

**CS6334 – Virtual Reality**  
**Final Prototype**  
**ReadMe Document**  
**Team 4 – S.A.D.V.R.**

This document explains the Unity scene that contains the final prototype for our project **S.A.D.V.R. (Spacecraft Analysis and Diagnosis using Virtual Reality)**.

**Unity Scene :**

There are two scenes in our final prototype. The first scene is called the “StartScene.unity”. This scene contains the game start menu which is loaded first when an user starts the game. When the user clicks on “Start Game” button on the menu, then the “Gameplay.unity” scene is loaded. This scene contains the virtual environment and the entire implementation of our game.

**Interaction Techniques:**

The final prototype utilizes the following interaction techniques:

**1. Moving left, right, forward and backward**

The user can move left, right, forward and backward using the bluetooth joystick.

**2. Teleportation**

The user can teleport to various levels in the game by going to the teleportation room in the spacecraft. Each teleportation room has a green button. When the user clicks on this green button using the bluetooth controller they can transport to a different part of the spacecraft.

**3. Object Manipulation**

There are few interactable objects provided in the scene (such as wire, plier, tools etc). A user can grab and drop an object by pressing “X” button on the bluetooth controller. Once an object is picked, the user can move it around by titling the Android phone or using the controller. There are various tasks in the game. Each task needs to be completed using an object. The tasks can be completed by pressing the “A” button on the bluetooth controller.

### **Android Phone and Controller:**

To use the final prototype, the user needs to use an Android phone and a bluetooth controller. The following steps must be followed:

1. Build the scene “StartScene.unity” and “Gameplay.unity” in Unity and create a “.apk” file for Android.
2. Install the “.apk” file on the Android phone.
3. Connect the bluetooth controller to the Android phone using Bluetooth.
4. The Android phone must be connected to the internet.
5. Start the VR application on the Android phone.
6. Put on the VR Cardboard and begin interacting with the virtual environment using the controller, keyboard and by titling the phone.

### **Gameplay Instructions/Flow:**

We are using the bluetooth controller for the final prototype.

1. The game starts with a start menu where the player can select to start the game.
2. Clicking on "Start Game" takes the player to Level 1, where they spawn.
3. Upon spawning, an audio cue plays to indicate the start of the game.
4. The final prototype also implements the multiplayer feature. Multiple players can play the game together. To play in the multiplayer mode, other players can join the game once the first player starts the game.
5. There are tools available for the player to use, which can be picked and dropped using the “X” button on the bluetooth controller.

6. To open doors, the player must press the "A" key, and the door will automatically close after 3 seconds.
7. One of the tasks in Level 1 is to fix some damaged wires. To do so, the player needs to grab the plier, find the damaged wires, and then long press the "A" button on the controller while aiming at the damaged wires. While the user is fixing the wires, a green buffer loading spinner can be seen. It takes 3 seconds to fix the wires, and the damage will no longer be visible.
8. While moving around the spacecraft, the player can see the Earth rotating from the window, but this is a non-interactable object.
9. After fixing the wires, the player should drop the pliers.
10. The players then need to put off a fire on Level 1 using the fire extinguisher. To put off the fire, the user needs to long press on the "A" button on the controller.
11. Then, the user must check the dashboard, which displays all the remaining tasks. The dashboard can also be turned on by clicking on the "A" button on the controller.
12. The users can also check the tasks that are completed and remaining using the task manager. The task manager can be opened through the in-game menu, which can be opened by clicking on the "OK" button.
13. To go back to the main room, the player must go through the automatic door.
14. There is a teleportation compartment that allows the player to move to another part of the spacecraft by pressing the green arrow symbol button with "A" button. This takes the player to Level 2, which is above Level 1.
15. In Level 2, the player can see a malfunctioning pipe with green fumes/smoke coming out of it, as mentioned in the monitor in Level 1.
16. The player can fix the malfunctioning pipes in Level 2 by using a wrench. They just need to aim the reticle pointer at the malfunctioning pipes and long press the "A" button to fix the pipes. This will solve the issue.
17. To go back to Level 1, the player must go to the teleportation compartment and click on the green button.
18. Once all tasks have been completed and all issues have been fixed, the player will find a blaring alarm that can be turned off by pressing the "A" key on the switch.

19. There is a timer present in the game, which starts automatically when the game starts. The players have 5 minutes to complete all the tasks. If the tasks are completed within the given time, a congratulations message appears on the screen and the user can then quit the game. If the users are not able to complete the tasks in the given time, a time-up message appears on the screen, and the user can quit the game.

### **Other VR Equipment:**

For the final prototype, we are using only the bluetooth controller.

The following keys are used:

<b>S.NO</b>	<b>Function</b>	<b>Button on the bluetooth controller</b>
1.	To open the In-game Menu	OK
2.	To select an option in the in-game menu	A
3.	To pickup an object	X
4.	To drop an object	X
5.	To fix any issue	Long press A
6.	To open a door	A

### **Multiplayer Environment:**

Our final prototype includes the framework required for a multiplayer environment i.e. using Photon.

In order to enable multiplayer functionality, all players must have the game's .apk file installed on their Android devices. Additionally, each player requires their own Bluetooth controller to interact with the game. This guide outlines the steps involved in initiating and joining multiplayer sessions.

**Requirements:**

1. Android devices with the game's .apk file installed.
2. Bluetooth controllers for each player.
3. Internet connectivity on all Android devices.

**Multiplayer Workflow:**

1. **Start Game:** To begin a multiplayer session, the first player initiates the game by clicking on the "Start Game" option in the start menu.
2. **Automatic Joining:** Once a game has already been started by a player, any subsequent players who launch the installed app will automatically join the ongoing game session. This ensures seamless integration and allows multiple players to participate simultaneously.
3. **Internet Connectivity:** To enable multiplayer functionality, all Android devices involved in the game session must be connected to the internet. This requirement ensures smooth communication and synchronization between players.

**YouTube Video Link:**

Here is a link to a video demonstrating our final prototype:

<https://youtu.be/EAHulr-4tU>