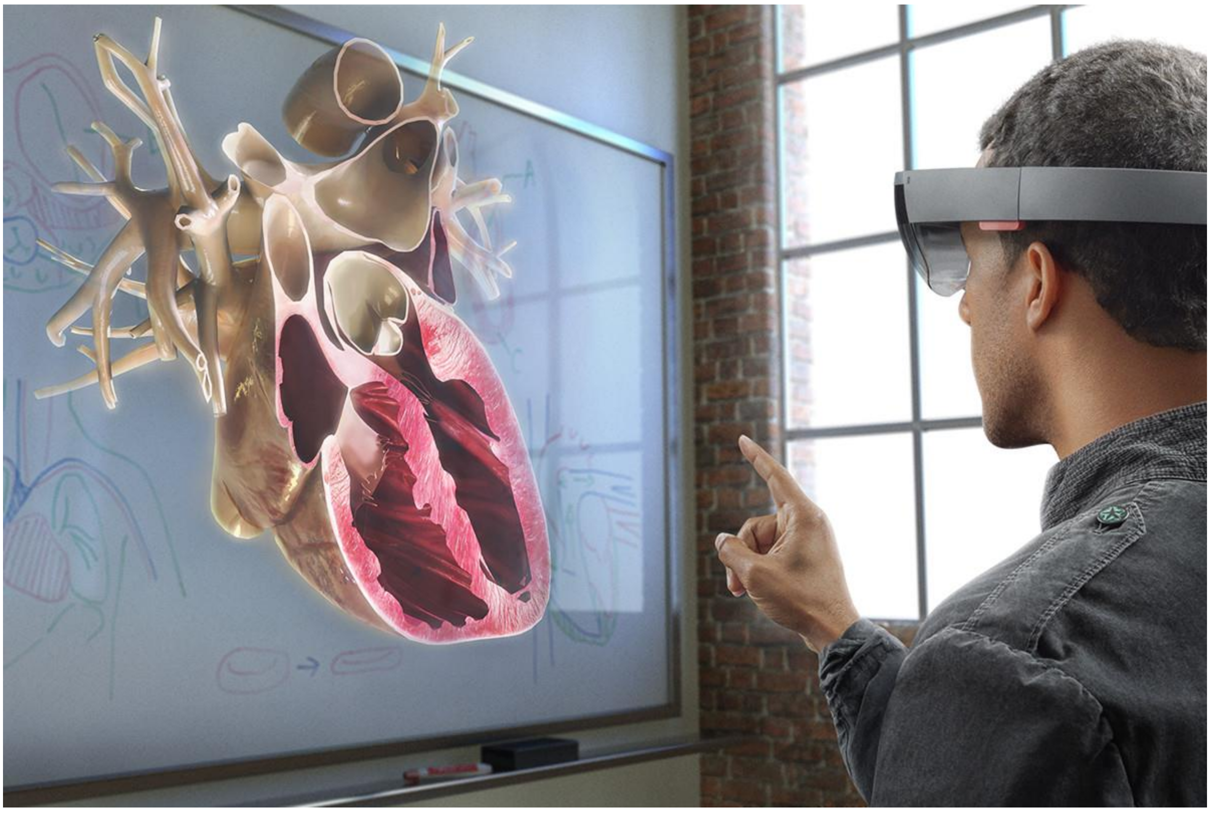
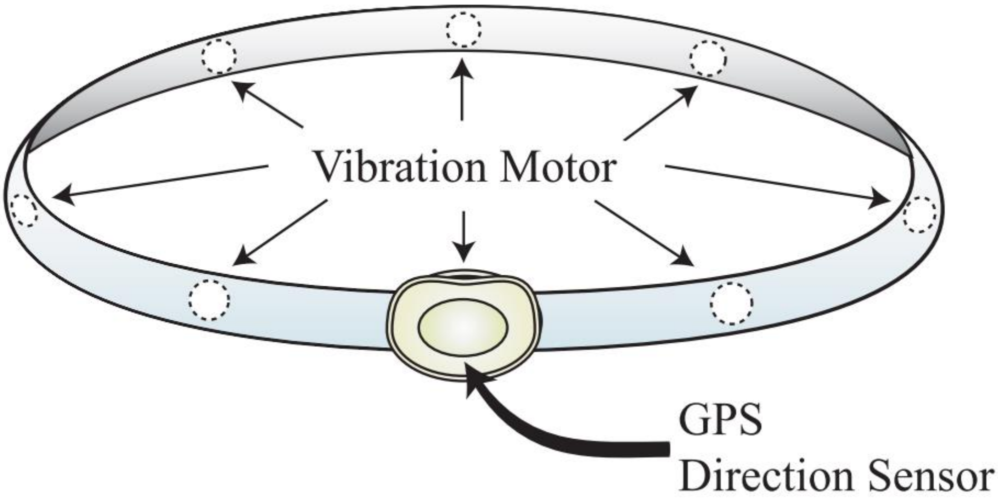
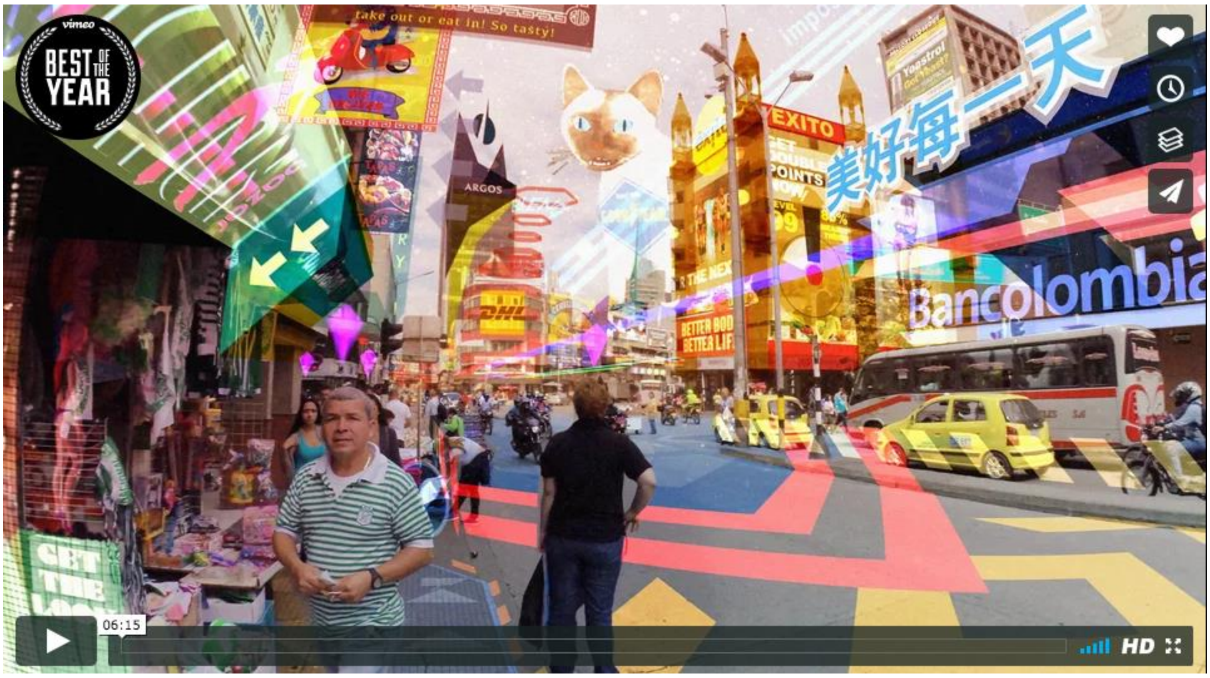
Chapter 1: Augment Your World

POKéMON
GO
Onix
PC 10

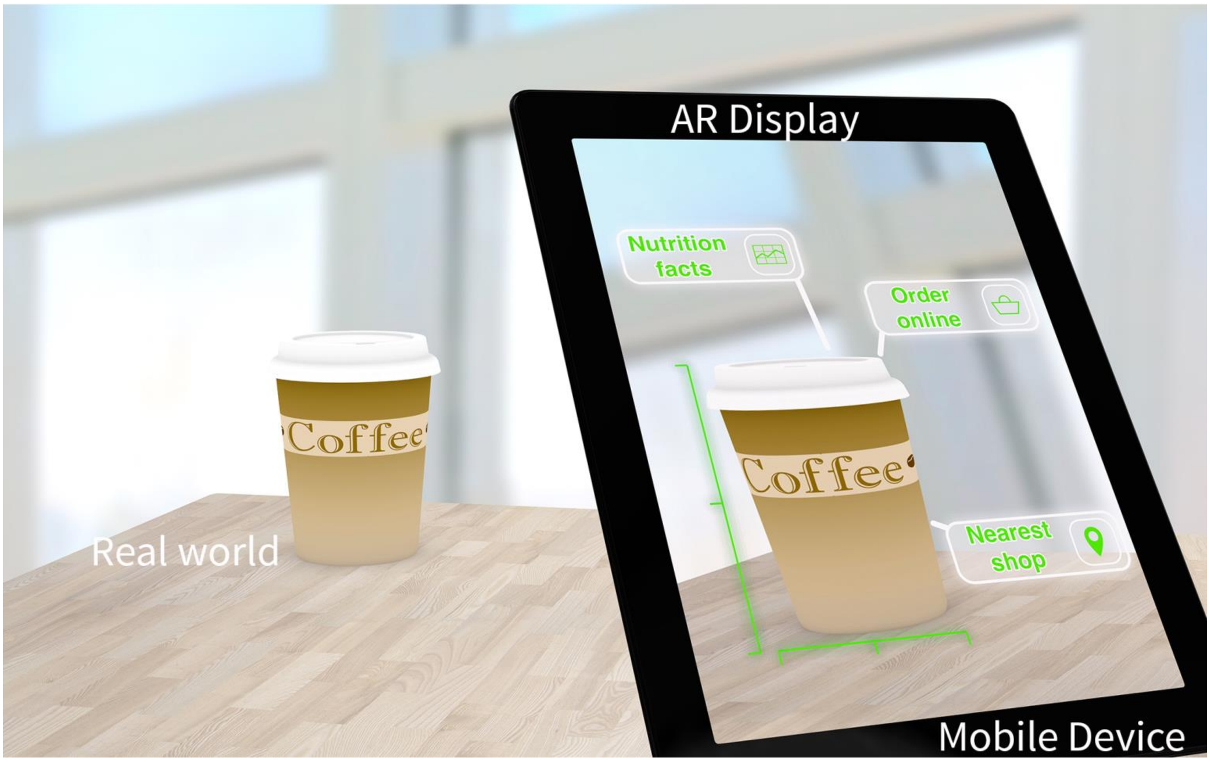



Vibration Motor
GPS
Direction Sensor

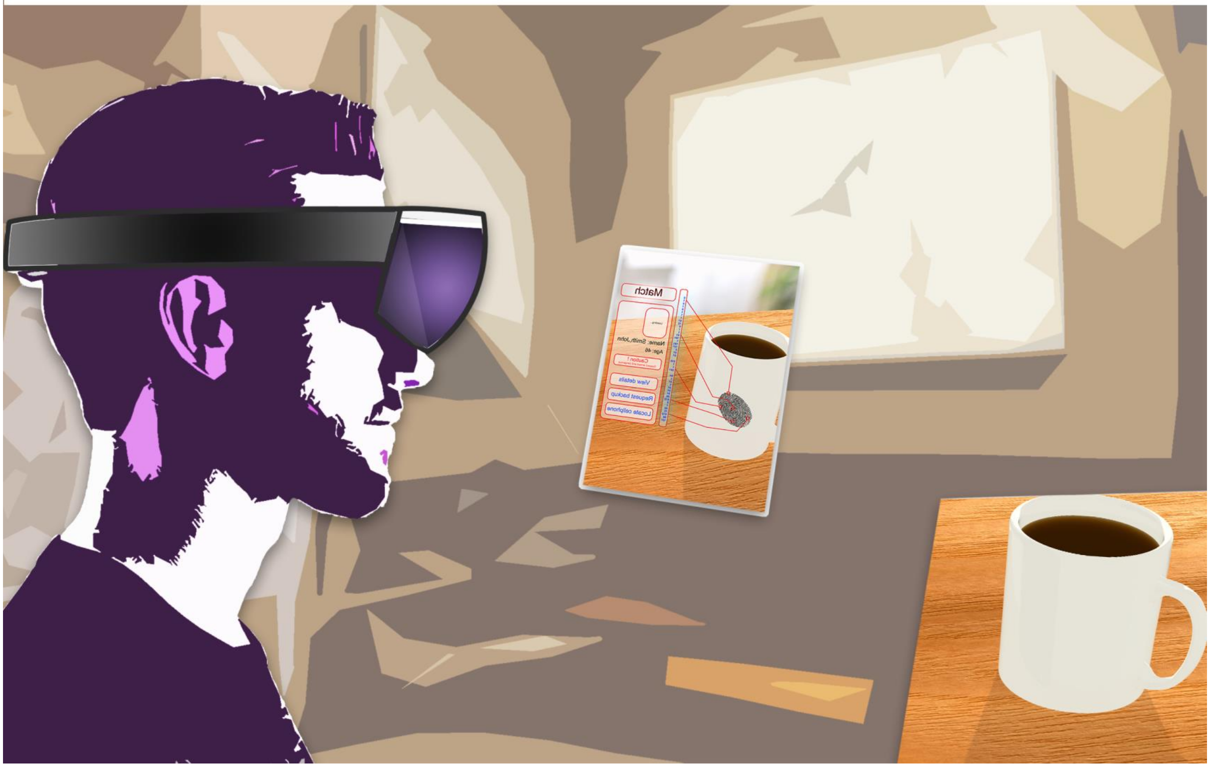

vimeo
BEST OF THE YEAR
take out or eat in! So tasty!
ARGOS
EXITO
美好每一天
Bancolombia
DHL
06:15
HD

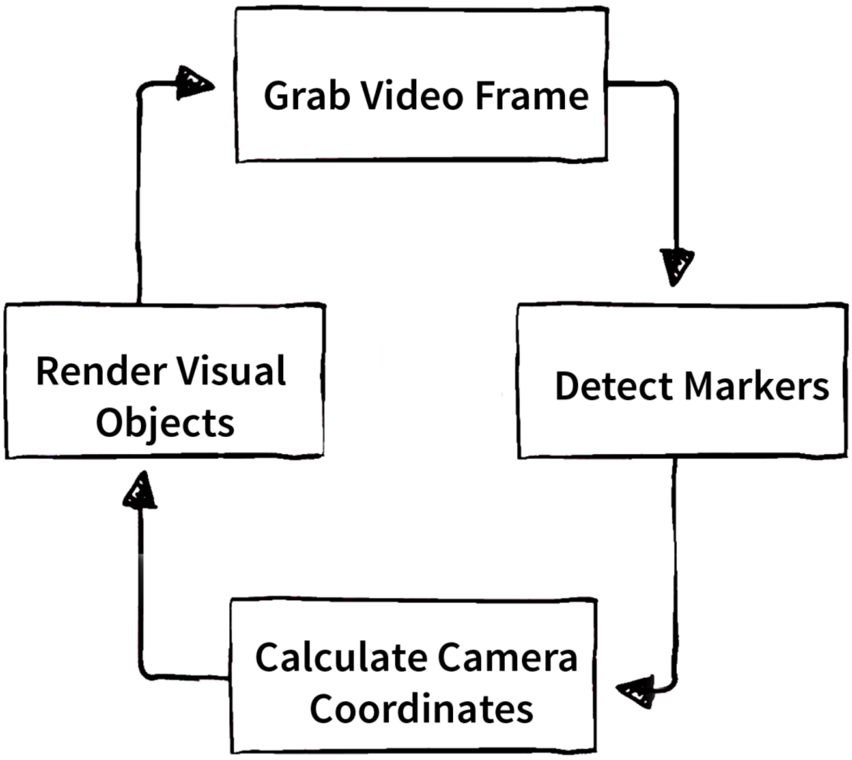
Handheld mobile video see-through

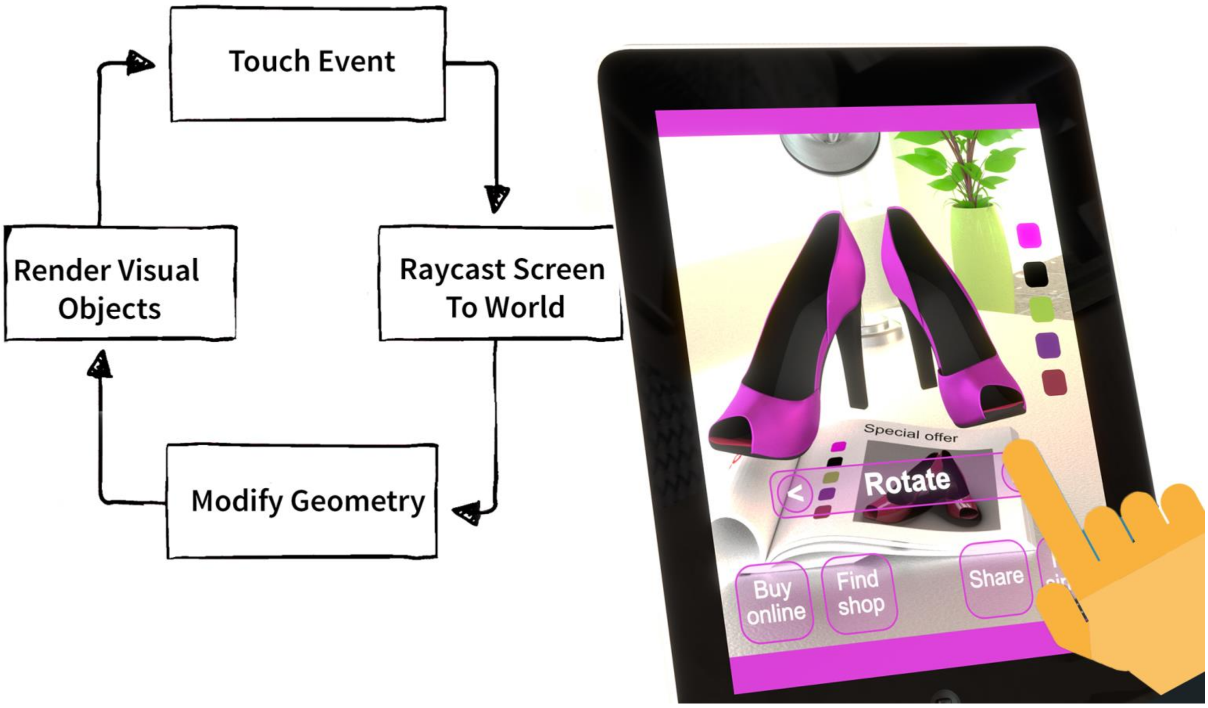
(Monocular)

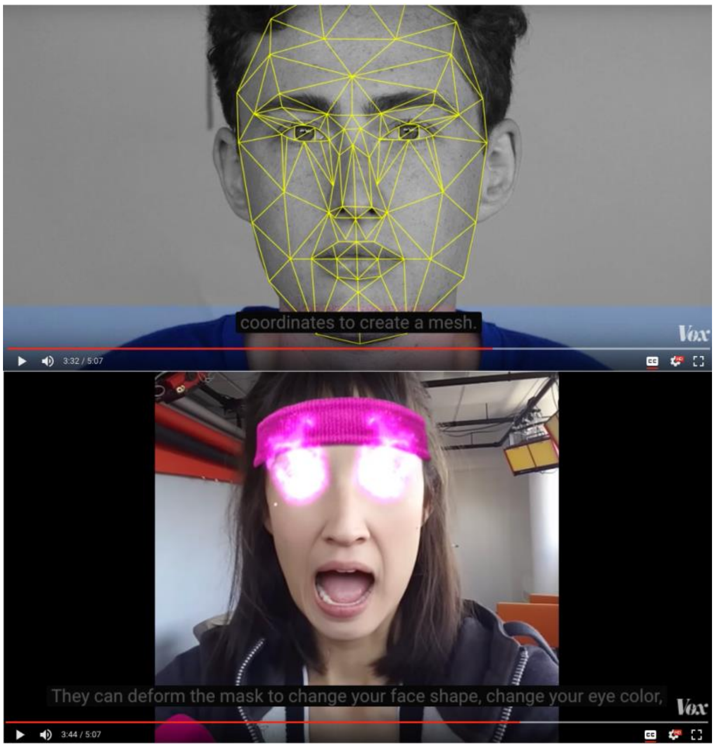

AR Display
Nutrition facts
Order online
Coffee
Coffee
Nearest shop
Real world
Mobile Device

Wearable near-eye optical see-through



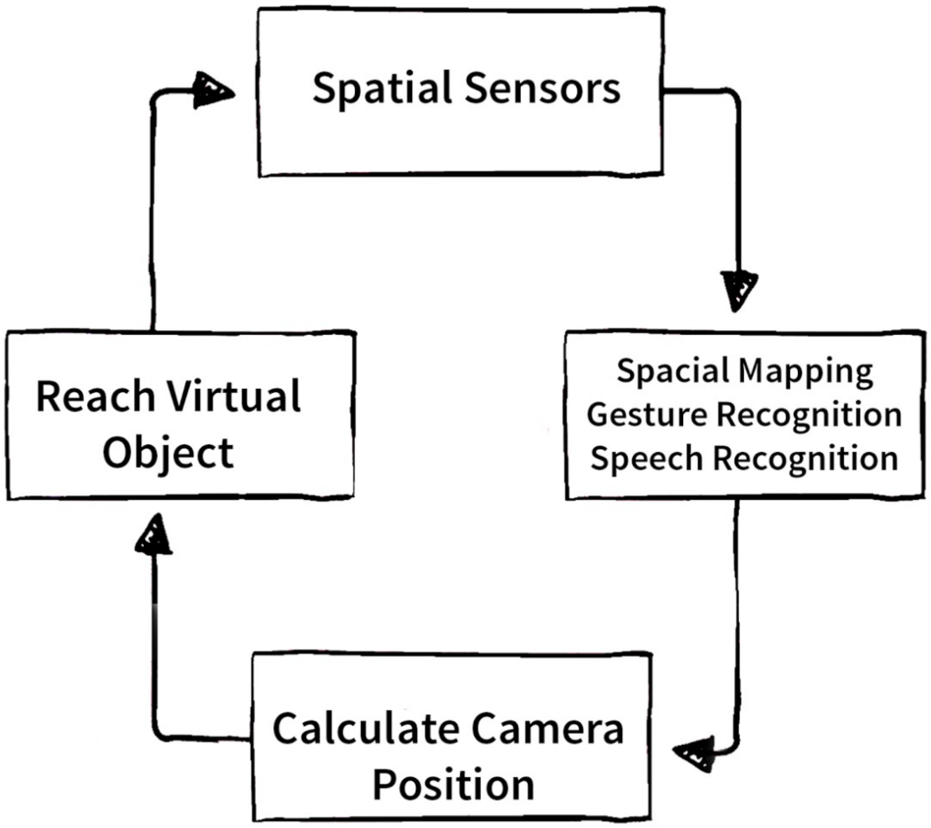

Grab Video Frame
Detect Markers
Calculate Camera Coordinates
Render Visual Objects


Touch Event
Raycast Screen To World
Modify Geometry
Render Visual Objects
Special offer
Rotate
<
Buy online
Find shop
Share

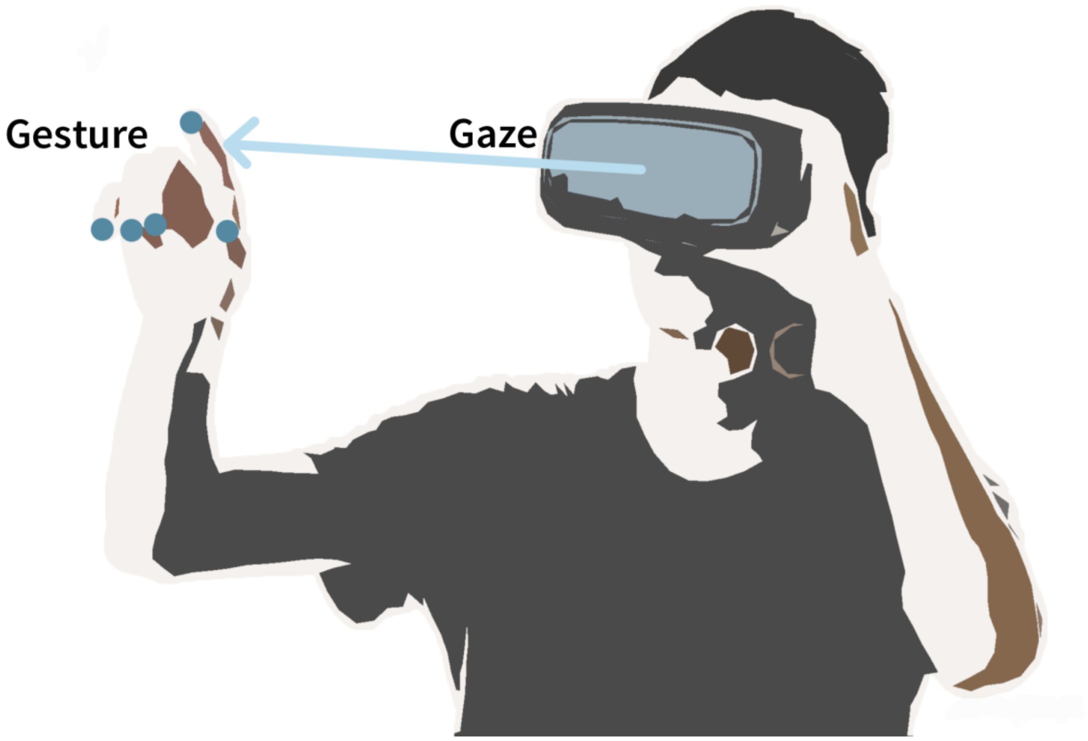

coordinates to create a mesh.

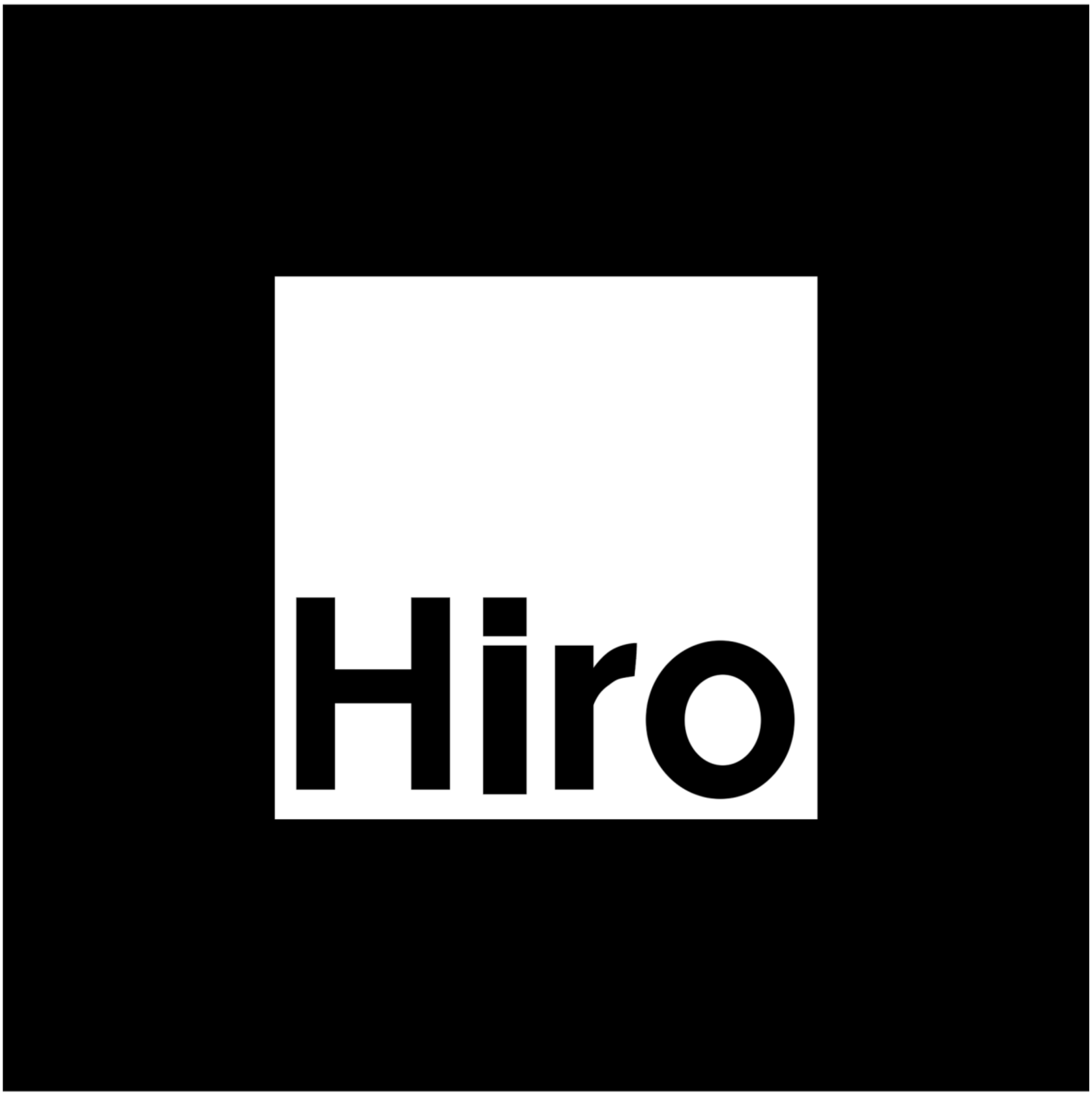
They can deform the mask to change your face shape, change your eye color,

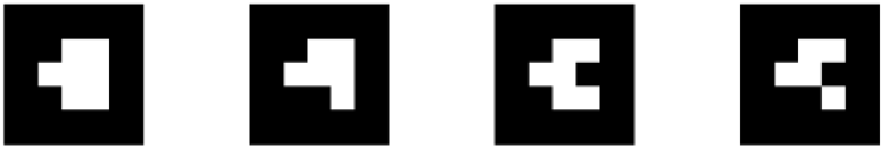
3:32 / 5:07
Vox
3:44 / 5:07
Vox

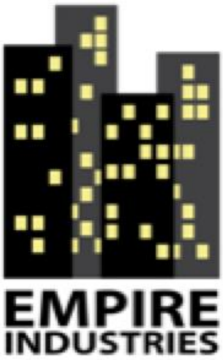

Spatial Sensors
Spacial Mapping
Gesture Recognition
Speech Recognition
Calculate Camera Position
Reach Virtual Object

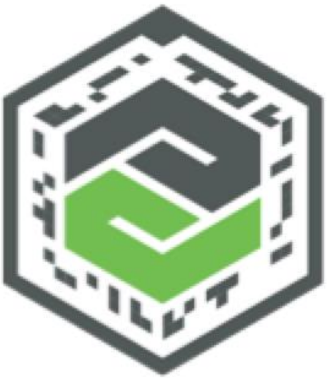
Input Interact

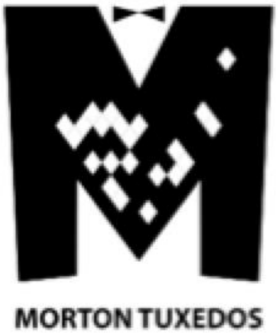

Gesture
Gaze

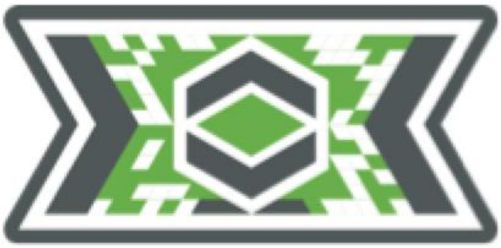

Hiro

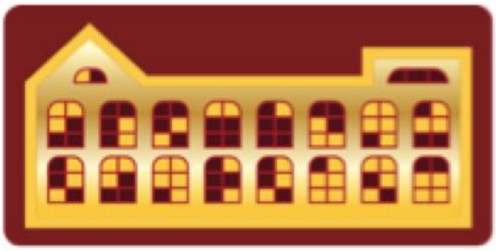



EMPIRE
INDUSTRIES



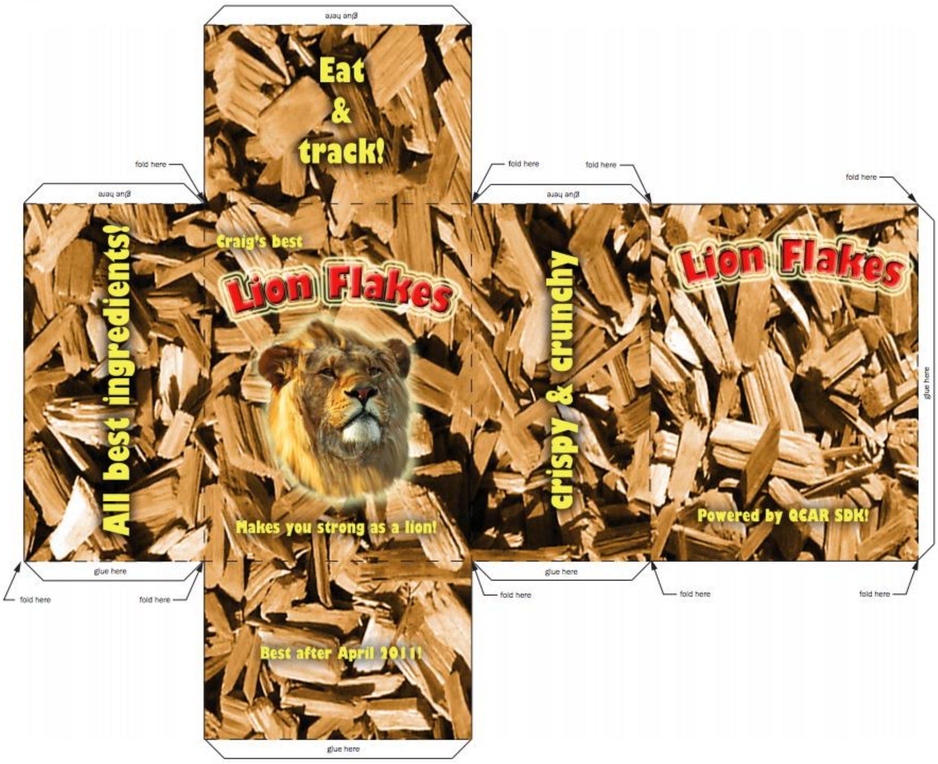

MORTON TUXEDOS





Multi Targets: Flakes Box

Vuforia™


glue here
Eat
&
track!
fold here
fold here
fold here
fold here
glue here
glue here
Craig's best
Lion Flakes
All best ingredients!
crispy & crunchy
Lion Flakes
glue here
Makes you strong as a lion!
Powered by QCAR SDK!
glue here
glue here
fold here
fold here
fold here
fold here
fold here
Best after April 2011!
glue here

Instructions

The folded box should look like this completed box.

