



Walking a Mile in my Shoes

Immersive Storytelling with Engaging Physical Actions

Advisor

Dr. David M Krum

Sponsor

InART

Students

Joseph Chong, Jimmy Hernandez, Edwin Hernandez,
Jaquan Jones, Alberto Landeros, Tony Lee, Jennelle Maximo,
Eduardo Meza, Dean Nguyen, Anthony Viramontes

Team Roles

- **Anthony Viramontes** : Team Lead & Level Software Engineer
- **Alberto Landeros** : Lead Designer & Level Designer
- **Dean Nguyen** : Concept Designer & Lead Programmer
- **Eduardo Meza** : Programmer & Tester
- **Edwin Hernandez** : Documentation
- **Jaquan Jones** : Sound/Software Engineer & Documentation Support
- **Jennelle Maximo** : Lead Art & Documentation
- **Jimmy Hernandez** : Sound Engineer & Programmer
- **Joseph Chong** : Software Engineer
- **Tony Lee** : Software Engineer & 3D Modeling

InART

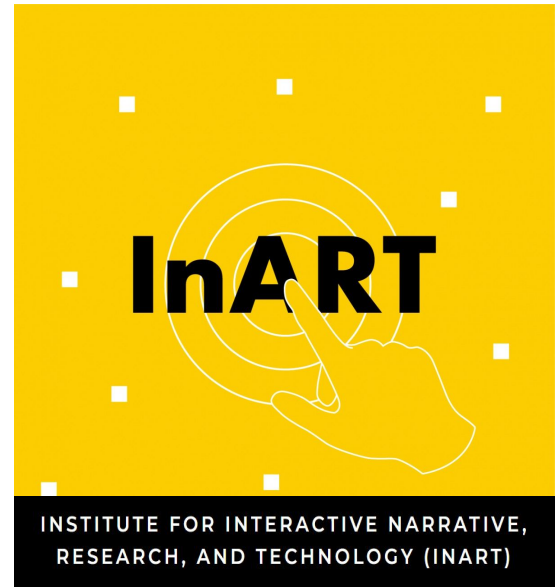
Advisor

Dr. David M Krum

Sponsor

InART

**Institute for Interactive Narrative, Research, and
Technology**



Overview

1. Project Overview

- What is “Walking a Mile in my Shoes” about?
- Goals

2. Background

- Major Design Decisions
- Planning & Design

3. Tools & Software

- Oculus Quest 2 + Unity + Blender
- Jira + Zoom + Discord
- VR Development

4. Challenges

5. Accomplishments

- Kitchen Level
- Farm Level

What is “Walking a mile in my shoes” about?

- “Walking a mile in my shoes” is an interactive VR experience, built in Unity Game Engine, telling a story of two immigrants in America, allowing users to step into their shoes for a day.
 - Farm Level
 - Kitchen Level
- Our game aspires to shift negative perceptions on immigration into positive ones and humanize the experiences of immigrants seeking a better life for themselves and their families

Goals

1. Share the stories of immigrants in America
2. Build immersive worlds
3. Create dynamic gestures
4. Build 3D assets needed

Background

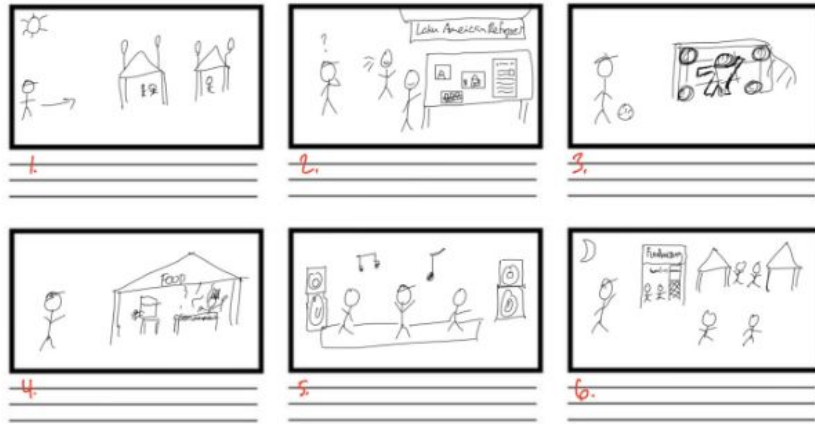
- Previous themes:
 - Environmentalism
 - Loss
 - Existentialism
 - Space and Fantasy
- Sharing personal and family stories
 - Immigration
 - Sacrifice and hardships
 - Public's treatment towards immigrants and refugees

