

VR MOTION PLATFORM DEVELOPMENT COURSES

Lesson 1

VR in Unity Fundamentals

AGENDA

- Overview of Unity game engine
- Overview of VR Unity game development
 - How To Install Unity for VR
 - How to add XR camera and hand controllers
 - How to Move around a VR scene
- Overview of Mobile and VR Game

OVERVIEW OF UNITY GAME ENGINE

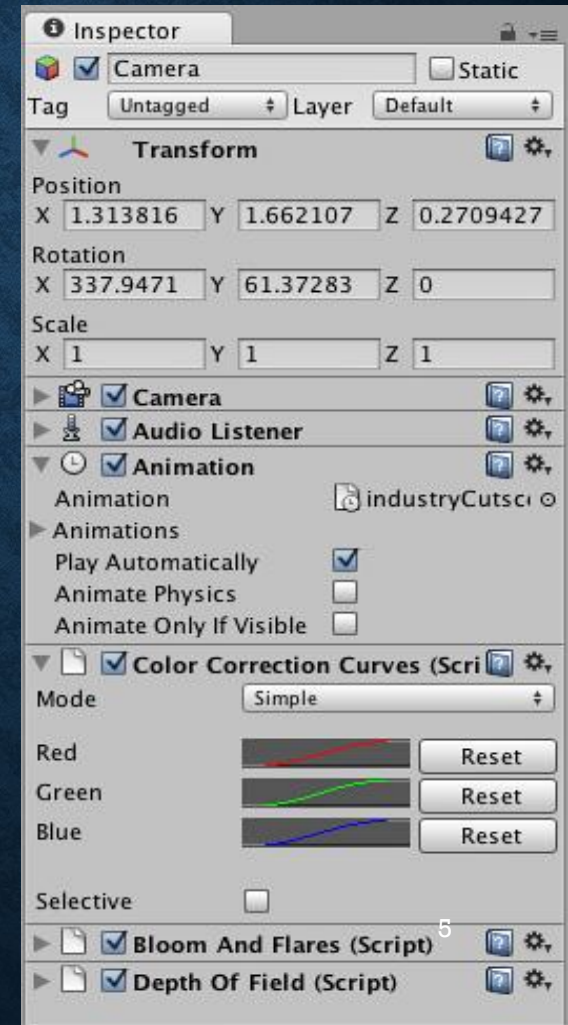
UNITY USER INTERFACE

- Official Courseware
 - Chapter 02 – Section 1 – Analyzing the Unity Editor User Interface



INTERFACE WINDOWS

- Project Browser
 - you can access and manage the assets that belong to your project.
- Hierarchy
 - The Hierarchy contains every GameObject in the **current Scene**.
- Inspector
 - The Inspector displays detailed information about your currently selected GameObject, including all attached Components and their properties.



UNITY EDITOR USER INTERFACE

- Official Courseware
 - Chapter 02 – Section 2 – Utilizing the Unity Editor User Interface

TUTORIALS IN INTERFACE

- <http://unity3d.com/cn/learn/tutorials/modules/beginner/editor/interface-overview?playlist=17090>
- Watch the online Lesson from the links above to be familiar with the Unity's Interface.

TOOLBAR



Transform Tools -- used with the Scene View



Transform Gizmo Toggles -- affect the Scene View display



Play/Pause/Step Buttons -- used with the Game View



Layers Drop-down -- controls which objects are displayed in Scene View



Layout Drop-down -- controls arrangement of all Views

ONLINE LESSON NO.1

Unity's Scene View, Orthogonal or Perspective.

- The Scene View - Unity Official Tutorials
- <https://www.youtube.com/watch?v=nG0fXdXy1MI>
- **The Project Panel and Importing**
- The Project Panel and Importing - Unity Official Tutorials
- <https://www.youtube.com/watch?v=4jXPMYffLEk>

ONLINE LESSON NO.2

The Inspector

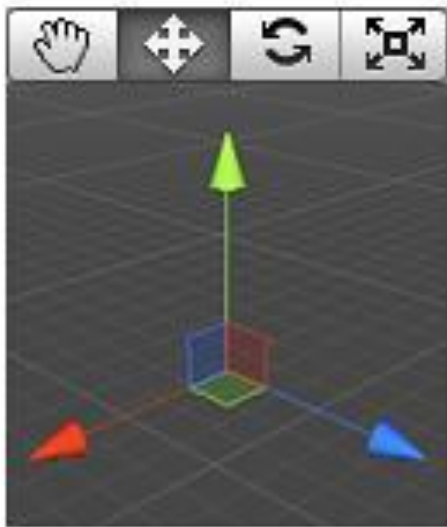
- The Inspector Window - Unity Official Tutorials
- <https://www.youtube.com/watch?v=qltyYjFdyVc>
- **Game Objects and Components**
- Game Objects and Components - Unity Official Tutorials
- https://www.youtube.com/watch?v=9Nf2_ds5y8c

SCENE VIEW NAVIGATION

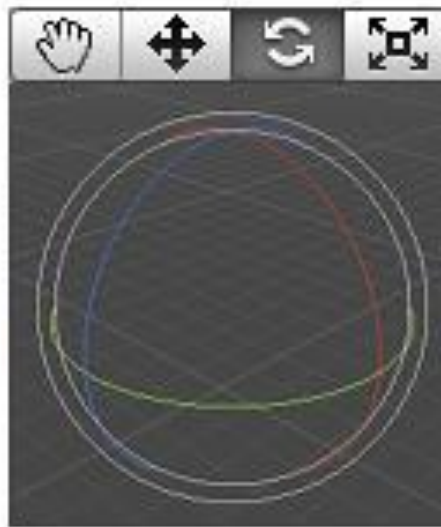


- Select a GameObject, press **“F”** to zoom and center the Scene View.
- **Alt+left button** to **“orbit”** the camera.
- **Alt+middle button** to **“pan”** the Scene View camera around.
- **Alt+right button** to **“zoom”** the Scene View.
- Press and Hold the right mouse button to enter **“Flythrough”** mode.

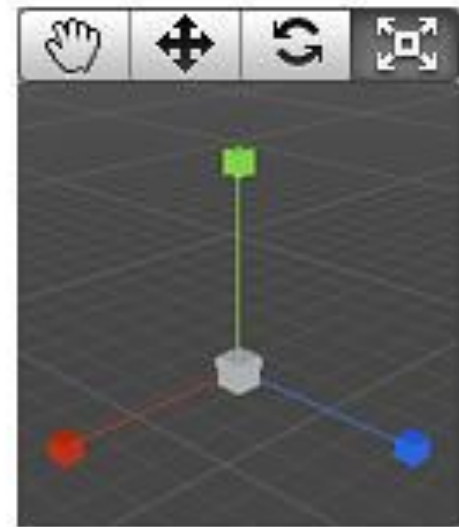
POSITIONING GAMEOBJECTS



Translate (W)



Rotate (E)



Scale (R)

- **Shortcut key: Q, W, E, R**



SCENE LIGHTING

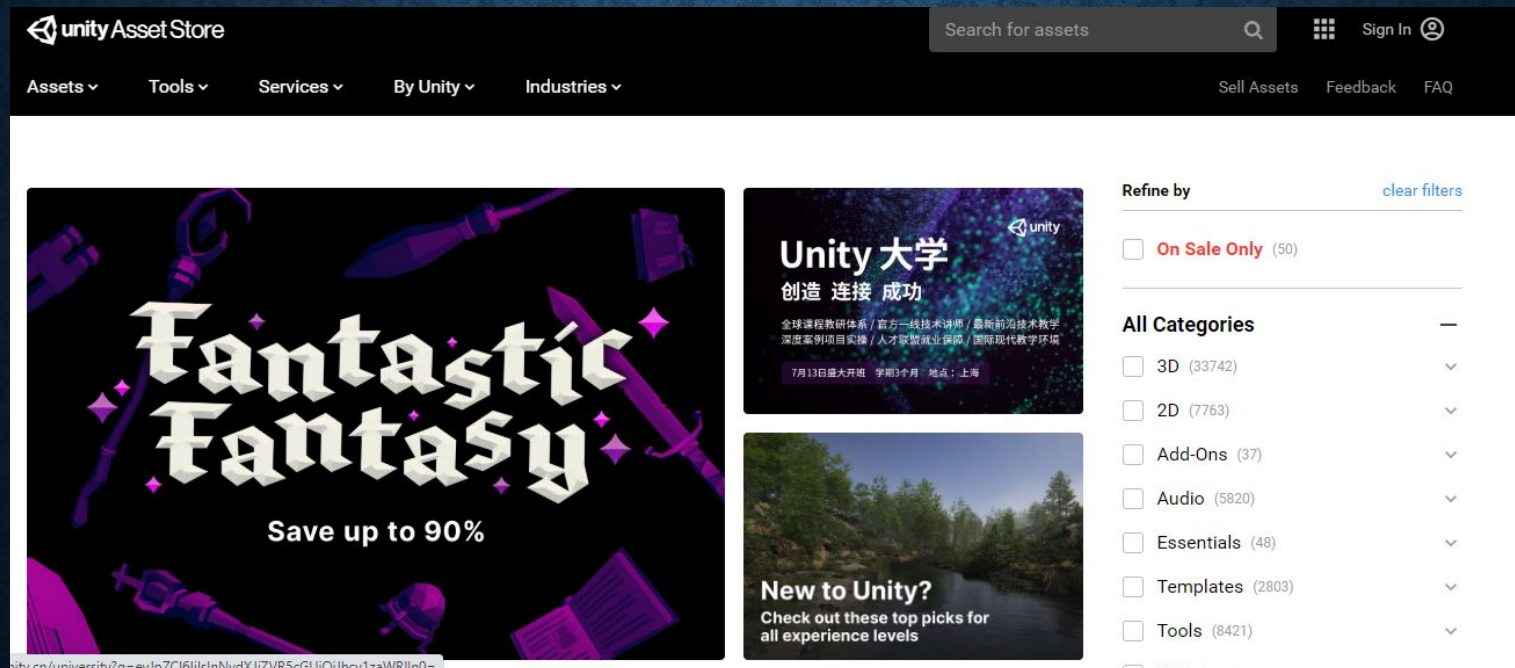
- Lights - Unity Official Tutorials
- <https://www.youtube.com/watch?v=u5DNkxkXBeI>
- https://www.youtube.com/watch?v=eGu9_8HS2uI