1. Print this page onto an A3 or Tabloid size 200-250g cardboard paper with 'Fit to Page'-option.
2. Cut along the outer strong lines.
3. Fold the box along the dashed lines.
4. Glue the marked areas with instant paper glue.

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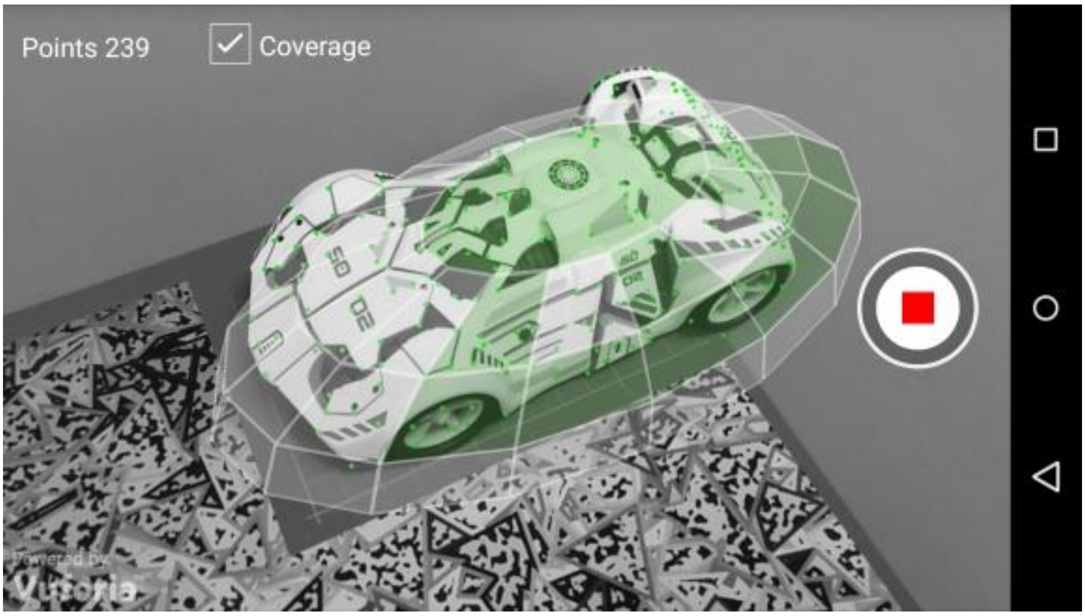
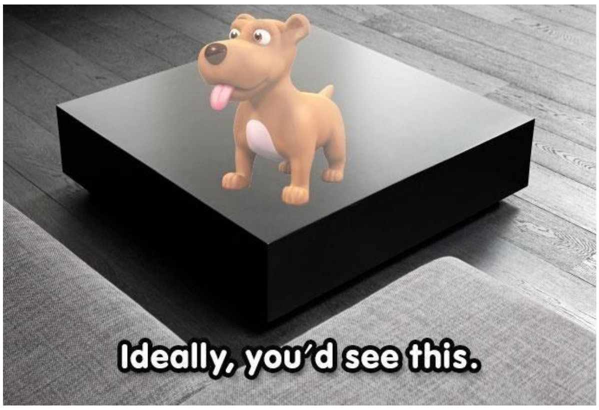
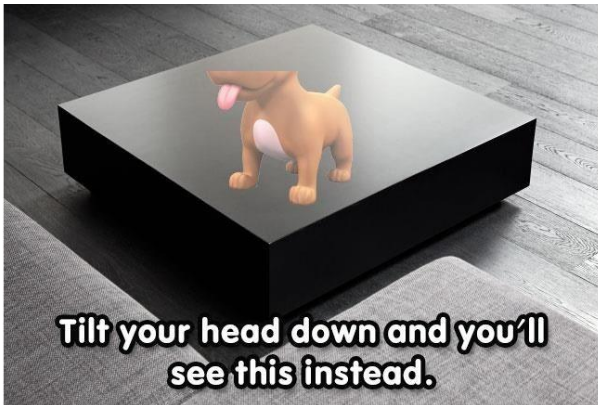
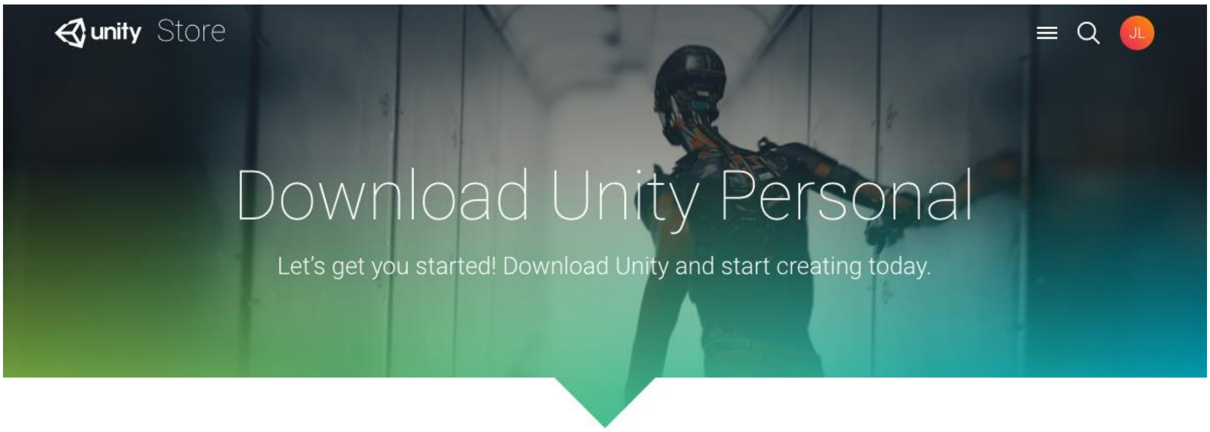

Points 239
☑ Coverage
Powered by Vuforia


Ideally, you'd see this.

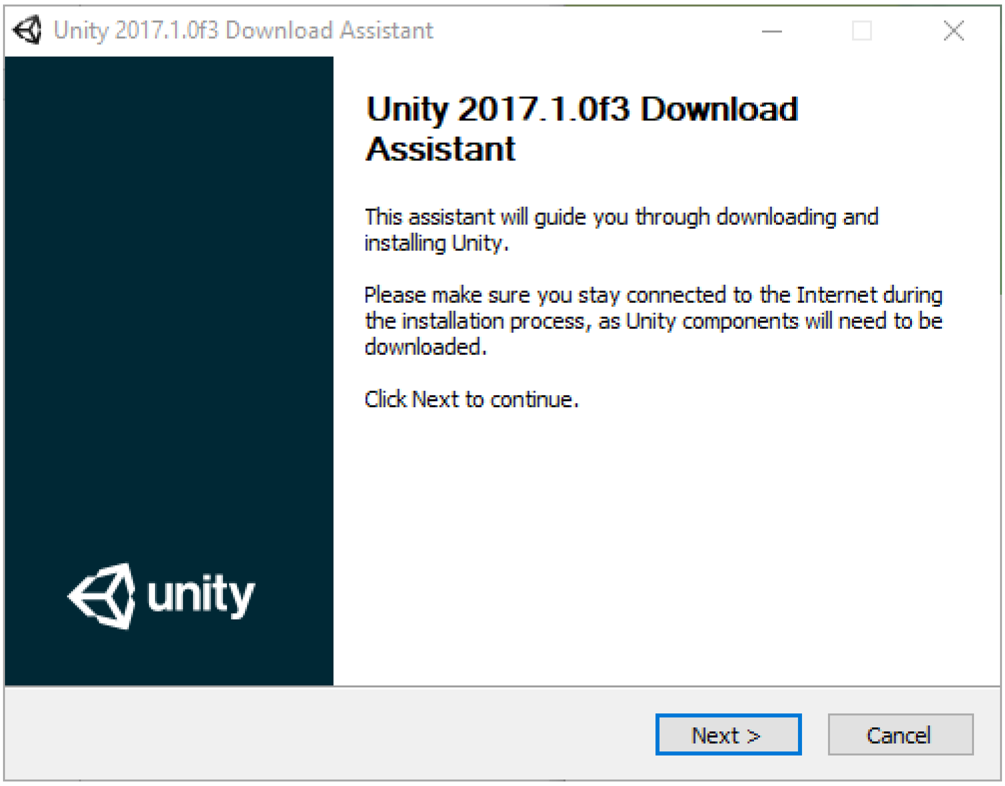

Tilt your head down and you'll see this instead.

Chapter 2: Setting Up Your System


unity Store
JL

Download Unity Personal

Let's get you started! Download Unity and start creating today.

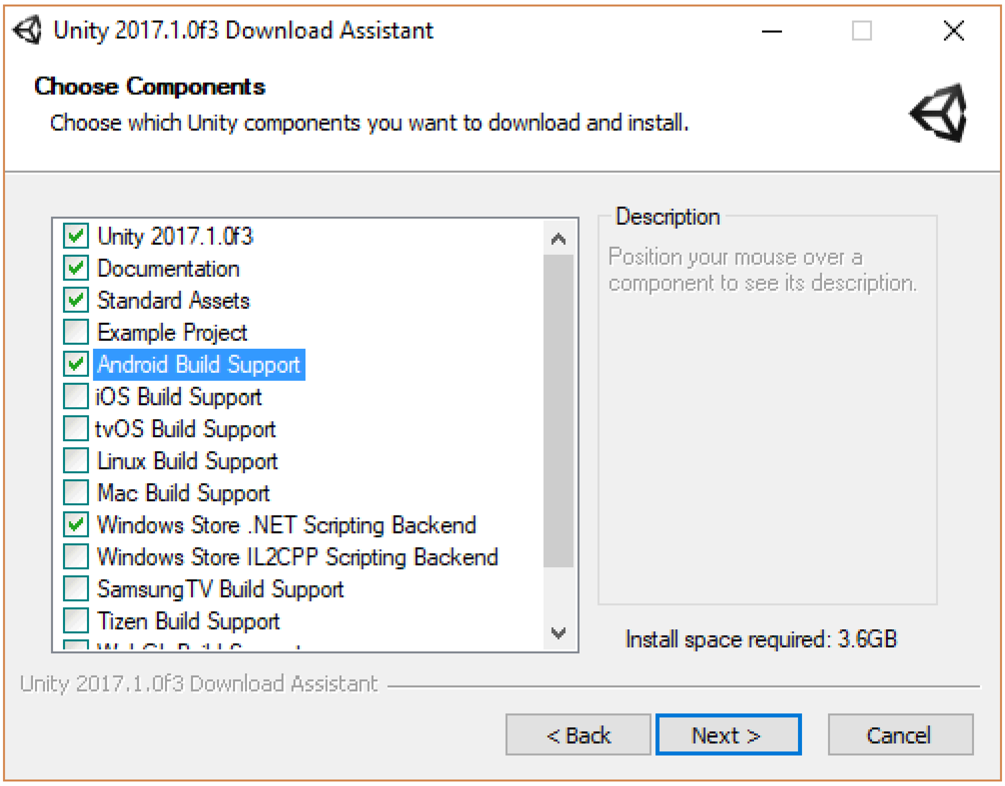

Unity 2017.1.0f3 Download Assistant
unity
Next >
Cancel

Unity 2017.1.0f3 Download Assistant

This assistant will guide you through downloading and installing Unity.

Please make sure you stay connected to the Internet during the installation process, as Unity components will need to be downloaded.

Click Next to continue.



Unity 2017.1.0f3 Download Assistant

Choose Components

Choose which Unity components you want to download and install.

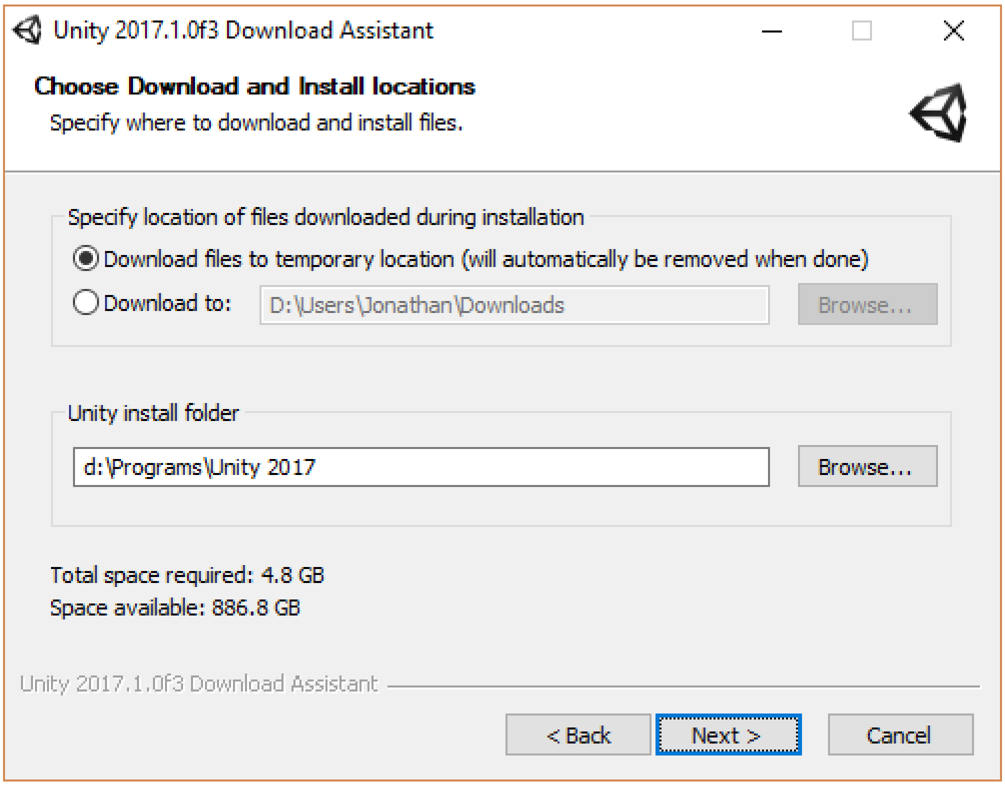
- ☑ Unity 2017.1.0f3
- ☑ Documentation
- ☑ Standard Assets
- ☐ Example Project
- ☑ Android Build Support
- ☐ iOS Build Support
- ☐ tvOS Build Support
- ☐ Linux Build Support
- ☐ Mac Build Support
- ☑ Windows Store .NET Scripting Backend
- ☐ Windows Store IL2CPP Scripting Backend
- ☐ SamsungTV Build Support
- ☐ Tizen Build Support

Description

Position your mouse over a component to see its description.

Install space required: 3.6GB

Unity 2017.1.0f3 Download Assistant
< Back
Next >
Cancel



Unity 2017.1.0f3 Download Assistant

Choose Download and Install locations

Specify where to download and install files.

Specify location of files downloaded during installation

- ● Download files to temporary location (will automatically be removed when done)
- ○ Download to: D:\Users\Jonathan\Downloads

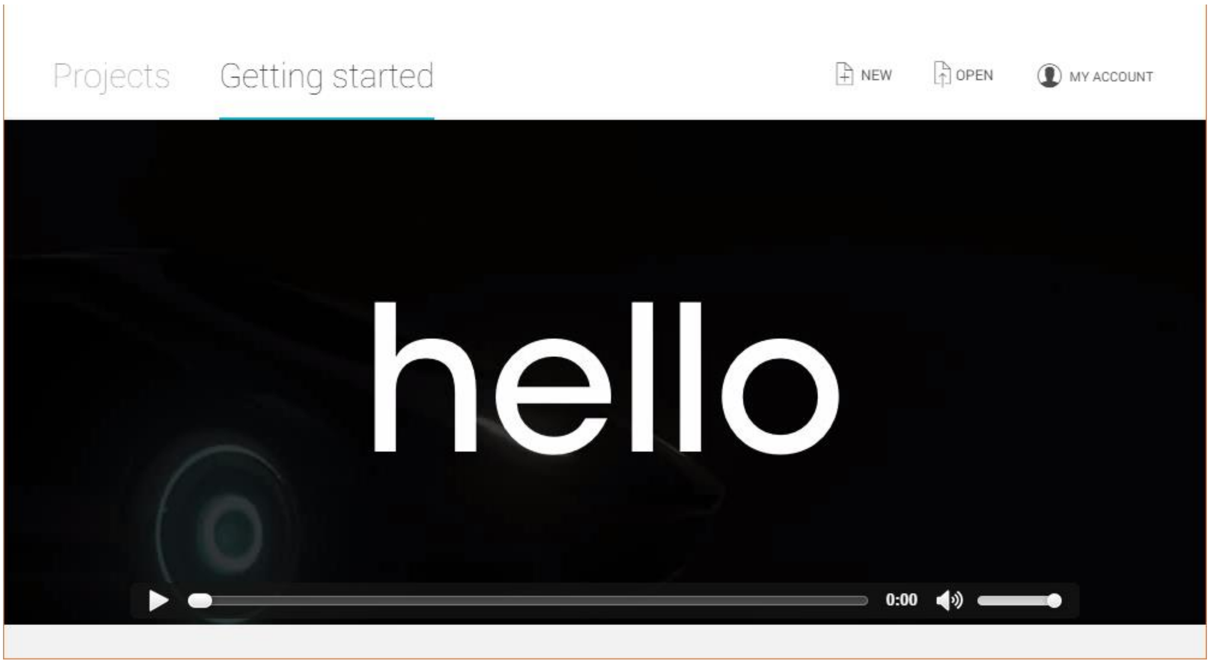
Unity install folder

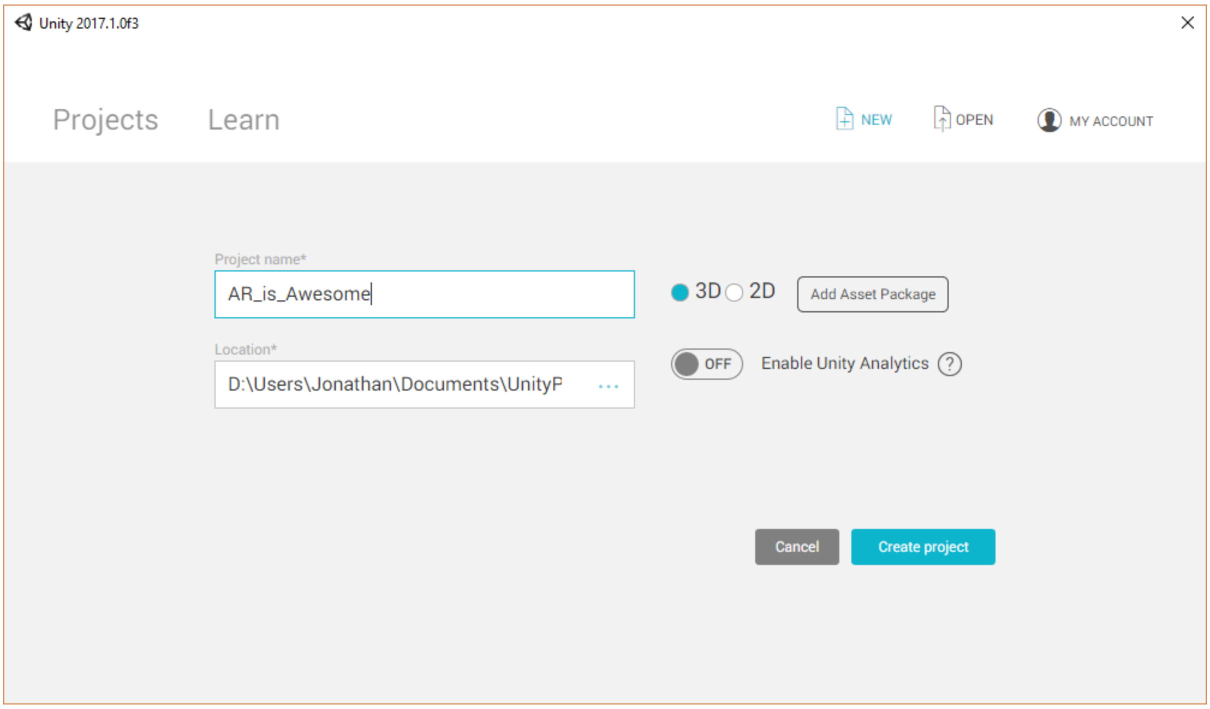
d:\Programs\Unity 2017

Total space required: 4.8 GB

Space available: 886.8 GB

Browse...
Browse...
Unity 2017.1.0f3 Download Assistant
< Back
Next >
Cancel


Projects
Getting started
NEW
OPEN
MY ACCOUNT
hello
0:00

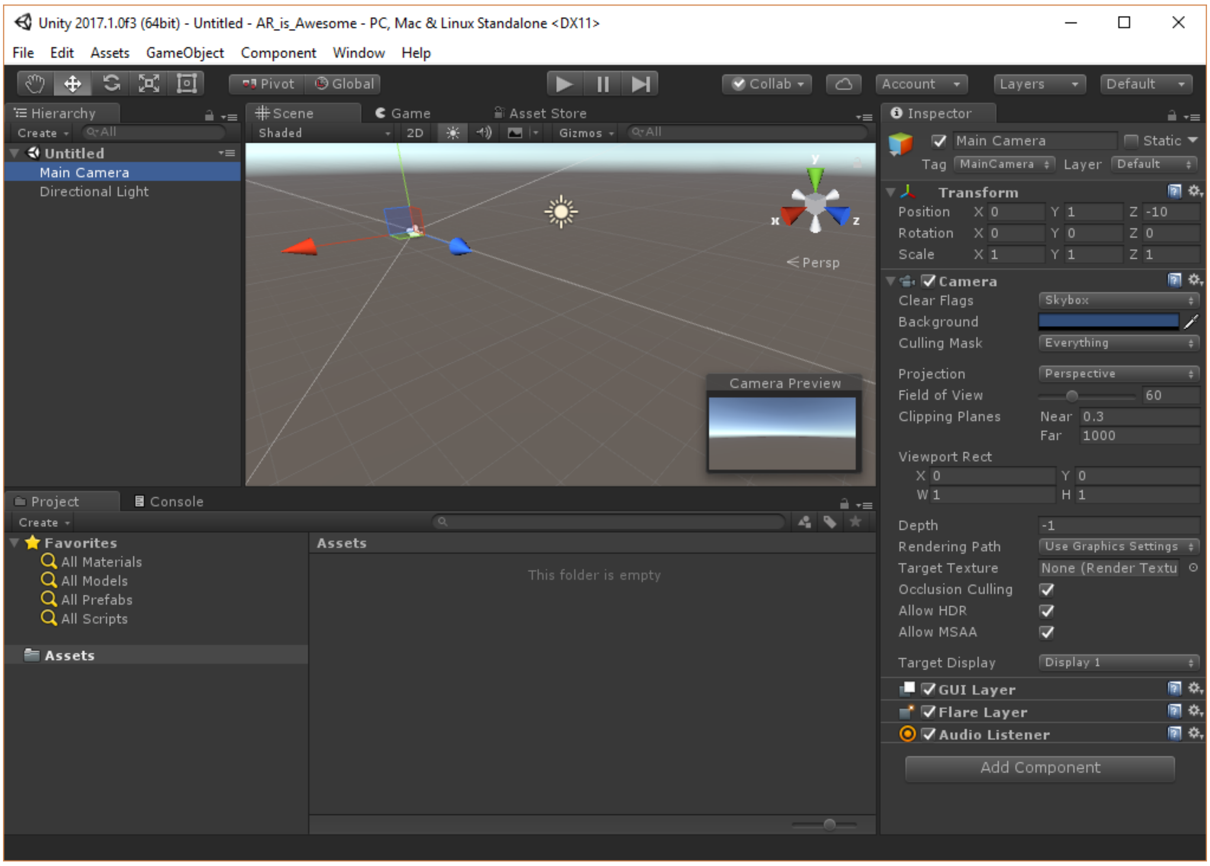

Unity 2017.1.0f3
Projects
Learn
NEW
OPEN
MY ACCOUNT
Add Asset Package
Cancel
Create project

Project name*: AR_is_Awesome

Location*: D:\Users\Jonathan\Documents\UnityP

● 3D ○ 2D

OFF Enable Unity Analytics



Unity 2017.1.0f3 (64bit) - Untitled - AR_is_Awesome - PC, Mac & Linux Standalone <DX11>

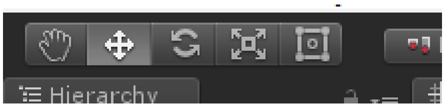
File
Edit
Assets
GameObject
Component
Window
Help
Pivot
Global
Collab
Account
Layers
Default
Hierarchy
Create
All
Untitled
Main Camera
Directional Light
Scene
Game
Asset Store
Shaded
2D
Gizmos
Persp
Camera Preview
Project
Console
Favorites
All Materials
All Models
All Prefabs
All Scripts
Assets
This folder is empty
Inspector
Add Component

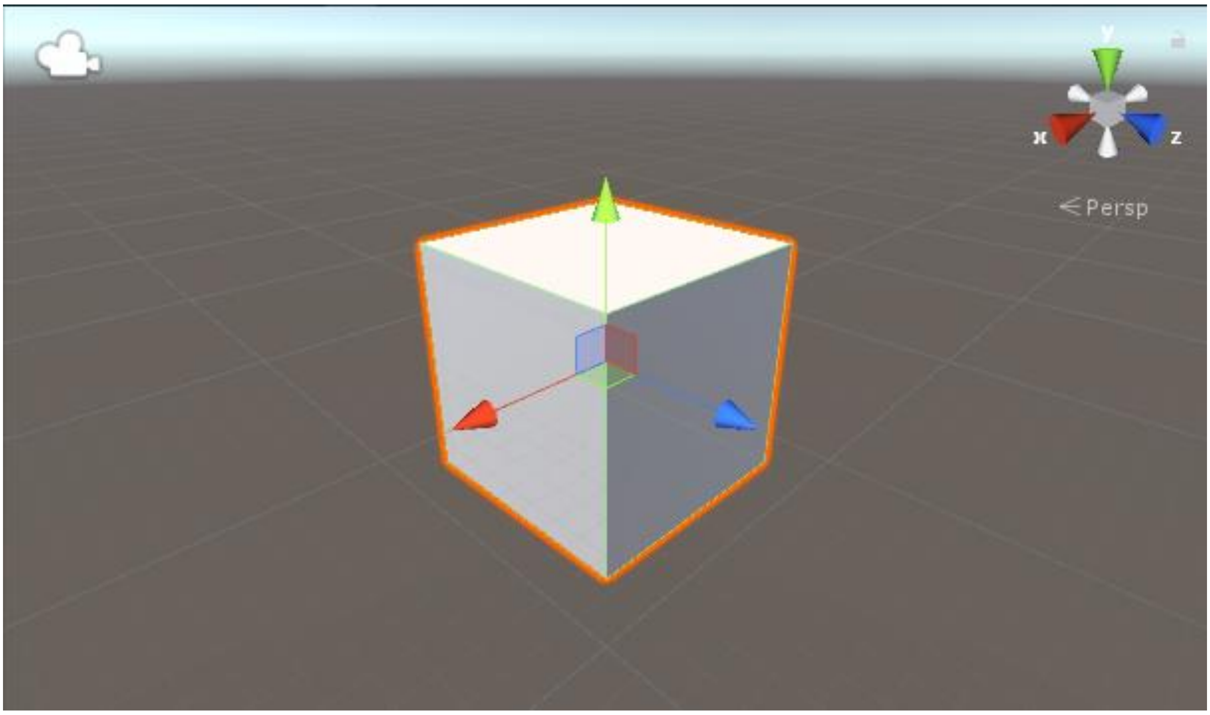
Main Camera ☐ Static
Tag MainCamera Layer Default

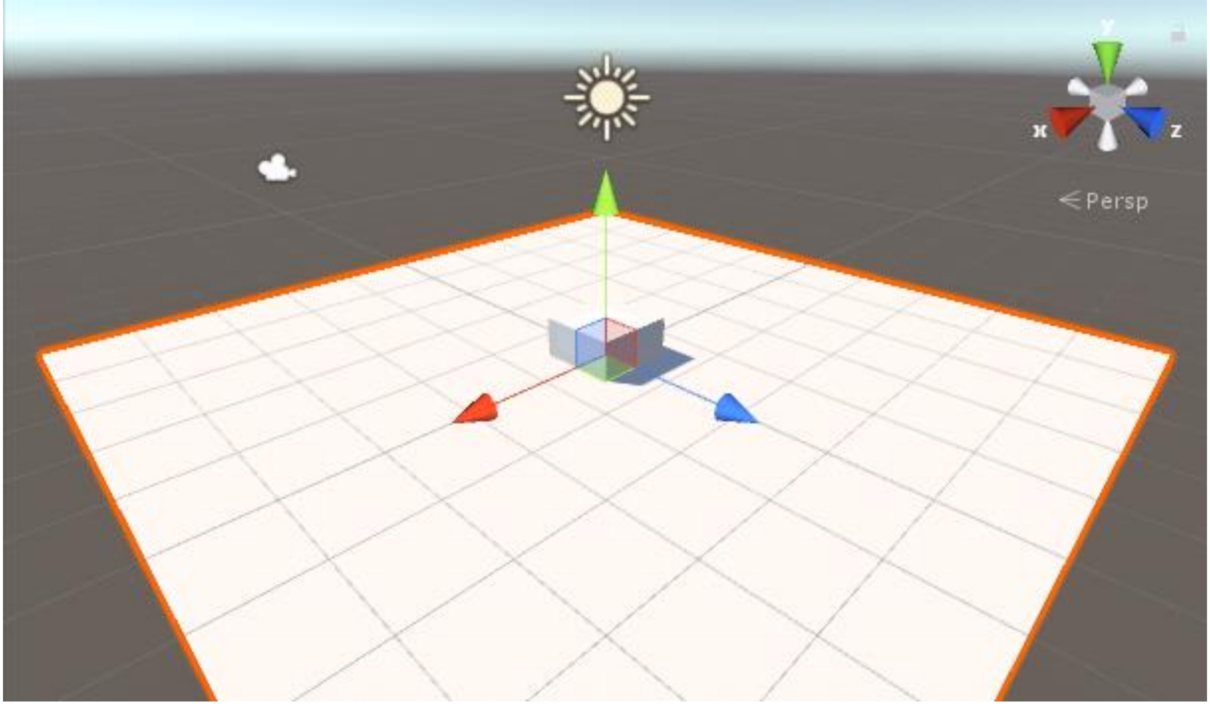
Transform
Position X 0 Y 1 Z -10
Rotation X 0 Y 0 Z 0
Scale X 1 Y 1 Z 1

