

Project Archive Final

# Bartender Simulation Challenge

Connor Wendt  
Shruthi Ravi  
Kristina Montanez

Capstone Project CS 467  
Spring 2022

# TABLE OF CONTENTS

<b><u>Introduction:</u></b>	<b><u>3</u></b>
<b><u>What Our Software Does:</u></b>	<b><u>4</u></b>
<b><u>Our Project Plan:</u></b>	<b><u>5</u></b>
<b><u>Development Tools:</u></b>	<b><u>7</u></b>
<b><u>Conclusion:</u></b>	<b><u>8</u></b>
<b><u>Link to Source Code:</u></b>	<b><u>9</u></b>
<b><u>Installation Instructions:</u></b>	<b><u>10</u></b>
<b><u>Installation Troubleshooting:</u></b>	<b><u>13</u></b>
<b><u>Game Instructions:</u></b>	<b><u>14</u></b>
<b><u>Game Troubleshooting:</u></b>	<b><u>19</u></b>
<b><u>Logo Copyright Citations:</u></b>	<b><u>21</u></b>

## Introduction:

Welcome to the Virtual Bartender Simulation Challenge! Our Virtual Reality simulation is an immersive game where a player can learn to be a bartender! This simulation is created using the Unity Engine for commonly used Virtual Reality hardware such as the Oculus Quest. As a team, our interest in this particular project stems from our collective interest to dive into something completely new; new software, new programming language; new level of complexity on a virtual reality platform. The virtual bartender simulation places the player in the role of a bartender behind an outdoor-style beach bar and allows the player to practice mixing various popular drinks with our helpful Bartender Menu to guide their progress until their drink is complete and ready to serve!



View of Bartender Simulation Game

We are excited to showcase our project, which includes a full bar layout, a pleasant beach environment, and a user interface (Bartender Menu) that manages the recipes for each drink. The bar environment has multiple liquor bottles and glasses that the player can tilt and pour various liquids into and out of. Below are the instructions for either observing the environment on a desktop through the Unity Engine editor, or to download the project onto a gaming device such as the Oculus Quest. Once you have completed the environment setup, please refer to the gaming instructions below to learn how to interact in the game and start pouring drinks! If you run into any issues with either installation or game interaction, don't forget to check the instruction troubleshooting and/or the game troubleshooting sections in this document.

## What Our Software Does:

Have you ever wondered what it would be like from a bartender's perspective? How about learning the popular drinks you order when you are at a bar? Our Bartender Simulation will provide you just that! A way to learn step-by-step how to create a drink, from what type of glass should be used for the specific drink, to the ingredients, whether it should be shaken, and even add garnishes!

To help you fully immerse yourself in our simulation, We have arranged the bar environment so that you have all ingredients including liquors and garnishes right at your fingertips. Our helpful Bartender Menu will show you what drinks you can mix and where to start, which includes what type of glass you should use for the particular drink you desire to make. Our bar layout is specifically set up for the VR experience, allowing the player to see all of the ingredients, bottles, and glasses in the center and left corner of the bar countertop so that head-turning is at a minimum when glancing back and forth from the Bartender Menu, located on the left bar countertop, to the drink in front of you.

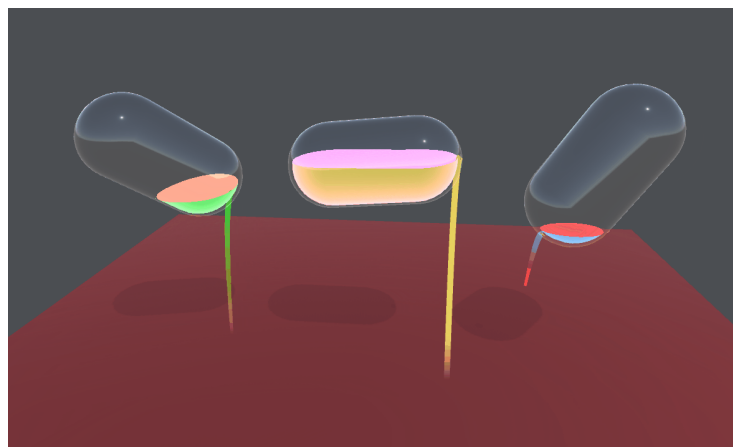
Worried that you may use the wrong ingredients, the wrong type of glass, or pour the wrong kind of liquor into your drink? Never fear! Bartender Menu has your back, as you start your drink mixing, it will place the correct liquor bottles, the correct type of drink glass, and show you which garnishes to use. You will have the view of a realistic bar countertop without being overwhelmed with endless choices of bottles and ingredients to pick from, avoiding the possibility of pouring incorrect liquids into your drink or placing a garnish that doesn't belong. Our Bartender Menu will take you through each step of the process, showing you a progress bar and the list of ingredients as a reference.