Major Design Decisions

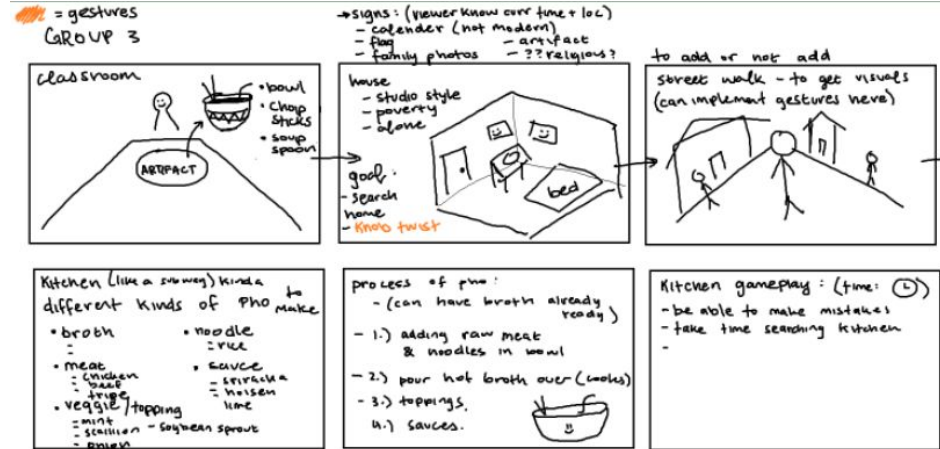
- Environment
 - Forest, Train, Homes, Kitchen?
- Emotional tones
 - Lighthearted, funny, emotional?
- Subject
 - What culture to focus on?
- Hand Gestures
 - Symbolic. Tech limitations.
- Gameplay
 - Interactive or mainly narrative
- Graphics
 - Using online assets and which style?
 - How to display next user tasks?
- Audio
 - Different languages or gibberish

Planning & Design: Rough Storyboarding

Farm Level



Kitchen Level



Planning & Design: Early Sketches & Inspiration

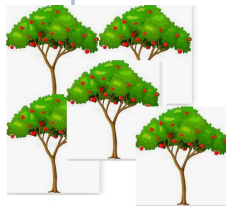
Farm Sketches



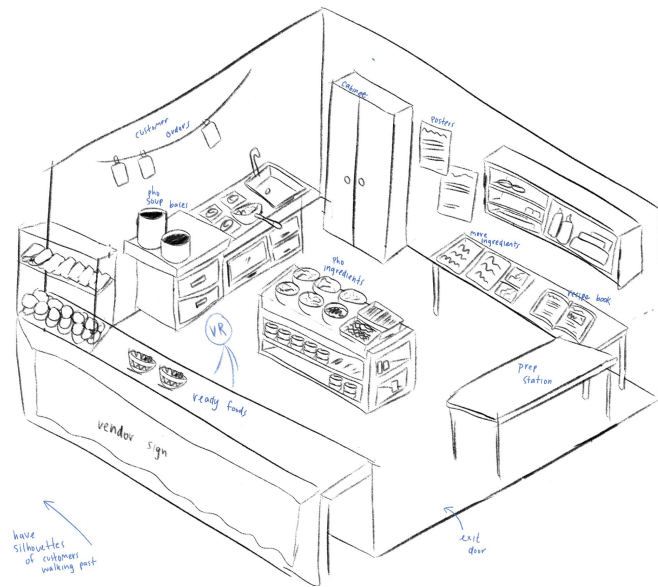
Start on a truck, just looking around. Going to farm