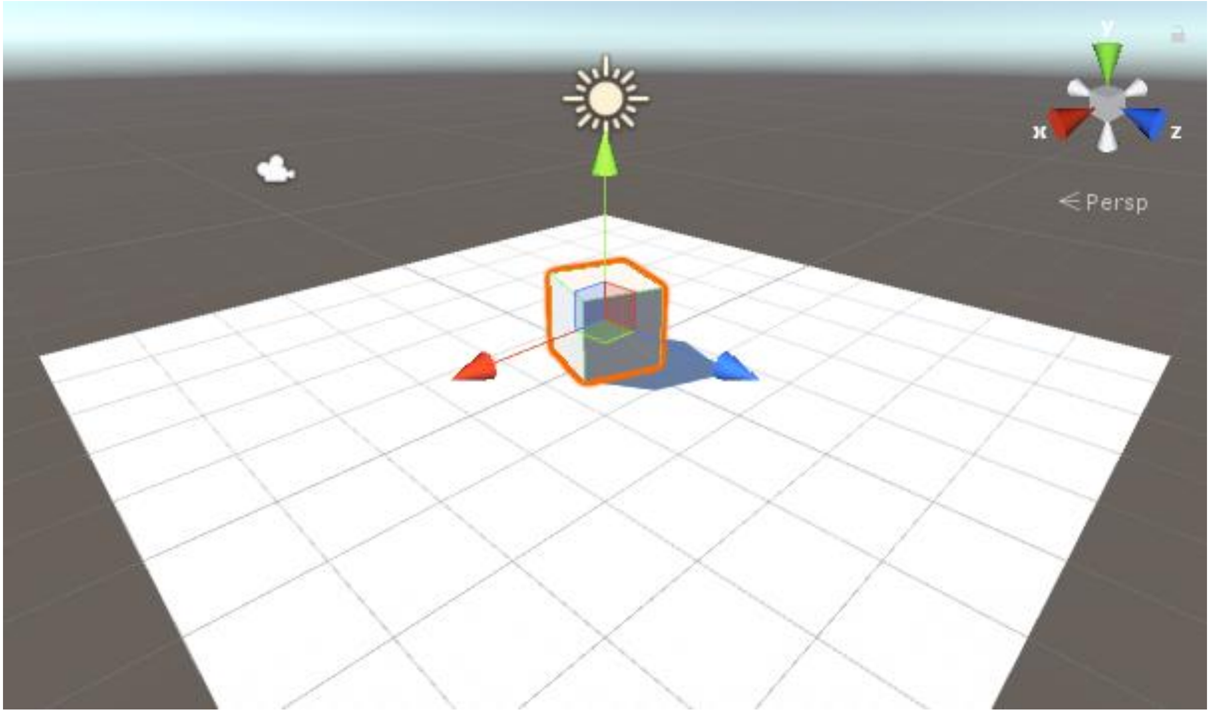
Camera
Clear Flags Skybox
Background
Culling Mask Everything
Projection Perspective
Field of View 60
Clipping Planes Near 0.3
Far 1000
Viewport Rect X 0 Y 0
W 1 H 1
Depth -1
Rendering Path Use Graphics Settings
Target Texture None (Render Textu
Occlusion Culling ☑
Allow HDR ☑
Allow MSAA ☑
Target Display Display 1

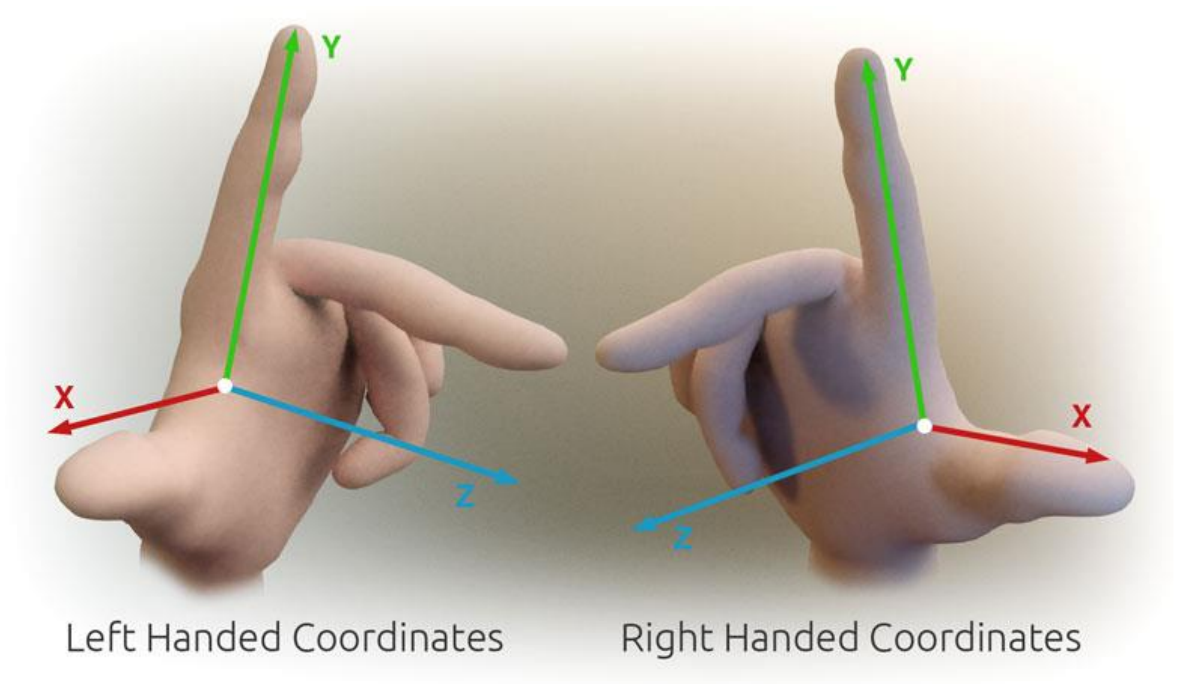
☑ **GUI Layer**
☑ **Flare Layer**
☑ **Audio Listener**

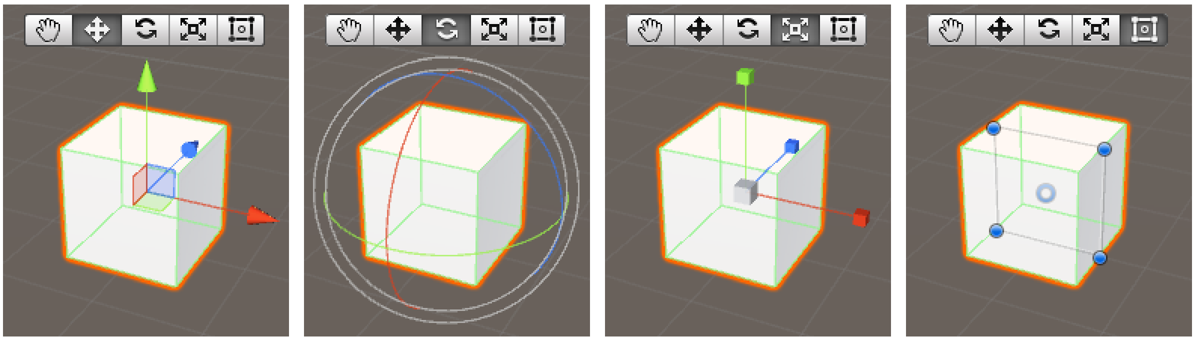


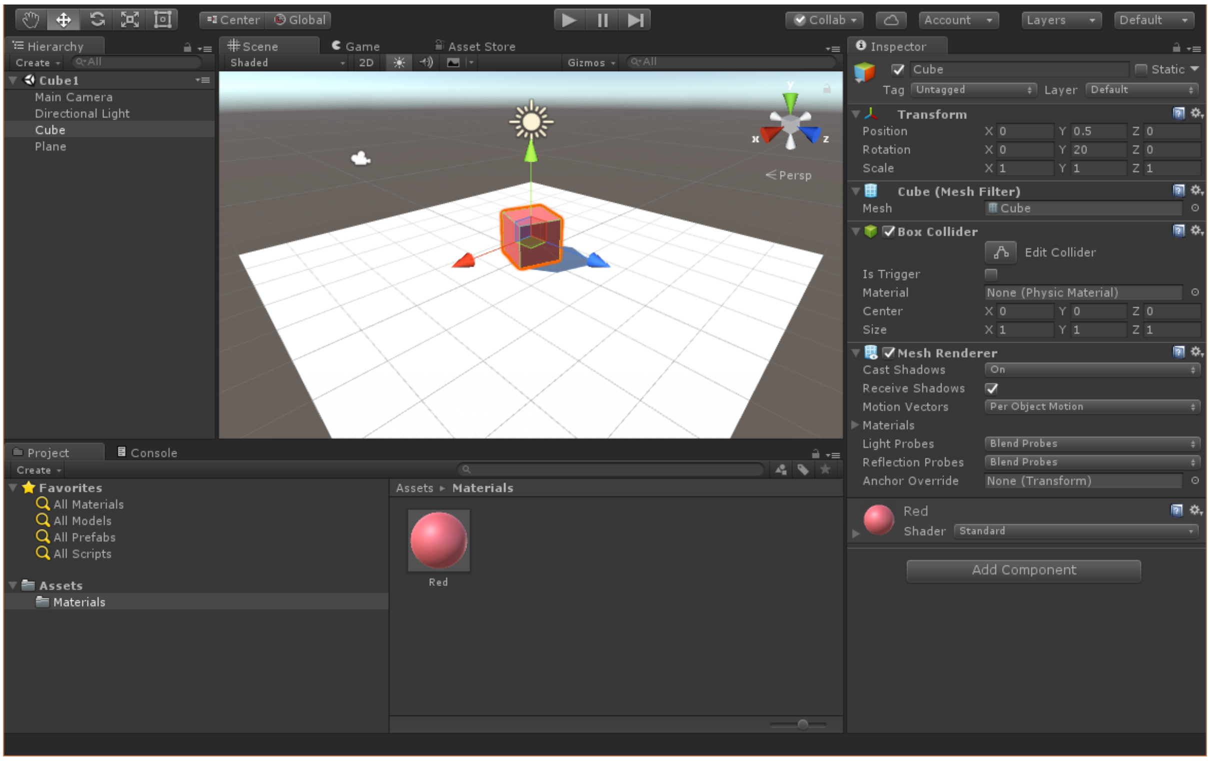



y
x
z
Persp


y
x
z
Persp


Y
X
Z
Left Handed Coordinates
Y
X
Z
Right Handed Coordinates




Center
Global
Collab
Account
Layers
Default
Hierarchy
Create
Cube1
Main Camera
Directional Light
Cube
Plane
Scene
Game
Asset Store
Shaded
2D
Gizmos
Persp
Inspector
Project
Console
Favorites
All Materials
All Models
All Prefabs
All Scripts
Assets
Materials
Assets ▸ Materials
Red
Add Component

Cube ☑ Static ☐
Tag Untagged Layer Default

Transform

Position	X 0	Y 0.5	Z 0
Rotation	X 0	Y 20	Z 0
Scale	X 1	Y 1	Z 1

Cube (Mesh Filter)

Mesh: Cube

☑ Box Collider

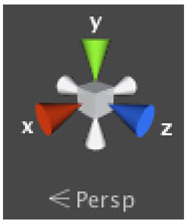
Edit Collider
Is Trigger ☐
Material: None (Physic Material)

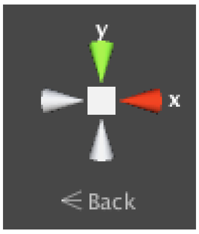
Center	X 0	Y 0	Z 0
Size	X 1	Y 1	Z 1

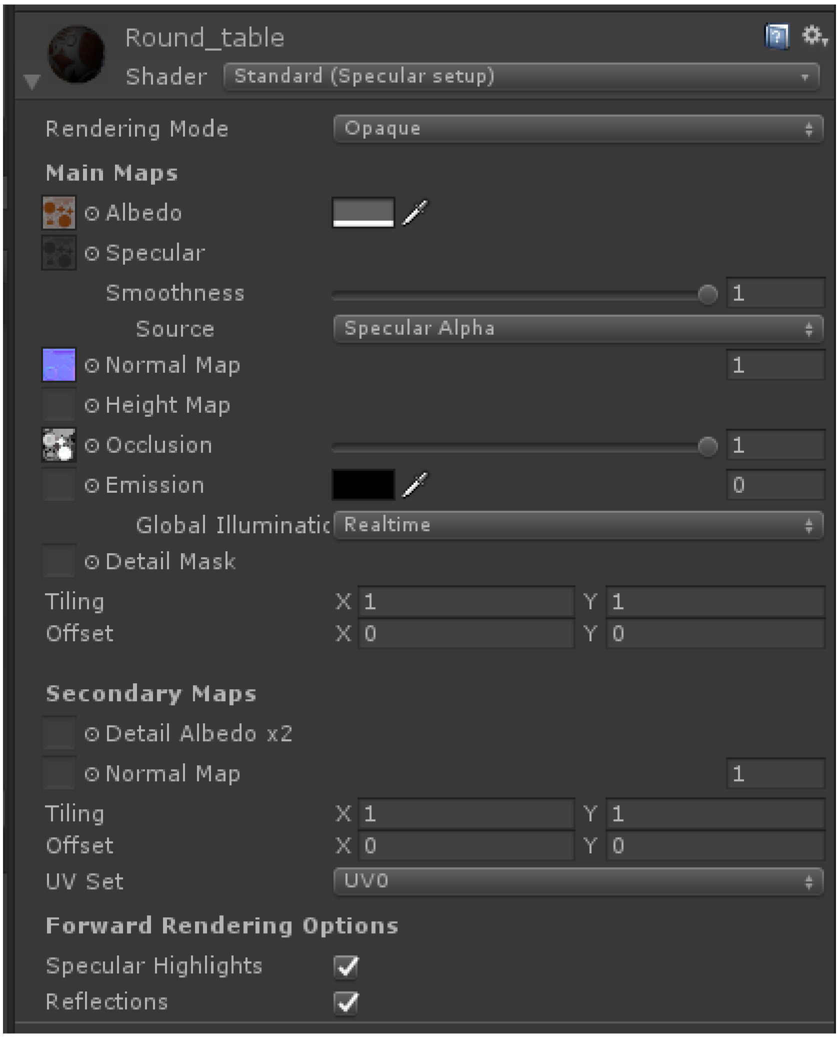
☑ Mesh Renderer

Cast Shadows: On
Receive Shadows ☑
Motion Vectors: Per Object Motion
Materials
Light Probes: Blend Probes
Reflection Probes: Blend Probes
Anchor Override: None (Transform)

Red
Shader: Standard







Round_table

Shader Standard (Specular setup)

Rendering Mode Opaque

Main Maps

Albedo

Specular

Smoothness 1

Source Specular Alpha

Normal Map 1

Height Map

Occlusion 1

Emission 0

Global Illuminatic Realtime

Detail Mask

Tiling X 1 Y 1

Offset X 0 Y 0

Secondary Maps

Detail Albedo x2

Normal Map 1

Tiling X 1 Y 1

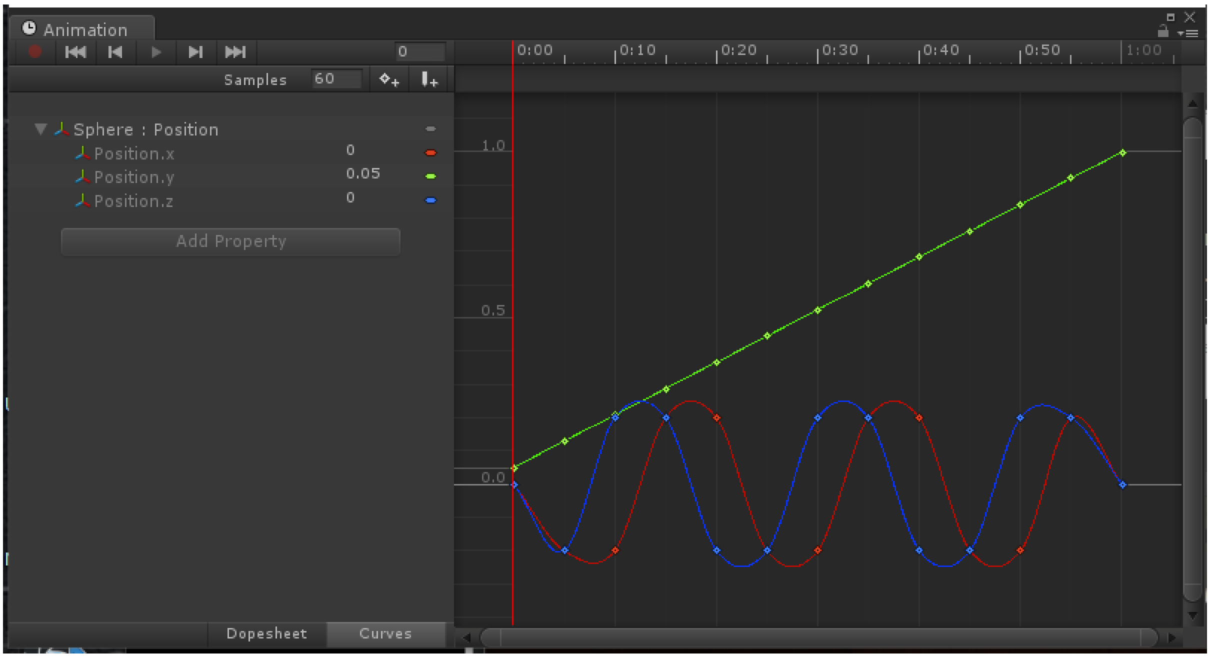
Offset X 0 Y 0

UV Set UV0

Forward Rendering Options

Specular Highlights ☑

Reflections ☑



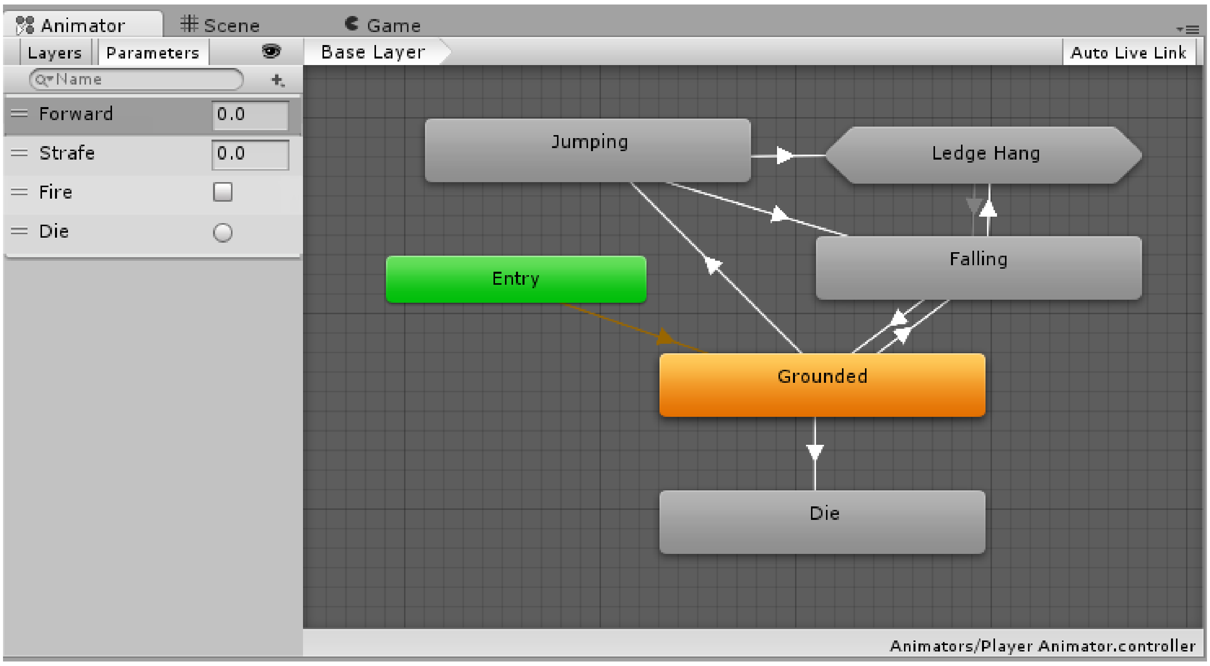
Animation
0
Samples 60
0:00
0:10
0:20
0:30
0:40
0:50
1:00
1.0
0.5
0.0
Add Property
Dopesheet
Curves

Sphere : Position

Position.x 0

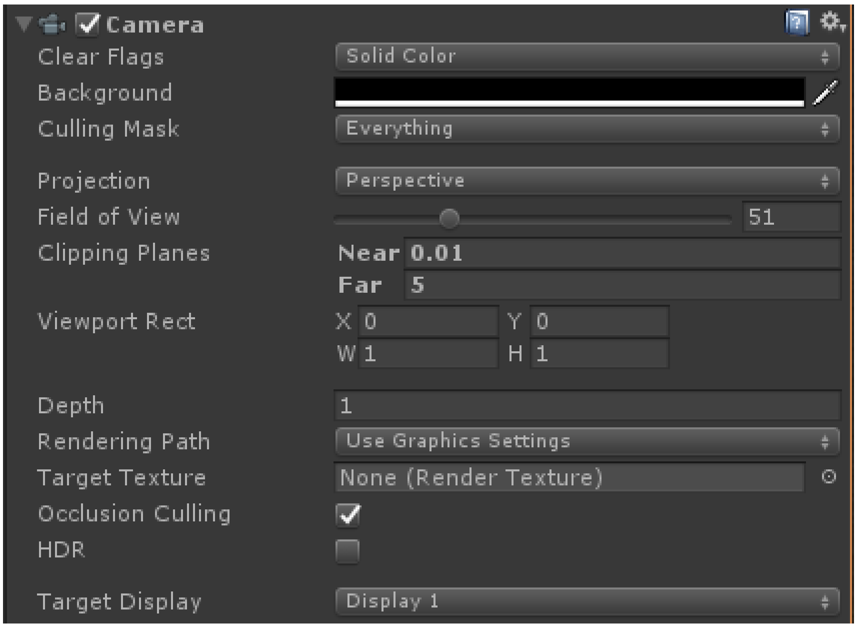
Position.y 0.05

Position.z 0

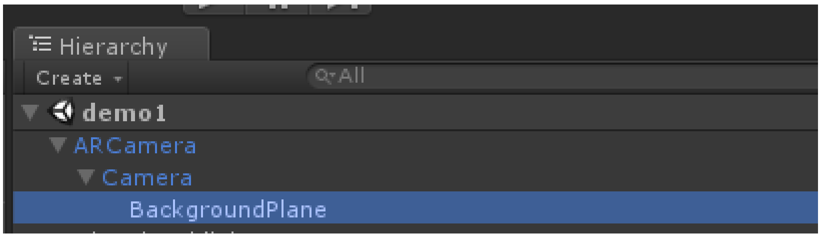

Animator
Scene
Game
Layers
Parameters
Base Layer
Auto Live Link
Name
Jumping
Ledge Hang
Falling
Entry
Grounded
Die

Forward 0.0
Strafe 0.0
Fire ☐
Die ○

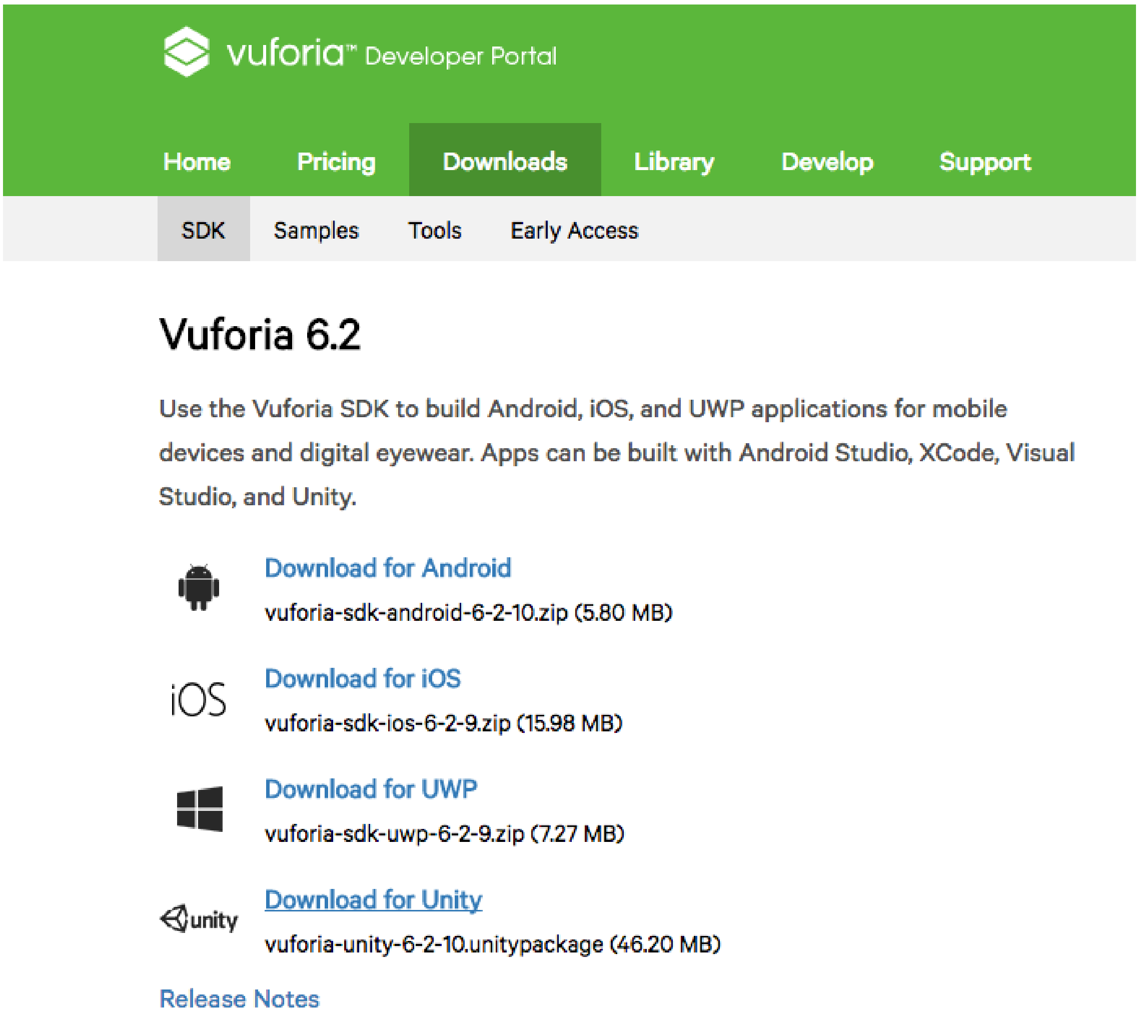
Animators/Player Animator.controller



☑ Camera
Clear Flags: Solid Color
Background
Culling Mask: Everything
Projection: Perspective
Field of View: 51
Clipping Planes: Near 0.01, Far 5
Viewport Rect: X 0, Y 0, W 1, H 1
Depth: 1
Rendering Path: Use Graphics Settings
Target Texture: None (Render Texture)
Occlusion Culling: ☑
HDR: ☐
Target Display: Display 1


Hierarchy
Create
All

demo1
ARCamera
Camera
BackgroundPlane


vuforia™ Developer Portal
Home
Pricing
Downloads
Library
Develop
Support
SDK
Samples
Tools
Early Access

Vuforia 6.2

Use the Vuforia SDK to build Android, iOS, and UWP applications for mobile devices and digital eyewear. Apps can be built with Android Studio, XCode, Visual Studio, and Unity.

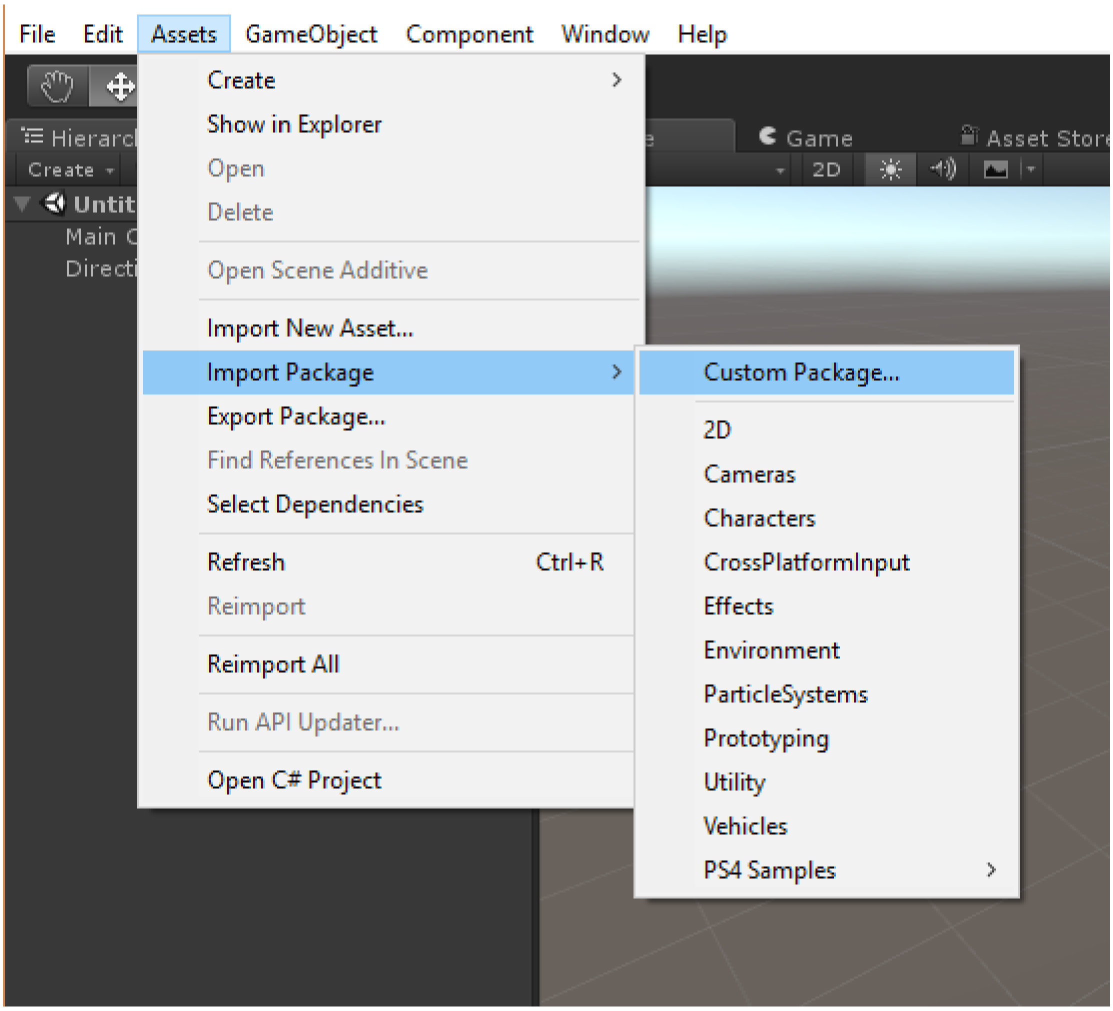
Download for Android
vuforia-sdk-android-6-2-10.zip (5.80 MB)