Materials and Textures

- Textures - Unity Official Tutorials
- <https://www.youtube.com/watch?v=-6iquaC0Hf4>
- Materials - Unity Official Tutorials
- <https://www.youtube.com/watch?v=IFlXvDZezB>

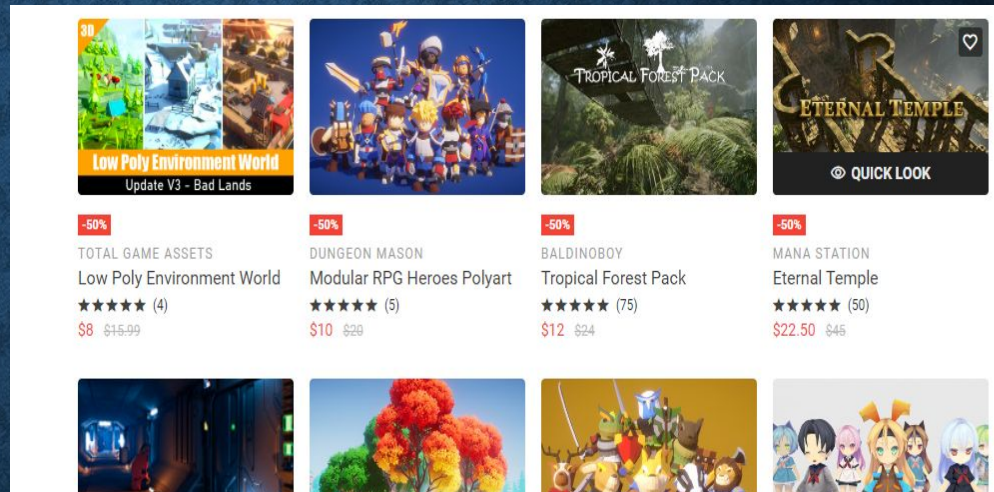
UNITY ASSETS

- <https://assetstore.unity.com/>



UNITY ASSETS TYPE

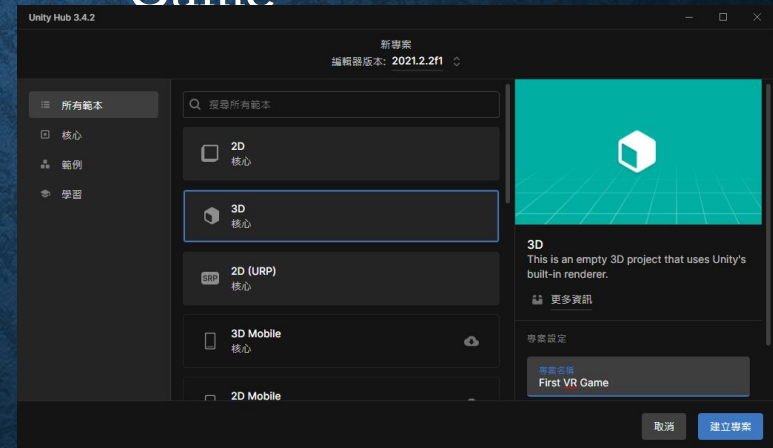
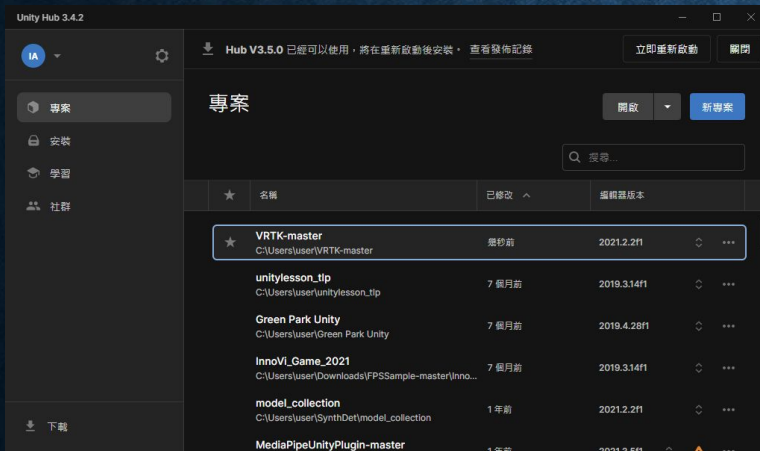
- 3D(33475)
- 2D(7628)
- Add-Ons(36)
- Audio(5696)
- Essentials(48)
- Templates(2732)
- Tools(8322)
- VFX(2378)



OVERVIEW OF VR UNITY GAME DEVELOPMENT

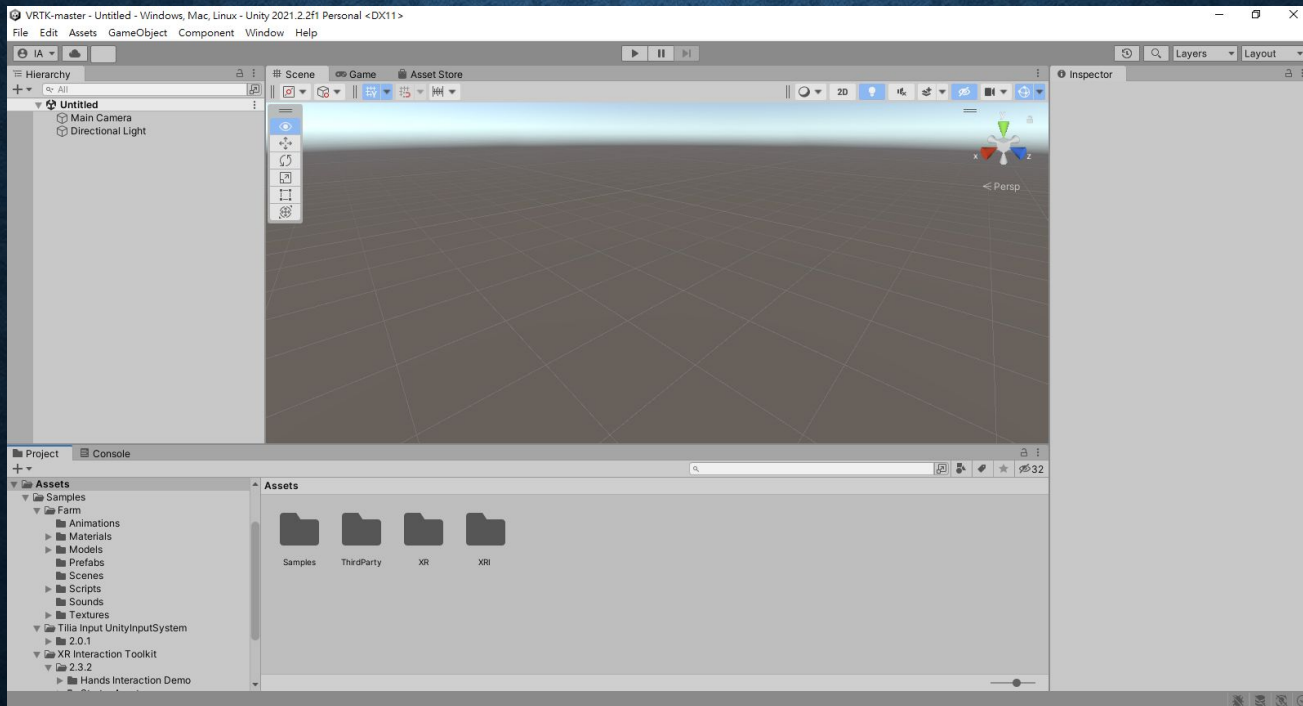
CREATE YOUR FIRST VR PROJECT

- Open Unity Hub
- Click New Project and named “First VR Game”



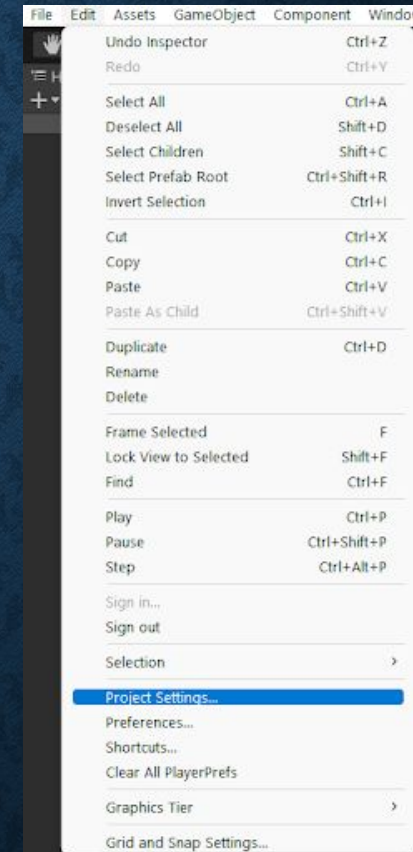
CREATE YOUR FIRST VR PROJECT

- A screen will be displayed.