Similar to this, Maybe with this perspective, alone on truck though

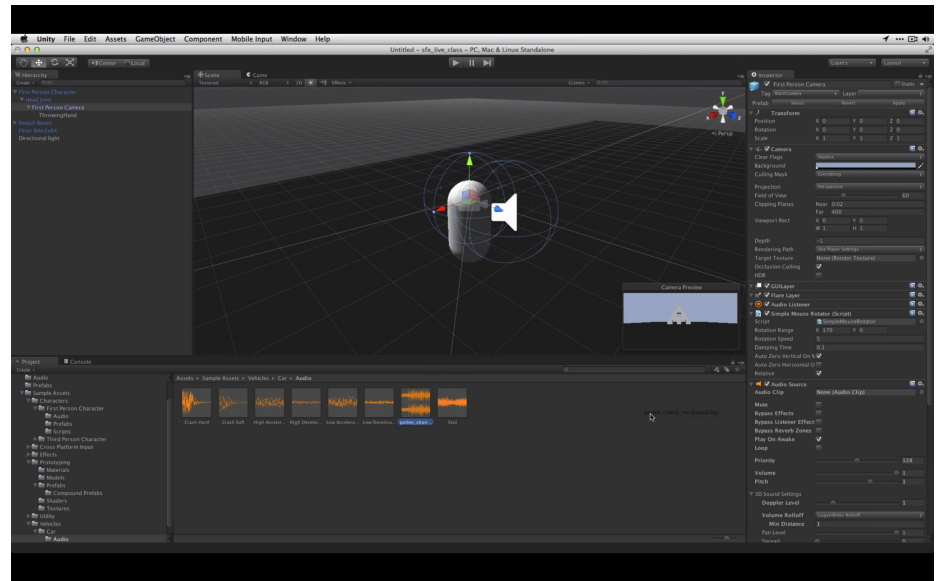


Kitchen Sketch



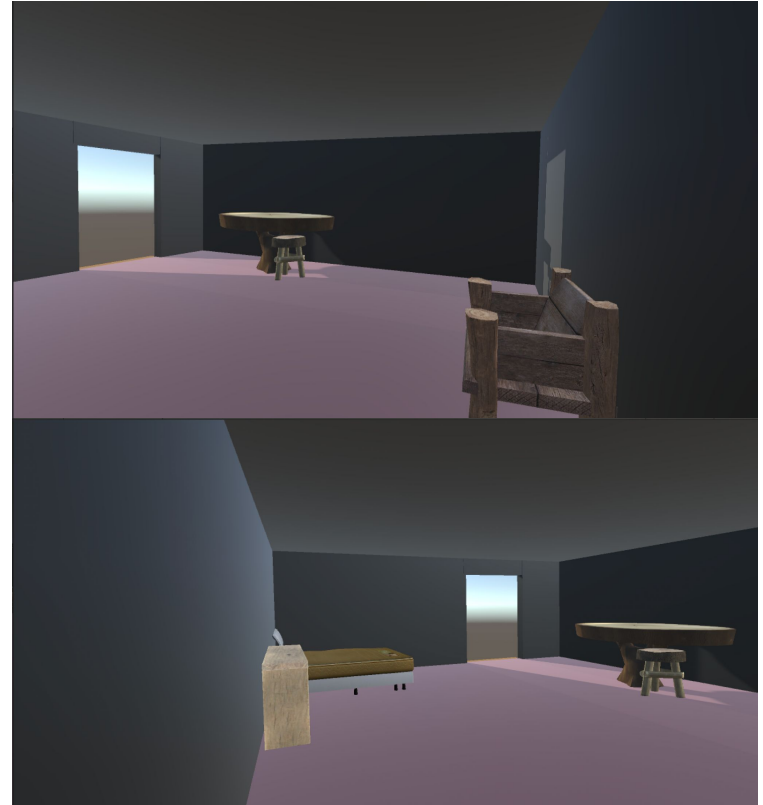
Sound Engineering

- Sounds implemented in the Oculus to represent real life experience
- The noise implementation get into details as the user is in different levels
- The sounds help give the player “life-like” experiences



Programming

- The programming to implement some of the materials/assets from the unity store was helpful
- This allowed the team to advance quickly
- Some of the materials that seems so simple were created using outside sources other than unity



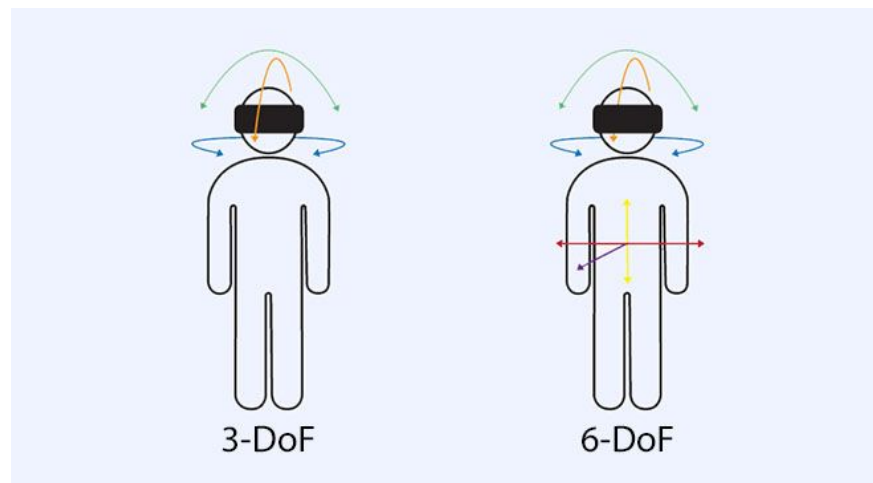
Tools: Oculus Quest 2

- The VR headset we decided to use for our project
- Relatively cheap entry to the world of virtual reality
- No wires needed is a big positive
- Runs an android-based OS