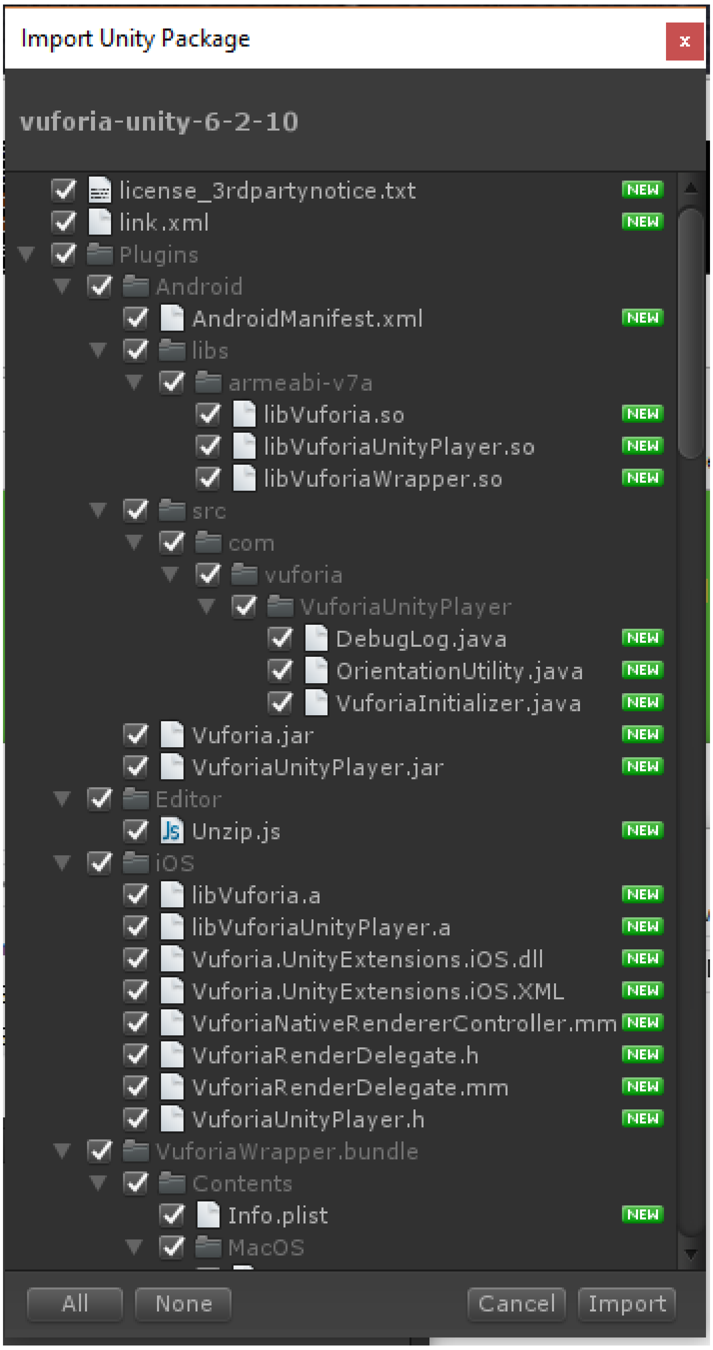
Download for iOS
vuforia-sdk-ios-6-2-9.zip (15.98 MB)

Download for UWP
vuforia-sdk-uwp-6-2-9.zip (7.27 MB)

Download for Unity
vuforia-unity-6-2-10.unitypackage (46.20 MB)

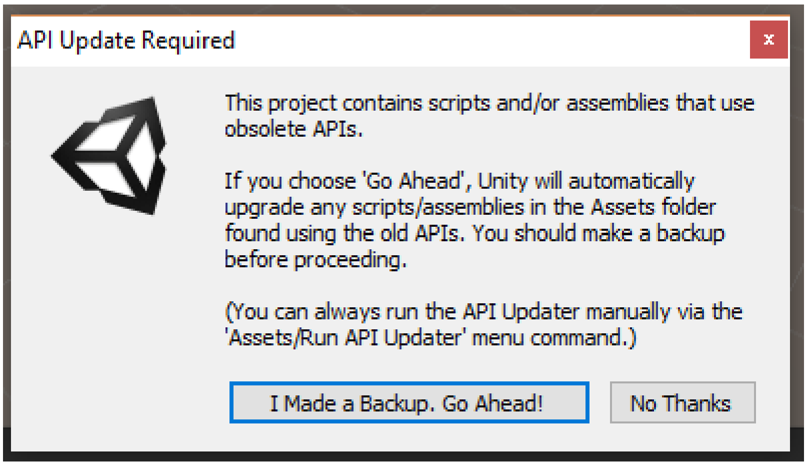
Release Notes


File
Edit
Assets
GameObject
Component
Window
Help
Hierarc
Create
Untit
Main C
Directi
Game
Asset Store
2D
Create
Show in Explorer
Open
Delete
Open Scene Additive
Import New Asset...
Import Package
Export Package...
Find References In Scene
Select Dependencies
Refresh Ctrl+R
Reimport
Reimport All
Run API Updater...
Open C# Project
Custom Package...
2D
Cameras
Characters
CrossPlatformInput
Effects
Environment
ParticleSystems
Prototyping
Utility
Vehicles
PS4 Samples



vuforia-unity-6-2-10

- ☑ license_3rdpartynotice.txt NEW
- ☑ link.xml NEW
- ☑ Plugins
  - ☑ Android
    - ☑ AndroidManifest.xml NEW
    - ☑ libs
      - ☑ armeabi-v7a
        - ☑ libVuforia.so NEW
        - ☑ libVuforiaUnityPlayer.so NEW
        - ☑ libVuforiaWrapper.so NEW
    - ☑ src
      - ☑ com
        - ☑ vuforia
          - ☑ VuforiaUnityPlayer
            - ☑ DebugLog.java NEW
            - ☑ OrientationUtility.java NEW
            - ☑ VuforiaInitializer.java NEW
    - ☑ Vuforia.jar NEW
    - ☑ VuforiaUnityPlayer.jar NEW
  - ☑ Editor
    - ☑ Unzip.js NEW
  - ☑ iOS
    - ☑ libVuforia.a NEW
    - ☑ libVuforiaUnityPlayer.a NEW
    - ☑ Vuforia.UnityExtensions.iOS.dll NEW
    - ☑ Vuforia.UnityExtensions.iOS.XML NEW
    - ☑ VuforiaNativeRendererController.mm NEW
    - ☑ VuforiaRenderDelegate.h NEW
    - ☑ VuforiaRenderDelegate.mm NEW
    - ☑ VuforiaUnityPlayer.h NEW
  - ☑ VuforiaWrapper.bundle
    - ☑ Contents
      - ☑ Info.plist NEW
      - ☑ MacOS



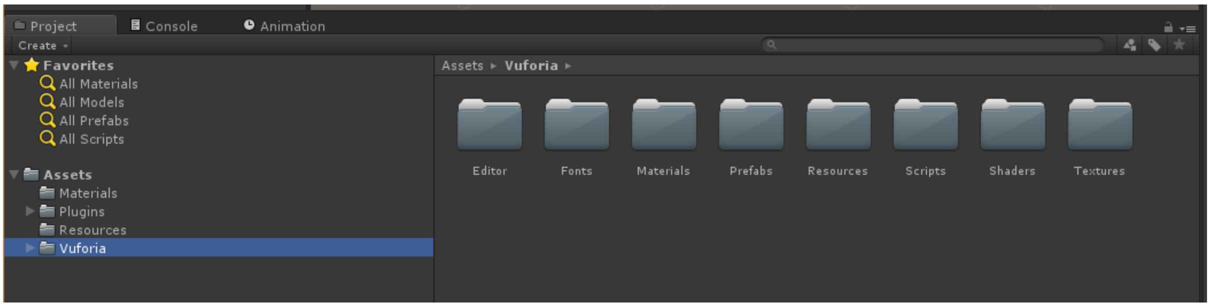
API Update Required

This project contains scripts and/or assemblies that use obsolete APIs.

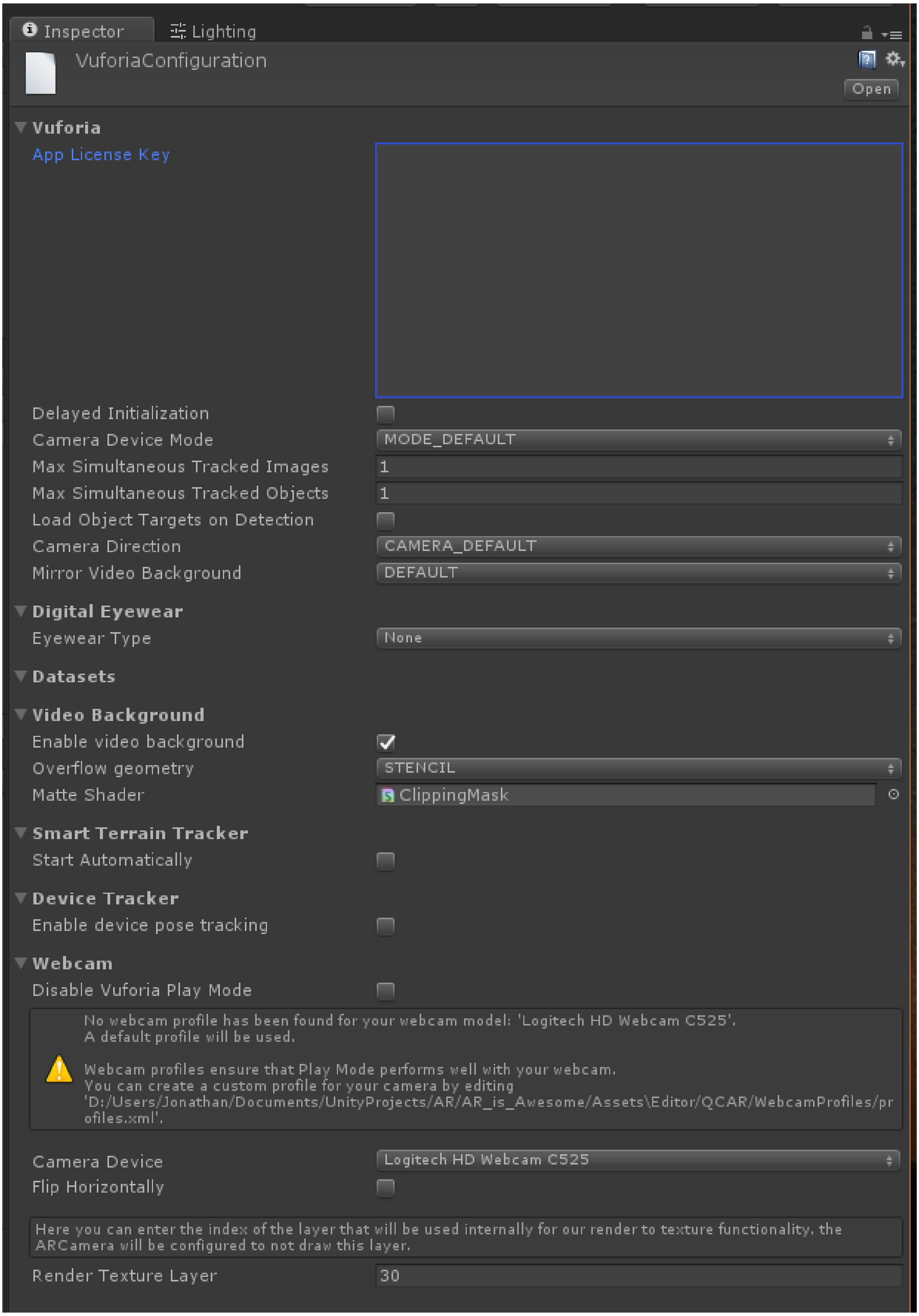
If you choose 'Go Ahead', Unity will automatically upgrade any scripts/assemblies in the Assets folder found using the old APIs. You should make a backup before proceeding.

(You can always run the API Updater manually via the 'Assets/Run API Updater' menu command.)

I Made a Backup. Go Ahead!
No Thanks



Project
Console
Animation
Create
Favorites
All Materials
All Models
All Prefabs
All Scripts
Assets
Materials
Plugins
Resources
Vuforia
Assets ▸ Vuforia ▸
Editor
Fonts
Materials
Prefabs
Resources
Scripts
Shaders
Textures



VuforiaConfiguration

Vuforia

App License Key

Delayed Initialization ☐

Camera Device Mode: MODE_DEFAULT

Max Simultaneous Tracked Images: 1

Max Simultaneous Tracked Objects: 1

Load Object Targets on Detection ☐

Camera Direction: CAMERA_DEFAULT

Mirror Video Background: DEFAULT

Digital Eyewear

Eyewear Type: None

Datasets

Video Background

Enable video background ☑

Overflow geometry: STENCIL

Matte Shader: ClippingMask

Smart Terrain Tracker

Start Automatically ☐

Device Tracker

Enable device pose tracking ☐

Webcam

Disable Vuforia Play Mode ☐

No webcam profile has been found for your webcam model: 'Logitech HD Webcam C525'.
A default profile will be used.

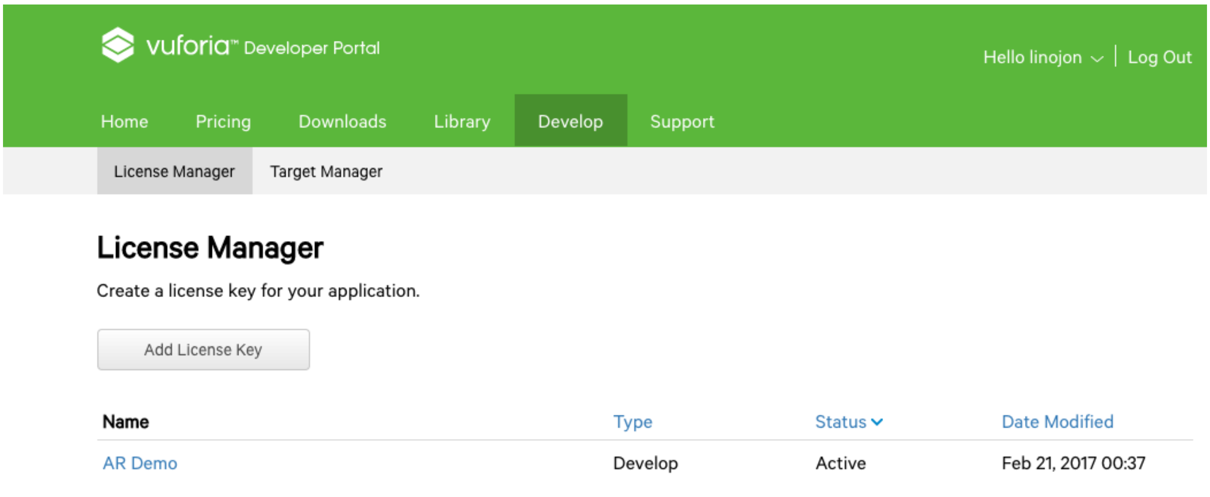
Webcam profiles ensure that Play Mode performs well with your webcam.
You can create a custom profile for your camera by editing
'D:/Users/Jonathan/Documents/UnityProjects/AR/AR_is_Awesome/Assets\Editor/QCAR/WebcamProfiles/profiles.xml'.

Camera Device: Logitech HD Webcam C525

Flip Horizontally ☐

Here you can enter the index of the layer that will be used internally for our render to texture functionality. the ARCamera will be configured to not draw this layer.

Render Texture Layer: 30

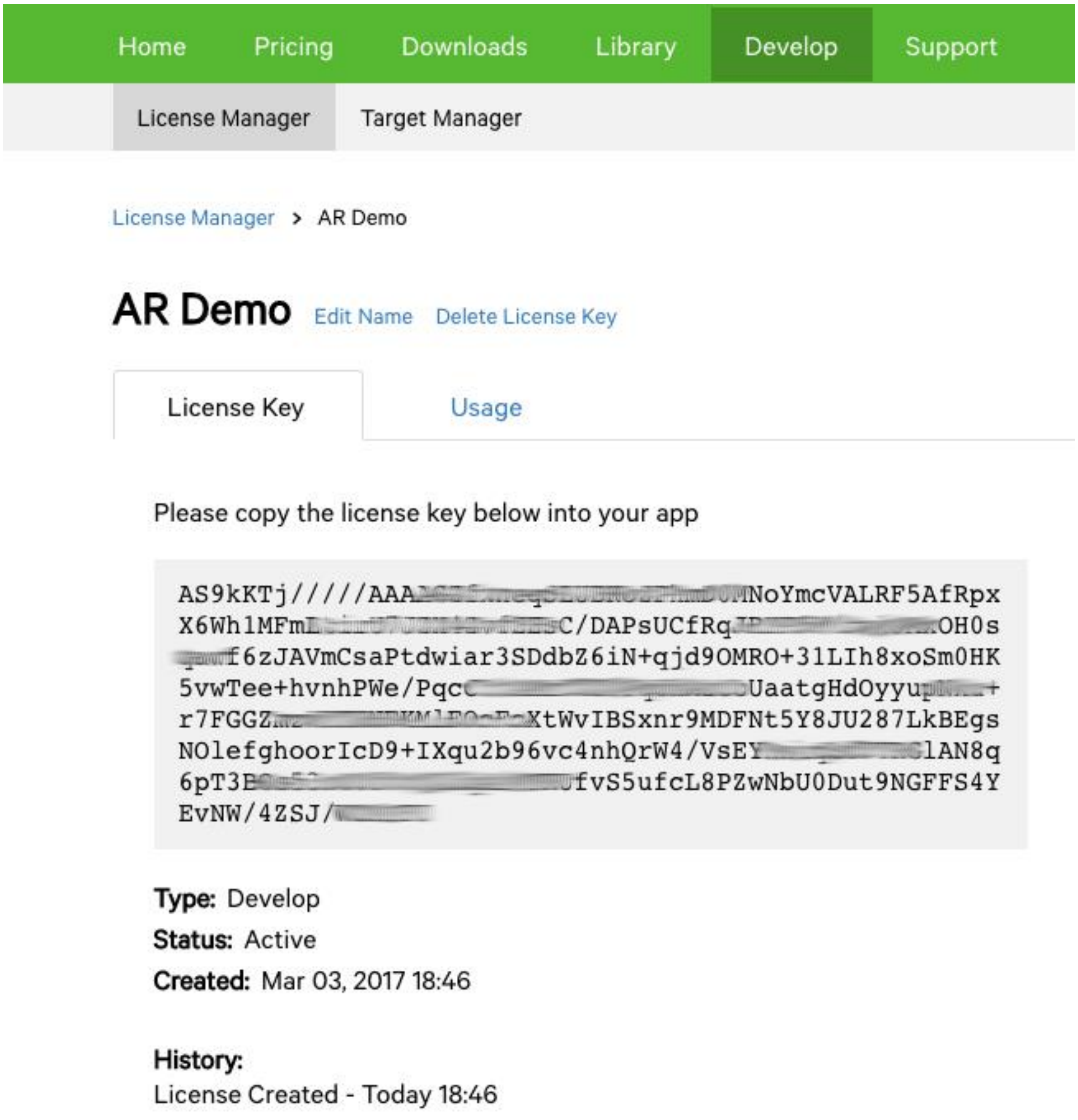

vuforia™ Developer Portal
Hello linojon
Log Out
Home
Pricing
Downloads
Library
Develop
Support
License Manager
Target Manager

License Manager

Create a license key for your application.

Add License Key

Name	Type	Status	Date Modified
AR Demo	Develop	Active	Feb 21, 2017 00:37


Home
Pricing
Downloads
Library
Develop
Support
License Manager
Target Manager
License Manager > AR Demo

AR Demo

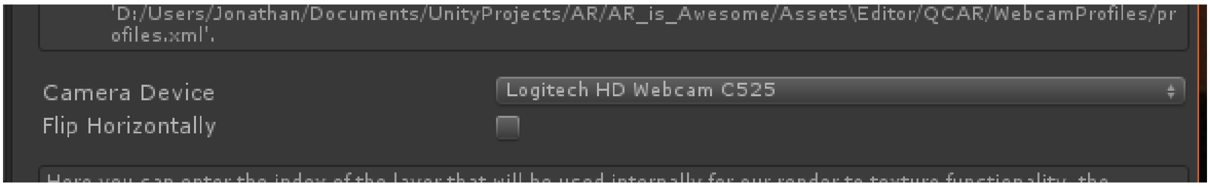
Edit Name
Delete License Key
License Key
Usage

Please copy the license key below into your app

```
AS9kKTj/////AAA[redacted]NoYmcVALRF5AfRpx
X6Wh1MFm[redacted]C/DAPsUCfRq[redacted]OH0s
[redacted]f6zJAVmCsaPtdwiar3SDdbZ6iN+qjd9OMRO+31LIh8xoSm0HK
5vwTee+hvnhPWe/Pqc[redacted]UaatgHdOyyu[redacted]+
r7FGGZ[redacted]XtWvIBSxnr9MDFNt5Y8JU287LkBEgs
NOlefghoorIcD9+IXqu2b96vc4nhQrW4/VsEY[redacted]lAN8q
6pT3[redacted]fvS5ufcL8PZwNbU0Dut9NGFFS4Y
EvNW/4ZSJ/[redacted]
```

Type: Develop
Status: Active
Created: Mar 03, 2017 18:46

History:
License Created - Today 18:46



'D:/Users/Jonathan/Documents/UnityProjects/AR/AR_is_Awesome/Assets\Editor/QCAR/WebcamProfiles/profiles.xml'.

Camera Device: Logitech HD Webcam C525

Flip Horizontally ☐

Here you can enter the index of the layer that will be used internally for our render to texture functionality. the

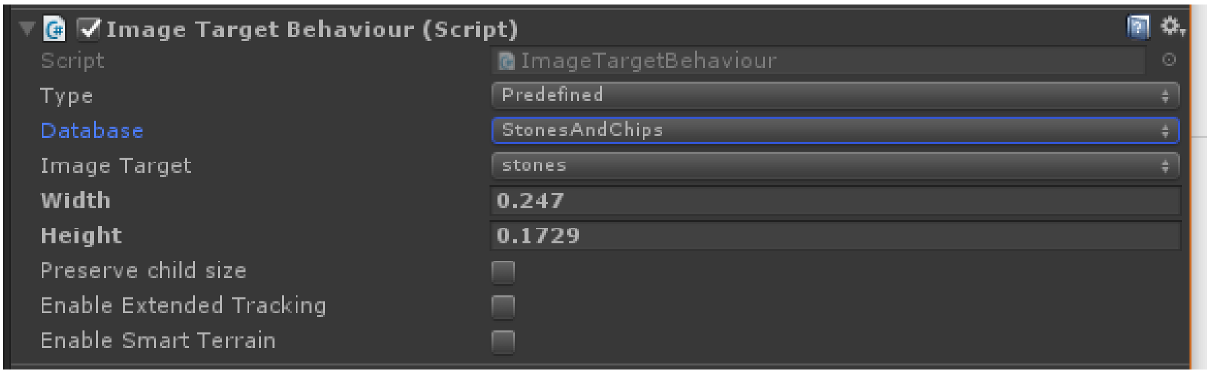


Image Target Behaviour (Script)

Script: ImageTargetBehaviour

Type: Predefined

Database: StonesAndChips

Image Target: stones

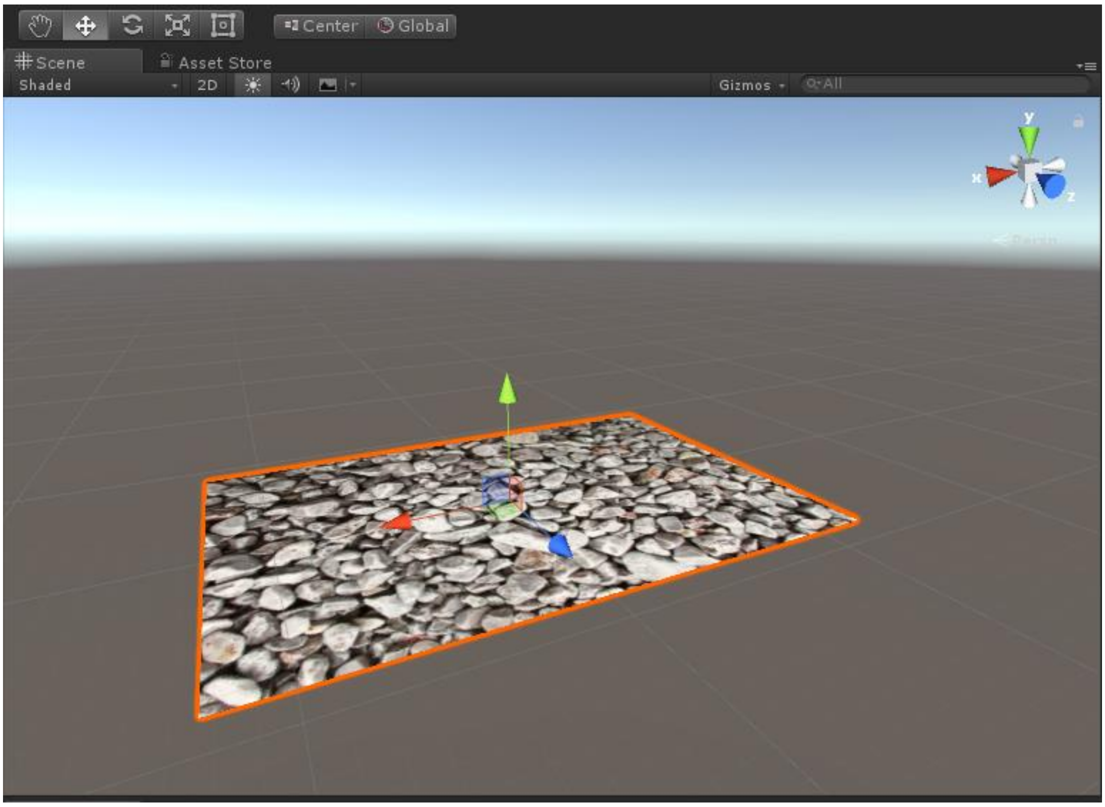
Width: 0.247

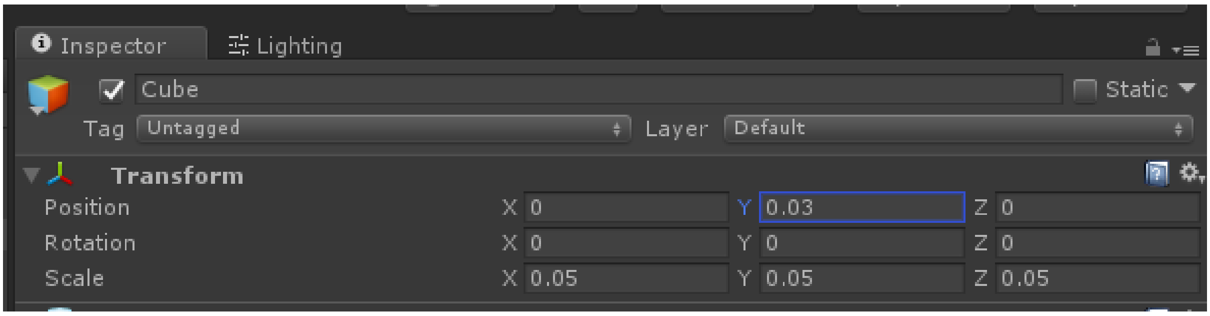
Height: 0.1729

Preserve child size ☐

Enable Extended Tracking ☐

Enable Smart Terrain ☐


Center
Global
Scene
Asset Store
Shaded
2D
Gizmos
All
y
x
z

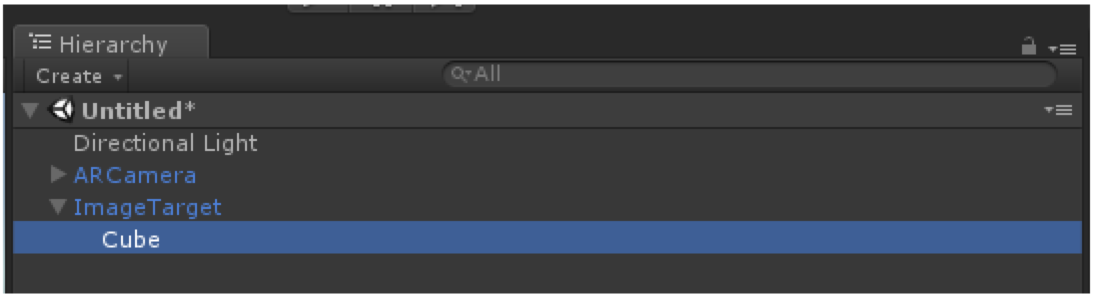

Inspector
Lighting

☑ Cube ☐ Static

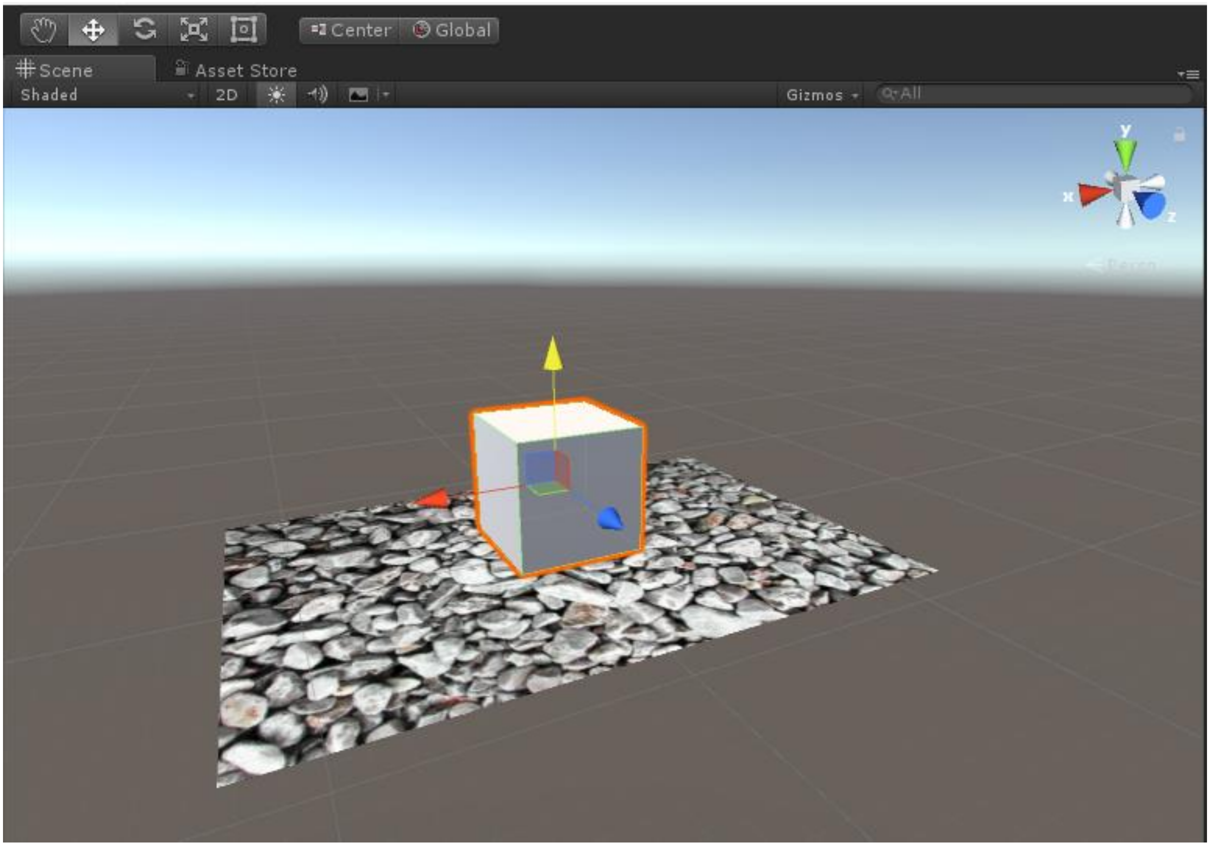
Tag Untagged Layer Default

Transform

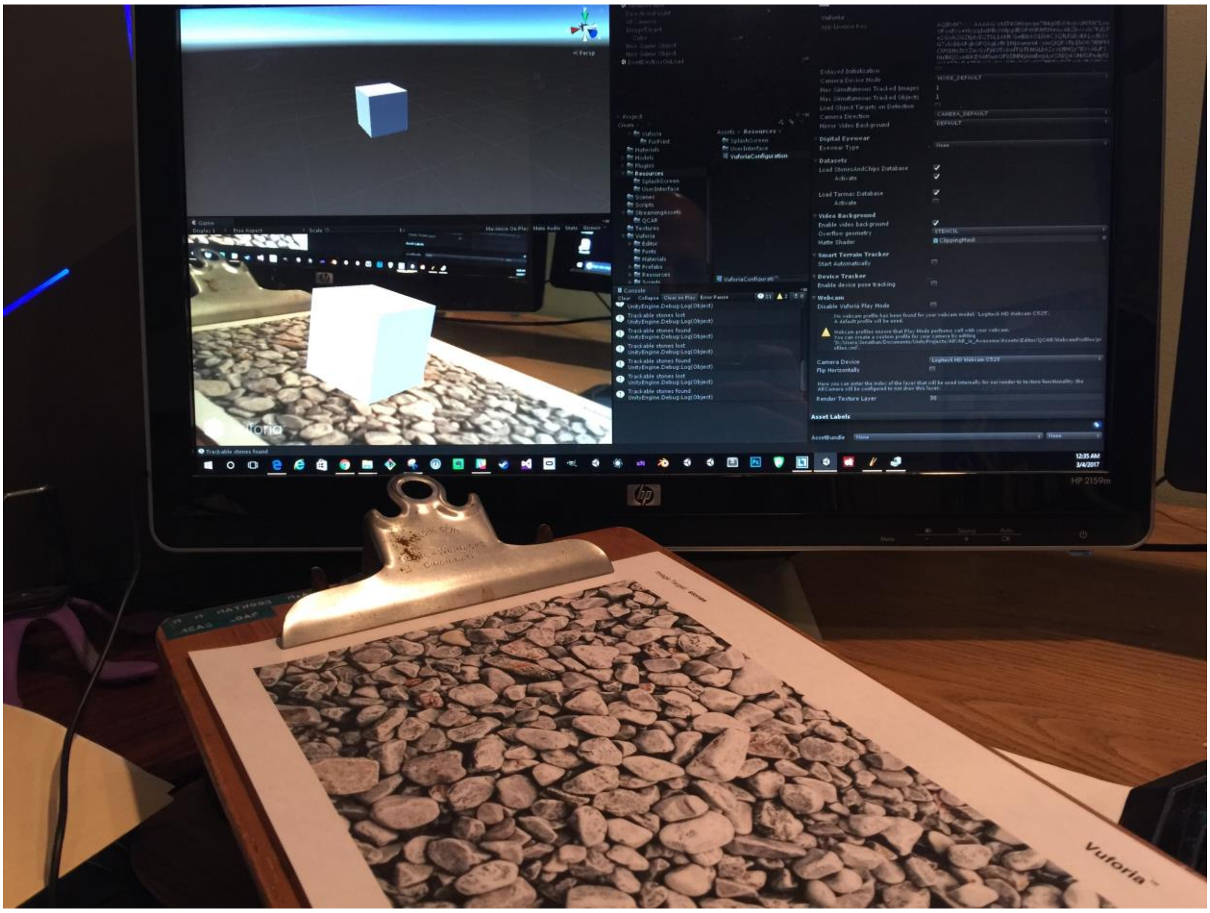
Position	X	0	Y	0.03	Z	0
Rotation	X	0	Y	0	Z	0
Scale	X	0.05	Y	0.05	Z	0.05


Hierarchy
Create
All

Untitled*
- Directional Light
- ARCamera
- ImageTarget
  - Cube



Center
Global
Scene
Asset Store
Shaded
2D
Gizmos
All
y
x
z
Persp



Vuforia

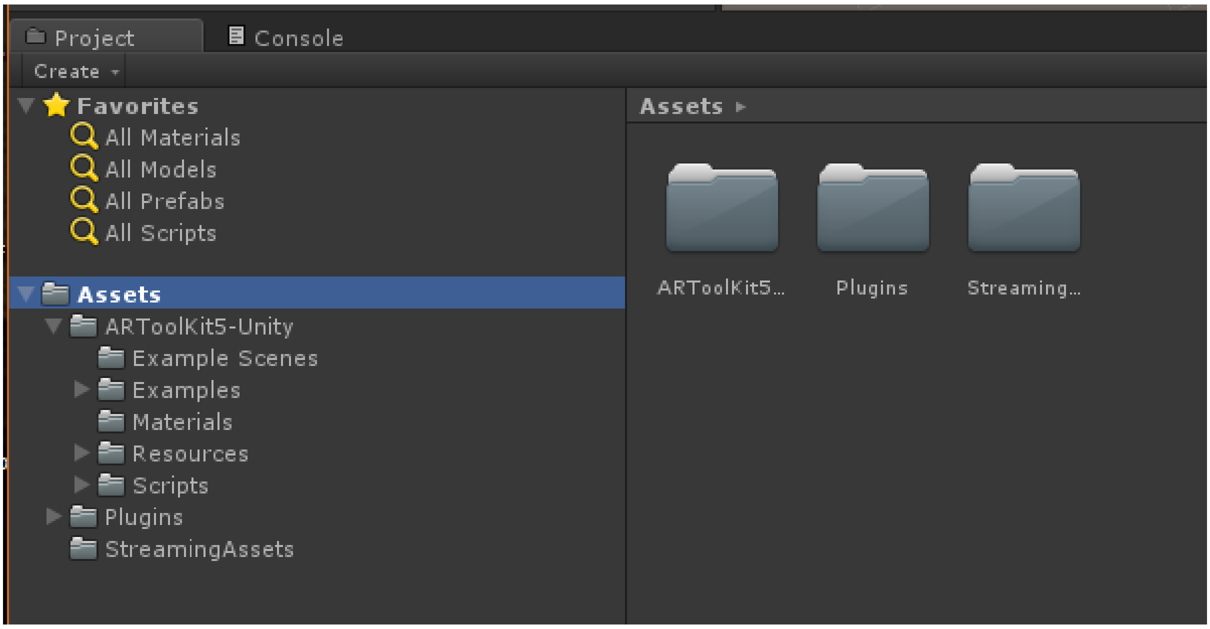
Using Unity?

