VRCADE

VR multiplayer minigame experience with a neon arcade theme

Oculus VR (Quest + Rift (PC Tethered))

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Chris Hayes - 1017689
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GitHub Repository: https://github.com/JamesSiebert/SAE-21T1-VR.git
Web API GitHub Repository: https://github.com/JamesSiebert/vrcade-api.git
Web API Site: http://vrcade.jamessiebert.com/
Itch.io: https://jamessiebert.itch.io/vrcade

Table of Contents

1.0 Overview

1.1 Game Summary

This game is designed to be an introduction to the possibilities of VR functionality. It is a multiplayer experience, with several mini-games which each hope to show off a different aspect of the capabilities of VR.

The game currently has 5 mini-games for players to enjoy (due to scope issues we will focus on 3 games to begin with and track our progress from there);
- **Air Hockey**
- Vertigo Simulation
- **Basketball machine**
- **Archery**
- Shooter

Our game will be playable on the Oculus Quest and Rift.

1.2 Desired Experience

The player shall have several small experiences to show off what is possible in VR. Each room should provide an individual or a group of friends the chance to experience some part of the VR platform.

1.3 Desired Player Behaviours

Players should experiment with each game. We hope that they will spend time in the Lobby for social interaction and communication with friends and VR strangers, to organise for friendly competition in one of the other rooms or just a cooperative experience.

1.4 Actual Mechanics

1.4.1 Consistent Mechanics

Image mockups for the lobby can be found here:
https://docs.google.com/document/d/14G6moK0Tlgu_46hpvvhCd_GqMWTzt7OkqspZZ54HtRc/
edit?usp=sharing

- VR movement
    - Players will be able to move around in their own room and turn on the spot. This will be relayed to the game. Alternatively players can teleport within the world. There are designated floors which the players can teleport on to ensure that they do not move outside of the play area.
- Grab/ Pick-up / Throw
    - This game allows the player to pick up or grab certain interactables within the game. This can be used within games to hold items or just move them from one location to another. Once the item has been picked up, the player can throw them away or drop them. Objects thrown will be able to travel as the physics engine will allow objects to move through the game world in a consistent manner.
- Avatar selection
    - Players will be able to select their avatar once they log in. They can return to this scene to change their avatar when they would like during the game.
- Selection indicator
    - Whilst the player is not holding an object, there will be a 'laser' to show the player where they are pointing so that they can pick up objects at longer distances or make selection decisions with menus. The colour of this laser may be customisable.
- Voice chat
    - This game has localised voice chat so that players can interact and talk with each other. A stretch goal is to enable the Oculus hand gestures, this will allow people to communicate through sign language as well.
- World Portals
    - Current iteration of the game will have world selection portals to travel to. These portals will teleport players to the different games or back to the lobby.
- Microtransactions
    - To enter some of the games the players will need to have tokens. They will be able to buy the tokens in the lobby and then it will be spent when they go through the World Portal for those games.

1.4.2 Air Hockey Mechanics

Image mocks ups for this game can be found here:
https://docs.google.com/document/d/1z1yzvmzjhf-nJPZ9UbaLI7FKmRFUiV-iZVia3XK8Cm4/edit?usp=sharing

- Puck
    - The Puck in this game will be locked on the Y axis so that it will not fly off the play area.
- Scoring
    - During play, there will be a scoreboard to keep track of which side has let the puck into their goal area. If the puck enters the goal area it will re-instantiate to ensure that the game can continue.
    - The scoreboard will be above the play area.
- Paddles
    - Each player will be able to pick up an Air Hockey Paddle. This paddle will be able to push the puck around and block the puck from going into their goal area.

1.4.3 Basketball Machine

- Basketball Ball
    - This object can be picked up and thrown. If the ball goes through the ring, the player will be awarded points. There will be several balls available from the start.
- Return ramp
    - Once the ball is thrown, the ball will slide down a ramp to return to the player
- Basketball Machine
    - There will be multiple machines in the room so that people can challenge each other. They will use their own machine to increase their score.
- Timer
    - There will be a countdown timer for when the players challenge each other.
- Score board
    - There will be a scoreboard which will track each player's score and provide information for the competition.

1.4.4 Archery

- GDD for this minigame can be found here
https://docs.google.com/document/d/1Rh20WdVhpxKphofx0c9S7Xivrr943nOlQ8CK698AkBA/edit?usp=sharing

1.5 Controls

Explain the controls of your game. Consider using diagrams or tables.