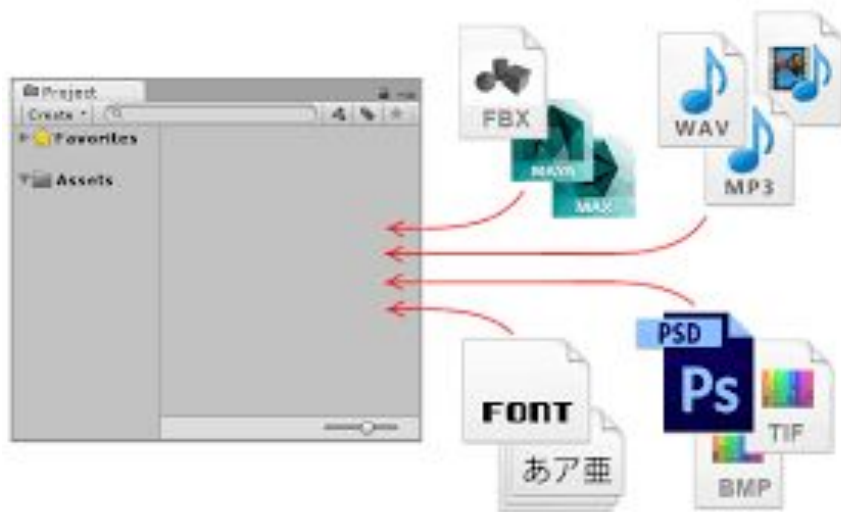
Degrees of Freedom

- Describes how an object or person moves through 3D space
- Oculus Quest 2 has 6- DoF
- 3 for rotational movement:
 - Movement around X, Y, Z axis
 - Pitch, yaw, and roll
- 3 for translational movement:
 - backwards/forwards
 - left/right
 - up/down



Unity Asset Store

- Main place to buy assets to use for Unity projects
- Limited amount of free assets
- We had to resort to using Blender for making certain assets
- Buying every asset we needed would have been pricey

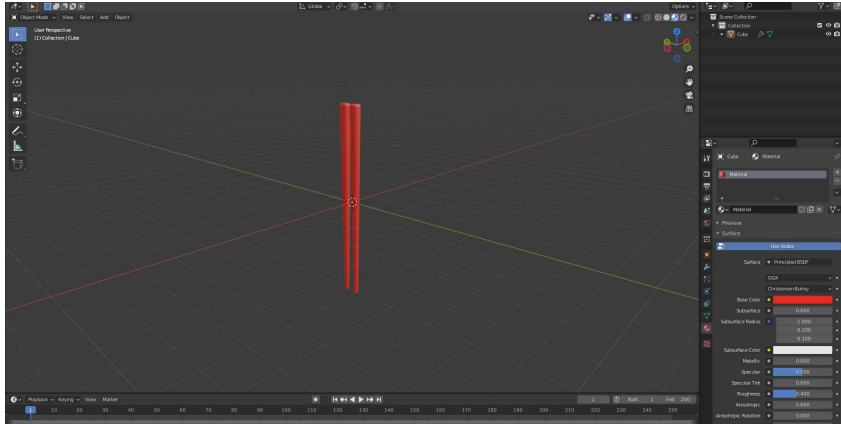


Tools for development: Blender

- Blender is a free 3D modeling software.
- Create models for assets that are not available in the unity asset store.