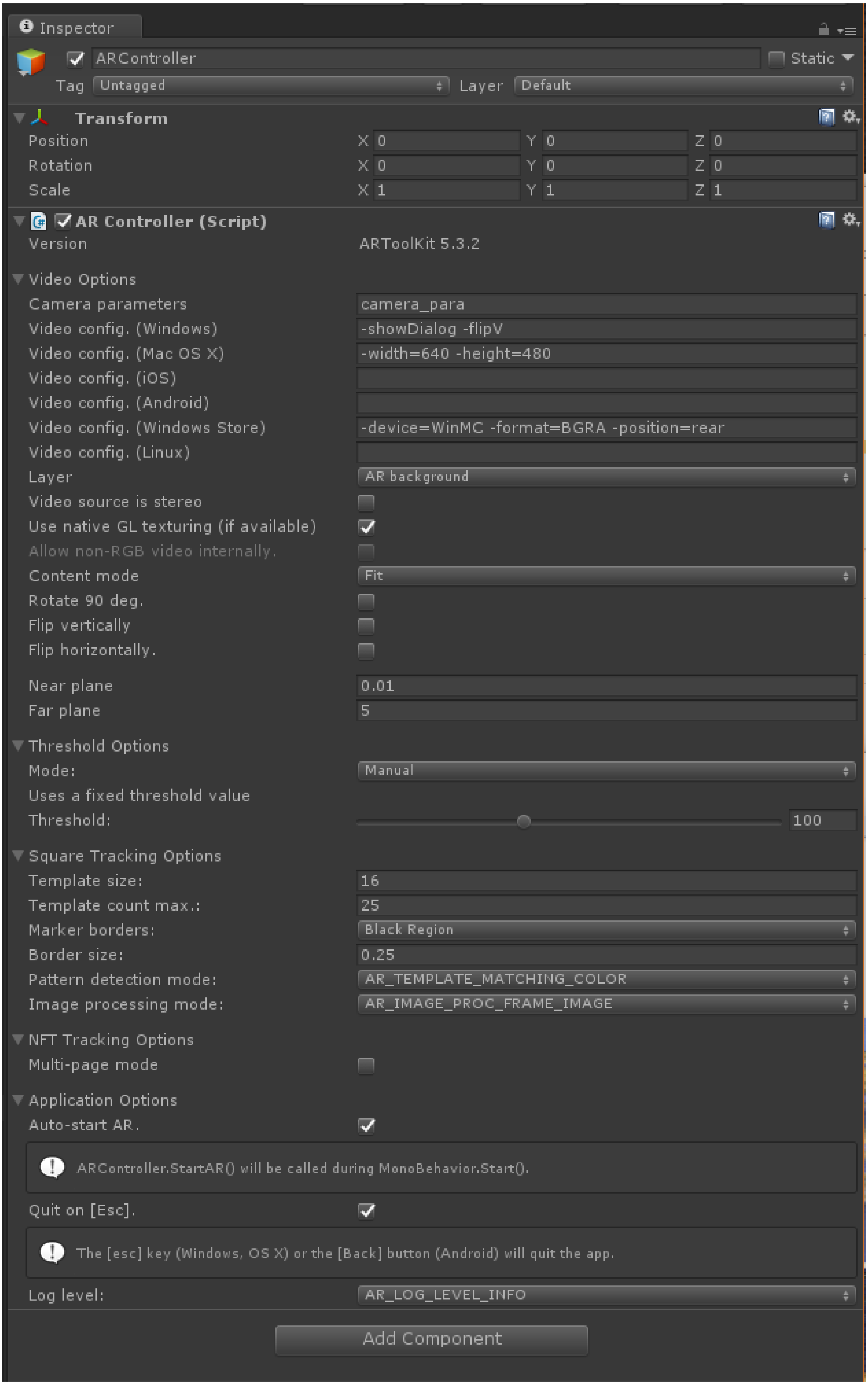
The latest ARToolKit for Unity package includes a full project and examples source, plus binaries for plugins and utilities. Plugins and utilities sources are in the ARToolKit packages.

Latest Version: 5.3.2

DOWNLOAD UNITY PACKAGE

DOWNLOAD ADDITIONAL UNITY TOOLS ▼


Project
Console
Create
Favorites
All Materials
All Models
All Prefabs
All Scripts
Assets
ARToolKit5-Unity
Example Scenes
Examples
Materials
Resources
Scripts
Plugins
StreamingAssets
Assets ▸
ARToolKit5...
Plugins
Streaming...



☑ ARController ☐ Static
Tag: Untagged
Layer: Default

Transform
Position X 0 Y 0 Z 0
Rotation X 0 Y 0 Z 0
Scale X 1 Y 1 Z 1

☑ AR Controller (Script)
Version: ARToolKit 5.3.2

Video Options
Camera parameters: camera_para
Video config. (Windows): -showDialog -flipV
Video config. (Mac OS X): -width=640 -height=480
Video config. (iOS):
Video config. (Android):
Video config. (Windows Store): -device=WinMC -format=BGRA -position=rear
Video config. (Linux):
Layer: AR background
Video source is stereo: ☐
Use native GL texturing (if available): ☑
Allow non-RGB video internally.: ☐
Content mode: Fit
Rotate 90 deg.: ☐
Flip vertically: ☐
Flip horizontally.: ☐

Near plane: 0.01
Far plane: 5

Threshold Options
Mode: Manual
Uses a fixed threshold value
Threshold: 100

Square Tracking Options
Template size: 16
Template count max.: 25
Marker borders: Black Region
Border size: 0.25
Pattern detection mode: AR_TEMPLATE_MATCHING_COLOR
Image processing mode: AR_IMAGE_PROC_FRAME_IMAGE

NFT Tracking Options
Multi-page mode: ☐

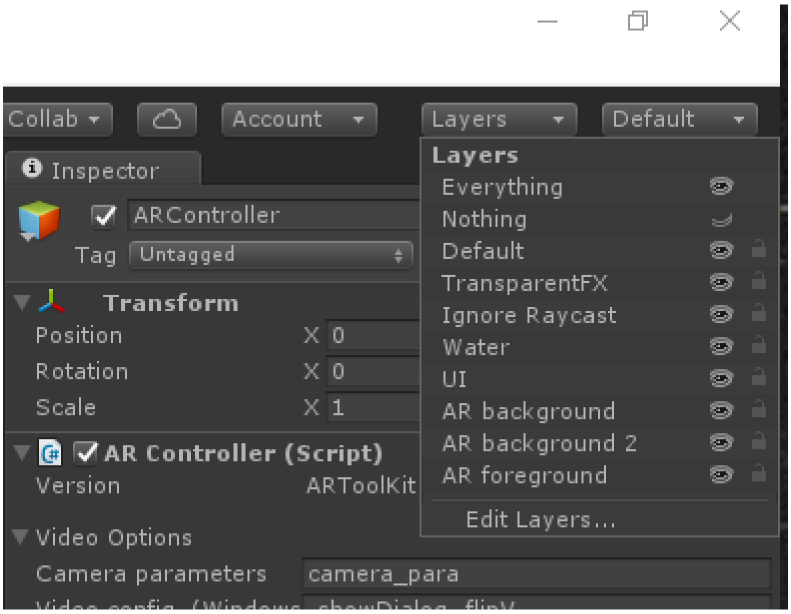
Application Options
Auto-start AR.: ☑

ARController.StartAR() will be called during MonoBehavior.Start().

Quit on [Esc].: ☑

The [esc] key (Windows, OS X) or the [Back] button (Android) will quit the app.

Log level: AR_LOG_LEVEL_INFO

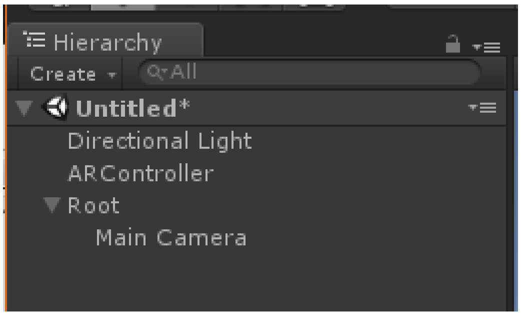

Collab
Account
Layers
Default
Inspector
Layers
Everything
Nothing
Default
TransparentFX
Ignore Raycast
Water
UI
AR background
AR background 2
AR foreground
Edit Layers...

ARController
Tag Untagged

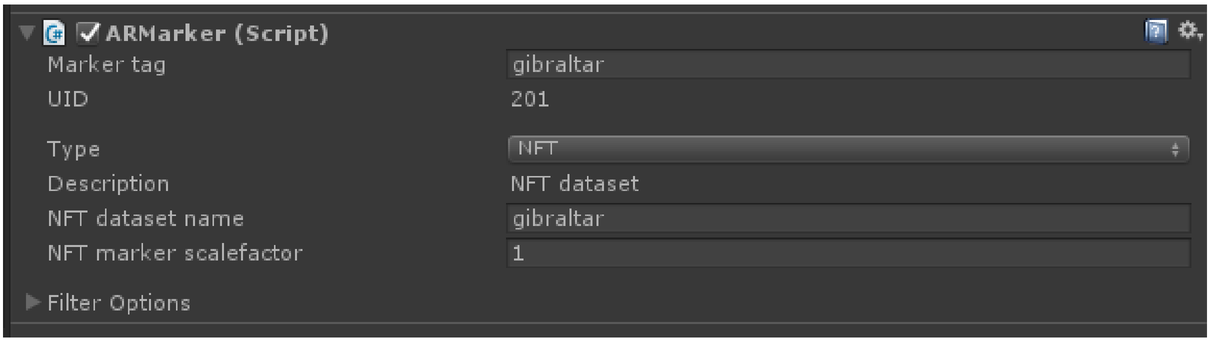
Transform
Position X 0
Rotation X 0
Scale X 1

AR Controller (Script)
Version ARToolKit

Video Options
Camera parameters camera_para
Video config (Windows showDialog, flipV


Hierarchy
Create
All

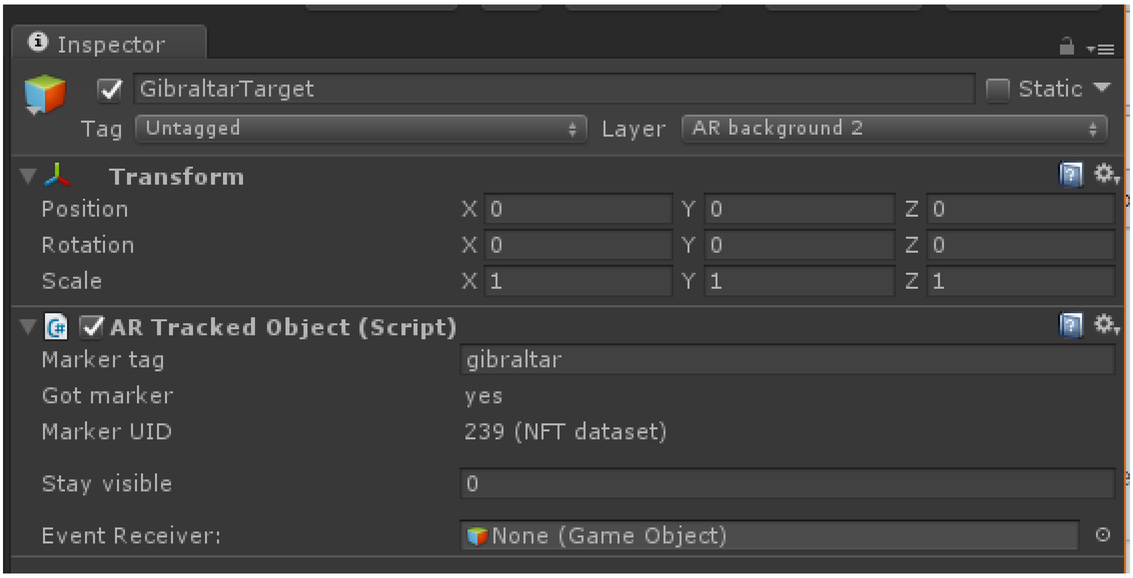
Untitled*
Directional Light
ARController
Root
  Main Camera



ARMarker (Script)

Marker tag	gibraltar
UID	201
Type	NFT
Description	NFT dataset
NFT dataset name	gibraltar
NFT marker scalefactor	1

Filter Options



Inspector

☑ GibraltarTarget ☐ Static

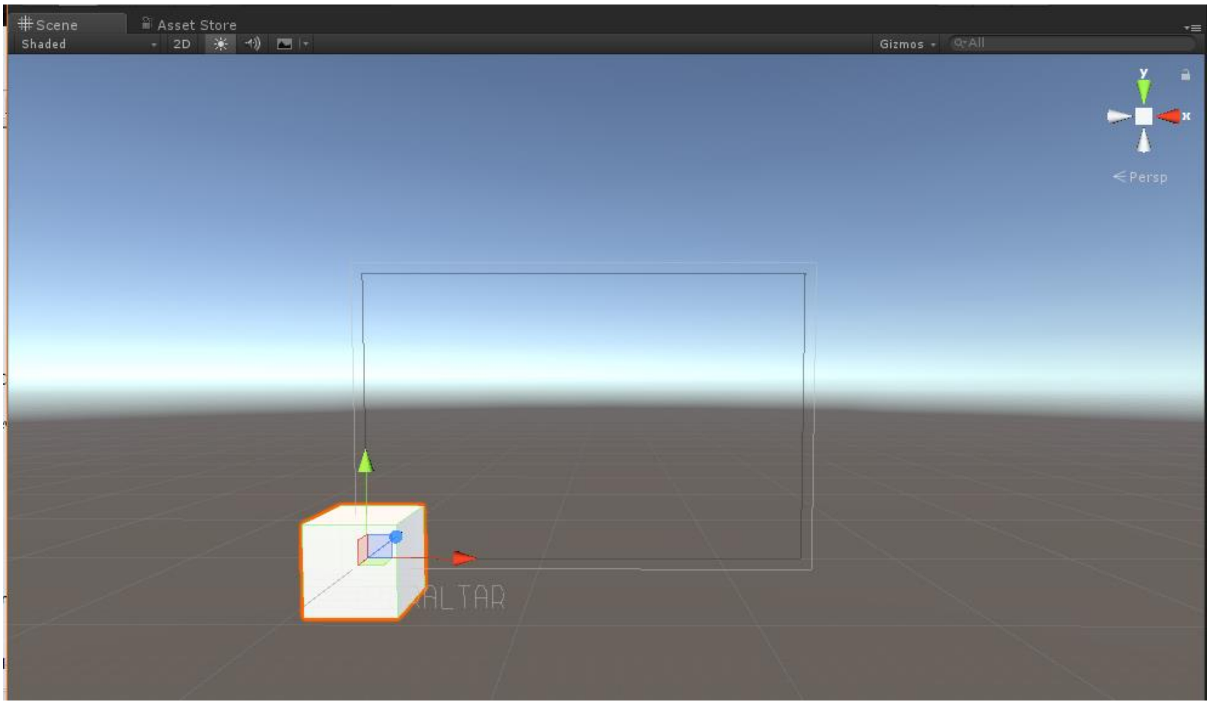
Tag Untagged Layer AR background 2

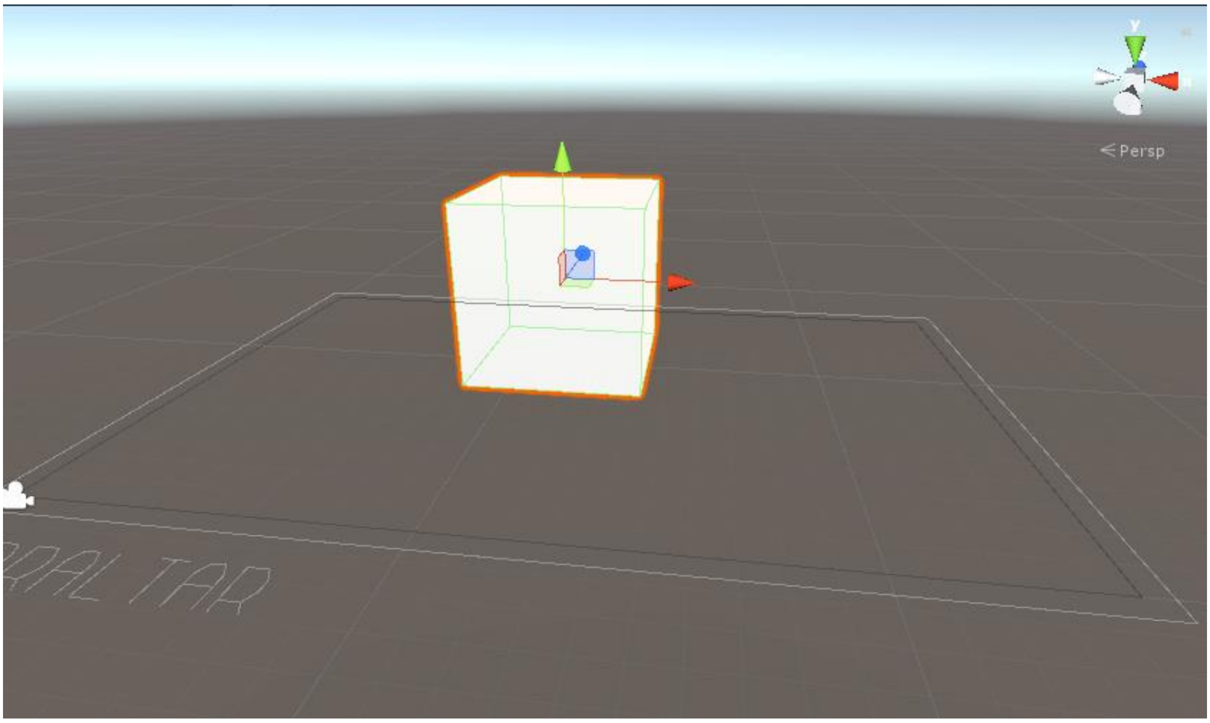
Transform

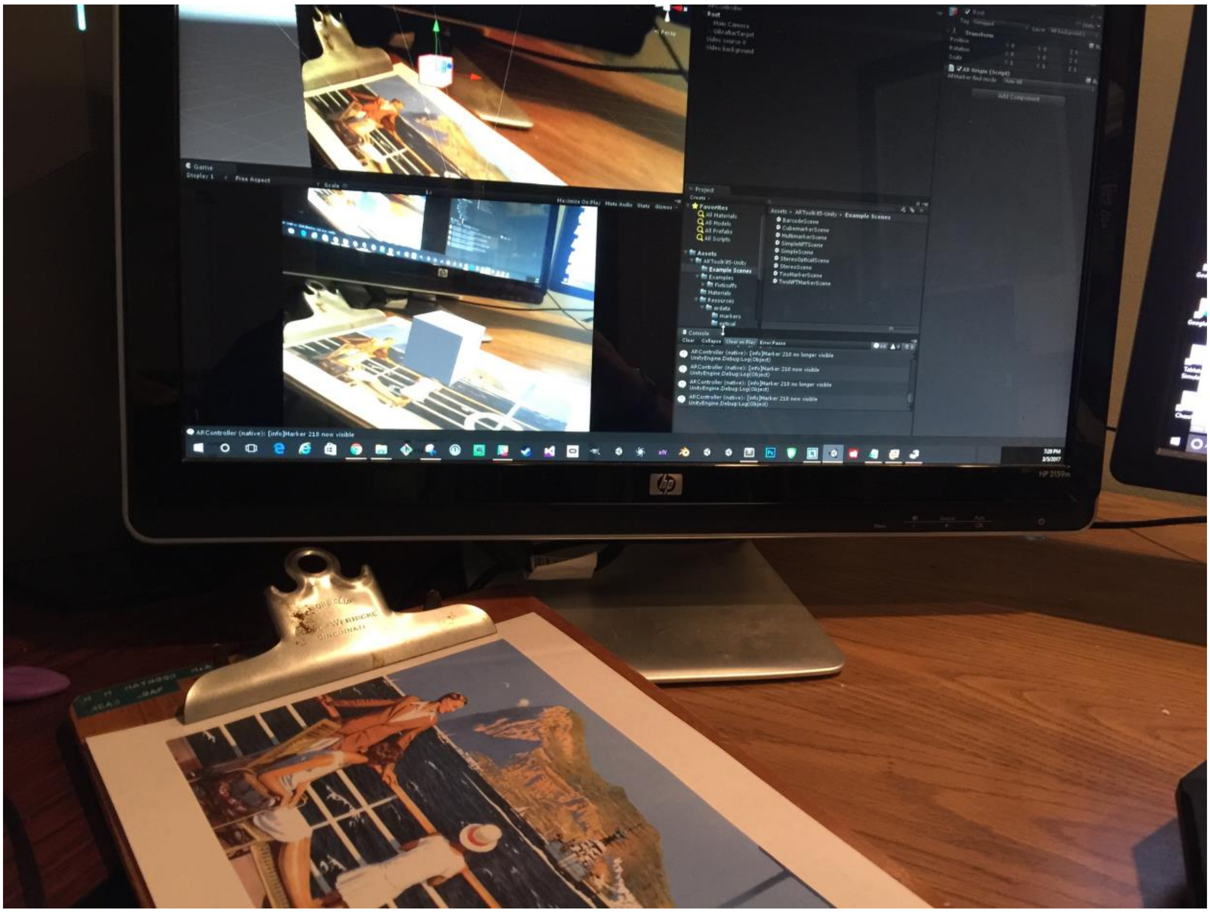
Position	X 0	Y 0	Z 0
Rotation	X 0	Y 0	Z 0
Scale	X 1	Y 1	Z 1

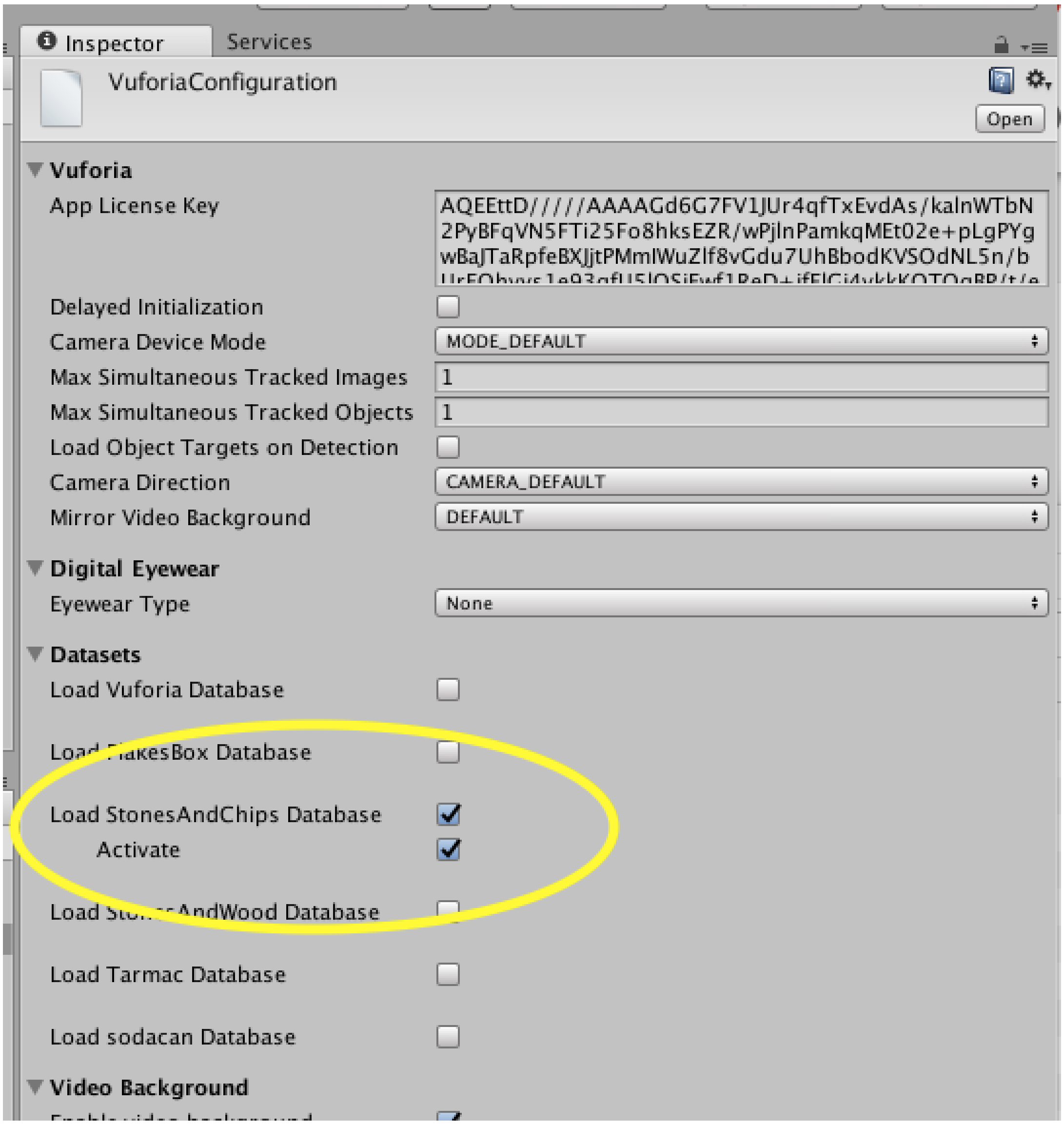
☑ **AR Tracked Object (Script)**

Marker tag	gibraltar
Got marker	yes
Marker UID	239 (NFT dataset)
Stay visible	0
Event Receiver:	None (Game Object)


Scene
Asset Store
Shaded
2D
Gizmos
All
y
x
Persp
ALTAR


Y
Persp
RAL TAR





VuforiaConfiguration

Vuforia

App License Key: AQEEttD/////AAAAGd6G7FV1JUr4qfTxEvdAs/kalnWTbN
2PyBFqVN5FTi25Fo8hksEZR/wPjlnPamkqMEt02e+pLgPYg
wBaJTaRpfeBXJjtPMmlWuZlf8vGdu7UhBbodKVSOdNL5n/b