L Thumb - TBC

X - Teleport

Y - Hand Menu

R Thumb - TBC

B - TBC

A - Teleport

<-Trigger->

<----------- Grab ----------->
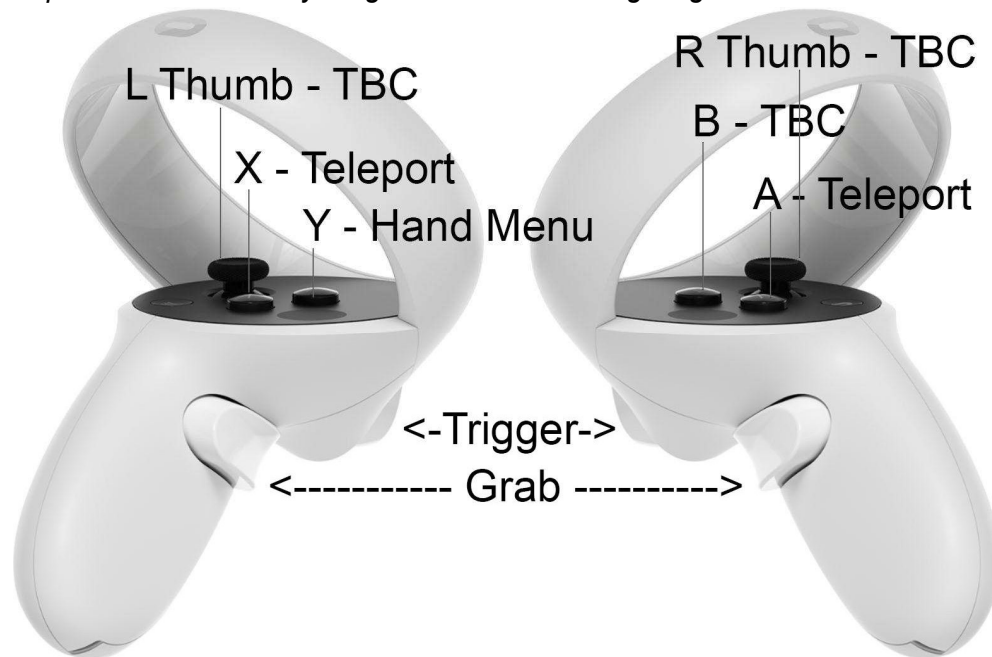
Teleport + rotate in 1 step
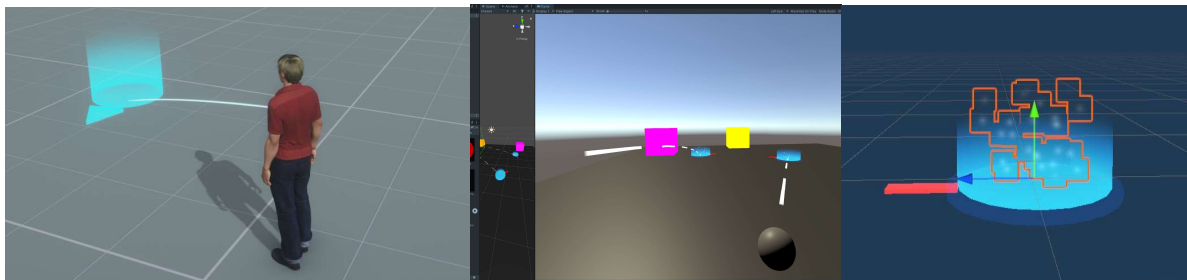
When the teleporter is activated, the arrow will be facing forward but if the user turns the controller whale holding the teleport button the arrow rotates about the teleport point.
When the teleport button is released the player is teleported to that location at the rotation indicated by the arrow.