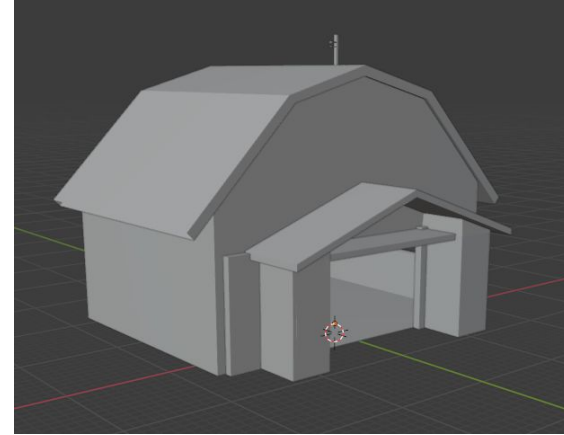
Blender Models



Chopsticks



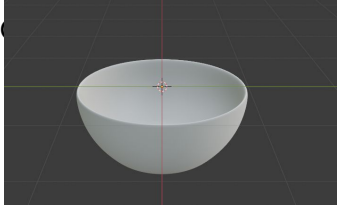
Sriracha bottle



Barn

Tony

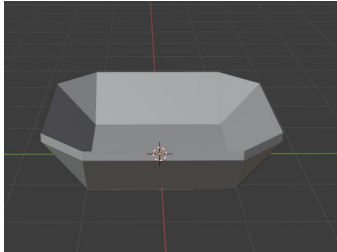
Blender Models Continued



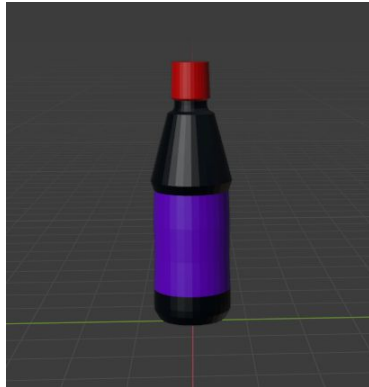
Bowl 1



Cooking Pot



Bowl 2



Hoisin Sauce Bottle



Table Counter

Jira

- Jira allowed the team to overview development across each team member.
- Tracked team issues and development in real time.
- I would recommend Jira to all future InART teams.
- In terms of keeping track of each teammate and their personal task, Jira was the glue of this operation because we would know if someone hasn't started their task yet, if it was in progress, if it was being reviewed, or we would know when someone is done.

Jira Example

Jira Software Your work ▾ Projects ▾ Filters ▾ Dashboards ▾ People ▾ Apps ▾ **Create**

INART VR Project
Software project

PLANNING

- Roadmap
- Backlog
- Board**

DEVELOPMENT

- Code
- Project pages
- CSNS Project Page
- Add shortcut
- Project settings

Projects / INART VR Project

IVP Sprint 2

Search [] AV TL A EM +5 [] Epic ▾

TO DO 3 ISSUES	IN PROGRESS 5 ISSUES	REVIEW 2 ISSUES	DONE 2 ISSUES ✓
<p>Farm Level: Have walking NPCs</p> <p>IVP-40 [] [Avatar]</p>	<p>Kitchen Level: Have functional stove</p> <p>IVP-39 [] [AV]</p>	<p>Have a functional button</p> <p>IVP-49 [] [AV]</p>	<p>Create Game Pitch</p> <p>IVP-22 [] ✓ [Avatar]</p>
<p>Jail Scene: Have NPCs react to gestors, have NPCs make noise if possible</p> <p>IVP-42 [] [JC]</p>	<p>Improving menu, make environment around menu better</p> <p>IVP-46 [] [EM]</p>	<p>Blender models</p> <p>IVP-43 [] [Avatar]</p>	<p>Farm Level: Enforce Collision, create objectives, fix day&night cycle</p> <p>IVP-41 [] ✓ [A]</p>
<p>Have an order system for kitchen</p> <p>IVP-48 [] [Avatar]</p>	<p>SDD/SRS documents</p> <p>IVP-44 [] [Avatar]</p>		
	<p>Adding sounds to kitchen</p> <p>IVP-47 [] [TL]</p>		
	<p>Senior design Report</p> <p>IVP-45 [] [EH]</p>		

Team Meetings

- ZOOM was used to host our weekly meetings every friday from 8am - 11am.
- Everyone got the opportunity to speak.
 - What they got done?
 - What will they do next to further development?
 - What issues did you have that the team should know about
- This would help the team further development so we can focus on the goals that would help us reach a deliverable project
- Discord was used for 1 on 1 meetings.

Kitchen Level

- Vietnamese Chef
- Getting The design right
- Getting the VR body and hands interacting with kitchen items
- Getting the materials needed to cook
- Development 80% complete
 - User can spawn items they need with a push of a button
 - Collision detection
- What is needed?
 - Cooking animation
 - Delivering food to NPC to complete objectives