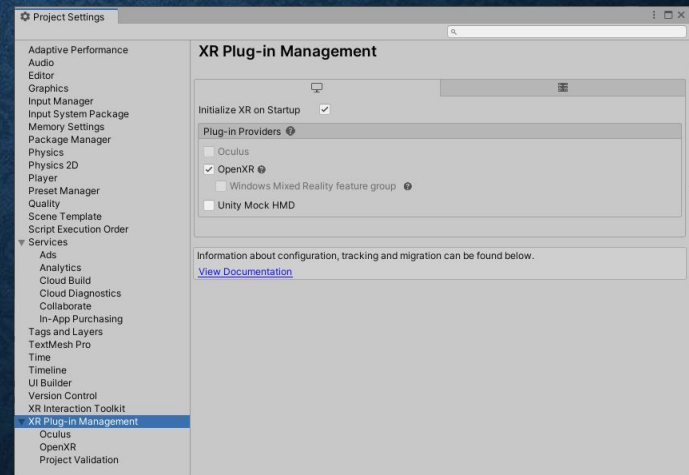
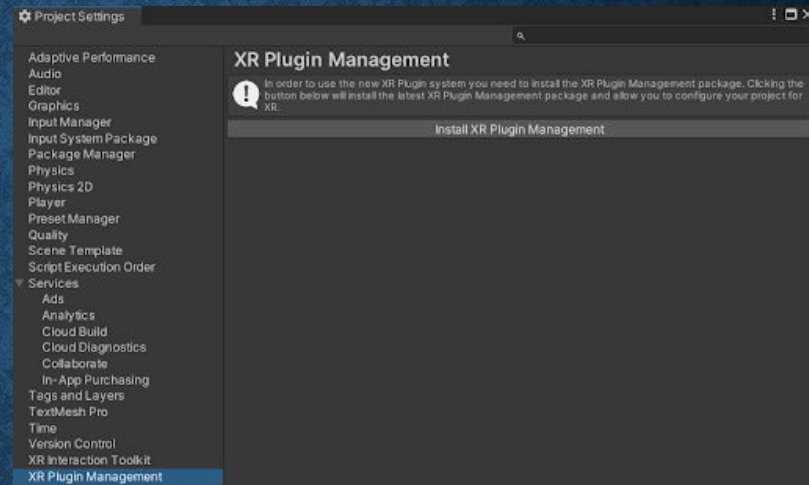
XR SETTINGS CONFIGURATION

- Go to Edit/Project Settings
- Click on XR Plugin Management (bottom left)



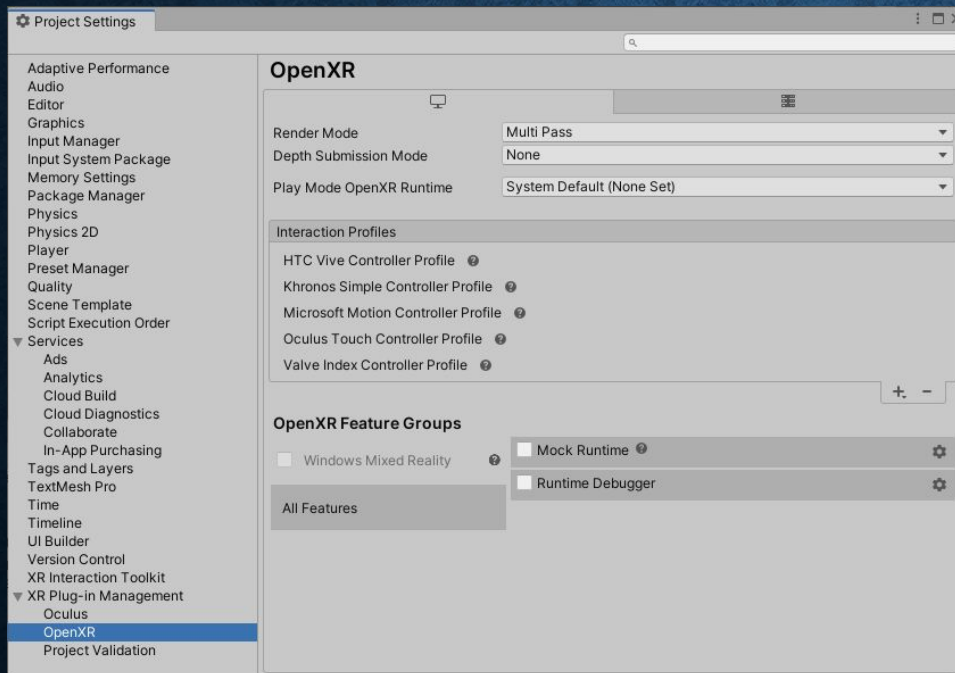
INSTALL OPENXR

- Click on Install XR Plugin Management
- Now the XR Plugin Management option will look like this:
- Install OpenXR in XR Plug-in Management



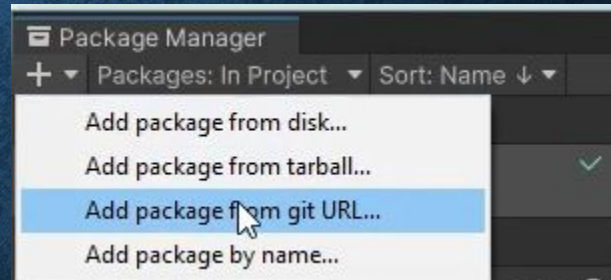
INSTALL OPENXR

- Go to OpenVR -> Change Render Mode to “Multi Pass”

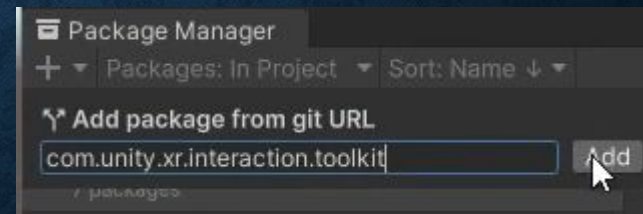


INSTALLING XR INTERACTION TOOLKIT

- Go to Window/Package Manager
- Click on the + button
- Select “Add package from git URL”



- Write “com.unity.xr.interaction.toolkit” and click on Add



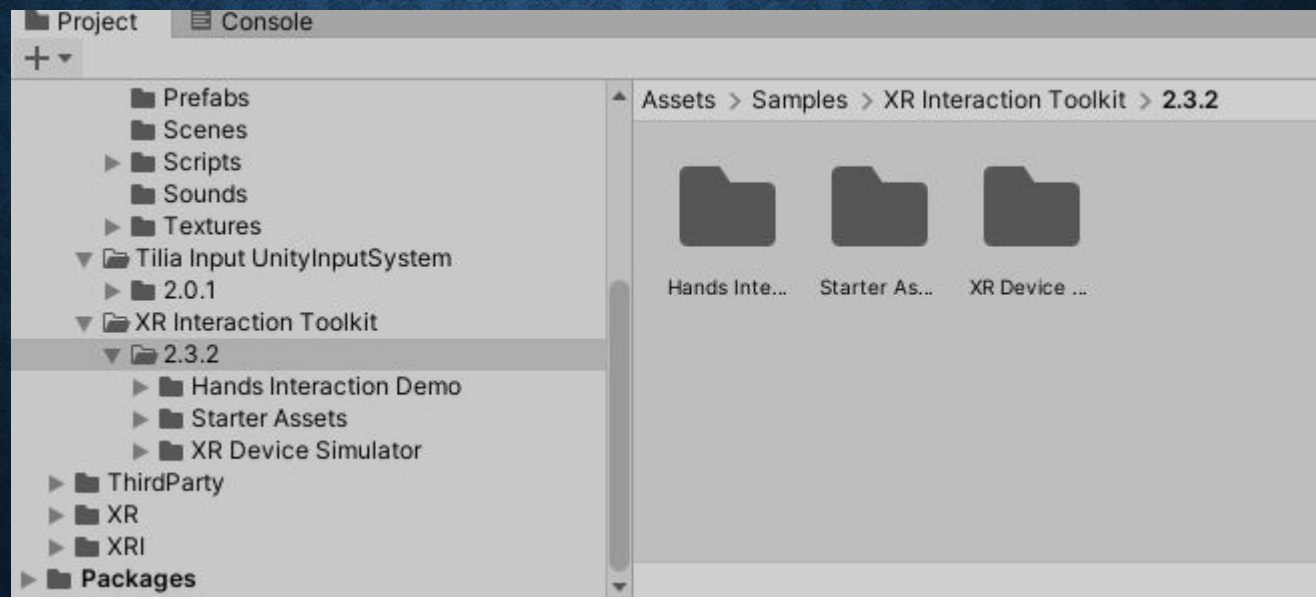
INSTALLING XR INTERACTION TOOLKIT

- After installed, select the package -> import the Starter Assets and XR Device Simulator