1.6 Screen Mockups
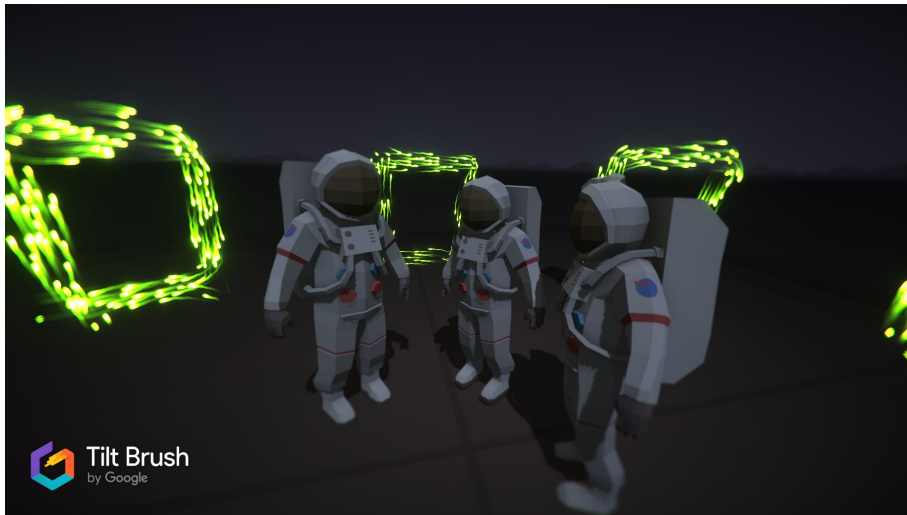
Concept design of Lobby
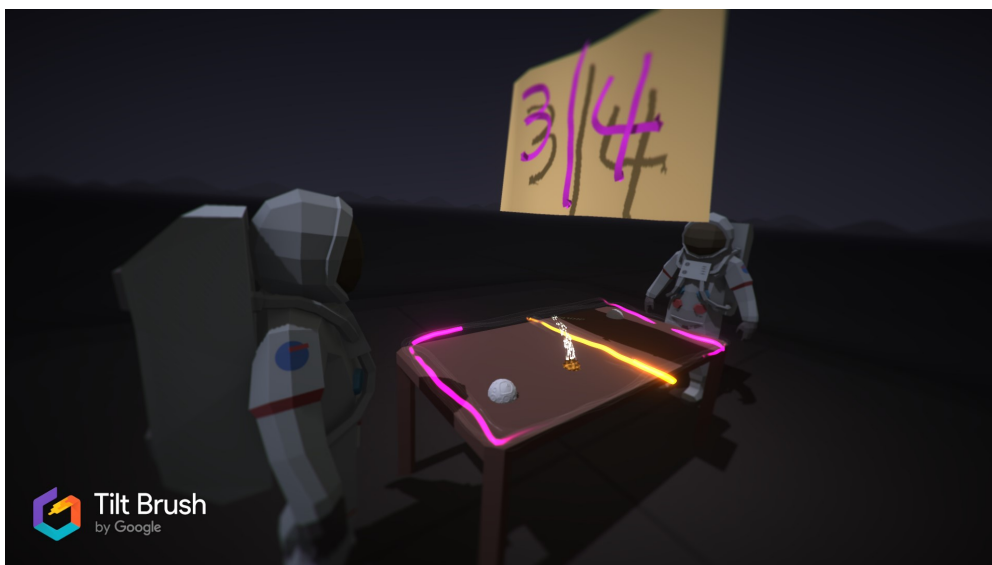
Concept design of Air Hockey game
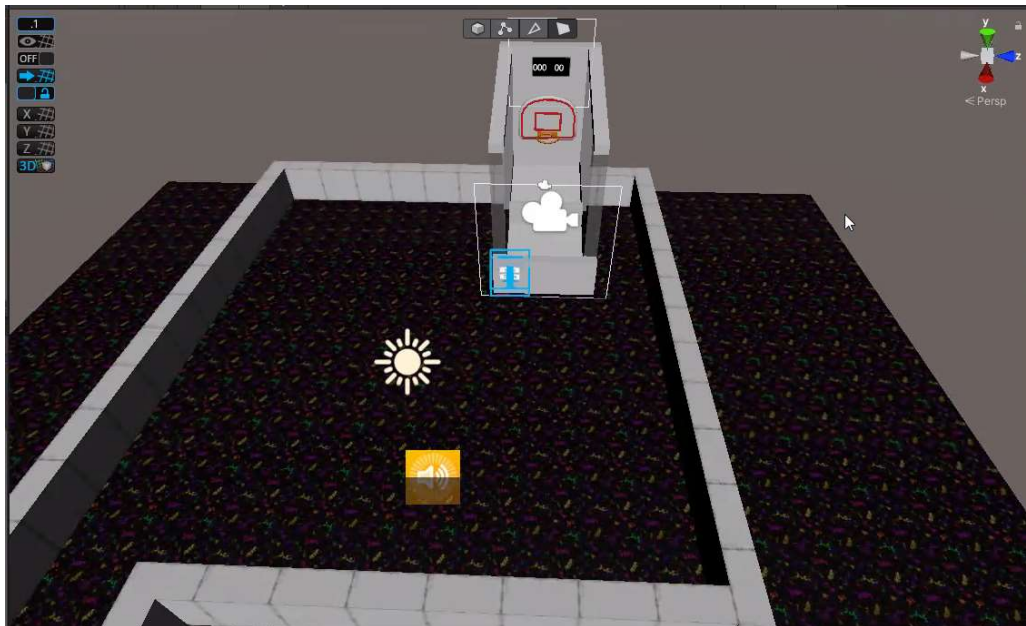
First draft of Basketball Machine builds