Kitchen Design so far



Anthony

Farm Level



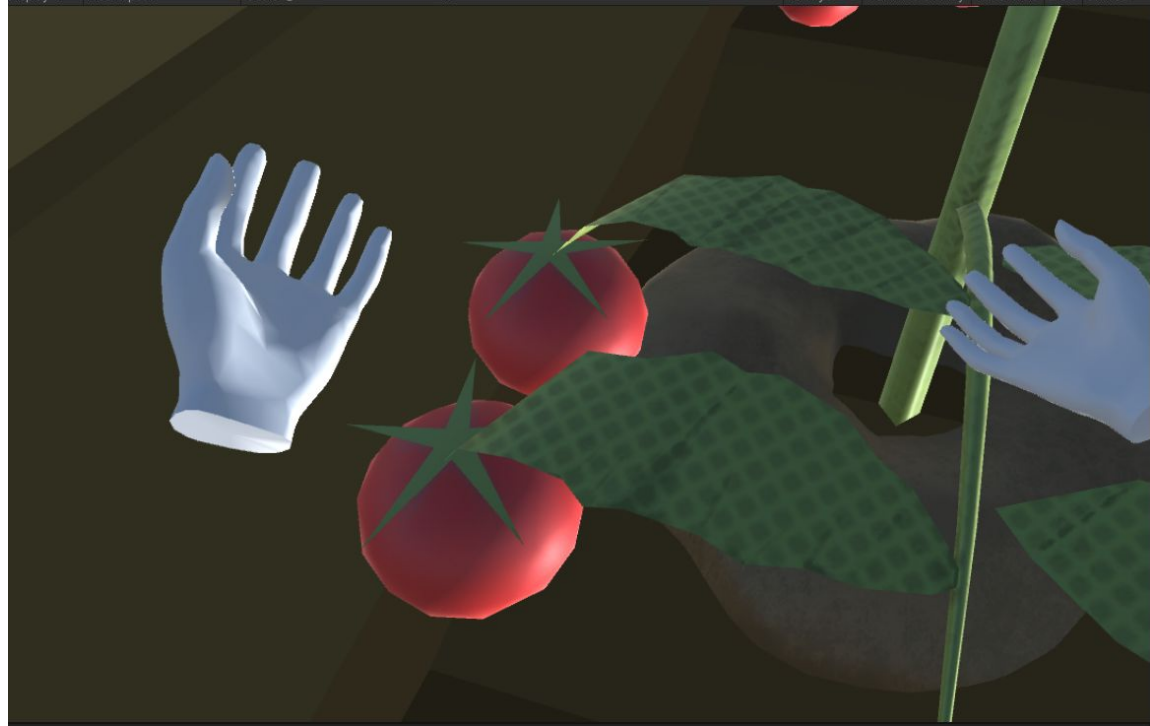
Goal of the Farm Level

- Immersion of poor immigrant farmer
 - Grab tools
 - Sound
 - Visual realism
 - Historical realism
- Working for an abusive boss



Objectives

- Utilization of Hands
 - One or Two handed
 - Grab tools
- Audio clips
 - Cows mooing
 - AI NPCs talking
 - Footsteps of the player
- Completing Objectives
 - Moving hay bales



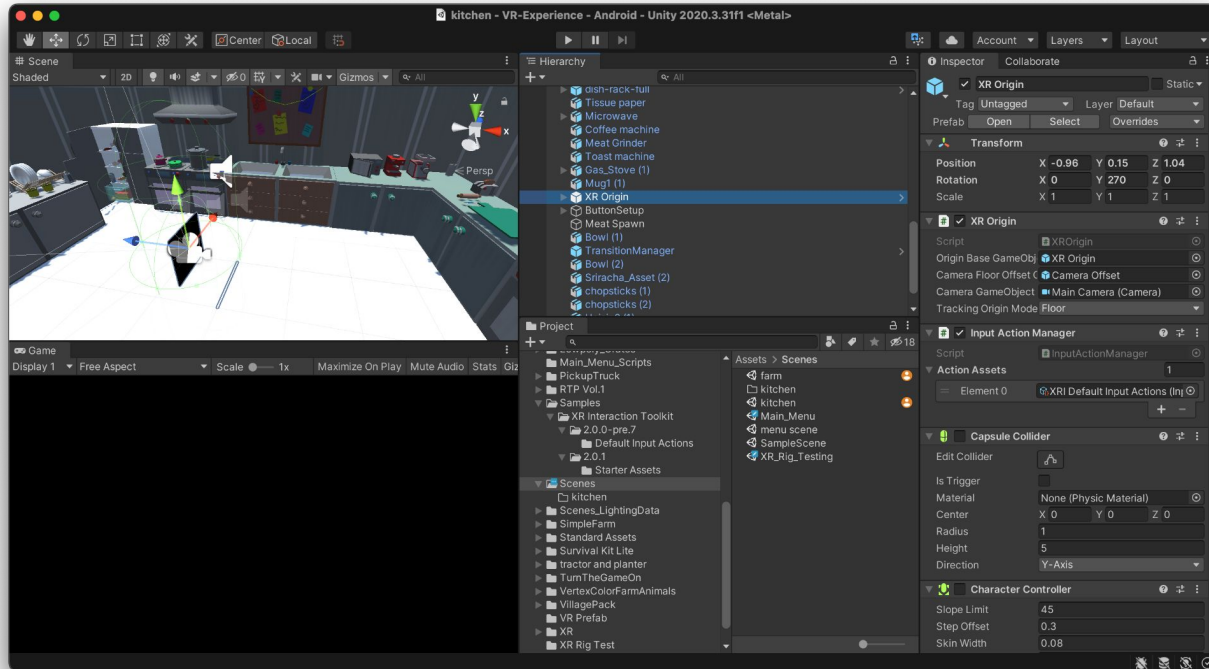
Unity

- Engine for developing games
- Target single or multiple platforms (PC, Android, iOS, consoles, etc.)