Worried that you'll break the simulation? Once again, have no fear! If you navigate towards the large tablet UI board to the left and select the "Settings" Button with your VR controller, you'll see a big button titled "RESET". If you press this button, the entire simulation will do exactly what you'd expect - reset! This way, if you lose your shaker bottles, drop some important liquor or create some other unexplainable behavior, you always have a means to revert back to the base state!

Feeling claustrophobic? Our simulation allows you to step away from the bar countertop and around the simulation to catch a break in the sun! You can move your VR viewpoint away from the bar and around to the customer tables. You can even maneuver your VR viewpoint to the beach and enjoy an open scene looking out on the ocean. Once you are done, feel free to make your way back to the bar countertop for another round of drinks!

## Our Project Plan:

Initially, the goal of our project plan was to create a realistic simulation for users to experience what it would be like to work as a bartender. From learning ingredient combinations and fulfilling mock customer drink orders, users will put their bartending skills to the test and be rewarded with interactive notifications of their successful progress. Overall, I believe that we have achieved that goal.



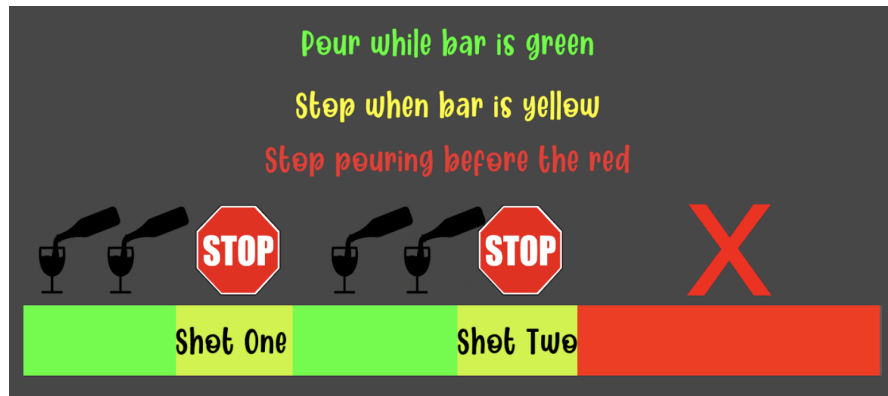
View of Fluid Simulation Design

No matter the amount of preparation, prior experience, or pragmatic objectives a team brings to the table, there will always be deviations from the original plan. There are several details in our project plan that changed over the course of the Capstone class as we realized that time and technical issues were not on our side. We originally had many plans for the type of recipes involved, the way the recipes could be mixed together, and the possible freedom that the user would have in mixing their drink in an “open world” idea, using any and every drink container found in the game scene. Once we implemented the drink making process, we discovered that allowing each and every container on the bar countertop to be a potential vessel for tracking

Specific details that we initially wanted as a mixing option included “shake” or “stir” mixing methods. Once we created the mechanics for the “shake” method, we appreciated how much time and effort would need to go into another method that would require so much trial and error. Therefore, we narrowed our mixing methods to either pour liquids into a shaker and “shake” or just pour liquids into a drink glass, forgoing the “stir” method.

Other details that we realized would take up too much time included ways to implement extraneous drinks such as “draft beers available to pour, again with the label on each handle.” Various features that we thought would be fun or interesting for us to implement included the

use of pouring angles, the amount of time the pouring will need to happen in order to pour the correct amount, and choosing correct garnish quantities, etc. However, with time constraints, and the difficulties in working with VR controller motions, we ultimately decided that this feature was not feasible.