(blueprints found here: https://drive.google.com/file/d/1P3lBtfWpIT6YI704uqHZocUgaY6Wcn-m/view?usp=sharing)
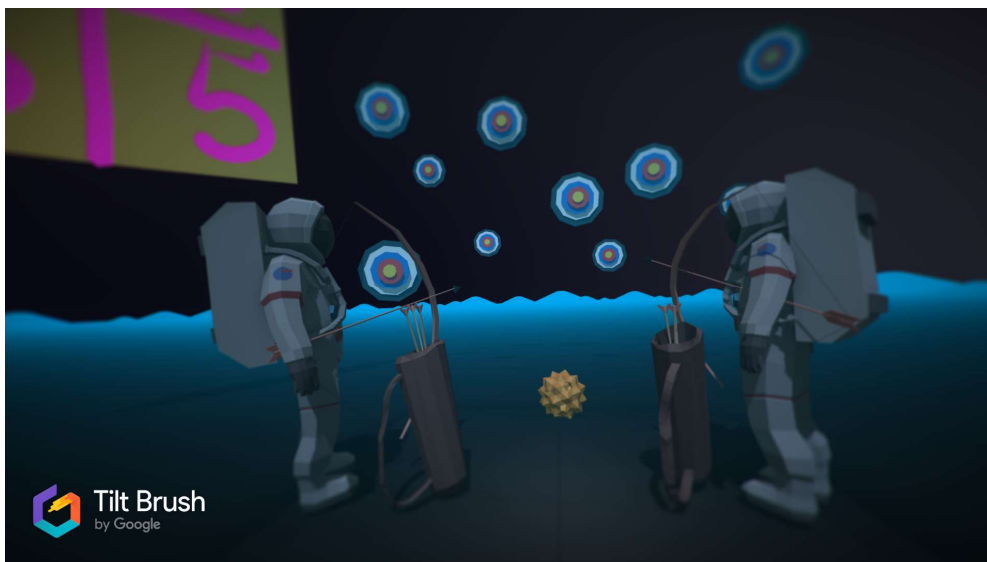
Concept design of Archery game
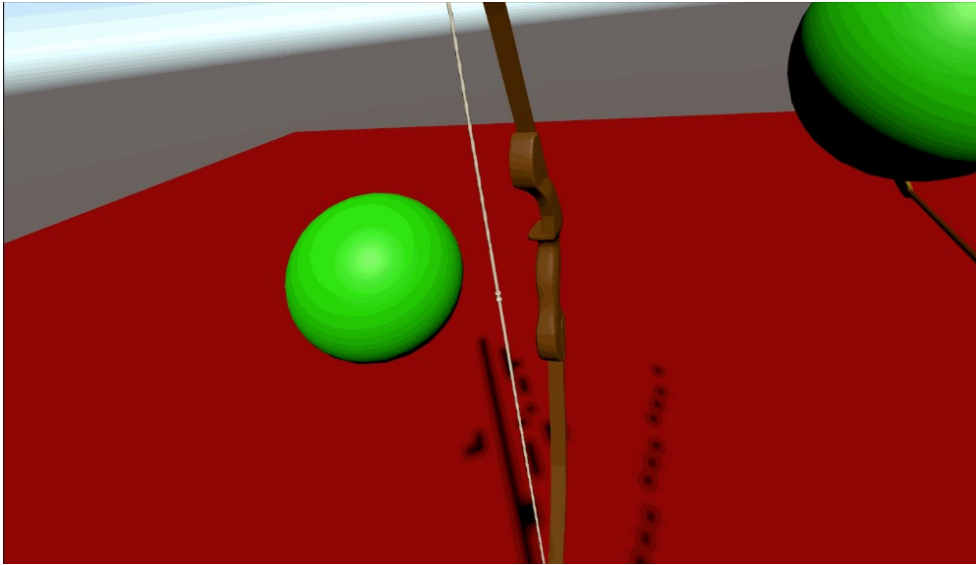
Early draft build of Archery game

2.0 Style and Feel

2.1 Summary of Desired Audiovisual Style

This game will have a futuristic, neon theme. The music will be synthwave/ chill and background music. Within each game there will be sound effects to denote when individuals make scores or select items. These sounds will be louder than the background music and provide quick feedback to the player.

We will disable anti-aliasing to ensure that our neon lighting does not consume too much of the processing power of the Oculus Quest 1 platform.

2.2 Desired Visual Style

(*Tron*)

Whilst we do not want to have the player characters keep to the look, we are looking to have a minimalist neon theme for the rooms that you play in. Each room should have a similar design to each other.

(*Synthwave Planet Retro Wave wallpaper*)

We will try to have our rooms have a similar grid design for the neon lights. Our skybox will also contain stars, to provide a feeling of being in a futuristic space arcade. Due to the limitations of the Oculus Quest 1, we will not have lots of light effects or animations in the background so we will keep these styles in the 'retro' theme.

(*NVIDIA VR Funhouse*)

We are using a similar style of arcade play as NVIDIA VR Funhouse. In particular we are having the games separated into separate scenes, and also have smaller experiences each to be explored one at a time.

2.3 Desired Audio Style

To fit in with our futuristic neon theme we are looking to have a synthwave soundtrack, with short sound effects to match some of the events on the screen. In particular we are looking at the below for inspiration for our game:
M.O.O.N - Dust
https://www.youtube.com/watch?v=phL6fDiYNJk
New Touch - AIRGLOW
https://www.youtube.com/watch?v=r_Q15eu03z8

2.4 Camera Controls

VR Headset. The player will be able to look around the room with their headset which will modify the camera. You can also teleport around the rooms, and between rooms.