The Unity Editor

- Integrated development environment

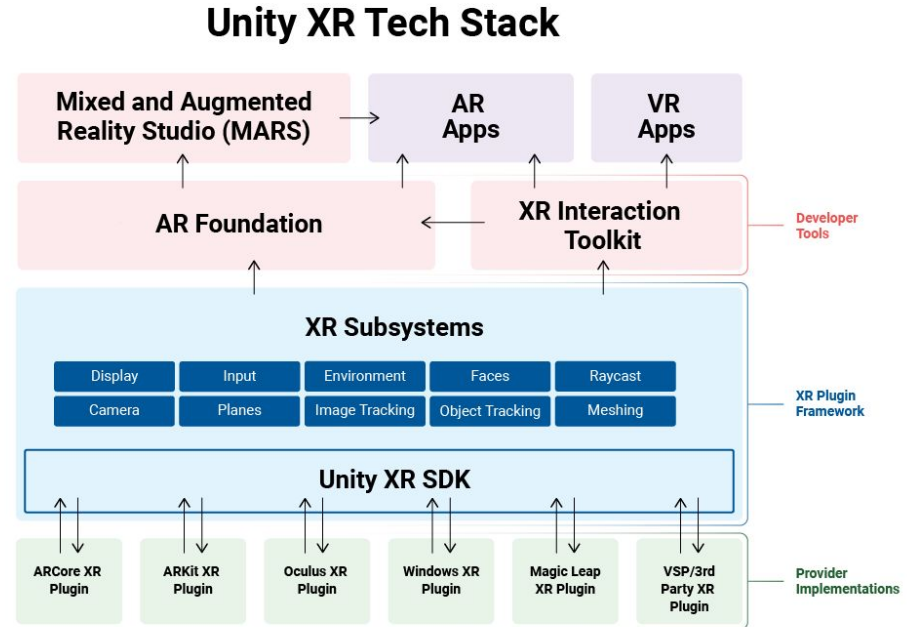


VR Development using the Unity XR Toolkit

- Unity provides the **XR Toolkit** (extended reality toolkit) for developing virtual reality (VR), mixed reality (MR), and augmented reality (AR) applications
- The XR tech stack supports platform integration these and more popular platforms:
 - ARKit (Apple)
 - Playstation VR
 - Oculus
 - HoloLens (Microsoft)

Unity XR Plugin Framework

- The XR Toolkit includes a plug-in framework called **XR SDK** that supports XR devices and runtimes
- This framework allows developers to focus on their applications and leaves the details of the implementation to the Unity Engine



XR Compatibility With Oculus Devices

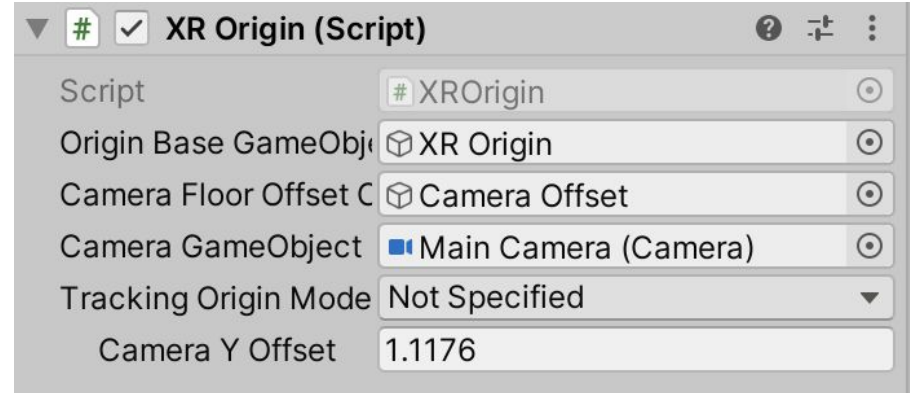
- In order to develop VR applications with Unity for the Oculus Quest 2 platform, we require the following plugins from the XR Toolkit:
 - **OpenXR:** An open royalty free standard that aims to simplify AR/VR development, it allows developers to target a wide range of platforms
 - **XR Interaction Toolkit:** A high-level component based interaction system that makes 3D and UI interactions possible from device inputs (controller/headset movement, button events, gesture interactions, haptic feedback, etc.)
 - **Oculus XR Plug-in:** This optional plug-in includes Oculus platform specific assets for development of XR apps.