Design for Original Progress Bar Idea



Design for Original Menu Idea

In retrospect, we were also unsure of how to set up the main menu and in-game UI. The UI goal's lack in clarity possibly stemmed from not having enough experience in VR games and simulations to visualize (pun intended) how a VR menu should look and behave. The project plan details a “Main Menu” which would place the VR player in front of a menu screen to either start the game, peruse through recipes, or review interaction tips prior to even setting foot in the actual Bartender Simulation. For simplicity's sake, and for ease of programming, we soon

broke from this two-step idea to an “in-game” billboard style menu. All of the changes discussed above, including this alteration, was born out of a lack of time and the need to customize ideas to fit the VR experience.

## Development Tools:

The major software, including software libraries, languages, APIs, development tools, servers, and other systems that we utilized to create the Bartender Simulation Challenge are as follows:



### Core Design Platforms:

- Unity development platform
- Unity Editor: 2020.3.32f1
- Blender 3D development platform
- Windows
- MacOS

### Language & file formats:

- C# script files
- .apk installation files
- .fbx asset files
- .obj asset files
- .blender asset files

### Game Simulation Tools:

- Oculus Quest 2 headset and dual controllers
- Oculus Rift headset and dual controllers
- VR headset
- SideQuest integration tool

## Conclusion:

We hope you enjoy our Bartender Simulation, as we have enjoyed the journey of bringing our ideas and design skills together to create this VR project. We are proud to see the culmination of many all-nighter work marathons, screen sharing, and lethal doses of coffee paid off. Our bar environment has gone from a simple concept in a shared project plan to a virtual world through the Oculus platform, an accomplishment that multiple team members have made for the first time.

Our vision for the Bartender Simulation project was to develop a realistic method for players to experience and learn how to work as a bartender and know the steps to make common drinks. This simulation will provide players with a means to take in-game recipes and mixing procedures, and implement these recipes in a professional bartending environment. More importantly, this simulation has the potential for expansion to be used as a training simulation for future bartenders to test their skills! Without spilling their drinks, of course.



## Link to Source Code:

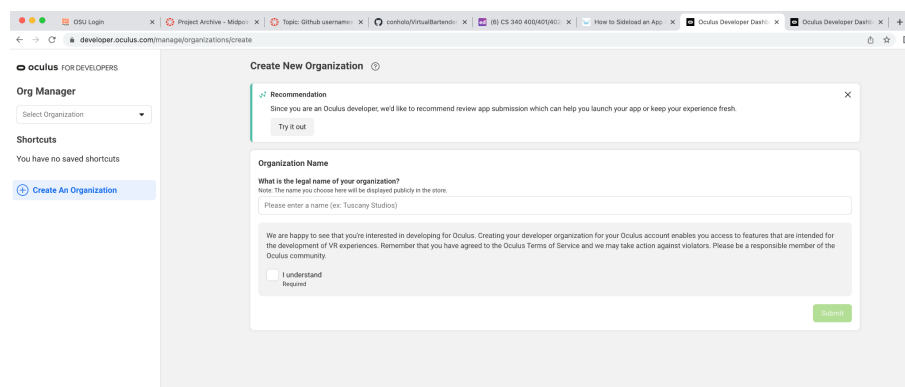
[VR 3D Bartender Simulation Challenge Github Repo](#)

## Installation Instructions:

Bartender Simulation Challenge Project Archive Midpoint includes a zip folder with 1) a PDF containing a link to source repo, installation instructions, game play instructions, and troubleshooting; and 2) a ".apk" build file which you will use to open onto a Virtual Reality device such as the Oculus Quest. Below are instructions for using either an Oculus Quest 2 device or Oculus Rift / Oculus Rift S device.

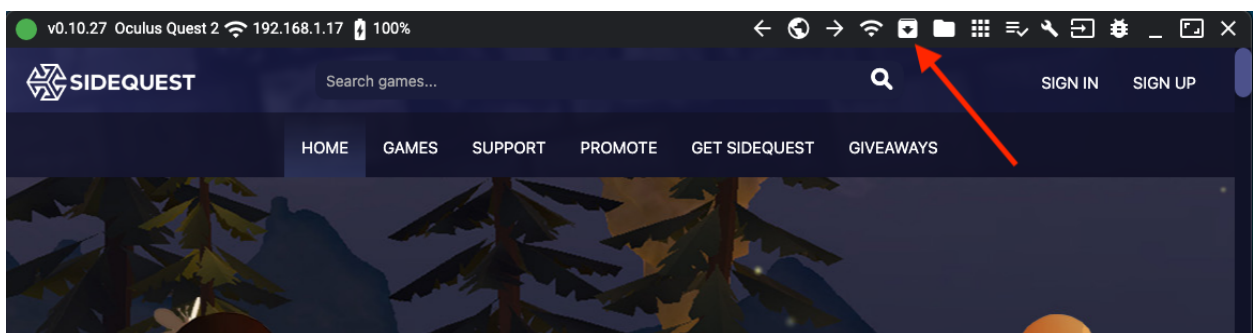
### For Android apk using an Oculus Quest 2 headset:

1. **IMPORTANT: You need to be using a Quest 2 headset to be able to view the project utilizing the .apk file. For an alternative way to view the project, go down to 'For exe using an Oculus Rift or Oculus Rift S device'**
2. Make sure that you have Enabled Developer Mode for your Oculus. To do this:
  - a. Navigate to your Oculus app on your phone
  - b. Go to the Menu tab, click Devices, and then under 'Headset Settings' click Developer Mode and toggle ON.
  - c. If this is the first time you've enabled developer mode, you'll need to follow the steps below to create a developer account with Facebook.
    - i. A website will automatically open so you can create a developer account.
      - Website link:  
<https://developer.oculus.com/manage/organizations/create>
    - ii. Scroll down and select the link below to create an organization.
    - iii. Login with your Oculus account.
    - iv. Enter the name of your "organization" (this can be anything).
    - v. Select submit.



Screenshot of page to create organization

- vi. Agree to the terms of the agreement.
  - vii. You'll need to enter a credit or debit card for identity verification. There is no charge to be an Oculus developer. However, Facebook's terms of service require you to verify your identity via this method.
  - viii. Once you've created your developer account, follow the first five steps to enable developer mode. Now that you've got that set, it's time to get Sidequest set up.
3. Download SideQuest to be able to sideload the provided .apk file to the Oculus headset.
  - a. Download SideQuest here for your OS: <https://sidequestvr.com/download>
4. Once downloaded, open up the SideQuest app on Desktop.
5. Make sure your Oculus headset is connected to your desktop via a USB to USB C cable. Your Oculus may ask for permissions to connect to your local machine.
6. At the top left corner within the SideQuest app, you will see your Oculus device, its Wifi status, and battery percentage. If you see this, that means your Oculus is connected to the app.
7. The app will have a series of icons at the top right icon bar. Click on the box icon showing a downward arrow (if you hover over this icon, it should say "Install APK file from folder on computer").



Screenshot of where to locate the box icon with downward arrow

8. Click on the icon and it should bring up a window that allows you to find the directory that contains the .apk on your local machine.
9. Click on the .apk file and it will automatically download it to your Oculus.

10. Once download is complete, you may unplug your Oculus.
11. Once your Oculus is unplugged, put your Oculus headset on, and navigate to the home screen.
12. In the Oculus home screen options, click on your applications window.
13. At the top-right corner of the applications menu, click the drop down menu. At the bottom of this drop-down list, select “unknown sources”. In the list of unknown sources, click on the bartender project you just installed.
14. This will take you to the bartender game. You can now skip to the “Game Instructions” section in this document under “**For Android apk**”.

**For exe using an Oculus Rift or Oculus Rift S device:**

1. If you are using either the Oculus Rift or Oculus Rift S headset, then to be able to view the project, all you need to do is:
  - a. Have your headset connected with the USB to USB C cable to your desktop.
  - b. Open up the .exe file
  - c. This should cause the project to show up within your headset.

## Installation Troubleshooting:

If you run into issues with loading the .apk file to your Virtual Reality device, please check out these tutorials below:

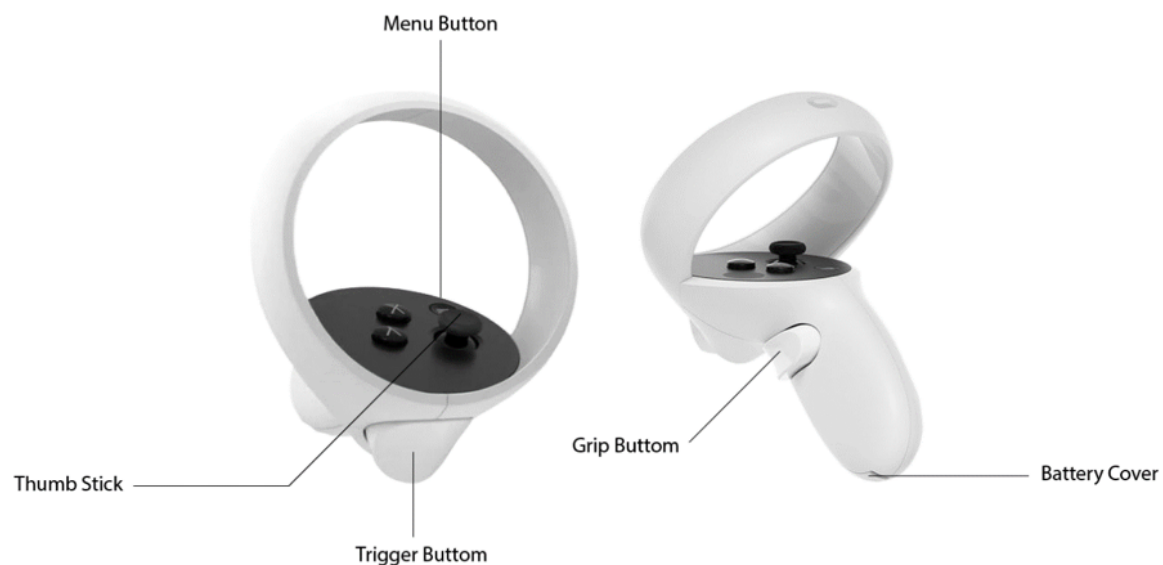
- If you wish to install the project on your Oculus Quest headset without using the Unity Engine editor, please follow the instructions in this link:  
<https://headjack.io/knowledge-base/how-to-easily-sideload-a-vr-app-to-oculus-quest-2/>
- Further instruction detailing how to use SideQuest to sideload to Oculus Quest:  
<https://uploadvr.com/sideload-quest-how-to/>

## Game Instructions:

Once you have completed the installation instructions on Virtual Reality Android devices such as the Oculus Quest 2 or other devices via the Windows 10 OS method, please follow these instructions accordingly:

### Virtual Reality Game Instructions:

For viewing the project in a Virtual Reality headset, these instructions assume that you have set up your headset as specified in the “Installation instructions” section above prior to playing the game.



Oculus Quest 2 Controller Buttons <sup>1</sup>

1. Once in the Virtual Reality environment, your view should be in front of a bar countertop with various bar liquor bottles, glasses, and garnish ingredients placed before you. To your left you will see the Bartender Menu, which will guide you through the simulation. If you do not see this environment viewpoint, and your original location is somewhere other than the bar countertop, please refer to

---

<sup>1</sup> Sam U (2021) *Introduction to Oculus Quest 2*. Linuxhint [Online]. Available: <https://linuxhint.com/oculus-quest-2/> (Accessed April 30, 2022).

the “Game Troubleshooting” section titled “*I am lost in the environment and I can’t get back to the bar counter!*”.

2. From here, you will interact with the Bartender Menu, located on the left bar countertop. Using your Oculus Quest controllers, point one of the red lasers at the Bartender Menu. Use the trigger button, located at the front of the Oculus Quest controller to press the buttons on the Bartender Menu. The Bartender Menu provides several options, including a list of recipes, a “Make a Drink” option, and a “reset” option.
3. Once you have chosen your desired drink from the Bartender Menu, you will see the correct drink glass, and the garnish ingredients appear on the center bar countertop, just right of the Bartender Menu. You will not be able to interact with the select drink glass, liquor bottles, and garnishes using your Oculus Quest controllers. With either Oculus Quest controller, point one of the red lasers at a glass, bottle, or garnish. Use your grip button, located on the inner handle of the controller, to select the target by pressing and holding the grip button. Warning: if you release the grip button, you will release the target and it will fall to the ground. If your drink falls to the ground, you will need to restart your drink making process.
4. CONTROLLER TIP:
  - a. While you are gripping a drink glass, shaker, or liquor bottle, you can tilt the controller holding the container. Tilting the controller “inward” (left controller to the right, right controller to the left) will allow you to pour the drink glass of liquor bottle’s fluid from the container.
  - b. Tilting the controller back “outward” (left controller to the left, right controller to the right) will stop the pouring action.
5. Once you have selected the correct liquor bottle to use, you may move your VR headset closer to the bar countertop with the left controller’s thumbstick. For a better vantage point, move yourself close enough to the other targets (liquor bottles, drink glass, and garnishes) on the countertop. Reach out with the controller holding the first liquor bottle, and tilt the controller inward to allow the first liquor bottle to pour liquid into the other target. The other target may be the drink glass selected by the Bartender Menu, or the shaker container, depending on what drink recipe you select.