Delayed Initialization ☐

Camera Device Mode: MODE_DEFAULT

Max Simultaneous Tracked Images: 1

Max Simultaneous Tracked Objects: 1

Load Object Targets on Detection ☐

Camera Direction: CAMERA_DEFAULT

Mirror Video Background: DEFAULT

Digital Eyewear

Eyewear Type: None

Datasets

Load Vuforia Database ☐

Load FlakesBox Database ☐

Load StonesAndChips Database ☑

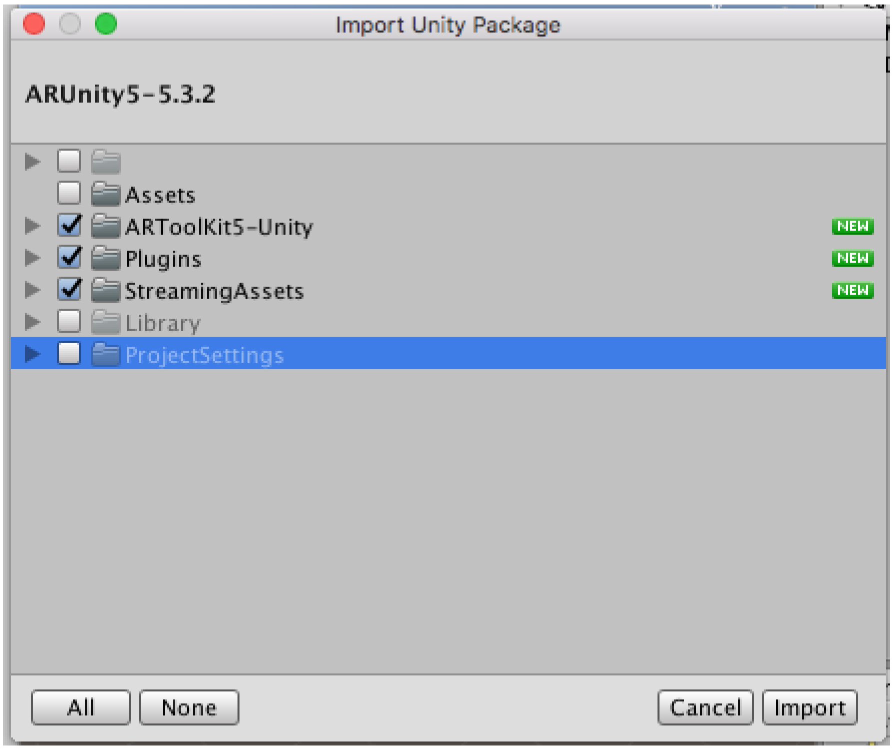
Activate ☑

Load StonesAndWood Database ☐

Load Tarmac Database ☐

Load sodacan Database ☐

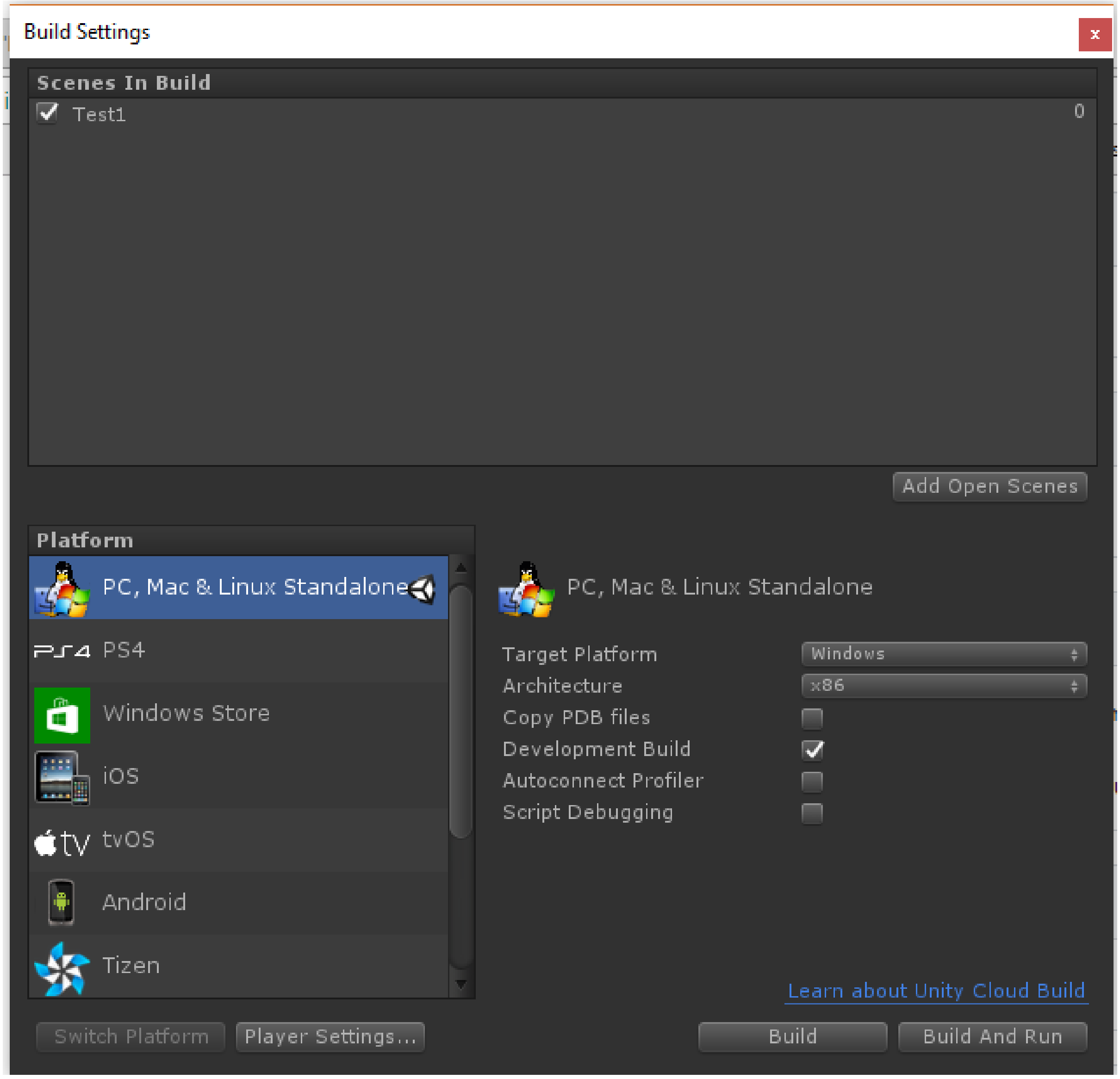
Video Background


Import Unity Package
All
None
Cancel
Import

ARUnity5-5.3.2

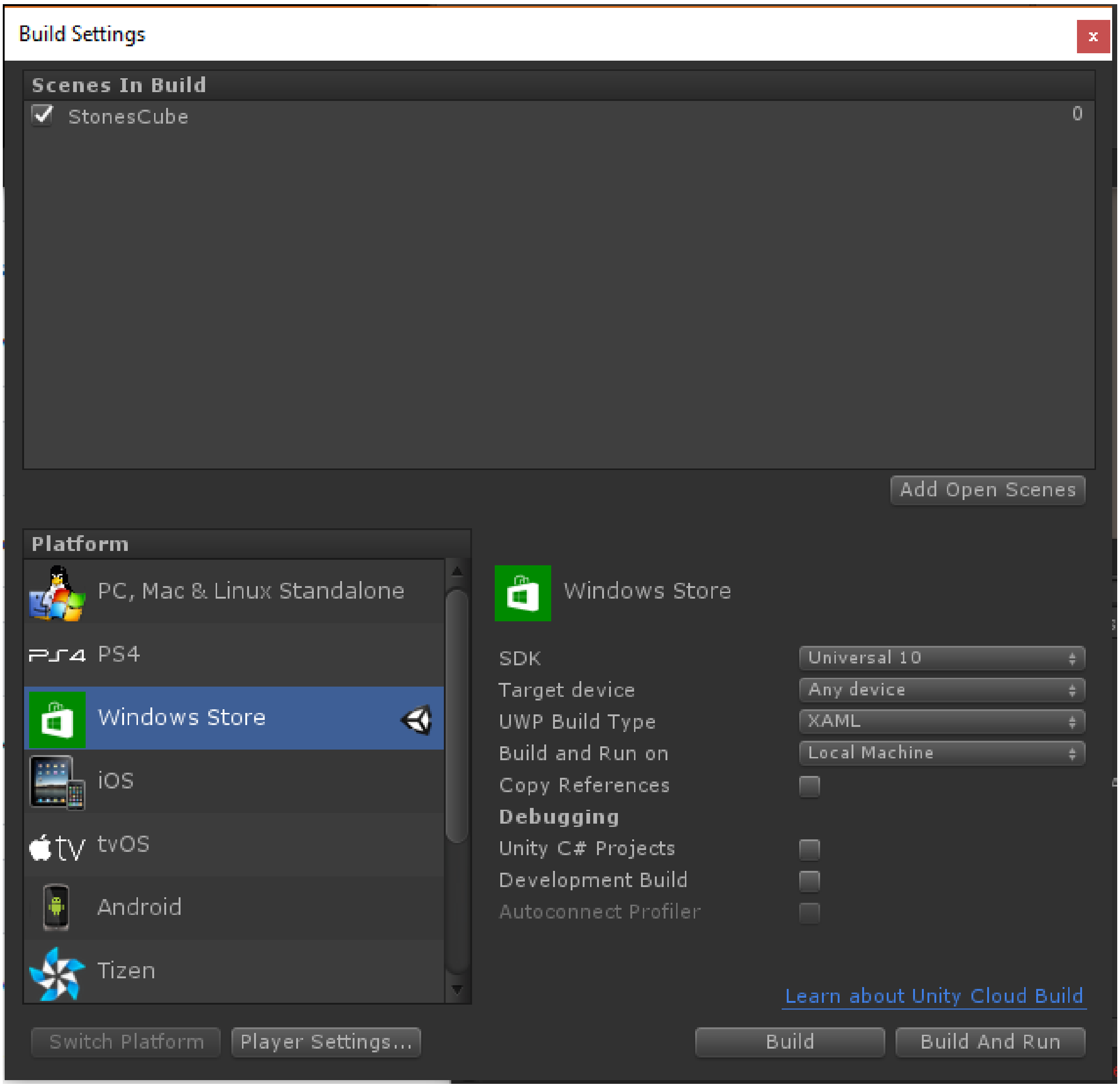
☐
☐ Assets
☑ ARToolKit5-Unity NEW
☑ Plugins NEW
☑ StreamingAssets NEW
☐ Library
☐ ProjectSettings

Chapter 3: Building Your App


Build Settings
Scenes In Build
Add Open Scenes
Platform
PC, Mac & Linux Standalone
PS4
Windows Store
iOS
tvOS
Android
Tizen
PC, Mac & Linux Standalone
Learn about Unity Cloud Build
Switch Platform
Player Settings...
Build
Build And Run

☑ Test1 0

Target Platform: Windows
Architecture: x86
Copy PDB files ☐
Development Build ☑
Autoconnect Profiler ☐
Script Debugging ☐



Build Settings

Scenes In Build

☑ StonesCube 0

Platform

Windows Store

SDK: Universal 10

Target device: Any device

UWP Build Type: XAML

Build and Run on: Local Machine

Copy References ☐

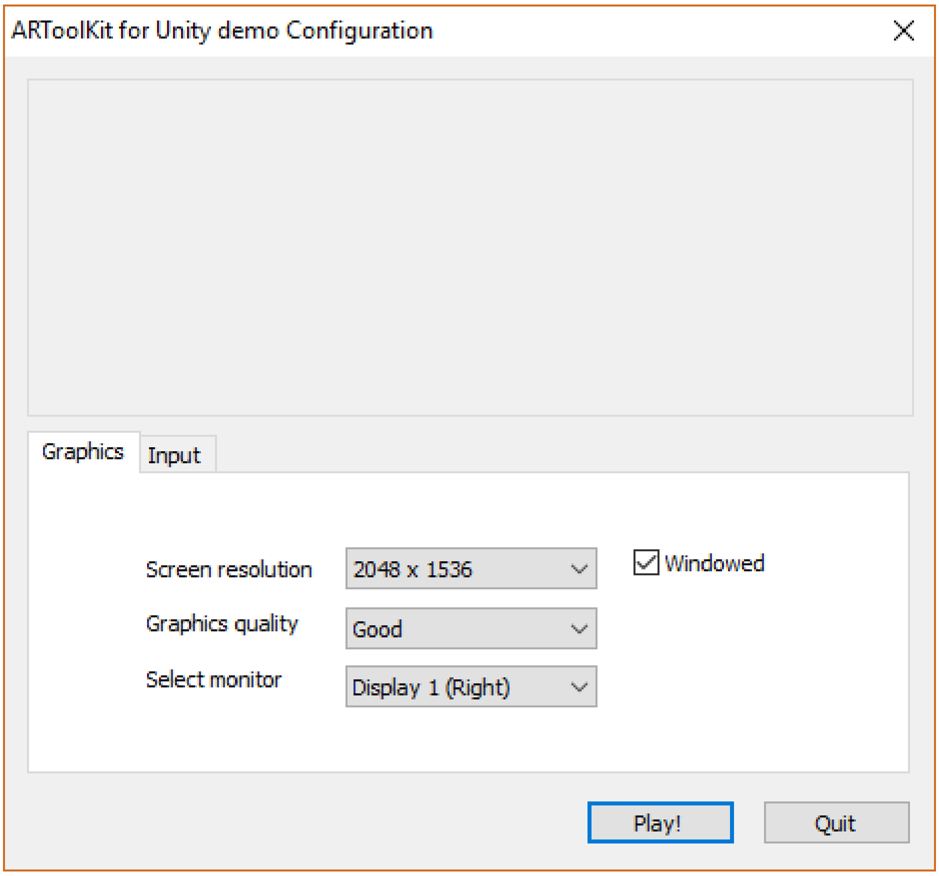
Debugging

Unity C# Projects ☐

Development Build ☐

Autoconnect Profiler ☐

×
Add Open Scenes
PC, Mac & Linux Standalone
PS4
Windows Store
iOS
tvOS
Android
Tizen
Learn about Unity Cloud Build
Switch Platform
Player Settings...
Build
Build And Run



ARToolKit for Unity demo Configuration

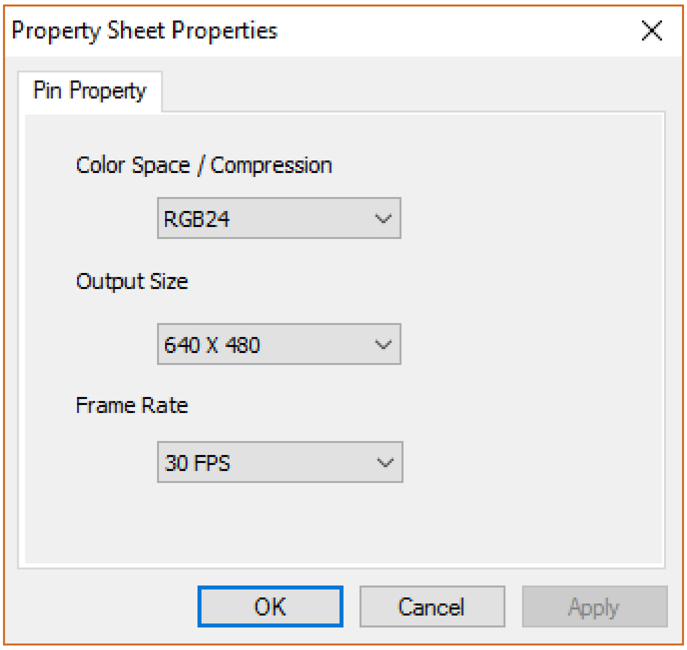
Graphics
Input
Play!
Quit

Screen resolution: 2048 x 1536

Graphics quality: Good

Select monitor: Display 1 (Right)

☑ Windowed



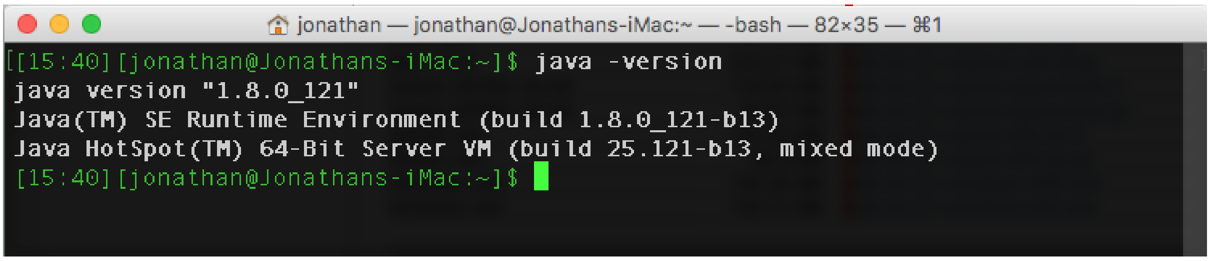
Property Sheet Properties

Pin Property
OK
Cancel
Apply

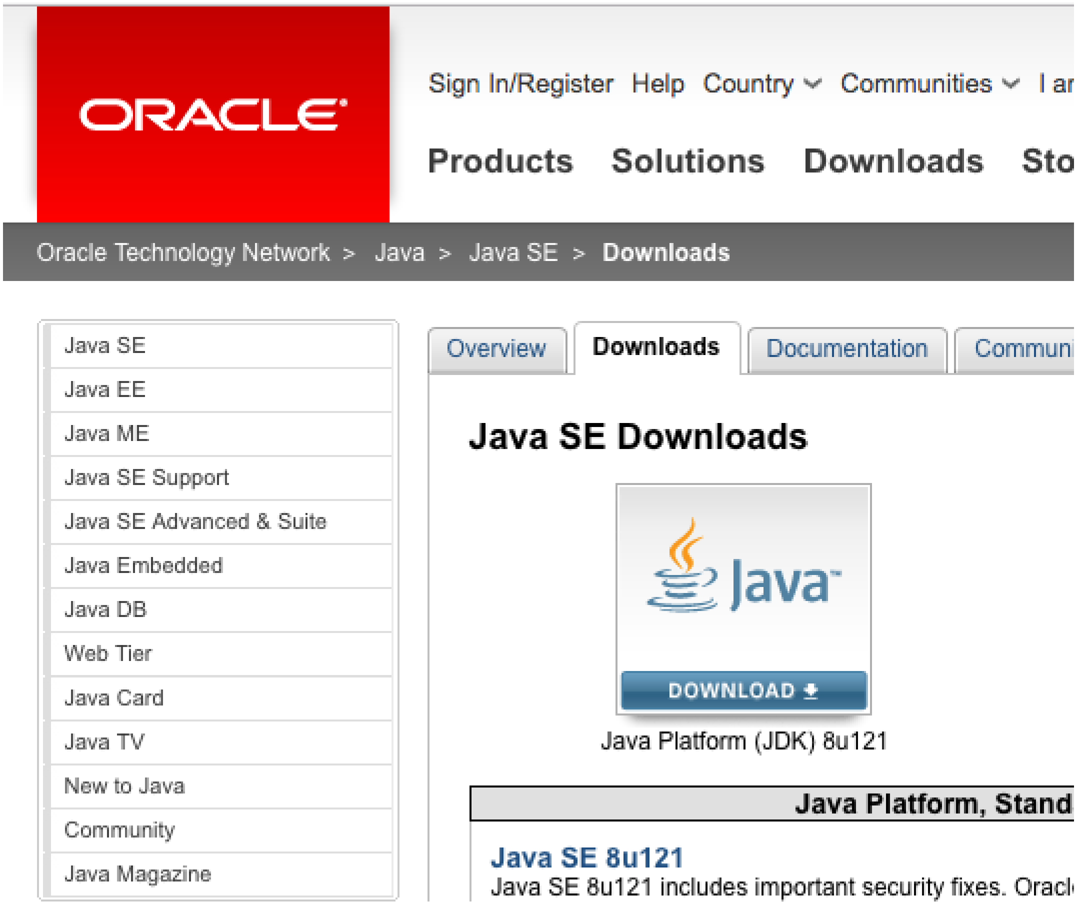
Color Space / Compression: RGB24

Output Size: 640 X 480

Frame Rate: 30 FPS


jonathan — jonathan@Jonathans-iMac:~ — -bash — 82×35 — ⌘1

```
[15:40][jonathan@Jonathans-iMac:~]$ java -version
java version "1.8.0_121"
Java(TM) SE Runtime Environment (build 1.8.0_121-b13)
Java HotSpot(TM) 64-Bit Server VM (build 25.121-b13, mixed mode)
[15:40][jonathan@Jonathans-iMac:~]$ 
```


ORACLE
Sign In/Register
Help
Country
Communities
I ar
Products
Solutions
Downloads
Sto
Oracle Technology Network > Java > Java SE > Downloads
Java SE
Java EE
Java ME
Java SE Support
Java SE Advanced & Suite
Java Embedded
Java DB
Web Tier
Java Card
Java TV
New to Java
Community
Java Magazine
Overview
Downloads
Documentation
Communi
Java
DOWNLOAD

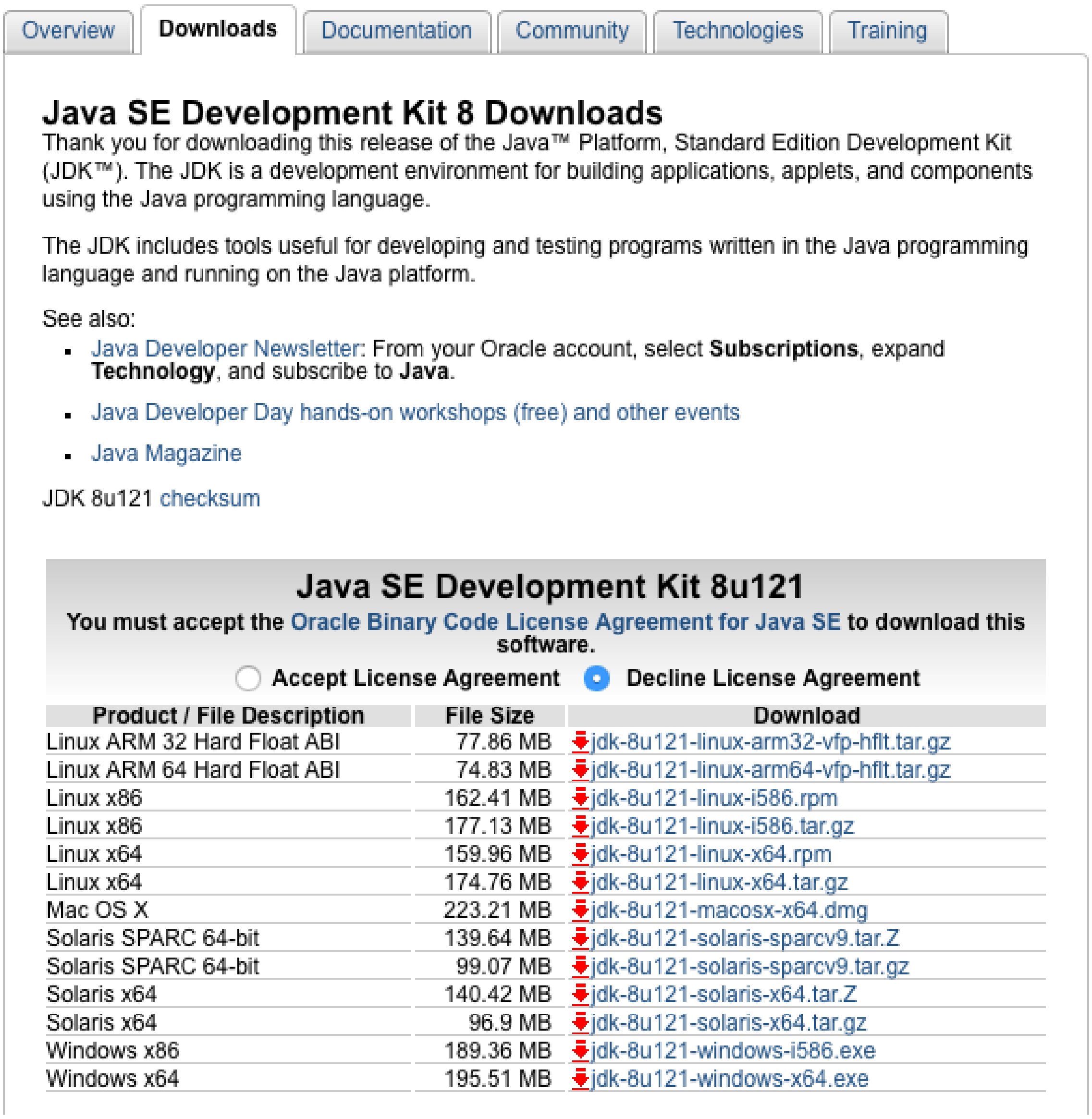
Java SE Downloads

Java Platform (JDK) 8u121

Java Platform, Stand

Java SE 8u121

Java SE 8u121 includes important security fixes. Oracl


Overview
Downloads
Documentation
Community
Technologies
Training

Java SE Development Kit 8 Downloads

Thank you for downloading this release of the Java™ Platform, Standard Edition Development Kit (JDK™). The JDK is a development environment for building applications, applets, and components using the Java programming language.

The JDK includes tools useful for developing and testing programs written in the Java programming language and running on the Java platform.

See also:

- Java Developer Newsletter: From your Oracle account, select **Subscriptions**, expand **Technology**, and subscribe to **Java**.
- Java Developer Day hands-on workshops (free) and other events
- Java Magazine

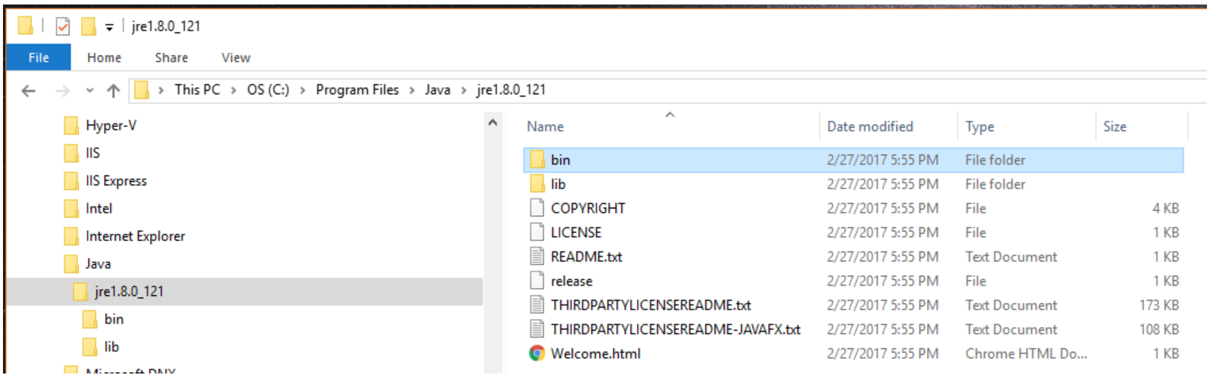
JDK 8u121 checksum

Java SE Development Kit 8u121

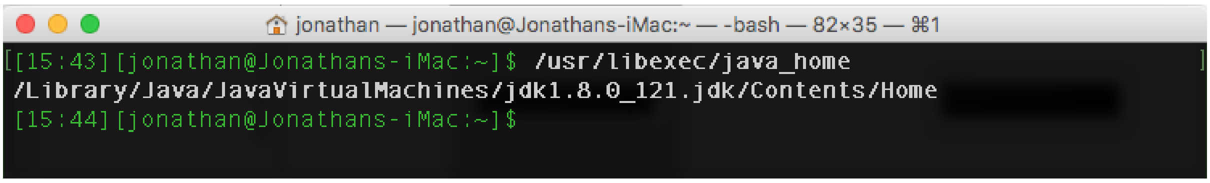
You must accept the Oracle Binary Code License Agreement for Java SE to download this software.

○ **Accept License Agreement** ● **Decline License Agreement**

Product / File Description	File Size	Download
Linux ARM 32 Hard Float ABI	77.86 MB	jdk-8u121-linux-arm32-vfp-hflt.tar.gz
Linux ARM 64 Hard Float ABI	74.83 MB	jdk-8u121-linux-arm64-vfp-hflt.tar.gz
Linux x86	162.41 MB	jdk-8u121-linux-i586.rpm
Linux x86	177.13 MB	jdk-8u121-linux-i586.tar.gz
Linux x64	159.96 MB	jdk-8u121-linux-x64.rpm
Linux x64	174.76 MB	jdk-8u121-linux-x64.tar.gz
Mac OS X	223.21 MB	jdk-8u121-macosx-x64.dmg
Solaris SPARC 64-bit	139.64 MB	jdk-8u121-solaris-sparcv9.tar.Z
Solaris SPARC 64-bit	99.07 MB	jdk-8u121-solaris-sparcv9.tar.gz
Solaris x64	140.42 MB	jdk-8u121-solaris-x64.tar.Z
Solaris x64	96.9 MB	jdk-8u121-solaris-x64.tar.gz
Windows x86	189.36 MB	jdk-8u121-windows-i586.exe
Windows x64	195.51 MB	jdk-8u121-windows-x64.exe

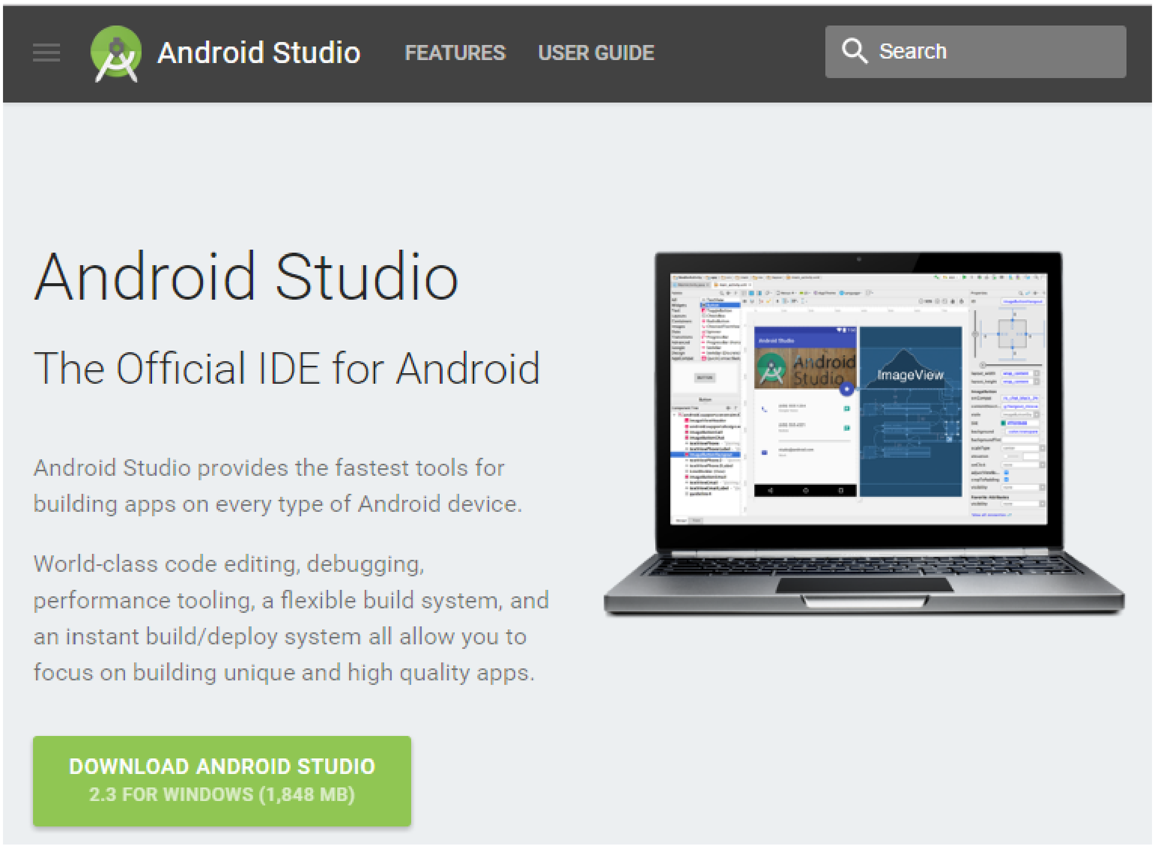

jre1.8.0_121
File
Home
Share
View
This PC › OS (C:) › Program Files › Java › jre1.8.0_121
Hyper-V
IIS
IIS Express
Intel
Internet Explorer
Java
jre1.8.0_121
bin
lib

Name	Date modified	Type	Size
bin	2/27/2017 5:55 PM	File folder	
lib	2/27/2017 5:55 PM	File folder	
COPYRIGHT	2/27/2017 5:55 PM	File	4 KB
LICENSE	2/27/2017 5:55 PM	File	1 KB
README.txt	2/27/2017 5:55 PM	Text Document	1 KB
release	2/27/2017 5:55 PM	File	1 KB
THIRDPARTYLICENSEREADME.txt	2/27/2017 5:55 PM	Text Document	173 KB
THIRDPARTYLICENSEREADME-JAVAFX.txt	2/27/2017 5:55 PM	Text Document	108 KB
Welcome.html	2/27/2017 5:55 PM	Chrome HTML Do...	1 KB



jonathan — jonathan@Jonathans-iMac:~ — -bash — 82×35 — ⌘1

```
[15:43][jonathan@Jonathans-iMac:~]$ /usr/libexec/java_home
/Library/Java/JavaVirtualMachines/jdk1.8.0_121.jdk/Contents/Home
[15:44][jonathan@Jonathans-iMac:~]$
```



Android Studio
FEATURES
USER GUIDE
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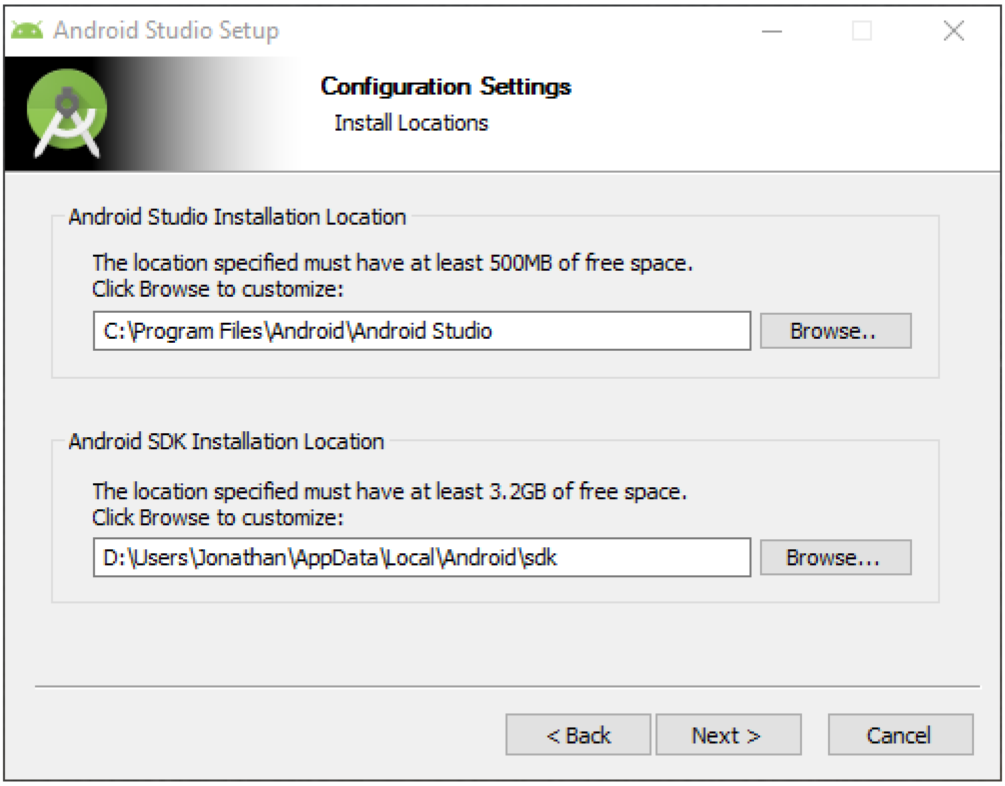
Android Studio

The Official IDE for Android

Android Studio provides the fastest tools for building apps on every type of Android device.