3.0 Game Flow

3.1 The Game Minute

The player logs into the game and is provided a chance to set up their username and avatar. From there they will go to the lobby. Here they can hang out and talk to other players in the Lobby. There will be one side of the room with a selection of portals that they can choose to go through. If they do not have any tokens on their account they can walk up to an ATM machine and buy additional tokens.

Once they have the required tokens they can enter the room of their choice. Here they will have the chance to compete against other players at the chosen game. They can talk and interact with each other and compete numerous times whilst they are in that room.

3.2 Game Flow Diagram

Overview
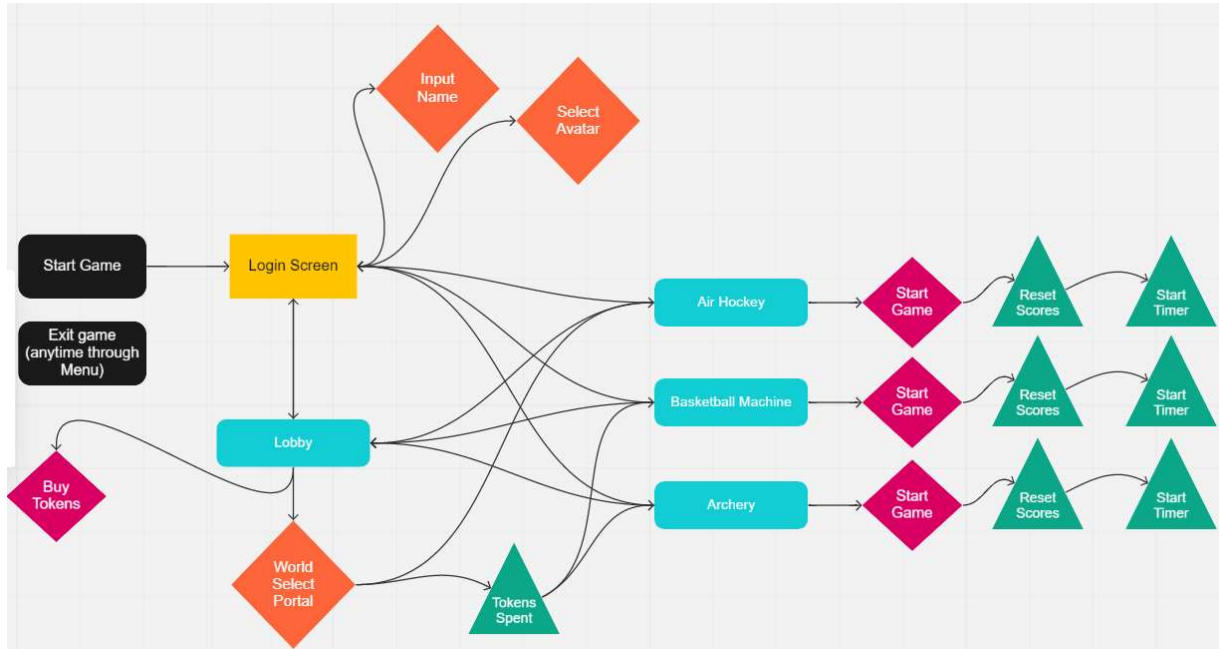
[Login Scene - Image Link](#)

[Home Scene - Image Link](#)