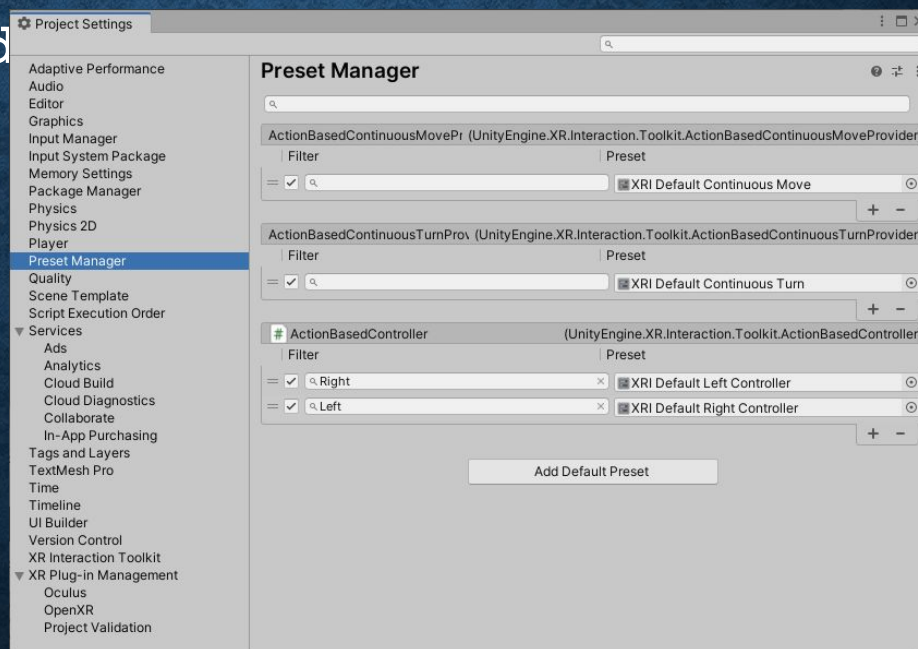
INSTALLING XR INTERACTION TOOLKIT

- After importing, you can see an folder named XR Interaction Toolkit



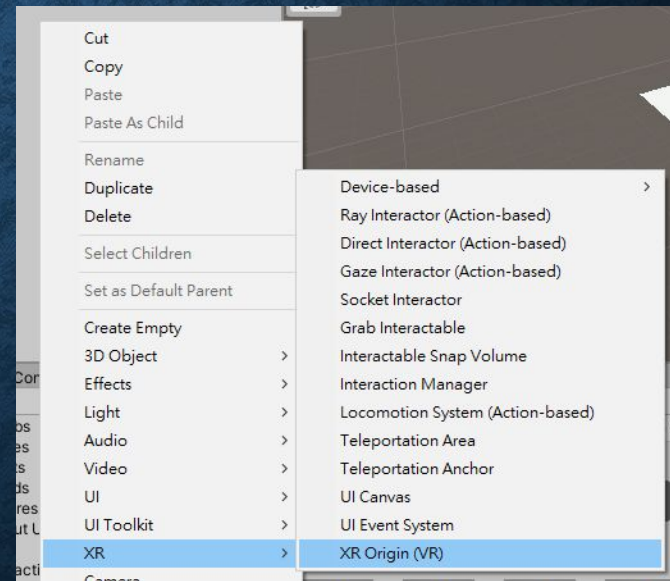
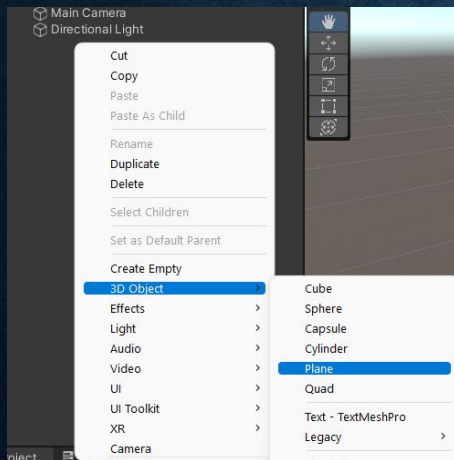
INSTALLING XR INTERACTION TOOLKIT

- Go to Edit/Project Settings/Presets Manager and write "Right" and "Left" for the corresponding Action Controllers (see image below, bottom middle)



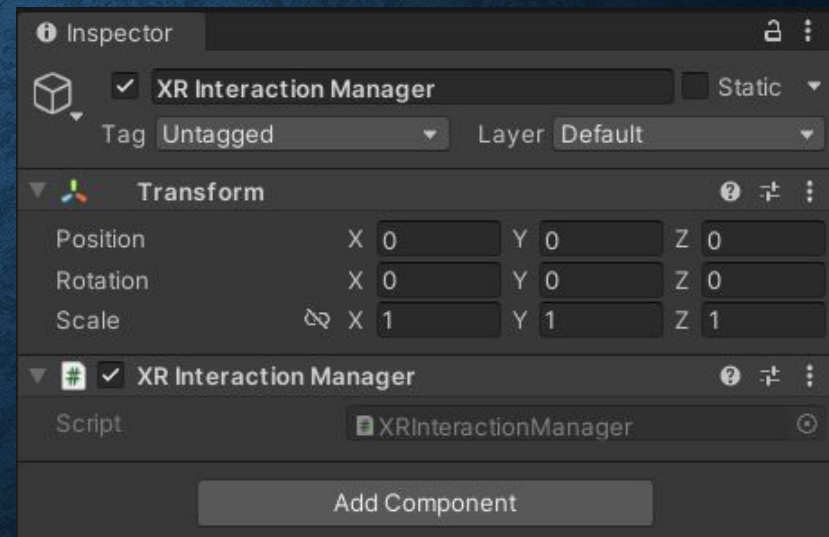
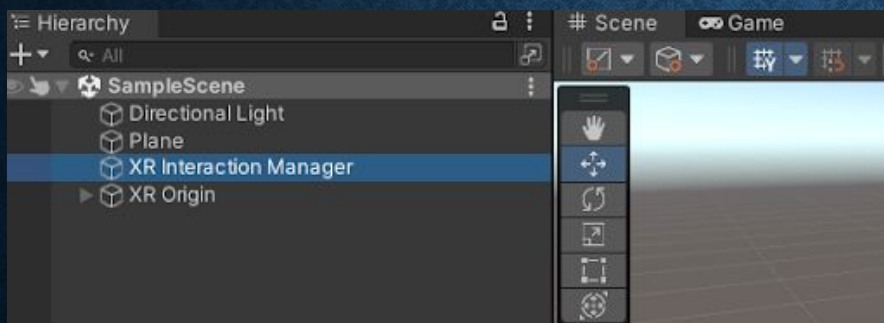
XR START

- Create a plane
- Click again on an empty space in the hierarchy to create a XR origin (VR) game object



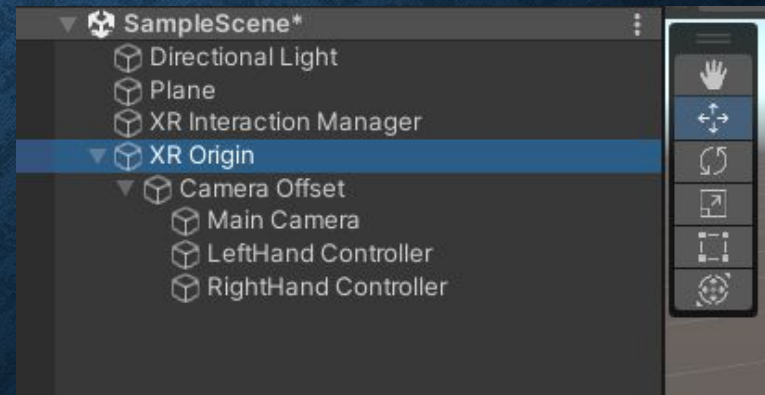
XR START

- The XR Interaction Manager game object that contains the script with the same name is automatically imported



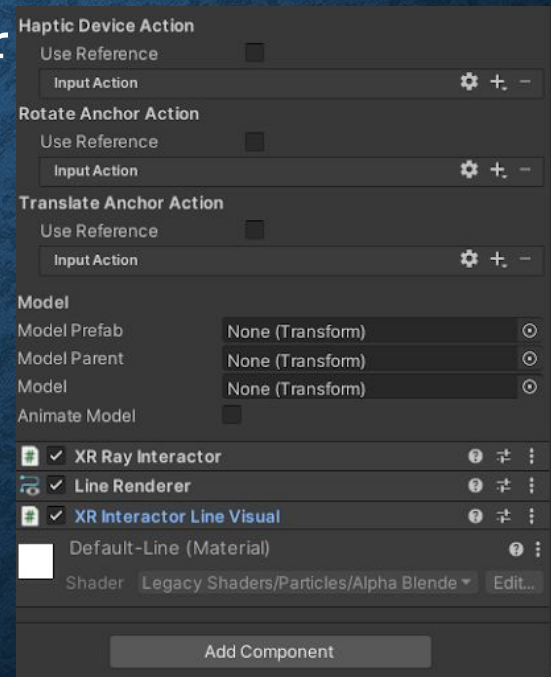
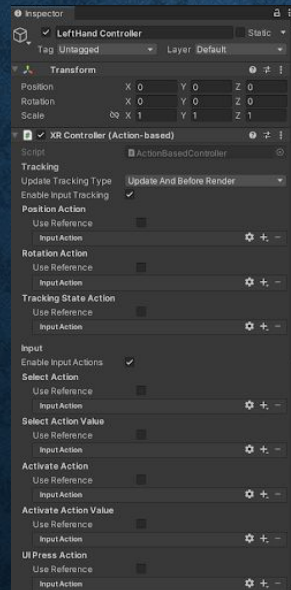
INPUT ACTION MANAGER

- Add the “Input Action Manager” component
- Click on the Action Assets option
- Click on the plus button at right
- Add the XRI Default Input Actions file



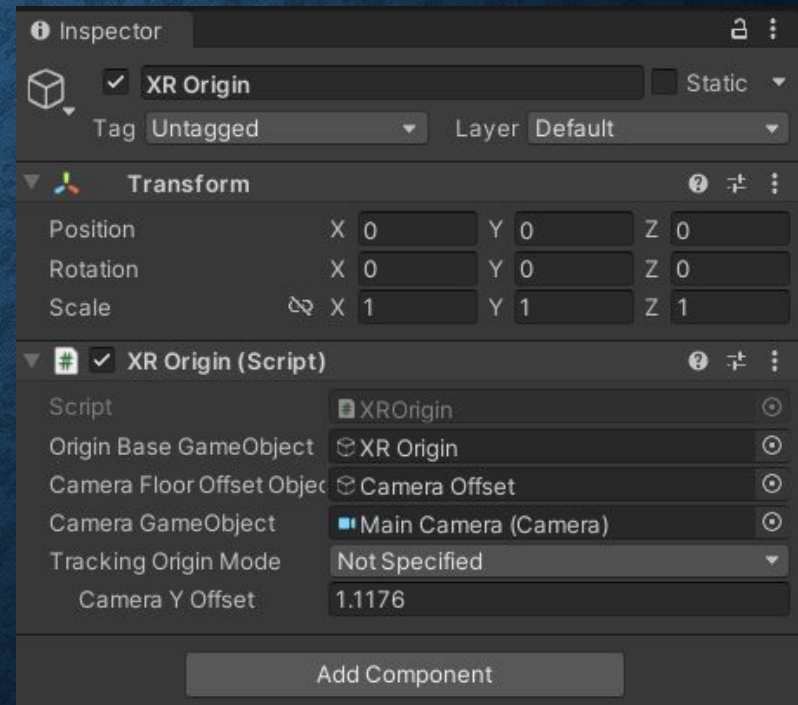
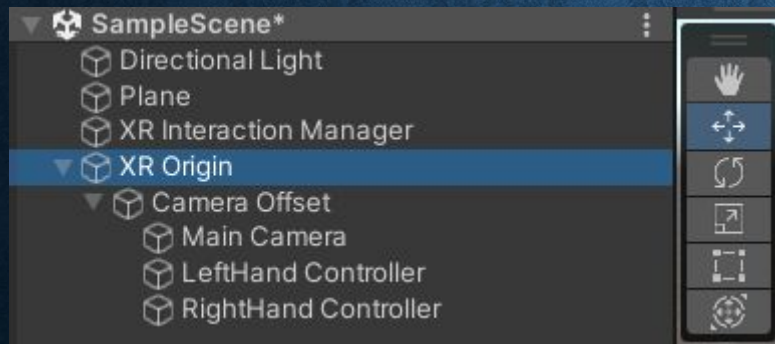
LEFT AND RIGHT HAND CONTROLLERS

