://www.w3schools.com/cs/index.php>
5. - <https://blog.prototypr.io/vr-paper-prototyping-9e1cab6a75f3>
6. <https://www.dropbox.com/s/b81o5ke92fejqiv/VR%20Sketch%20Sheets%20and%20Paper%20Prototype%20Public.pdf?dl=0>
7. - <https://docs.unity3d.com/Manual/UnityAnalyticsBasicSDK.html>
8. - <https://unity3d.com/unity/whatsnew/2020.3.0>