Home Scene – Game Flow Diagram

```
                    ┌─────────────────────┐
                    │       Start         │
                    │ Player enters scene │
                    └─────────────────────┘
                              │
   ┌──────────────────────────┼──────────────────────────────────────┐
   │                          │                                       │
┌──────────────────────────────────────────────────────────────────────┐
│                          Player Choice                                 │
└──────────────────────────────────────────────────────────────────────┘
   │                          │                                       │
┌────────────────────┐  ┌────────────────────┐  ┌───────────────────────────────┐
│ Player selects     │  │ Player uses scene  │  │ Player teleports to a new     │
│ avatar             │  │ menu               │  │ position                      │
└────────────────────┘  └────────────────────┘  └───────────────────────────────┘
   │         │                  │
┌──────────┐ ┌──────────┐  ┌────────────────────┐
│ Previous │ │ Next     │  │ Player presses     │
│ button   │ │ button   │  │ enter              │
│ pressed  │ │ pressed  │  └────────────────────┘
└──────────┘ └──────────┘           │
   │            │                   │
┌──────────┐ ┌──────────┐  ┌──────────────────────────────┐
│ Avatar   │ │ Avatar   │  │ END                          │
│ changed  │ │ changed  │  │ Server - Room Change Initiated│
│ (- 1)    │ │ (+ 1)    │  │ Scene = Selected Room        │
└──────────┘ └──────────┘  └──────────────────────────────┘
```
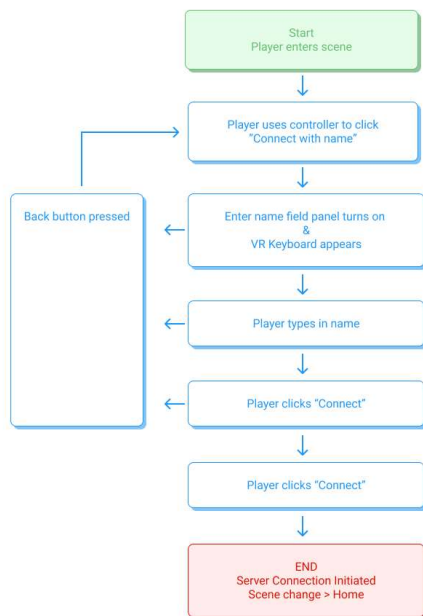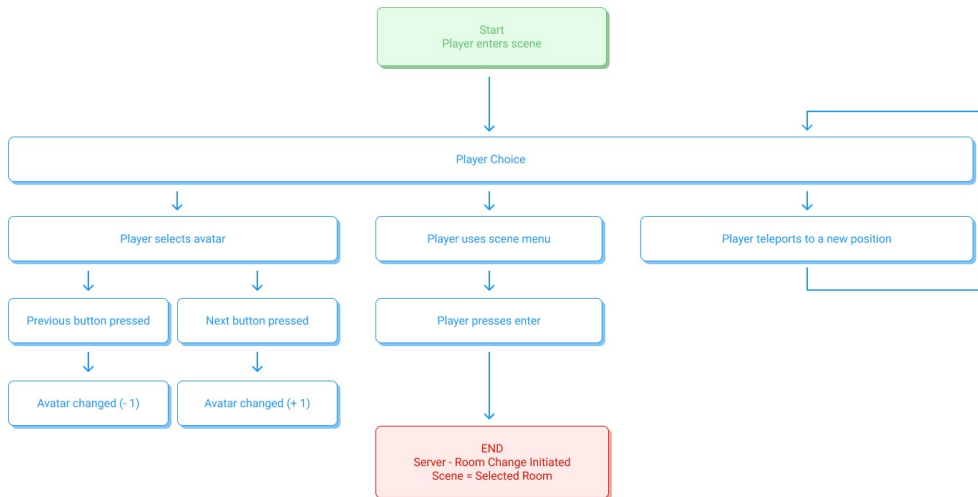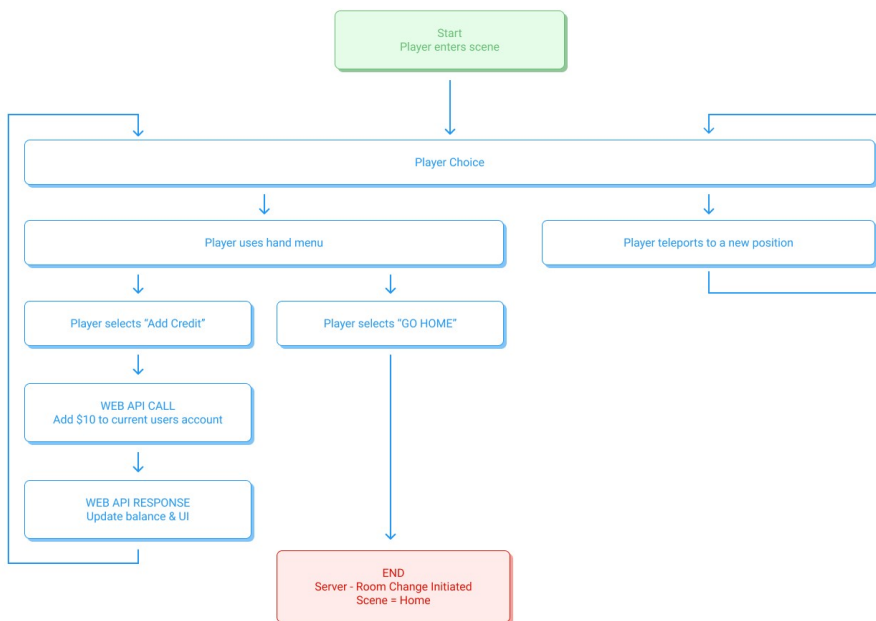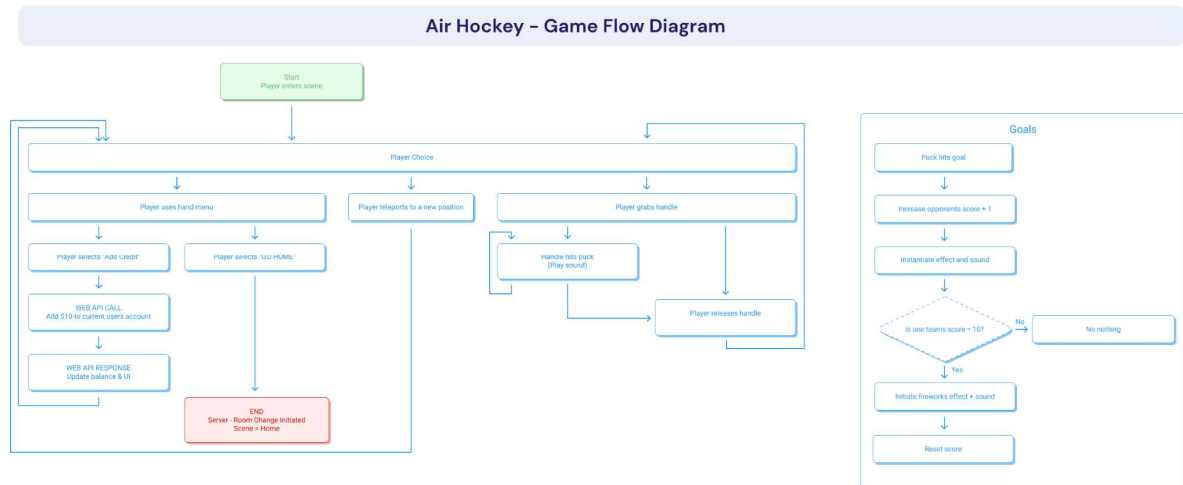
[Lobby - Image Link](#)