- Both Left and Right Hand Controllers must have the following actions configured in the inspector



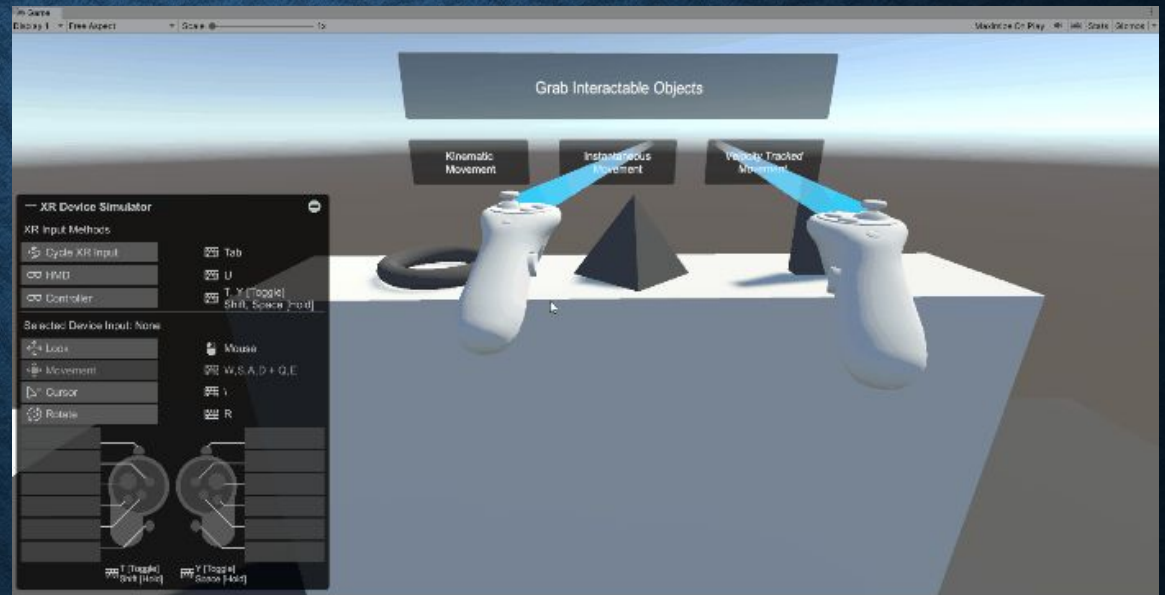
XR ORIGIN

- And XR Origin must look something like this:



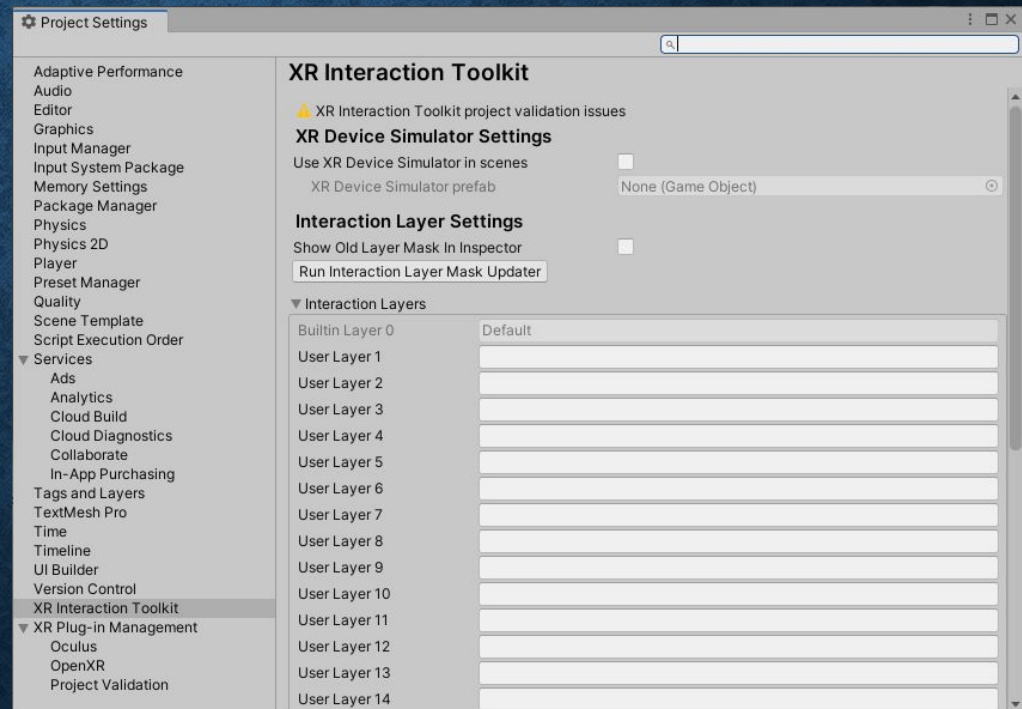
XR DEVICE SIMULATOR OVERVIEW

- The XR Device simulator is a runtime utility that is included as part of the Samples add-on in this package. This utility lets you simulate user inputs from plain key presses (be it from a keyboard and mouse combo or a controller) to drive the XR headset and controller devices in the scene.



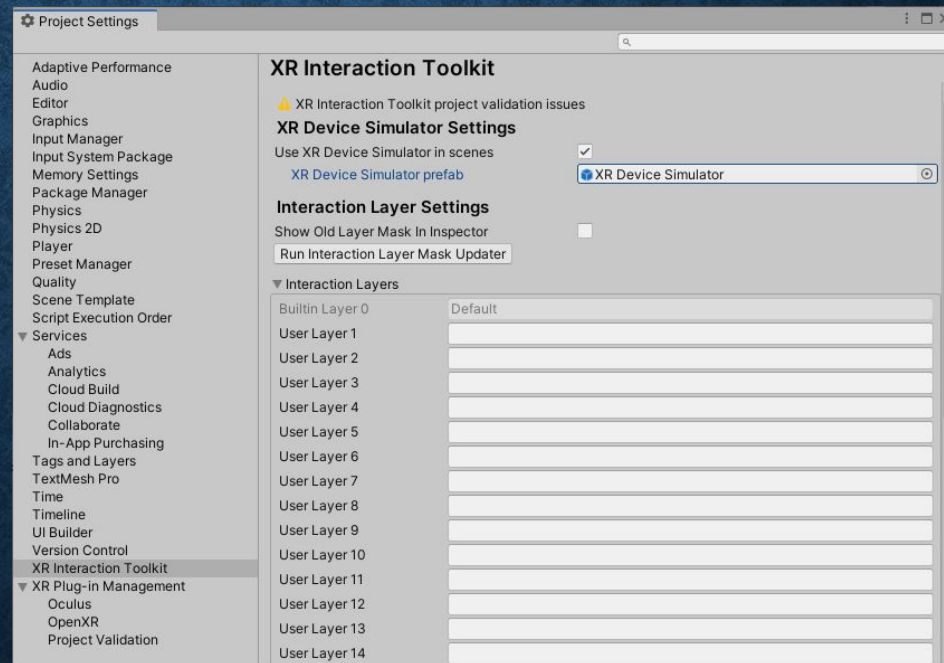
SET XR EMULATOR

- Open Edit>Project Settings -> Click XR Interaction Toolkit



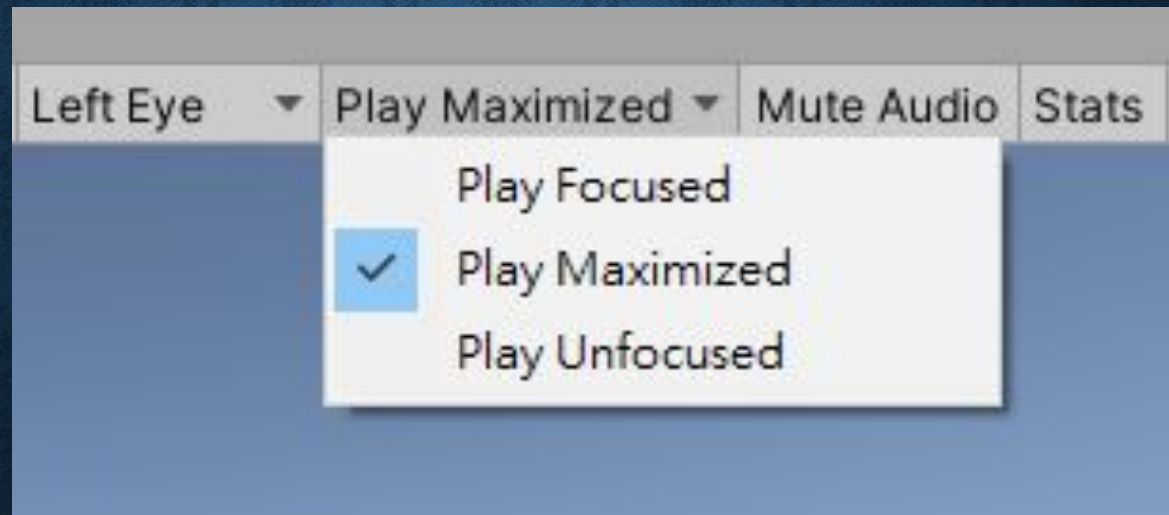
SET XR EMULATOR

- Enable “Use XR Device Simulator Settings”