World-class code editing, debugging, performance tooling, a flexible build system, and an instant build/deploy system all allow you to focus on building unique and high quality apps.

DOWNLOAD ANDROID STUDIO
2.3 FOR WINDOWS (1,848 MB)



Android Studio Setup

Configuration Settings

Install Locations

Android Studio Installation Location

The location specified must have at least 500MB of free space.
Click Browse to customize:

C:\Program Files\Android\Android Studio

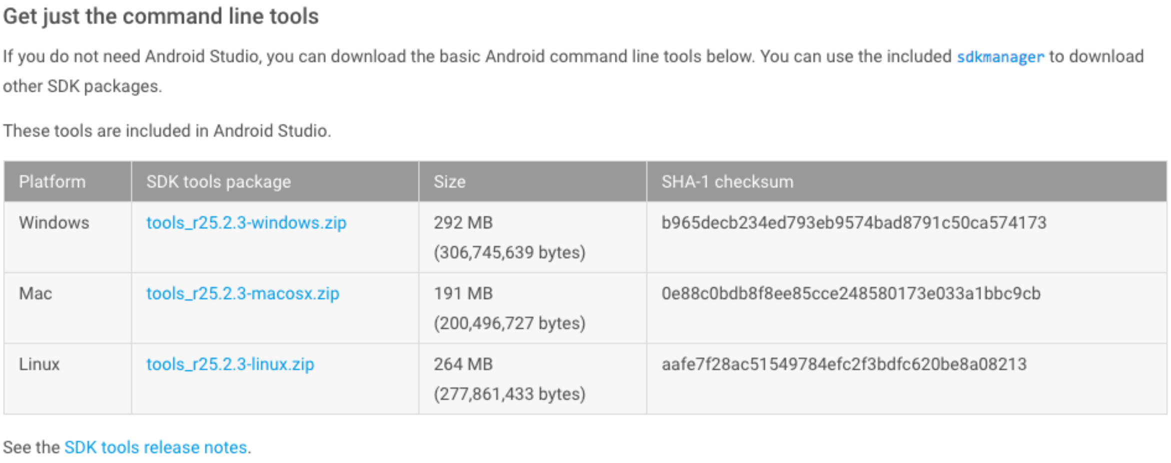
Browse..

Android SDK Installation Location

The location specified must have at least 3.2GB of free space.
Click Browse to customize:

D:\Users\Jonathan\AppData\Local\Android\sdk

Browse...
< Back
Next >
Cancel



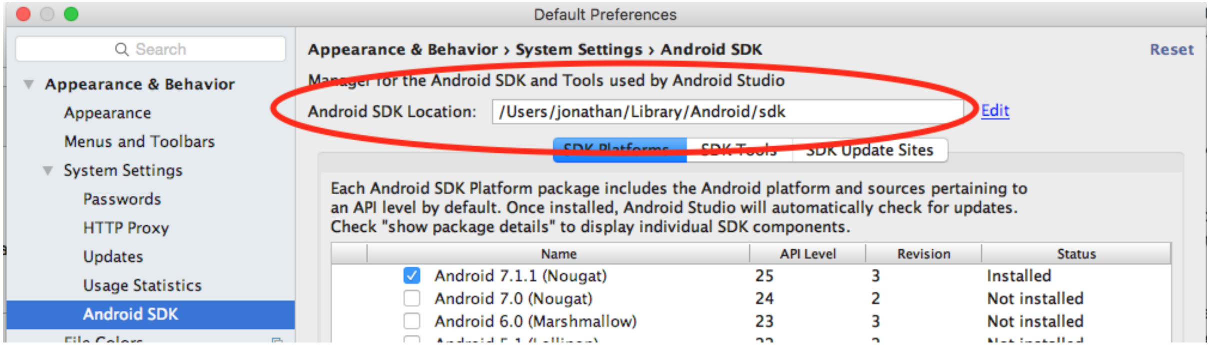
Get just the command line tools

If you do not need Android Studio, you can download the basic Android command line tools below. You can use the included `sdkmanager` to download other SDK packages.

These tools are included in Android Studio.

Platform	SDK tools package	Size	SHA-1 checksum
Windows	tools_r25.2.3-windows.zip	292 MB (306,745,639 bytes)	b965decb234ed793eb9574bad8791c50ca574173
Mac	tools_r25.2.3-macosx.zip	191 MB (200,496,727 bytes)	0e88c0bdb8f8ee85cce248580173e033a1bbc9cb
Linux	tools_r25.2.3-linux.zip	264 MB (277,861,433 bytes)	aafe7f28ac51549784efc2f3bdfc620be8a08213

See the SDK tools release notes.



Default Preferences
Search
Appearance & Behavior
Appearance
Menus and Toolbars
System Settings
Passwords
HTTP Proxy
Updates
Usage Statistics
Android SDK
Reset

Appearance & Behavior › System Settings › Android SDK

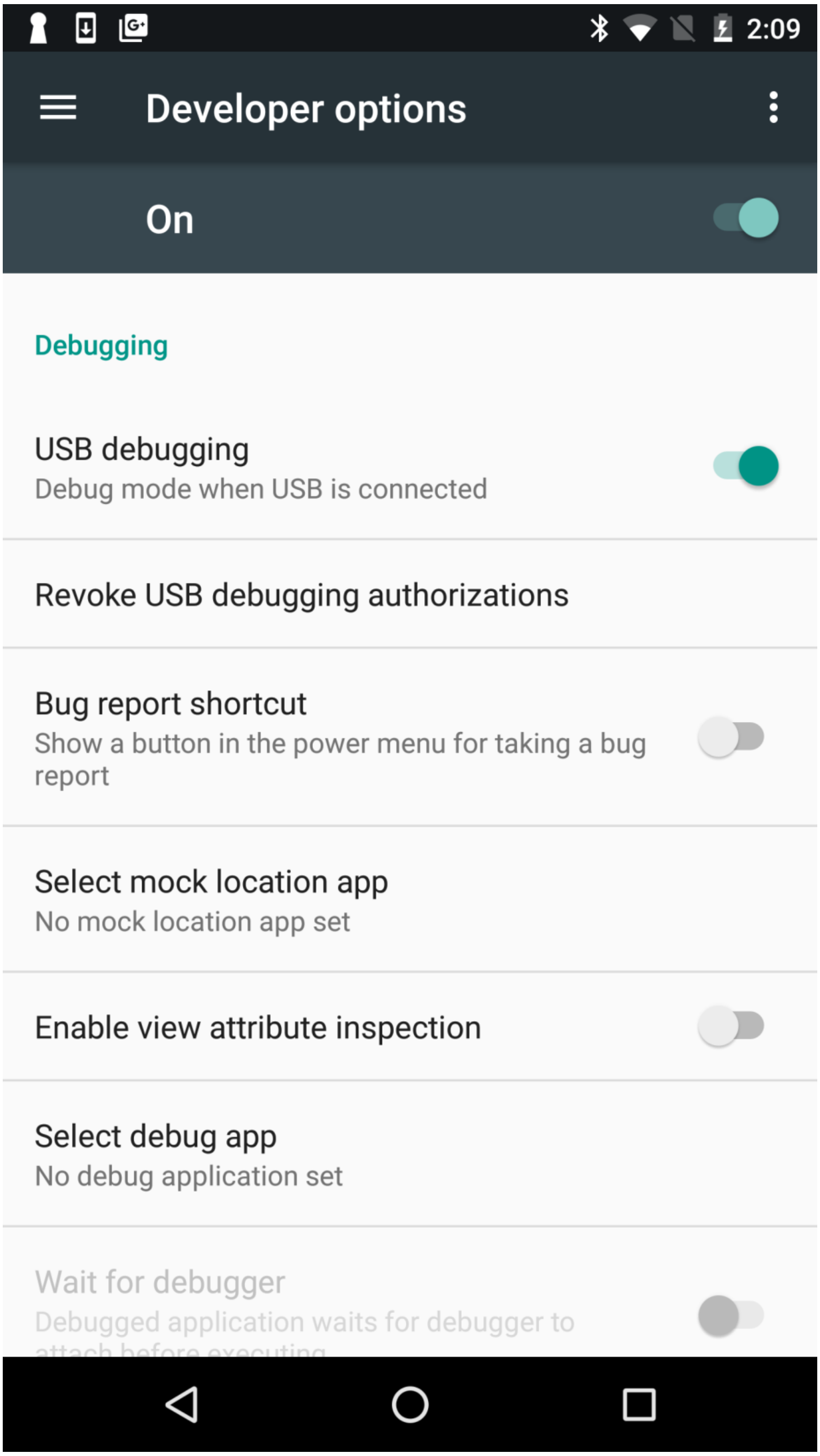
Manager for the Android SDK and Tools used by Android Studio

Android SDK Location: /Users/jonathan/Library/Android/sdk Edit

SDK Platforms
SDK Tools
SDK Update Sites

Each Android SDK Platform package includes the Android platform and sources pertaining to an API level by default. Once installed, Android Studio will automatically check for updates. Check "show package details" to display individual SDK components.

Name	API Level	Revision	Status
☑ Android 7.1.1 (Nougat)	25	3	Installed
☐ Android 7.0 (Nougat)	24	2	Not installed
☐ Android 6.0 (Marshmallow)	23	3	Not installed



On

Debugging

USB debugging
Debug mode when USB is connected

Revoke USB debugging authorizations

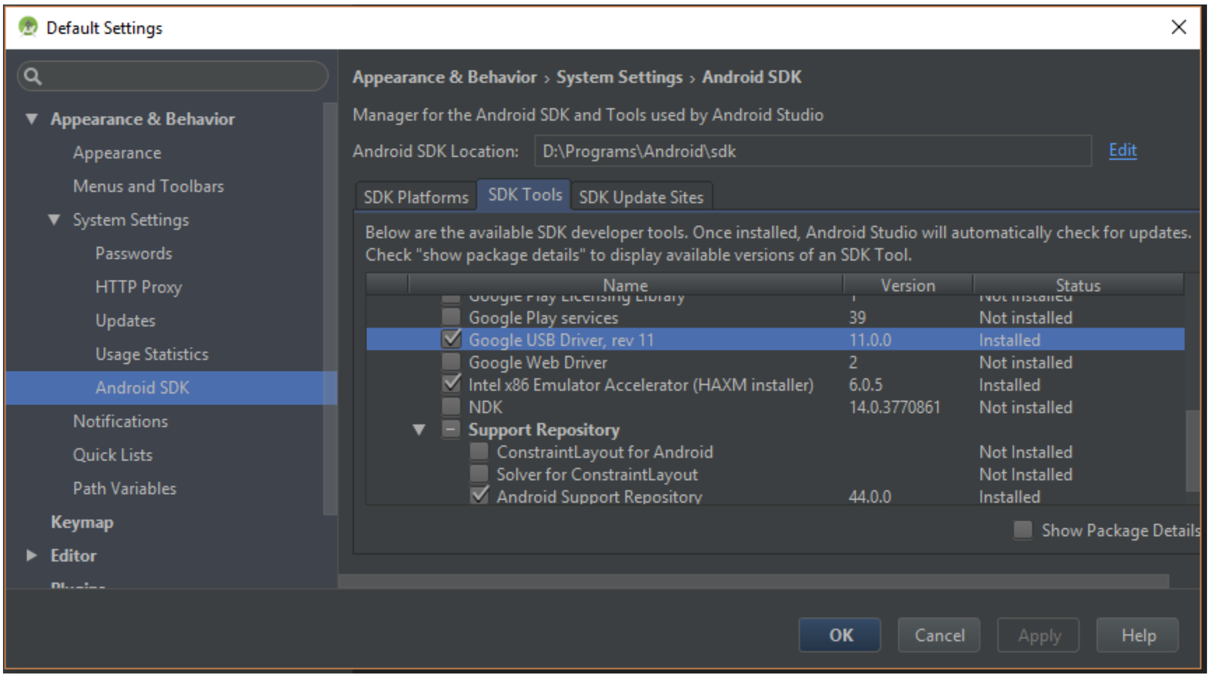
Bug report shortcut
Show a button in the power menu for taking a bug report

Select mock location app
No mock location app set

Enable view attribute inspection

Select debug app
No debug application set

Wait for debugger
Debugged application waits for debugger to attach before executing


Default Settings
Appearance & Behavior
Appearance
Menus and Toolbars
System Settings
Passwords
HTTP Proxy
Updates
Usage Statistics
Android SDK
Notifications
Quick Lists
Path Variables
Keymap
Editor
SDK Platforms
SDK Tools
SDK Update Sites
OK
Cancel
Apply
Help

Appearance & Behavior › System Settings › Android SDK

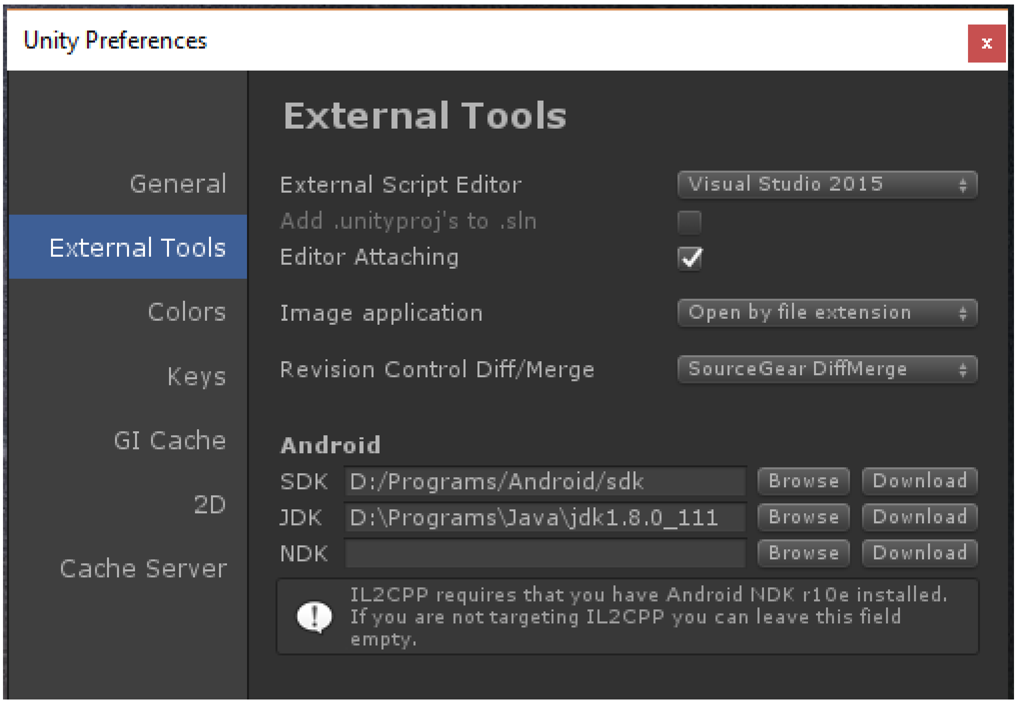
Manager for the Android SDK and Tools used by Android Studio

Android SDK Location: D:\Programs\Android\sdk Edit

Below are the available SDK developer tools. Once installed, Android Studio will automatically check for updates. Check "show package details" to display available versions of an SDK Tool.

Name	Version	Status
☐ Google Play services	39	Not installed
☑ Google USB Driver, rev 11	11.0.0	Installed
☐ Google Web Driver	2	Not installed
☑ Intel x86 Emulator Accelerator (HAXM installer)	6.0.5	Installed
☐ NDK	14.0.3770861	Not installed
Support Repository		
☐ ConstraintLayout for Android		Not Installed
☐ Solver for ConstraintLayout		Not Installed
☑ Android Support Repository	44.0.0	Installed

☐ Show Package Details

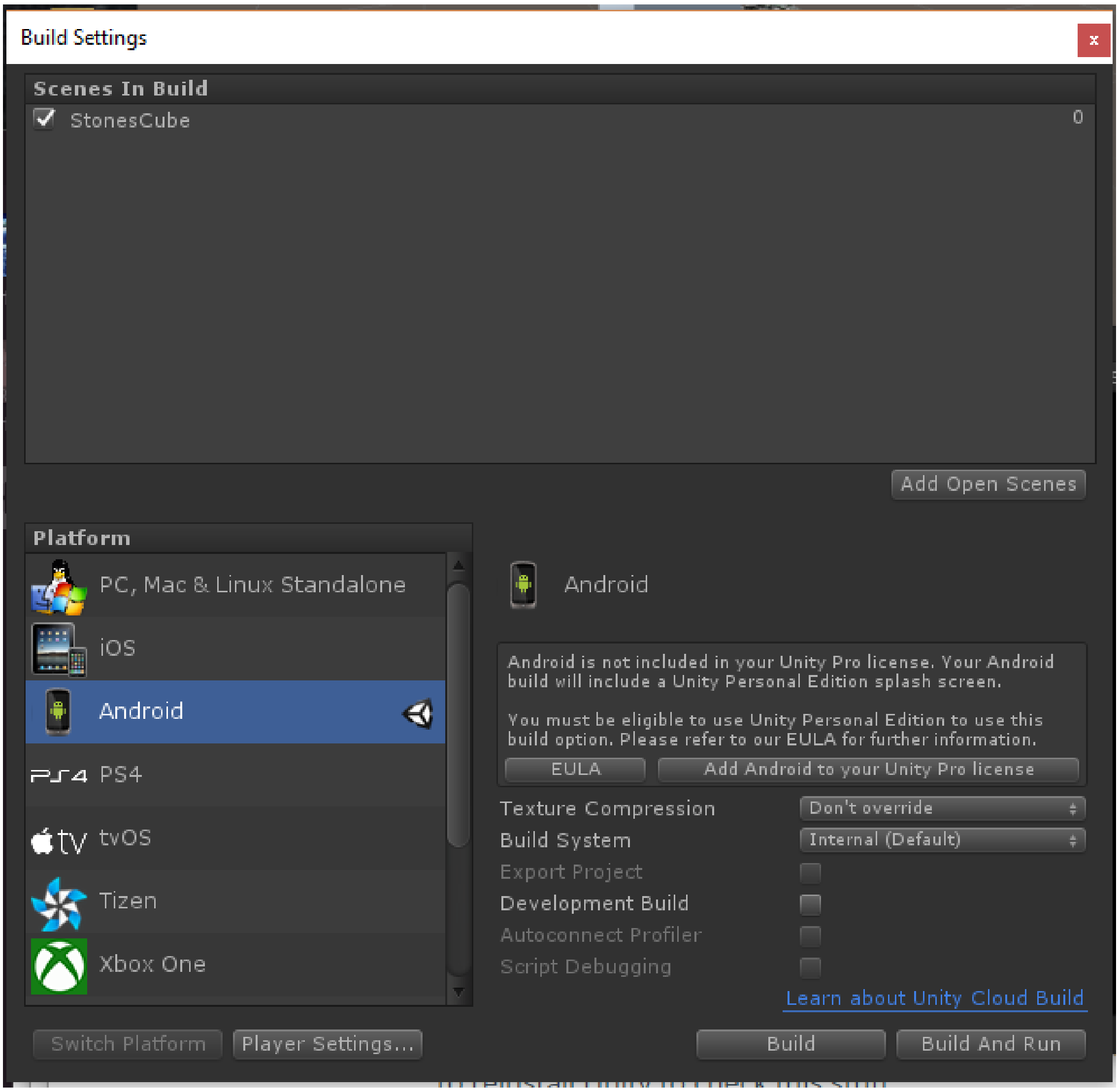

Unity Preferences
General
External Tools
Colors
Keys
GI Cache
2D
Cache Server
Browse
Download
Browse
Download
Browse
Download

External Tools

External Script Editor: Visual Studio 2015
Add .unityproj's to .sln: ☐
Editor Attaching: ☑
Image application: Open by file extension
Revision Control Diff/Merge: SourceGear DiffMerge

Android
SDK D:/Programs/Android/sdk
JDK D:\Programs\Java\jdk1.8.0_111
NDK

IL2CPP requires that you have Android NDK r10e installed. If you are not targeting IL2CPP you can leave this field empty.

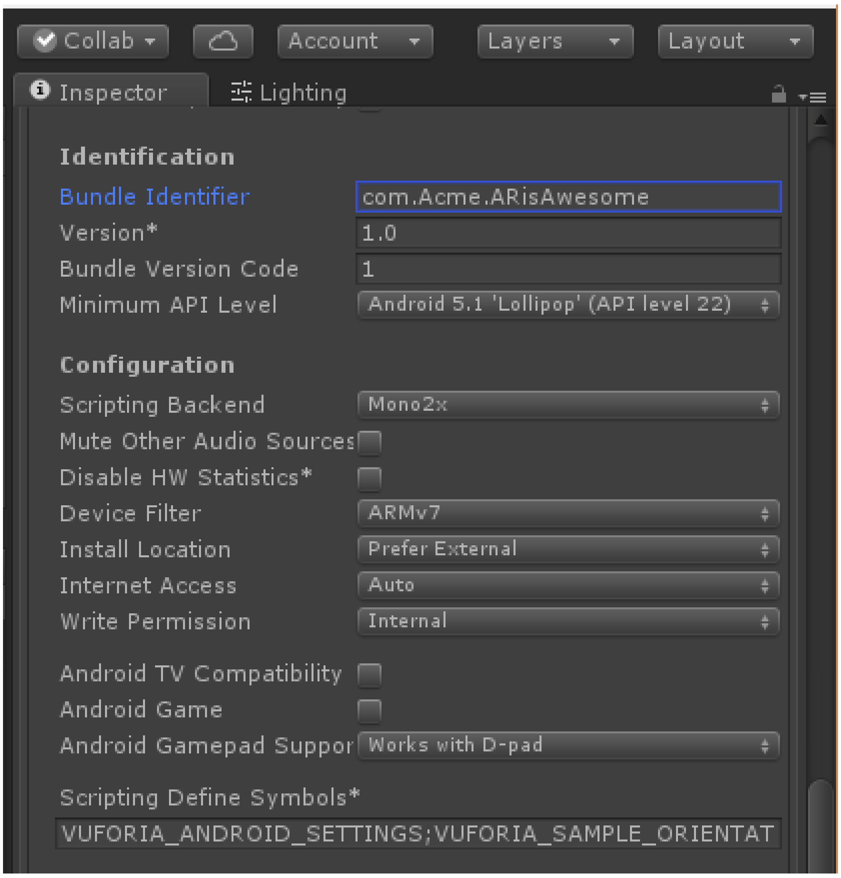

Build Settings
×
Scenes In Build
Add Open Scenes
Platform
PC, Mac & Linux Standalone
iOS
Android
PS4
tvOS
Tizen
Xbox One
Android
EULA
Add Android to your Unity Pro license
Learn about Unity Cloud Build
Switch Platform
Player Settings...
Build
Build And Run

☑ StonesCube 0

Android is not included in your Unity Pro license. Your Android build will include a Unity Personal Edition splash screen.

You must be eligible to use Unity Personal Edition to use this build option. Please refer to our EULA for further information.

Texture Compression: Don't override
Build System: Internal (Default)
Export Project ☐
Development Build ☐
Autoconnect Profiler ☐
Script Debugging ☐



Identification

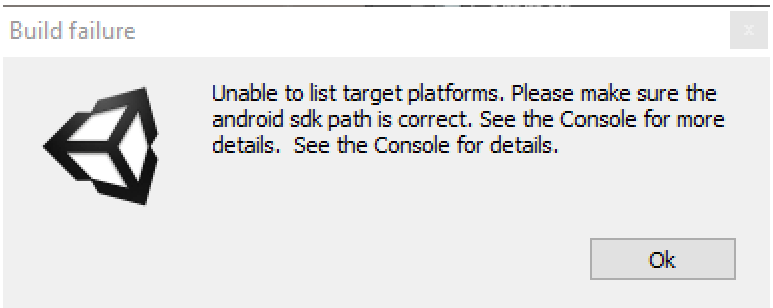
Bundle Identifier: com.Acme.ARisAwesome
Version*: 1.0
Bundle Version Code: 1
Minimum API Level: Android 5.1 'Lollipop' (API level 22)

Configuration

Scripting Backend: Mono2x
Mute Other Audio Sources ☐
Disable HW Statistics* ☐
Device Filter: ARMv7
Install Location: Prefer External
Internet Access: Auto
Write Permission: Internal

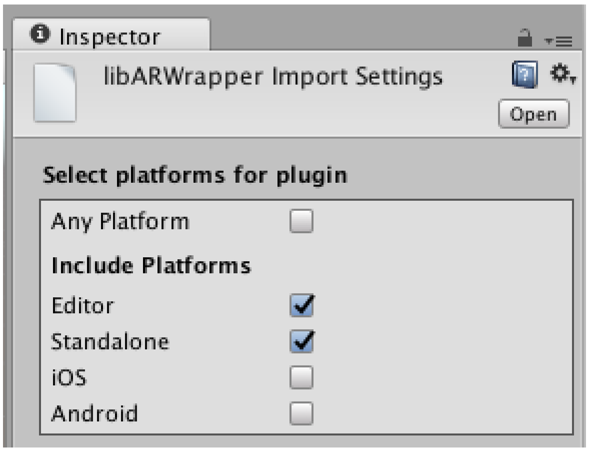
Android TV Compatibility ☐
Android Game ☐
Android Gamepad Suppor: Works with D-pad

Scripting Define Symbols*
VUFORIA_ANDROID_SETTINGS;VUFORIA_SAMPLE_ORIENTAT



Build failure

Unable to list target platforms. Please make sure the android sdk path is correct. See the Console for more details. See the Console for details.



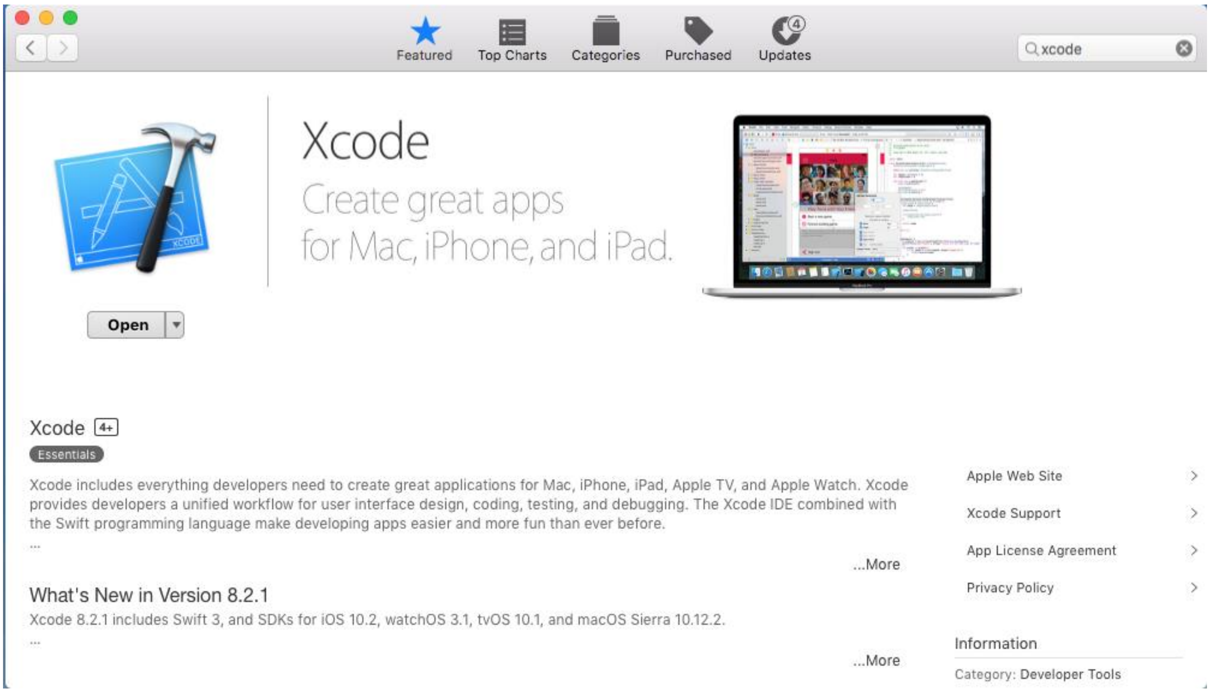
libARWrapper Import Settings

Select platforms for plugin

Any Platform ☐

Include Platforms

Editor ☑
Standalone ☑
iOS ☐
Android ☐



Featured
Top Charts
Categories
Purchased
Updates
xcode
Xcode
Create great apps
for Mac, iPhone, and iPad.
Open
Xcode 4+
Essentials

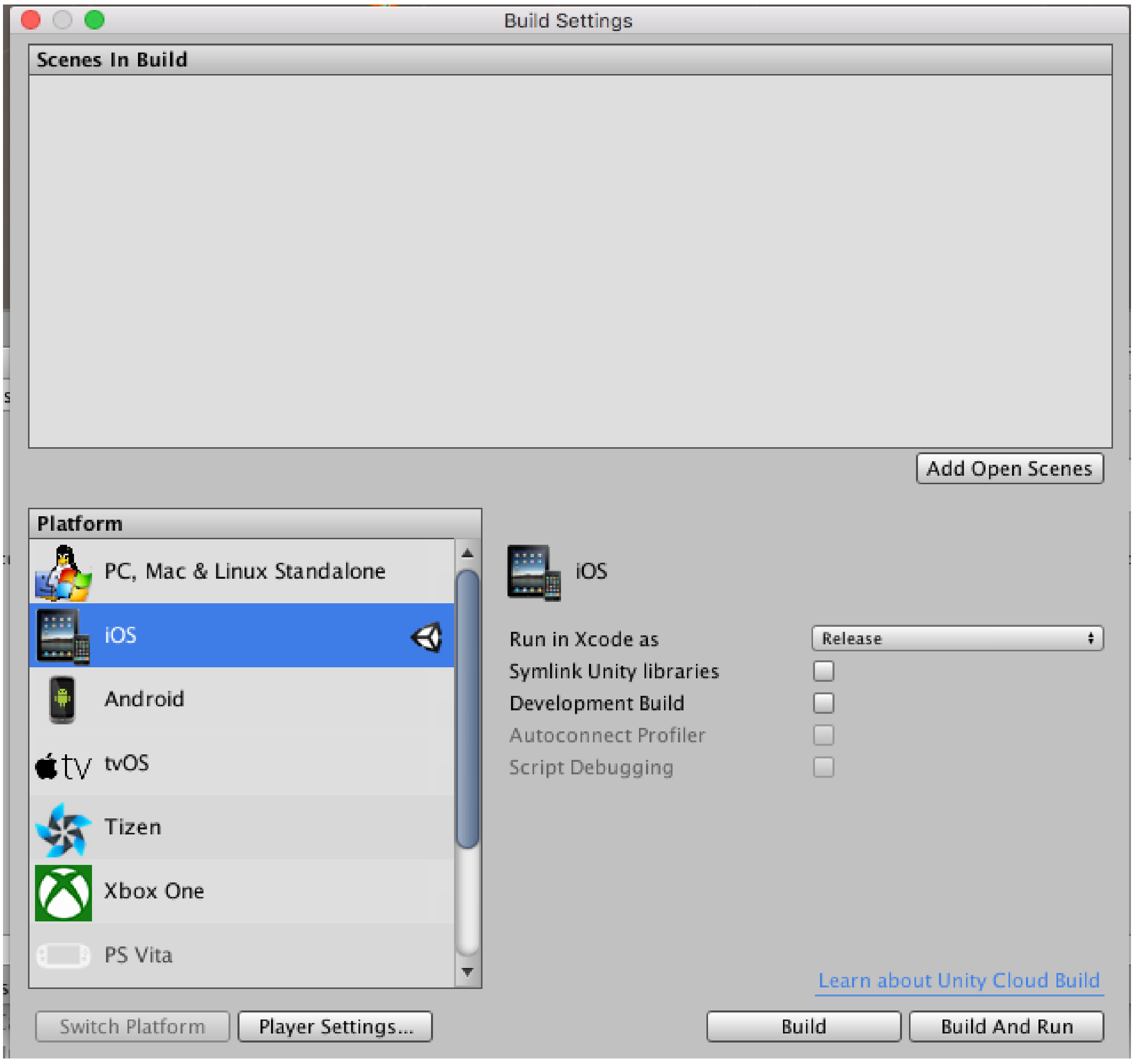
Xcode includes everything developers need to create great applications for Mac, iPhone, iPad, Apple TV, and Apple Watch. Xcode provides developers a unified workflow for user interface design, coding, testing, and debugging. The Xcode IDE combined with the Swift programming language make developing apps easier and more fun than ever before.
...