Lobby – Game Flow Diagram

```
                    ┌─────────────────────┐
                    │       Start         │
                    │ Player enters scene │
                    └─────────────────────┘
                              │
   ┌──────────────────────────┼──────────────────────────────────────┐
   │                          │                                       │
┌──────────────────────────────────────────────────────────────────────┐
│                          Player Choice                                 │
└──────────────────────────────────────────────────────────────────────┘
   │                          │                                       │
┌──────────────────────────────────┐              ┌───────────────────────────────┐
│ Player uses hand menu            │              │ Player teleports to a new     │
└──────────────────────────────────┘              │ position                      │
   │                    │                          └───────────────────────────────┘
┌────────────────────┐ ┌────────────────────┐
│ Player selects     │ │ Player selects     │
│ "Add Credit"       │ │ "GO HOME"          │
└────────────────────┘ └────────────────────┘
   │                          │
┌────────────────────────┐    │
│ WEB API CALL           │    │
│ Add $10 to current     │    │
│ users account          │    │
└────────────────────────┘    │
   │                          │
┌────────────────────────┐    │
│ WEB API RESPONSE       │    │
│ Update balance & UI    │    │
└────────────────────────┘    │
                              │
                   ┌──────────────────────────────┐
                   │ END                          │
                   │ Server - Room Change Initiated│
                   │ Scene = Home                 │
                   └──────────────────────────────┘
```
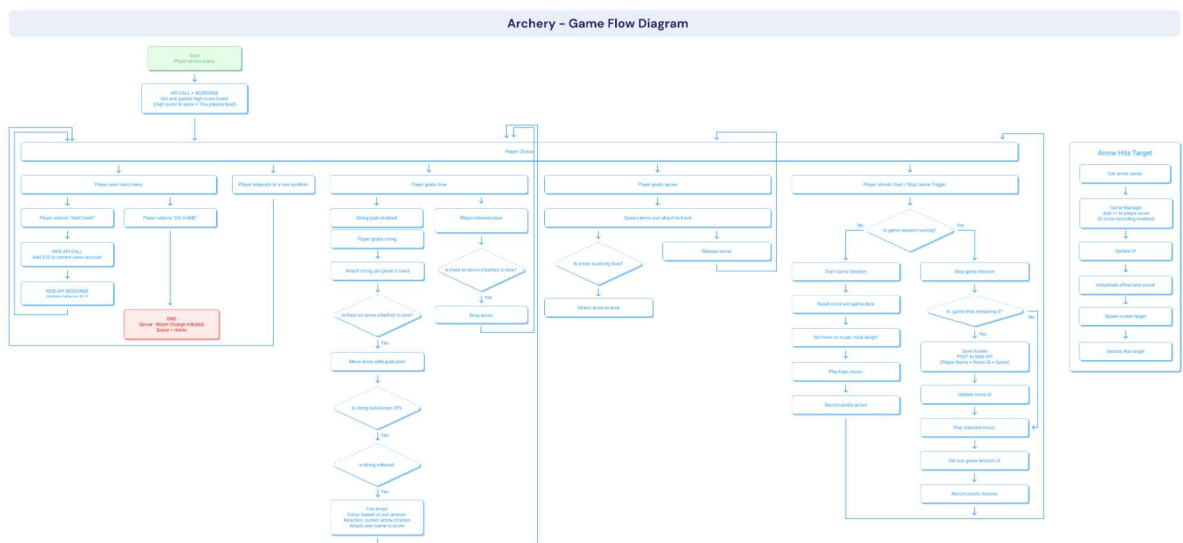
Air Hockey - Image Link

Air Hockey – Game Flow Diagram

Archery - Image Link

Archery – Game Flow Diagram

4.0 Target Audience

The key audience that we are targeting are individuals who are new to VR/ have recently purchased a VR headset, or developers who wish to see our skills developing with the Oculus Quest / Rift. Our game avoids any overt leaning towards gender, and includes several player avatars that would be associated more closely with male, female or neither.