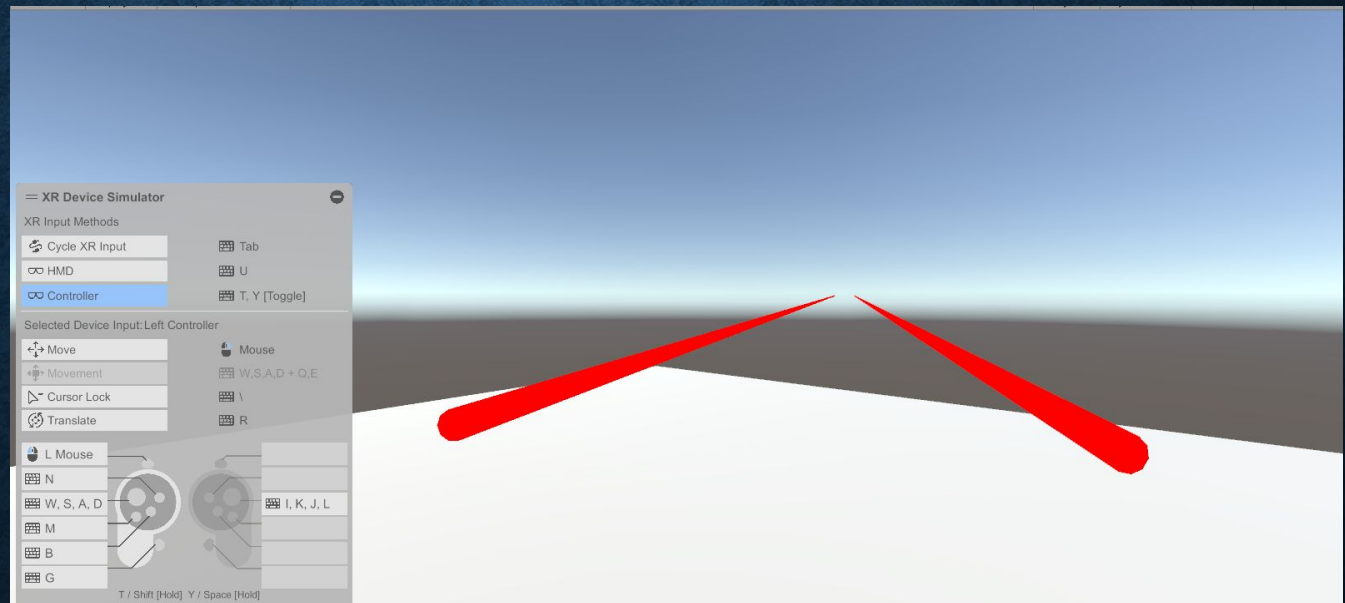
SET XR EMULATOR

- Open the game in Maximized mode



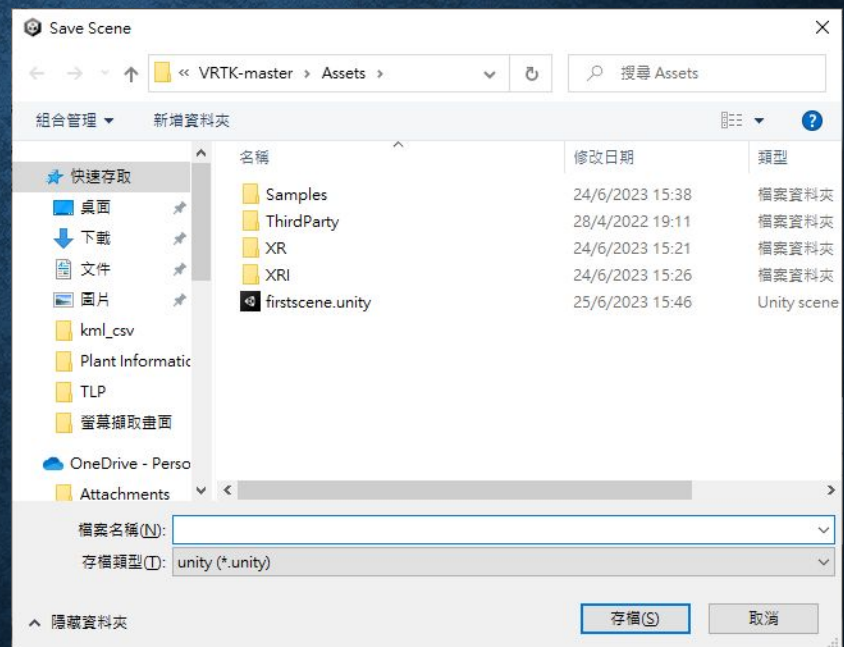
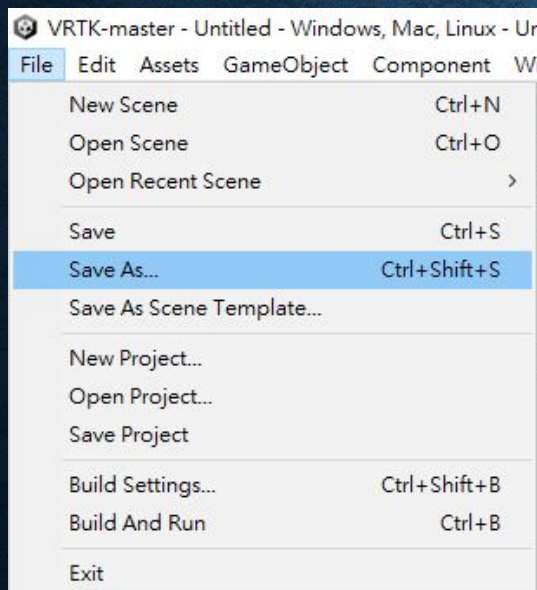
SET XR SIMULATOR

- Click Run and test the simulator



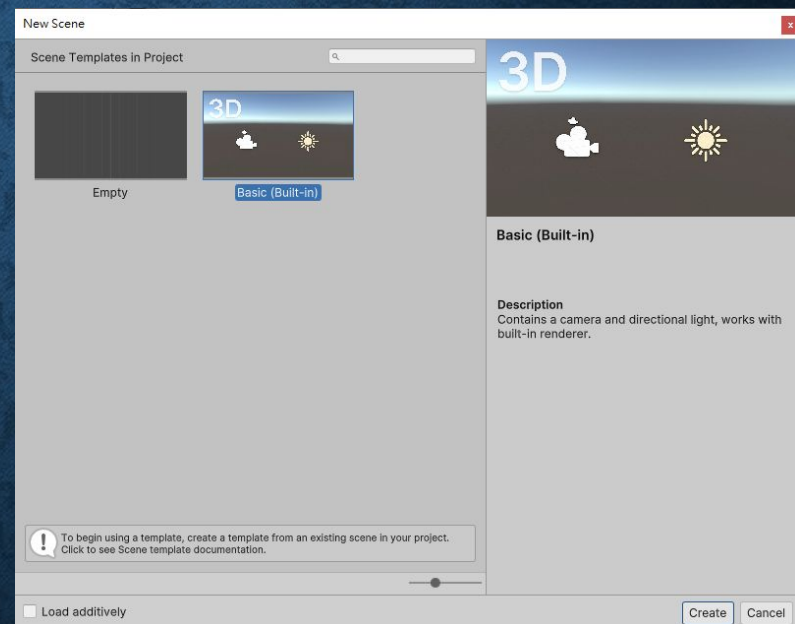
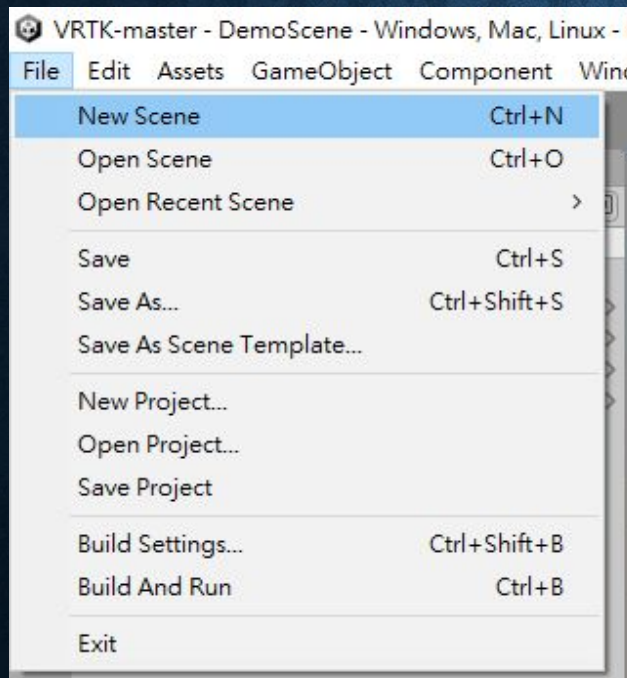
SAVE SCENE

- Click File -> Save As -> enter name “firstscene”



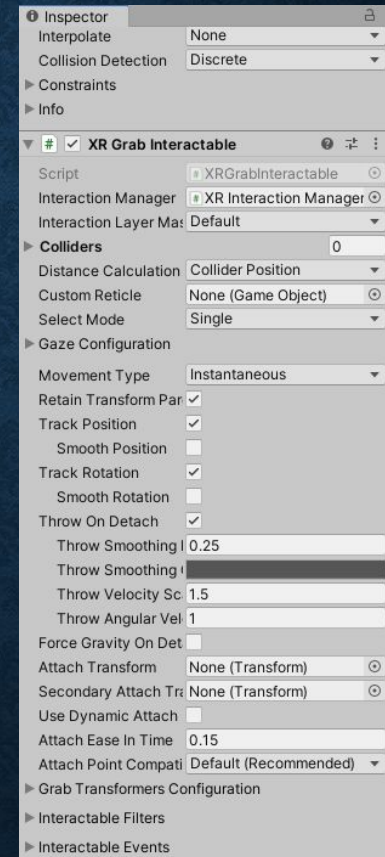
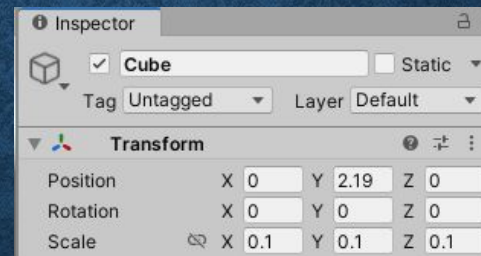
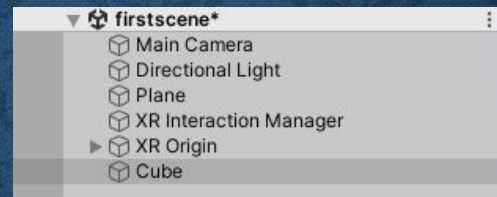
START A NEW PROJECT

- Create a New Scene and select Basic(Built-in)