6. You will now see the liquid from the first liquor bottle decrease, and the liquid in the other target (drink glass or shaker container) increase. Congrats! You are now simulating mixing a drink!
7. While you are pouring liquid from the selected liquor bottle to the drink glass or shaker container, be mindful of the Bartender Menu. The Bartender Menu will show a progress bar, indicating how far you are in the drink making process. It will also list the ingredients needed for your drink so you know what all will need to be poured or placed in your drink glass.
8. After pouring the first liquor bottle, you can place the liquor bottle back on the bar countertop by moving close enough to the countertop to see the liquor bottle hover over the spot you want to place it down. Make sure you are not hovering the liquor bottle too high in the air as this will cause you to drop the bottle on the countertop and risk the bottle rolling on the ground. Once it is in the place you want to leave it, release the grip button on the Oculus Quest controller.
9. FOR DRINK RECIPES REQUIRING A SHAKER CONTAINER:
  - a. Once you have poured each liquor bottle into your shaker container, and placed the liquor bottles back on the bar countertop, you will now shake your drink. Locate the shaker lid. This shaker lid is a metal top that corresponds to the shaker container.
  - b. Using the Oculus Quest controller that is currently NOT holding the shaker container, point the red laser at the shaker lid. Use your grip button, located on the inner handle of the Oculus Quest controller, to select the lid by pressing and holding the grip button. You will now have your shaker container in one hand, and the shaker lid in the other hand. Use the tilting motions discussed in Paragraph 4 of these instructions to tilt the shaker lid toward the shaker container. Make sure that your hands are close enough together for the shaker lid to make contact with the shaker container. WARNING: do not tilt the shaker container during this step, you may risk pouring out your drink!
  - c. Once the shaker lid has connected to the shaker container, You will see directions on the Bartender Menu to shake your drink. Use a “shaking motion” with the Oculus Quest controller that currently holds the shaker container and lid, until the Bartender Menu indicates that you are done shaking.
  - d. Once you have completed the shaking step as described in Paragraph 9(c) above, you can disconnect the shaker lid by using the Oculus Quest



controller that is currently NOT holding the shaker container. Point the red laser at the shaker lid. Use your grip button, located on the inner handle of the Oculus Quest controller, to select the lid by pressing and holding the grip button. This will disconnect the lid from the shaker container. You may place the shaker lid on the bar countertop, by moving close enough to the countertop to see the lid hover over the spot you want to place it down. Make sure you are not hovering the lid too high in the air as this will cause you to drop the lid on the countertop and risk the lid rolling on the ground. Once it is in the place you want to leave it, release the grip button on the Oculus Quest controller.

10. After all liquids are poured into your drink, you may place the drink down on the bar countertop. Move close enough to the countertop to see the drink glass or shaker container hover over the spot you want to place it down. Make sure you are not hovering the liquor bottle too high in the air as this will cause you to drop the bottle on the countertop and risk the bottle rolling on the ground. Once it is in the place you want to leave it, release the grip button on the Oculus Quest controller.

11. FOR DRINK RECIPES REQUIRING GARNISHES:

- a. Once you have poured every liquid ingredient indicated on the Bartender Menu's recipe list, you may add garnishes to your drink. Look to the Bartender Menu to see what garnishes are used in your selected drink, and where to place them.
- b. With either Oculus Quest controller, point one of the red lasers at a garnish. Use your grip button, located on the inner handle of the controller, to select the garnish by pressing and holding the grip button. Move the garnish close enough to the drink glass to see the garnish hover over the spot you want to place it in or on the rim of the drink glass. This action will cause the garnish to connect with the drink glass, placing it in the correct location, either in the drink glass, or on the drink glass rim.

12. Once you have all liquids and garnishes in your drink glass, refer to the Bartender Menu to see if your drink is complete!