Developing For VR

- Organization of game levels is separated into self contained **scenes** within the Unity editor.
- All 3D assets, sound effects, and UI interfaces are known as **game objects**
- Game objects can have **components** attached to them that modify their properties or add certain functionality
- The virtual game environment can be explored by the player through a **XR Origin** game object

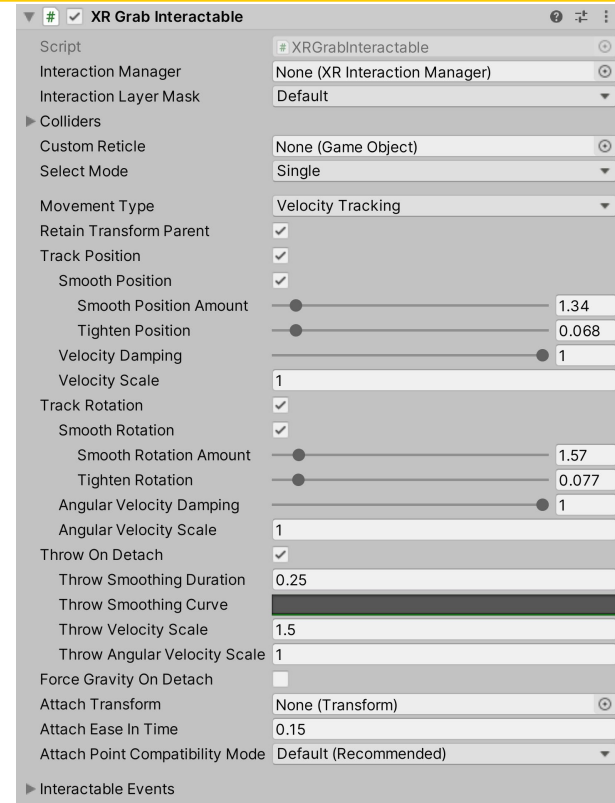
The XR Origin Game Object

- The XR Origin is a collection of game objects and components that work together to enable the player to interact with the virtual environment
 - Game camera
 - Left/right controller
 - Locomotion/teleportation
 - XR Interactable



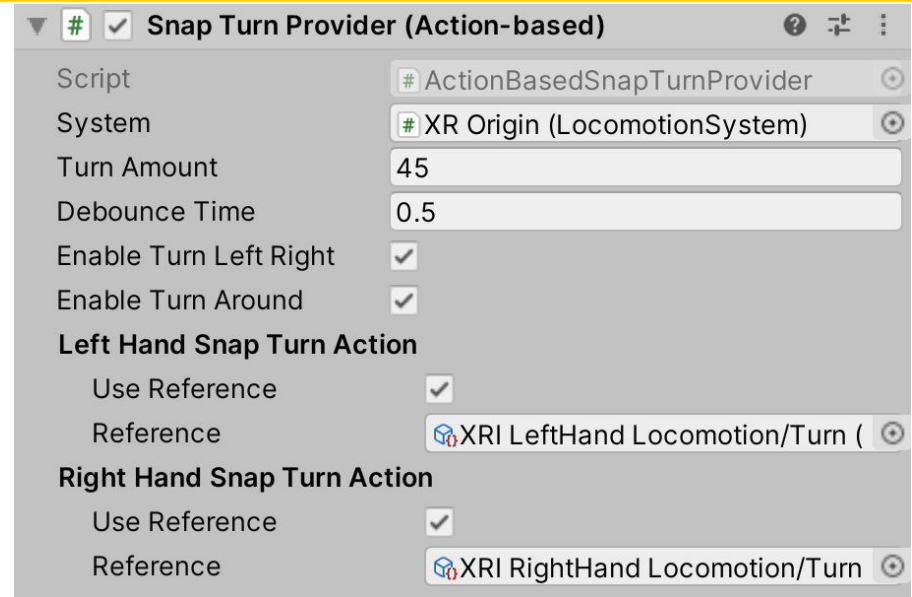
Interaction With Virtual Objects

- The **XR Grab Interactable** component allows the player to virtually interact with 3D objects within the scene
- The **XR Ray Interactor** component allows the player to interact with the user interface



Movement In VR

- The **Locomotion System** component allows the player to move throughout the game environment in a Unity scene
- The **Teleportation Provider** component allows the player to instantaneously move to certain points in a Unity scene
 - Requires a Ray Interactor component to target and select valid teleportation areas
- The **Snap/Continuous Turn Provider** components allow the player to rotate its perspective within a scene through controller input



Challenges

- Lack of VR Headsets for every person on the team
- Lack of resources
 - Needing to purchase assets from Unity Asset Store
 - Getting Unity Teams set up

Thank you!