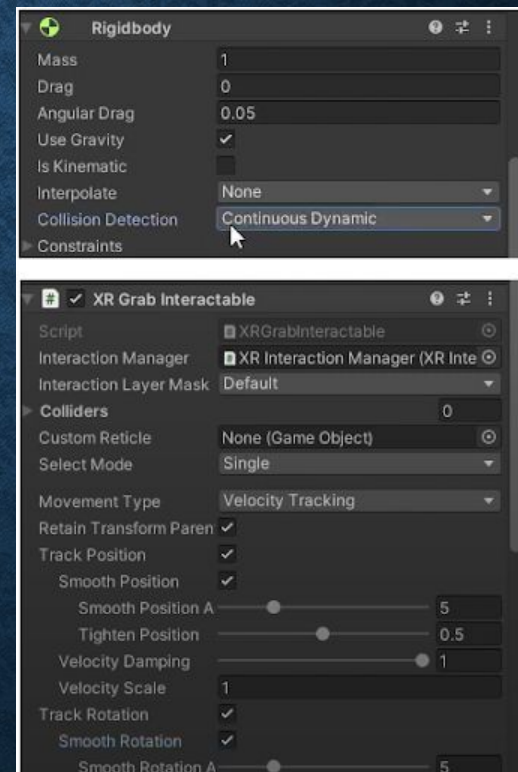
MOVE AROUND A VR SCENE

- Use Grabbable objects
- Start a new scene
- Create a cube
- Modify its scale to 0.1
- While the cube is select in hierarchy, add a XR Grab Interactable component in the inspector



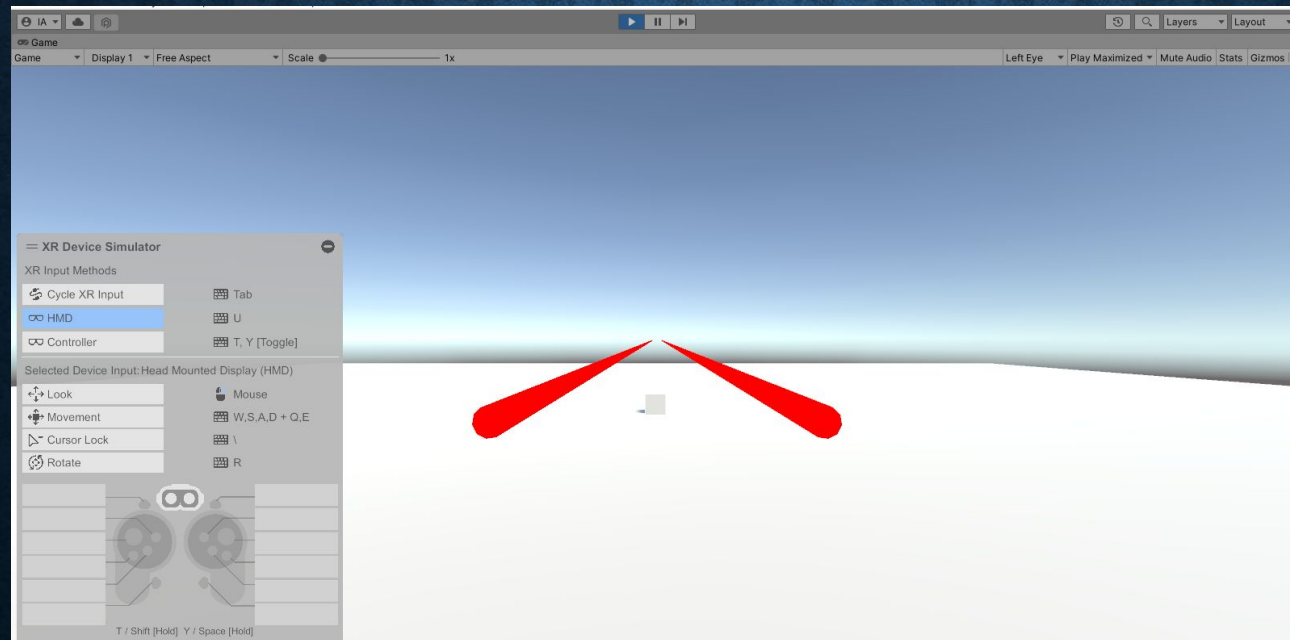
MOVE AROUND A VR SCENE

- For better performance:
- Modify Movement Type to Velocity Tracking
- Enable Smooth Position and Rotation
- Rigidbody: change Collision Detection to Continuous Dynamic



MOVE AROUND A VR SCENE

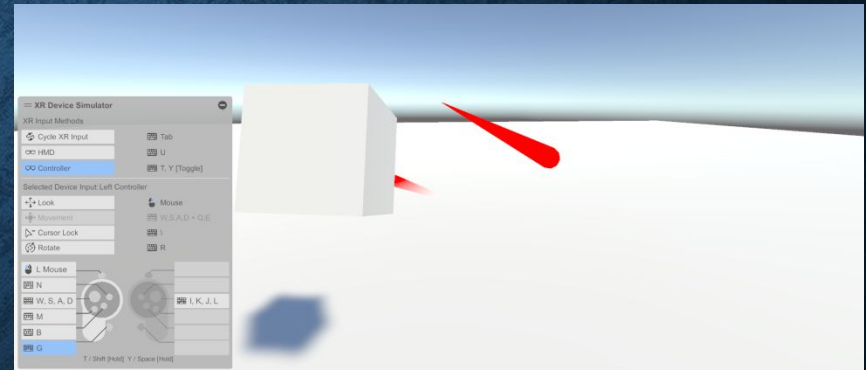
- Click play



MOVE AROUND A VR SCENE

- Click W,A,S,D to move the camera
- Click T to control left controller

Click G to drag the cube



OVERVIEW OF VR GAME MARKET

VR BACKGROUND

- VC firm Andreessen Horowitz (a16z) has published a [gamers' survey](#) conducted by Robin Guo and Games Investment Partner. Over 2,000 U.S.-based gamers of various ages, races, genders, and incomes participated in the study about their gaming habits and preferences.
- The majority Half of gamers surveyed use a console as their primary device for gaming; 18% prefer gaming on PCs, and 28% play on phones. Tablet and VR devices are used more infrequently.
- Only 6% of the 2,128 gamers play on VR every day, while 65% rarely use VR consoles. The most [popular gaming](#) device for everyday use is a mobile phone.

VR GAME BACKGROUND

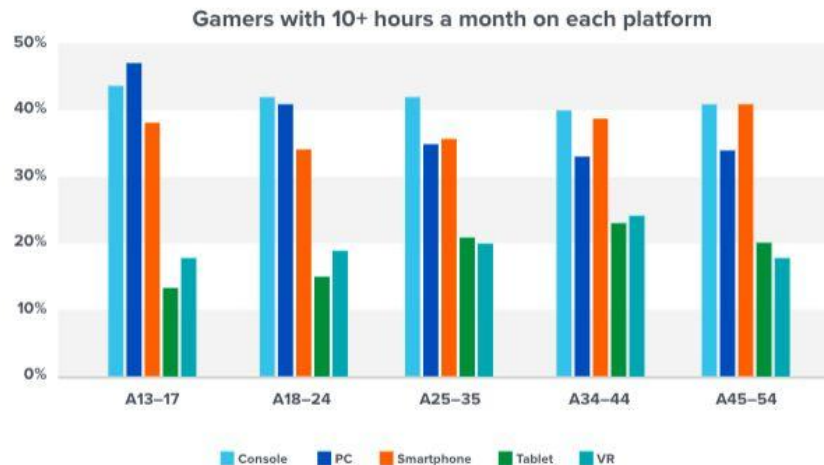
Only 6% of the 2,128 gamers play on VR every day, while 65% rarely use VR consoles. The most popular gaming device for everyday use is a mobile phone.

Platform	Everyday	1–3/Week	1–3/Month	Rarely
Console	28%	39%	15%	17%
PC	25%	28%	13%	33%
Mobile	58%	27%	7%	7%
Tablet	18%	24%	11%	47%
VR	6%	18%	10%	65%

VR GAME BACKGROUND

Gamers aged 34–44 use VR devices more than any other age group and account for approximately a fourth of all VR gamers. On the other hand, 13–17 year-olds and gamers aged 45–54 are least interested in VR devices. However, the youngest generation still prefers VR to games on a tablet.