The key distribution platform for our product is *itch.io* and we can use this site to show off our skills to other developers, or to our friends. Furthermore, this project will be shared on our individual social media, and be included in our portfolios. In particular we can use the IGDA Sydney Facebook page and their social event, *Beer & Pixels*, to market the game to other developers within Sydney.

All marketing and outreach for this game will only cost us time, and will not have a financial cost or burden on us. As a product developed for our class, it may be used for promotional material for SAE, but this is unlikely to convert to downloads of our game directly.

5.0 Monetisation model

VRcade has an inbuilt monetisation model. For this project whenever someone is in a room other than the Login or Home scenes, they will lose 10 cents periodically over time. At any stage the player can add more money onto their account. Should they run low, a warning will display in their vision and they can use their left hand controller to access the menu.

For the current project, this is only a placeholder and does not link to financial accounts. The students who have made this project have not profited from VRcade as a part of our coursework.

Licencing / Legal

Unity
https://unity3d.com/legal/terms-of-service

Laravel
https://laravel-guide.readthedocs.io/en/latest/license/
Licence Type: MIT

VR Keys by The Campfire Union
https://assetstore.unity.com/packages/tools/input-management/vrkeys-99222
Licence Type: Extension Asset
Unity EULA - James - Free Asset

Sherbb's Particle Collection by
https://assetstore.unity.com/packages/vfx/particles/sherbb-s-particle-collection-170798
Licence Type: Extension Asset
Unity EULA James - Free Asset

Photon Pun2 by Exit Games
https://assetstore.unity.com/packages/tools/network/pun-2-free-119922
Licence Type: Extension Asset
Unity EULA - James - Free Asset

Photon Voice 2 by Exit Games
https://assetstore.unity.com/packages/tools/audio/photon-voice-2-130518
Licence Type: Extension Asset
Unity EULA - James - Free Asset

Retro Synthwave Music Pack by FicusProsound
https://assetstore.unity.com/packages/audio/music/electronic/retro-synthwave-music-pack-161716
Licence Type: Site
Unity EULA - single entity - James Paid

Sci-fi Neon Cyber Room kitbash 2 by Alex Merqury
https://assetstore.unity.com/packages/3d/environments/sci-fi/sci-fi-neon-cyber-room-kitbash-2-129951
Licence Type: Site
Unity EULA - single entity - James Paid

The Cougar by A Drop A Day
https://www.youtube.com/watch?v=36PMXxYHEgk
Licence Type: Creative Commons

Far Apart by Airglow

https://soundcloud.com/airglowsounds/far-apart

Licence Type: Creative Commons

New Touch by Airglow

https://soundcloud.com/airglowsounds/new-touch

Licence Type: Creative Commons

Synthwave Dreams 2020 by Aries Beats

https://www.youtube.com/watch?v=xeIYMkj8S_g

Licence Type: Creative Commons

Back in Time by Top Flow Production

https://www.youtube.com/watch?v=XpymnemK1O0

Licence Type: Creative Commons

User Friendly (future mix) by Lee Rosevere

https://www.youtube.com/watch?v=csIbvslrP2I

Licence Type: Creative Commons

Sunday Morning Synthwave by Quinn Payne

https://soundcloud.com/troubadourmonk/sunday-morning-synthwave

Licence Type: Creative Commons

Rise of the Star by Top Flow Production

https://soundcloud.com/top-flow-official/no-copyright-music-vlog-music-rise-of-the-star-synthwave-electronica-by-top-flow-production

Licence Type: Creative Commons

Fore more info on different licences:

https://choosealicense.com/

VRCADE Privacy Policy

Last updated: 29/04/2021

VRCADE ("us", "we", or "our") operates VRCADE (the "Game"). This page informs you of our policies regarding the collection, use and disclosure of Personal Information we receive from users of the Game.

We use your Personal Information only for providing and improving the Game. By using the Game, you agree to the collection and use of information in accordance with this policy.

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While using our Game, we may ask you to provide us with certain personally identifiable information that can be used to contact or identify you. Personally identifiable information may include, but is not limited to your name.

Log Data

Like many game operators, we collect information that your game sends whenever you visit our Game ("Log Data").

This Log Data may include information such as your username, game scores, credit balance, balance top ups, the time and date of your visit, the time spent in rooms and other statistics.

In addition, we may use third party services such as Google Sheets and Microsoft Excel to analyze this data.

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The security of your Personal Information is important to us, but remember that no method of transmission over the Internet, or method of electronic storage, is 100% secure. While we strive to use commercially acceptable means to protect your Personal Information, we cannot guarantee its absolute security.

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