13. RESET SIMULATION

- a. Worried that you'll break the simulation? Once again, have no fear! If you navigate towards the large tablet UI board to the left and select the "Settings" Button with your VR controller, you'll see a big button titled

“RESET”. If you press this button, the entire simulation will do exactly what you’d expect - reset! This way, if you lose your shaker bottles, drop some important liquor or create some other unexplainable behavior, you always have a means to revert back to the base state!

14. When you are done enjoying the game, press the “Oculus Menu” button on the left Oculus Quest controller. This will give you the option of either resuming the game, or exiting the game. Point your laser pointer at the “exit” option. This will exit the game and return you back to the Oculus home screen.
15. To uninstall the game, select the “applications” section on your Oculus Quest home screen. At the top-right corner of the menu, click the drop down menu. At the bottom of this drop-down list, select “unknown sources”. In the list of unknown sources, click on the “...” option to the right of the bartender simulation challenge source. This will give you the option to uninstall the project.

## Game Troubleshooting:

For common game issues using the Oculus Quest, please check out the following troubleshooting tips below:

- ***I can't pick up the glass or other ingredients!***

With your Oculus Quest game controllers, locate the “grip” button on each controller. This button will be the curved trigger located on the inner side of each controller. In your Oculus headset, you will see your controllers floating in the environment, and red laser pointers connected to the top of each controller. Use the red laser pointer that you see in the VR headset to point to a target, e.g. a glass, liquor bottle, or garnish. When the red laser pointer is pointing at the target, press and hold the grip button. This will bring the target to your controller and hold it in place. You can tilt your controller to see the container tilting in the headset. See that the container pours out the liquid and a liquid stream is formed below the container. When you release the grip button, this will release the container.

- ***I have spilled or lost my drink!***

Move your view in the headset to see the “Reset” button on the Menu Screen. This button will allow you to reset your environment. Use the red laser pointer that you see in the VR headset to point the button. When the red laser pointer is pointing at the button, press and hold the grip button. This will replace the required drink glass and liquor bottles back on the bar countertop with the original liquids in each bottle. You may resume pouring liquid from the bottles.

- ***I am lost in the environment and I can't get back to the bar counter!***

On the off chance you enter the environment in an area of the environment where you do not have immediate access to the bar countertop, place your thumbs on the upper-flat “button pad” area of each controller. On the button pad, locate the thumbstick on each controller. These thumbsticks will allow you to move throughout the environment. The left thumbstick will allow you to move forward-backward-right-left. The right thumbstick will allow you to turn right or left. Using both thumbsticks, navigate your way through the environment to the bar location and place your character viewpoint close to the inside of the bar near the center countertop. From here, you can resume

grabbing the drink glass and liquor bottles placed in front of you and continue pouring drinks!

- ***I can't figure out how to use the shaker container!***

*To pick up the shaker container:*

With your Oculus Quest game controllers, locate the “grip” button on each controller. This button will be the curved trigger located on the inner side of each controller. In your Oculus headset, you will see your controllers floating in the environment, and red laser pointers connected to the top of each controller. Use the red laser pointer that you see in the VR headset to point to the shaker container. When the red laser pointer is pointing at the shaker container, press and hold the grip button. This will bring the shaker container to your controller and hold it in place. **WARNING:** do not tilt the shaker container during this step, you may risk pouring out your drink! Further, do not release the grip button, as this will release the shaker container and drop it on the ground.

*If you are already holding the shaker container:*

With the Oculus Quest game controller that is currently NOT holding the shaker container, point the red laser at the shaker lid. Use your grip button, located on the inner handle of the Oculus Quest controller, to select the lid by pressing and holding the grip button. You will now have your shaker container in one hand, and the shaker lid in the other hand. Next, make sure that your hands are close enough together for the shaker lid to make contact with the shaker container. This should connect the shaker lid with the shaker container. You are now ready to shake your drink!

## Logo Copyright Citations:

1. Unity Homepage [Online]. Available: <https://unity.com/> (Accessed May 25, 2022).
2. Blender Logo Information Page [Online]. Available:  
<https://www.blender.org/about/logo> (Accessed May 25, 2022).
3. Meta/Oculus Quest Homepage [Online]. Available:  
<https://www.oculus.com/experiences/quest> (Accessed May 25, 2022).
4. SideQuest Homepage [Online]. Available: <https://sidequestvr.com/branding>  
(Accessed May 25, 2022).