Platform usage changes generation to generation



VR GAME INTRODUCTION

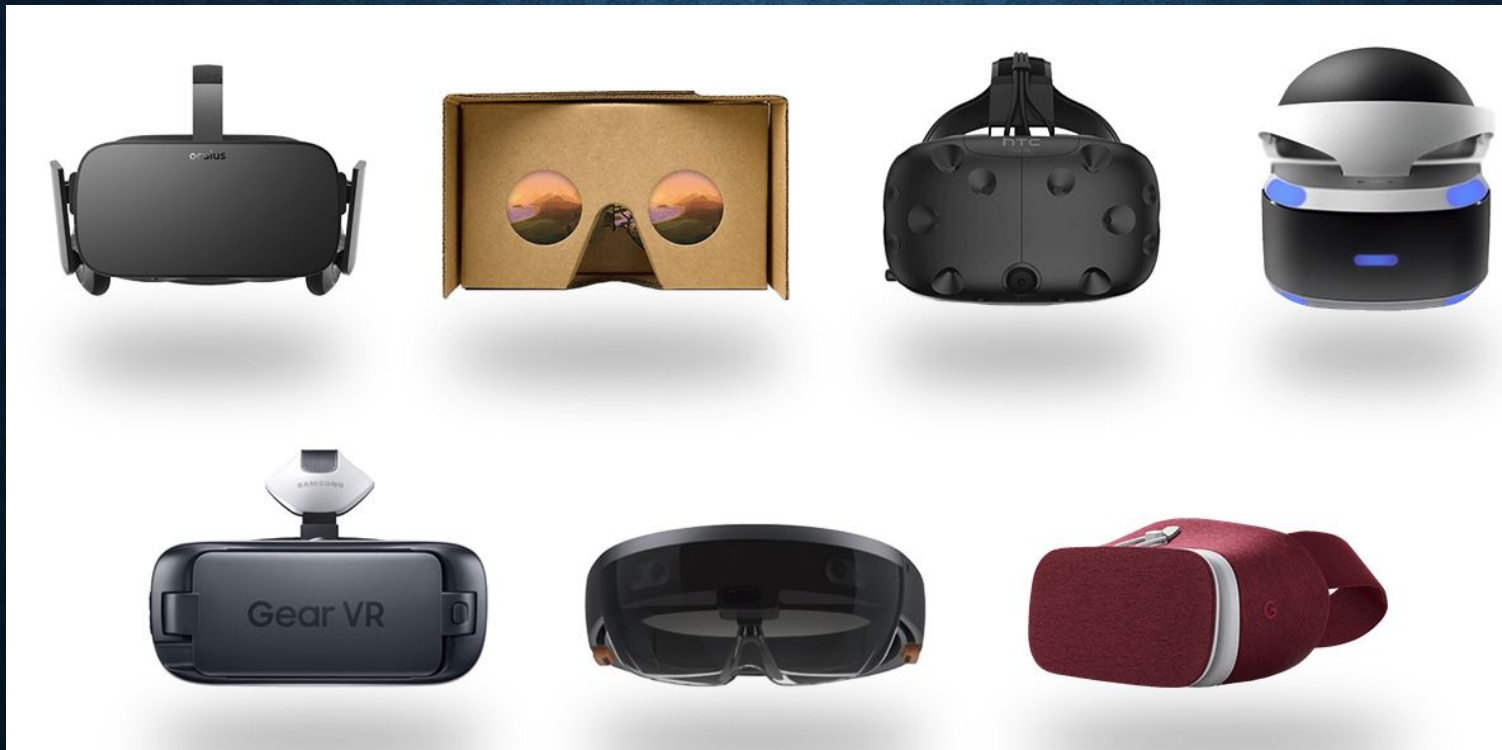
Leading the XR Revolution

Unity is the most widely used VR development platform, and over 91% of HoloLens experiences are Made with Unity.

Whether it's VR, AR, or MR, you can count on Unity's highly optimized rendering pipeline and the rapid iteration capabilities of our Editor to make your XR creative vision a reality.



VR HEAD



SETUP PROJECT



GEAR VR



- Install Android SDK
- osig
- <https://developer.oculus.com/osig/>
- Put into Project/Assets/Plugins/Android/assets/

Oculus Signature File (osig) Generator

Please [log in](#) to continue.

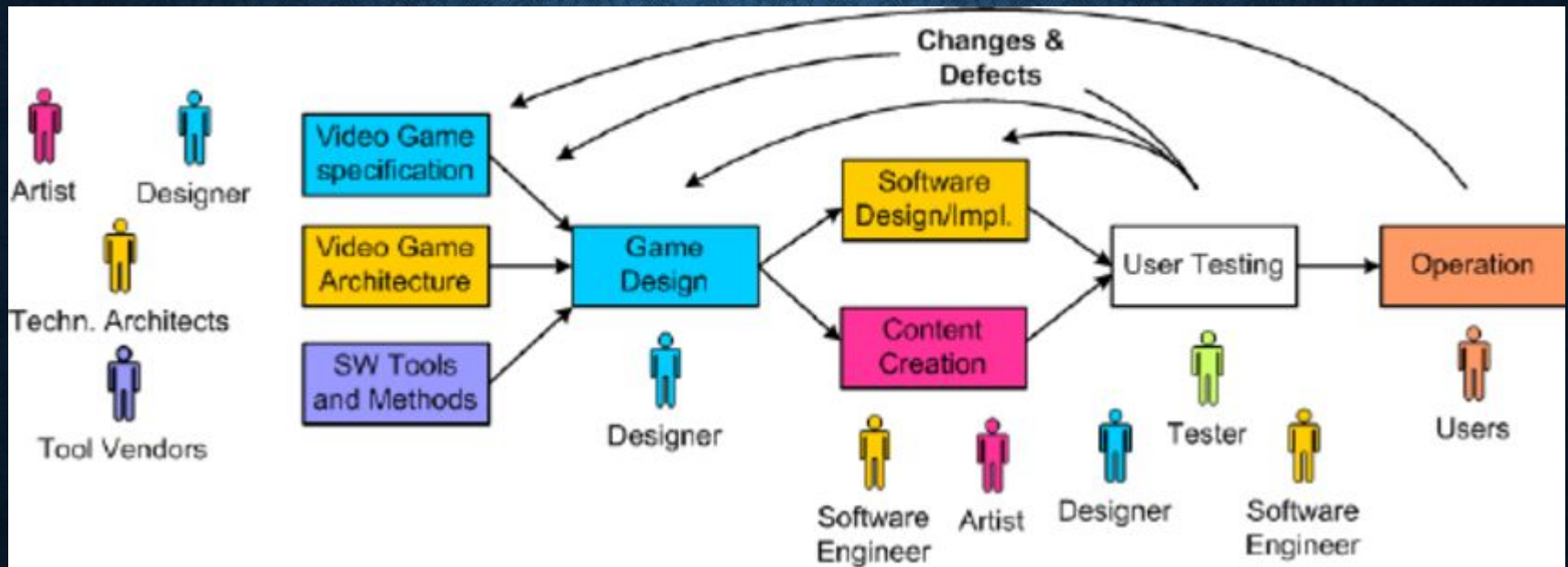
Device ID:

You must be logged in to enter your ID.

Download File

OVERVIEW OF GAME MARKET

GAME DEVELOPMENT FULL CYCLE



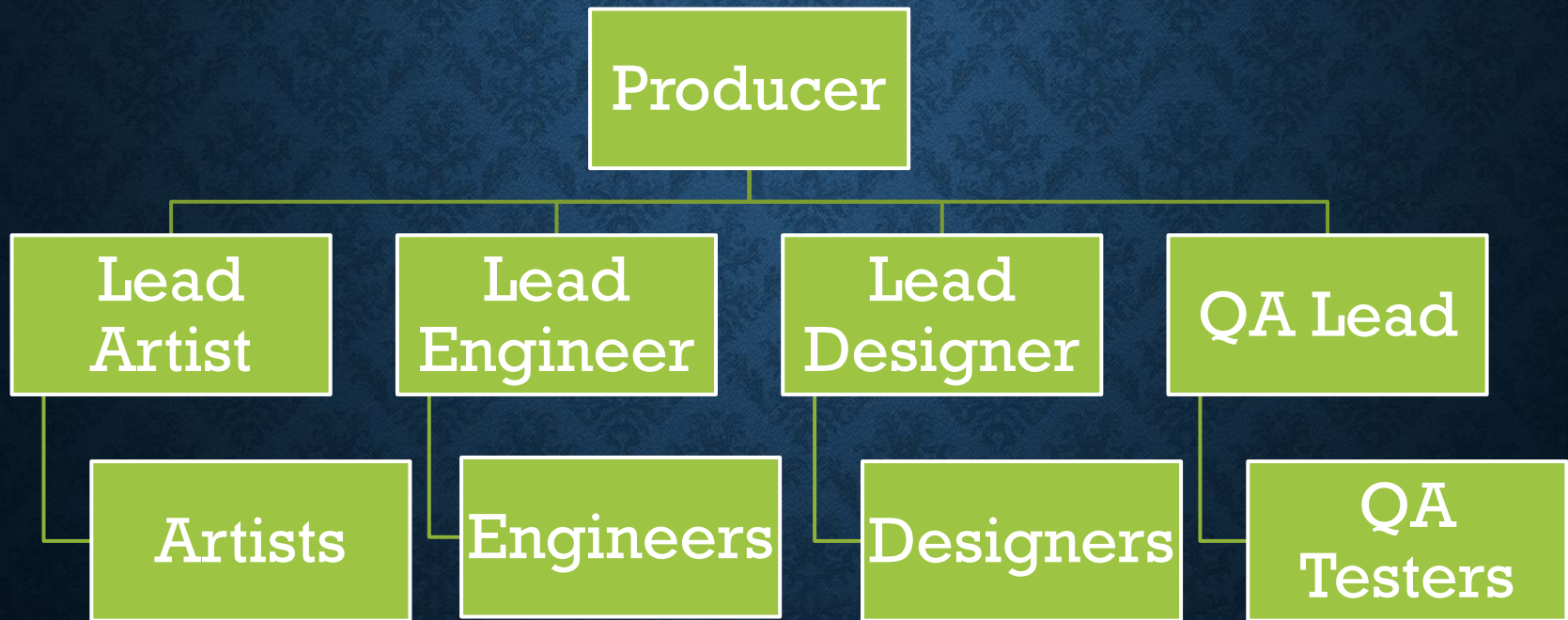
GAME DEVELOPMENT CYCLE

- **Game Art Principles**
- **Asset Management**
- **Scene Management**
- **Project Management**
- **User Interface**
- **Programming**
- **Materials And Effects :VFX**
- **Lighting**
- **Physics**
- **Audio**
- **Animation**
- **Navigation and Pathfinding**
- **Services**

TEAM ROLE

- Game artist
- Game developer
- Game programmer
- Game publisher
- IP
- Game Engine : Unity vs Unreal

SMALL TEAM WITH PRODUCER/LEAD STRUCTURE



LARGE TEAM WITH PRODUCER/LEAD STRUCTURE



TEAM WITH EXECUTIVE PRODUCER STRUCTURE



TERRAIN TOOLS SAMPLE ASSET PACK

- <https://assetstore.unity.com/packages/2d/textures-materials/terrain-tools-sample-asset-pack-145808>
- File size : 325.4 MB
- Latest version : 1.0
- Latest release date : May 23, 2019
- Support Unity versions : 2019.1.1 or higher

EXTRA UNITY MATERIALS

UNITY SCENE ASSETS

- Free Package
- <https://assetstore.unity.com/packages/3d/characters/easyroads3d-free-v3-987>
- <https://assetstore.unity.com/packages/3d/environments/roadways/windridge-city-132222>
- <https://assetstore.unity.com/packages/3d/environments/3d-scifi-kit-starter-kit-92152>

QUICK PROTOTYPING TOOLS

- ProBuilder -
<https://unity3d.com/unity/features/worldbuilding/probuilder>
- Realtime CSG -
<https://assetstore.unity.com/packages/tools/modeling/realtime-csg-69542>
- **MAST - Modular Asset Staging Tool** -
<https://assetstore.unity.com/packages/tools/level-design/mast-modular-asset-staging-tool-154939>