What's New in Version 8.2.1

Xcode 8.2.1 includes Swift 3, and SDKs for iOS 10.2, watchOS 3.1, tvOS 10.1, and macOS Sierra 10.12.2.
...

...More
...More
Apple Web Site
Xcode Support
App License Agreement
Privacy Policy
Information

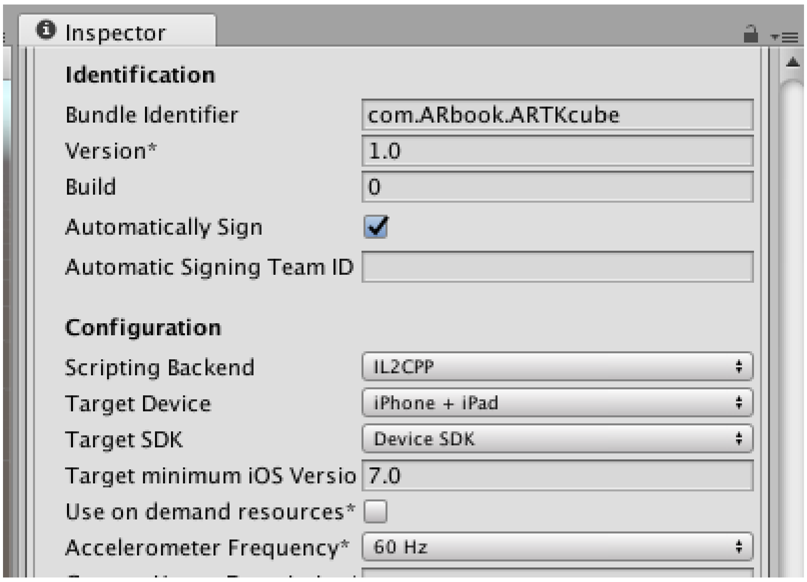
Category: Developer Tools



Build Settings
Scenes In Build
Add Open Scenes
Platform
PC, Mac & Linux Standalone
iOS
Android
tvOS
Tizen
Xbox One
PS Vita
iOS

Run in Xcode as: Release
Symlink Unity libraries ☐
Development Build ☐
Autoconnect Profiler ☐
Script Debugging ☐

Learn about Unity Cloud Build
Switch Platform
Player Settings...
Build
Build And Run

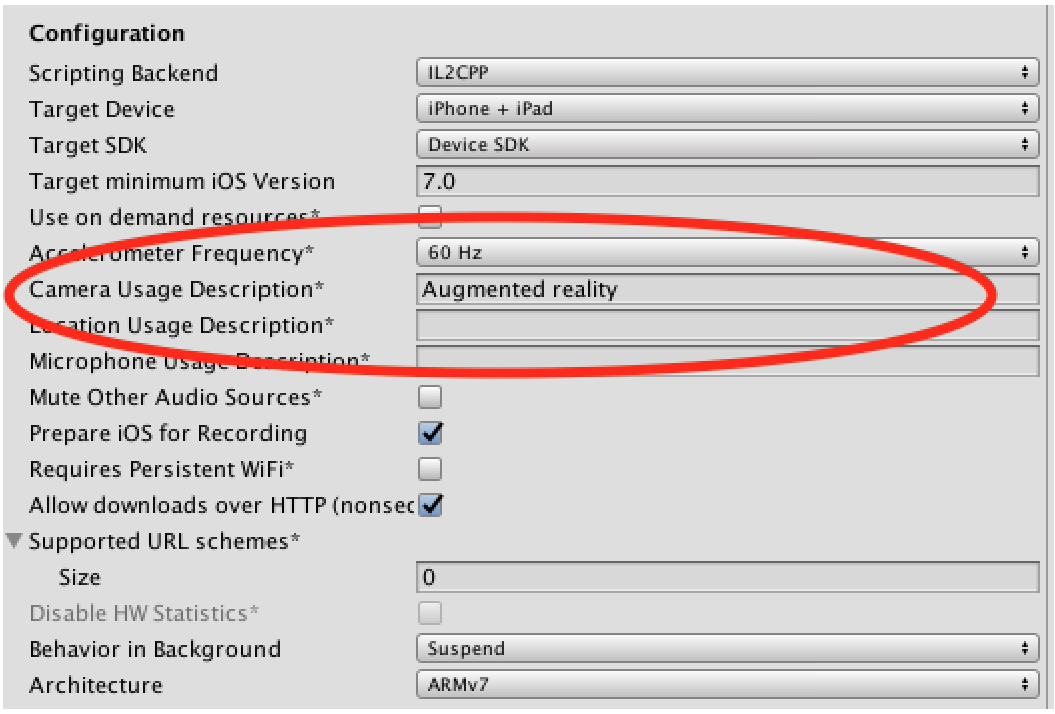


Identification

Bundle Identifier: com.ARbook.ARTKcube
Version*: 1.0
Build: 0
Automatically Sign: ☑
Automatic Signing Team ID:

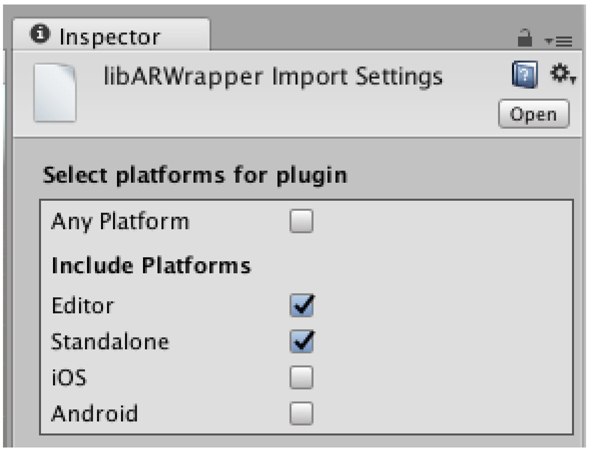
Configuration

Scripting Backend: IL2CPP
Target Device: iPhone + iPad
Target SDK: Device SDK
Target minimum iOS Versio: 7.0
Use on demand resources*: ☐
Accelerometer Frequency*: 60 Hz



Configuration

Scripting Backend: IL2CPP
Target Device: iPhone + iPad
Target SDK: Device SDK
Target minimum iOS Version: 7.0
Use on demand resources*: ☐
Accelerometer Frequency*: 60 Hz
Camera Usage Description*: Augmented reality
Location Usage Description*:
Microphone Usage Description*:
Mute Other Audio Sources*: ☐
Prepare iOS for Recording: ☑
Requires Persistent WiFi*: ☐
Allow downloads over HTTP (nonsec: ☑
Supported URL schemes*
Size: 0
Disable HW Statistics*: ☐
Behavior in Background: Suspend
Architecture: ARMv7


Inspector
Open

libARWrapper Import Settings

Select platforms for plugin

Any Platform ☐

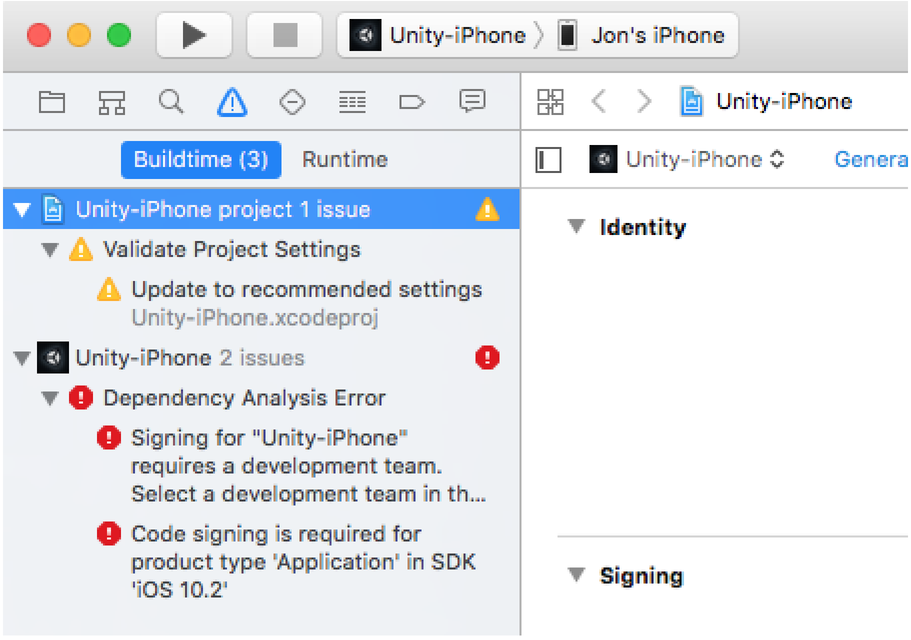
Include Platforms

Editor ☑

Standalone ☑

iOS ☐

Android ☐


Unity-iPhone
Jon's iPhone
Unity-iPhone
Buildtime (3)
Runtime
Unity-iPhone
Genera
Identity
Signing

Unity-iPhone project 1 issue

Validate Project Settings

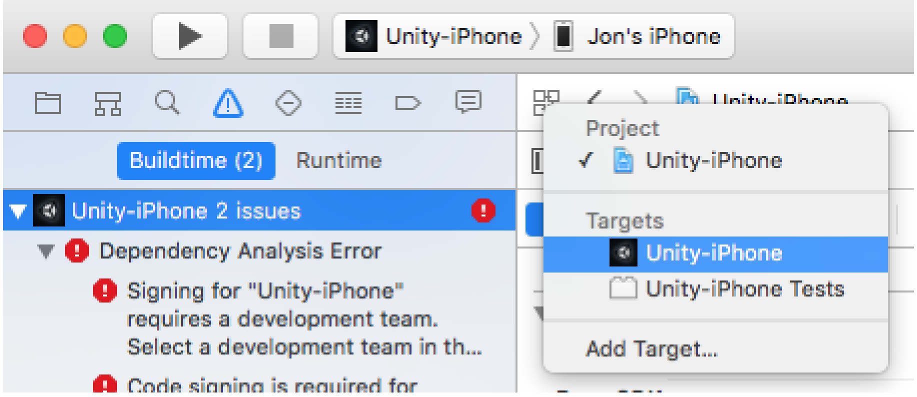
Update to recommended settings
Unity-iPhone.xcodeproj

Unity-iPhone 2 issues

Dependency Analysis Error

Signing for "Unity-iPhone" requires a development team. Select a development team in th...

Code signing is required for product type 'Application' in SDK 'iOS 10.2'

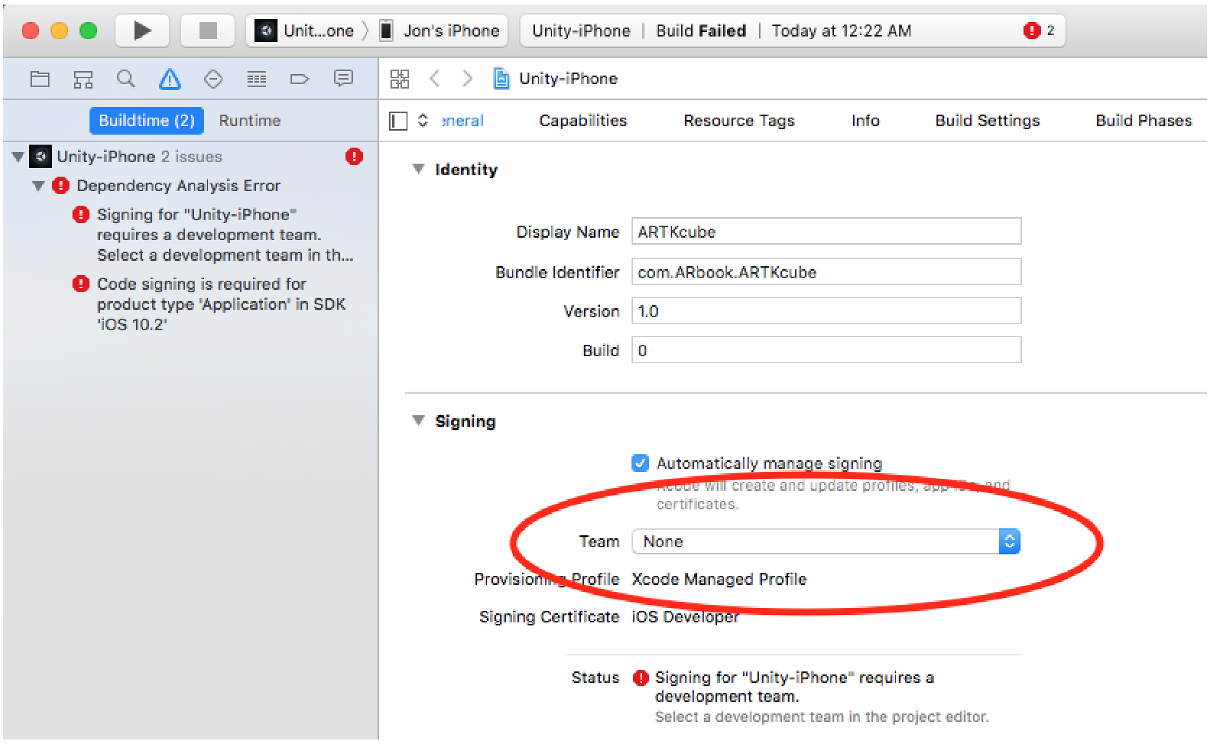

Unity-iPhone
Jon's iPhone
Unity-iPhone
Buildtime (2)
Runtime
Project
✓ Unity-iPhone
Targets
Unity-iPhone
Unity-iPhone Tests
Add Target...

Unity-iPhone 2 issues

Dependency Analysis Error

Signing for "Unity-iPhone" requires a development team. Select a development team in th...

Code signing is required for


Unit...one
Jon's iPhone
Buildtime (2)
Runtime
Unity-iPhone
neral
Capabilities
Resource Tags
Info
Build Settings
Build Phases
Identity
Signing

Unity-iPhone | Build **Failed** | Today at 12:22 AM ❗ 2

Unity-iPhone 2 issues

Dependency Analysis Error

Signing for "Unity-iPhone" requires a development team. Select a development team in th...

Code signing is required for product type 'Application' in SDK 'iOS 10.2'

Display Name: ARTKcube

Bundle Identifier: com.ARbook.ARTKcube

Version: 1.0

Build: 0

☑ Automatically manage signing

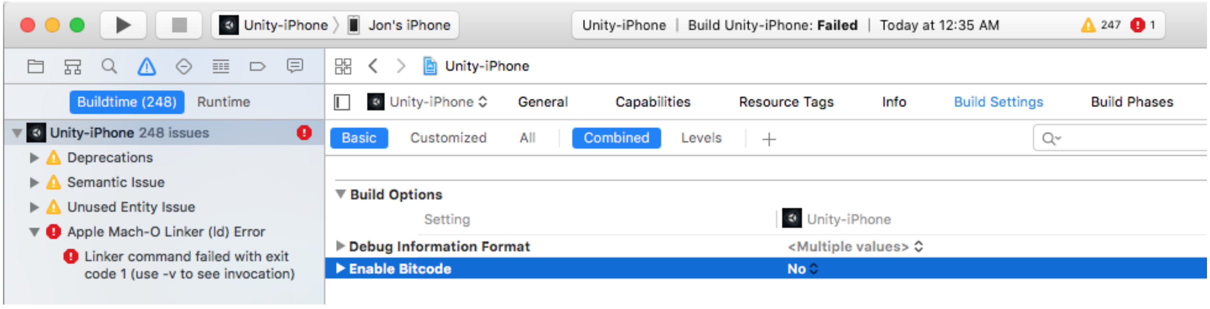
Xcode will create and update profiles, app IDs, and certificates.

Team: None

Provisioning Profile: Xcode Managed Profile

Signing Certificate: iOS Developer

Status: Signing for "Unity-iPhone" requires a development team.
Select a development team in the project editor.

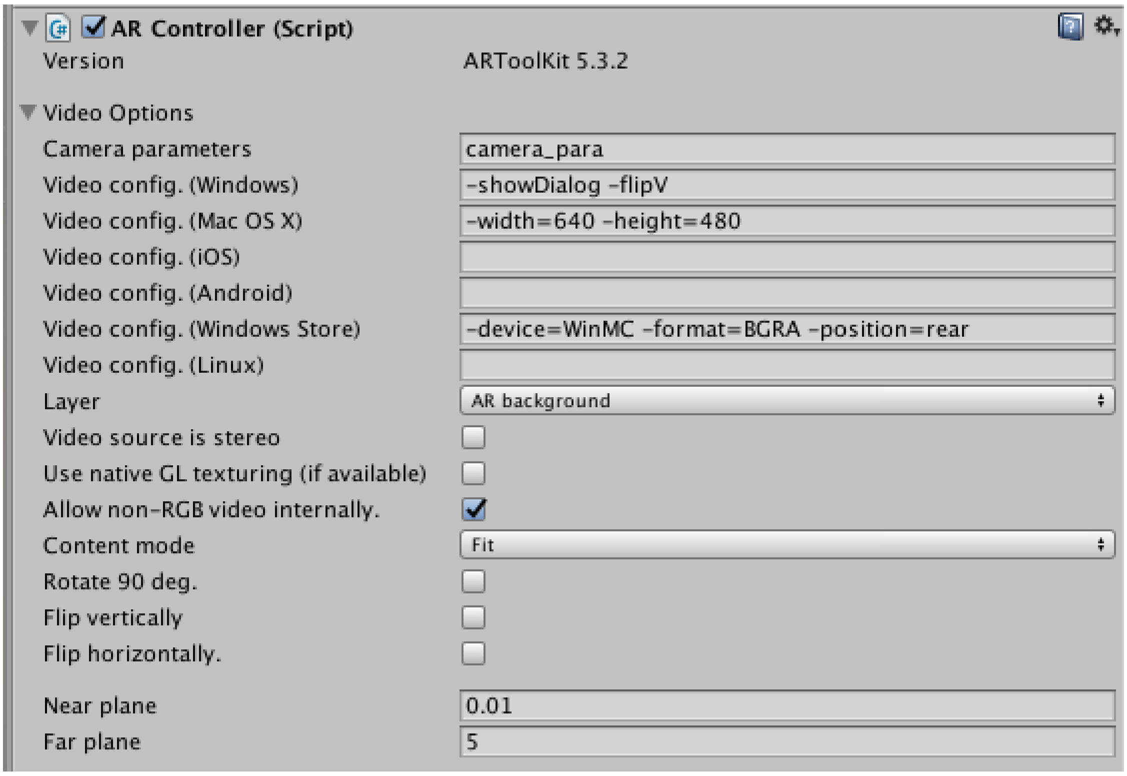

Unity-iPhone
Jon's iPhone
Buildtime (248)
Runtime
Unity-iPhone
Unity-iPhone
General
Capabilities
Resource Tags
Info
Build Settings
Build Phases
Basic
Customized
All
Combined
Levels
+
Build Options

Unity-iPhone | Build Unity-iPhone: **Failed** | Today at 12:35 AM ⚠ 247 ❗ 1

Unity-iPhone 248 issues

- Deprecations
- Semantic Issue
- Unused Entity Issue
- Apple Mach-O Linker (ld) Error
  - Linker command failed with exit code 1 (use -v to see invocation)

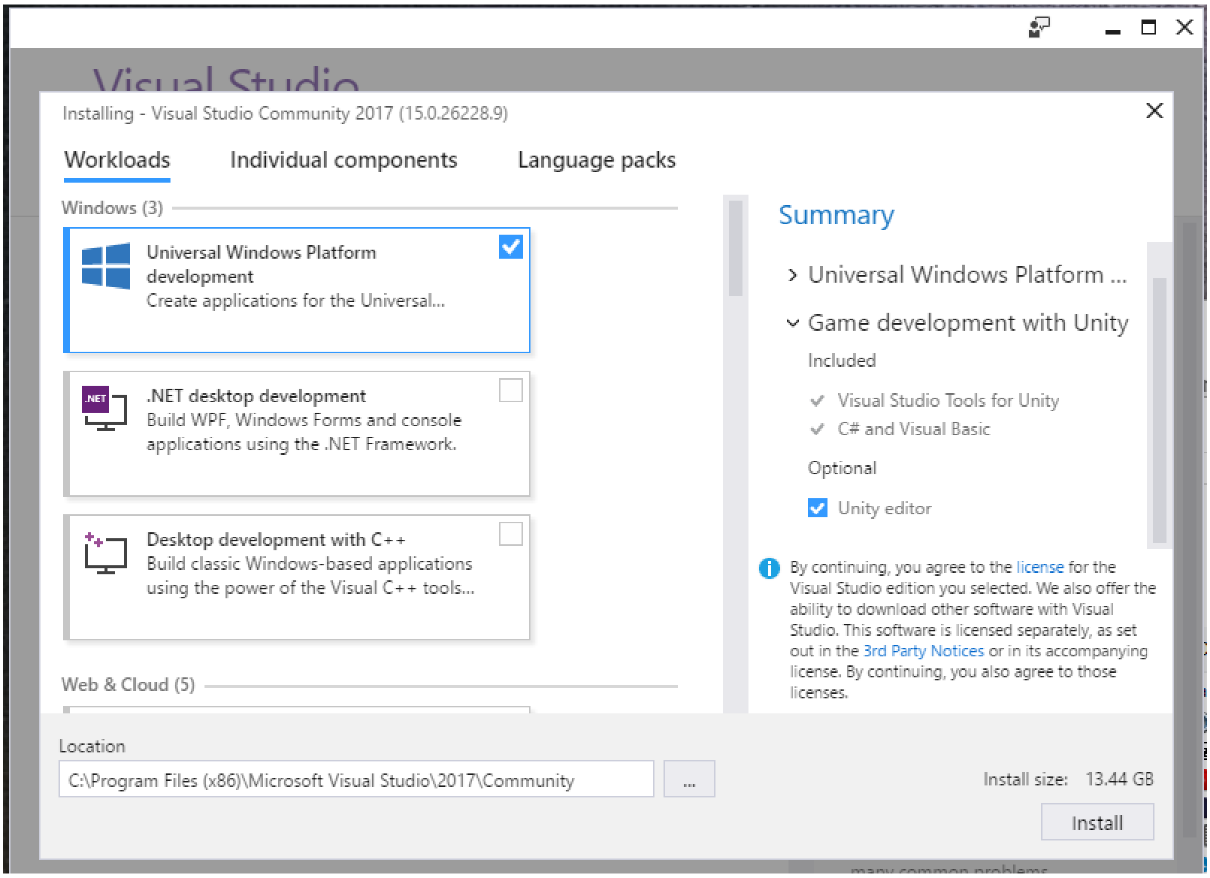
Setting	Unity-iPhone
Debug Information Format	<Multiple values>
Enable Bitcode	**No**



☑ **AR Controller (Script)**

Version ARToolKit 5.3.2

Video Options
- Camera parameters: camera_para
- Video config. (Windows): -showDialog -flipV
- Video config. (Mac OS X): -width=640 -height=480
- Video config. (iOS):
- Video config. (Android):
- Video config. (Windows Store): -device=WinMC -format=BGRA -position=rear
- Video config. (Linux):
- Layer: AR background
- Video source is stereo ☐
- Use native GL texturing (if available) ☐
- Allow non-RGB video internally. ☑
- Content mode: Fit
- Rotate 90 deg. ☐
- Flip vertically ☐
- Flip horizontally. ☐
- Near plane: 0.01
- Far plane: 5



Installing - Visual Studio Community 2017 (15.0.26228.9)

Windows (3)

☑ Universal Windows Platform development
Create applications for the Universal...

☐ .NET desktop development
Build WPF, Windows Forms and console applications using the .NET Framework.

☐ Desktop development with C++
Build classic Windows-based applications using the power of the Visual C++ tools...

Web & Cloud (5)

Summary

› Universal Windows Platform ...

⌄ Game development with Unity

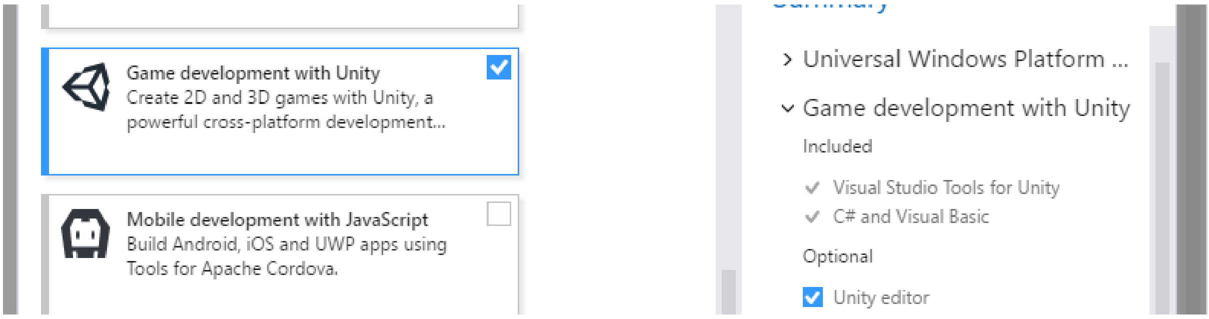
Included
- ✓ Visual Studio Tools for Unity
- ✓ C# and Visual Basic

Optional
- ☑ Unity editor

By continuing, you agree to the license for the Visual Studio edition you selected. We also offer the ability to download other software with Visual Studio. This software is licensed separately, as set out in the 3rd Party Notices or in its accompanying license. By continuing, you also agree to those licenses.

Location: C:\Program Files (x86)\Microsoft Visual Studio\2017\Community

Install size: 13.44 GB



☑ **Game development with Unity**
Create 2D and 3D games with Unity, a powerful cross-platform development...

☐ **Mobile development with JavaScript**
Build Android, iOS and UWP apps using Tools for Apache Cordova.

› Universal Windows Platform ...

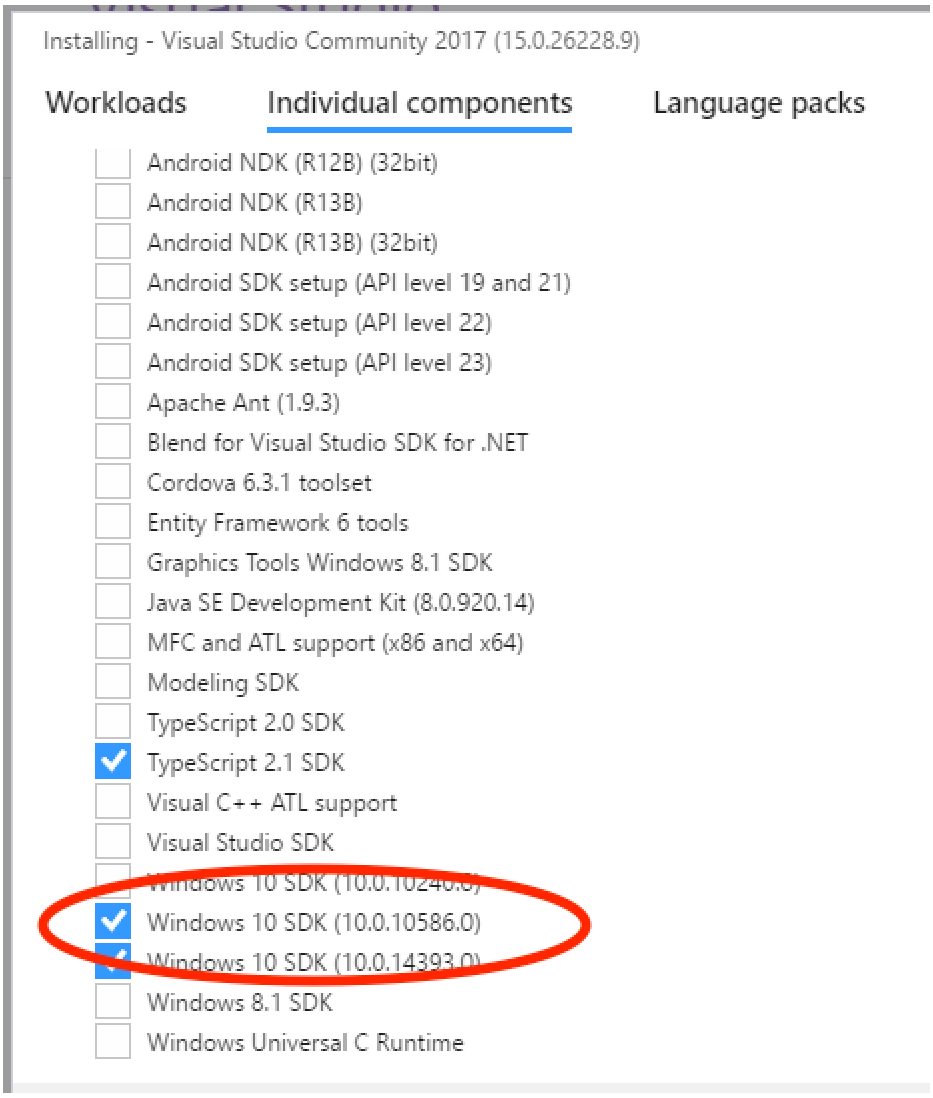
⌄ Game development with Unity

Included

- ✓ Visual Studio Tools for Unity
- ✓ C# and Visual Basic

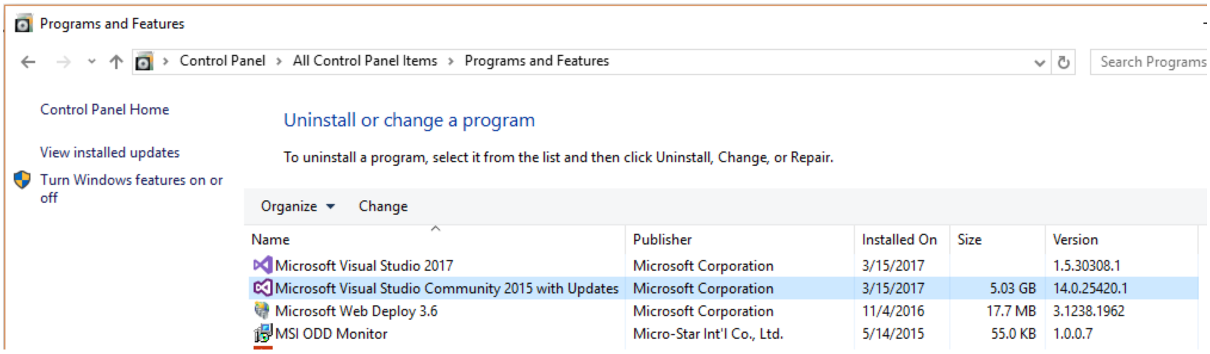
Optional

- ☑ Unity editor



Installing - Visual Studio Community 2017 (15.0.26228.9)

- ☐ Android NDK (R12B) (32bit)
- ☐ Android NDK (R13B)
- ☐ Android NDK (R13B) (32bit)
- ☐ Android SDK setup (API level 19 and 21)
- ☐ Android SDK setup (API level 22)
- ☐ Android SDK setup (API level 23)
- ☐ Apache Ant (1.9.3)
- ☐ Blend for Visual Studio SDK for .NET
- ☐ Cordova 6.3.1 toolset
- ☐ Entity Framework 6 tools
- ☐ Graphics Tools Windows 8.1 SDK
- ☐ Java SE Development Kit (8.0.920.14)
- ☐ MFC and ATL support (x86 and x64)
- ☐ Modeling SDK
- ☐ TypeScript 2.0 SDK
- ☑ TypeScript 2.1 SDK
- ☐ Visual C++ ATL support
- ☐ Visual Studio SDK
- ☐ Windows 10 SDK (10.0.10240.0)
- ☑ Windows 10 SDK (10.0.10586.0)
- ☑ Windows 10 SDK (10.0.14393.0)
- ☐ Windows 8.1 SDK
- ☐ Windows Universal C Runtime



Programs and Features

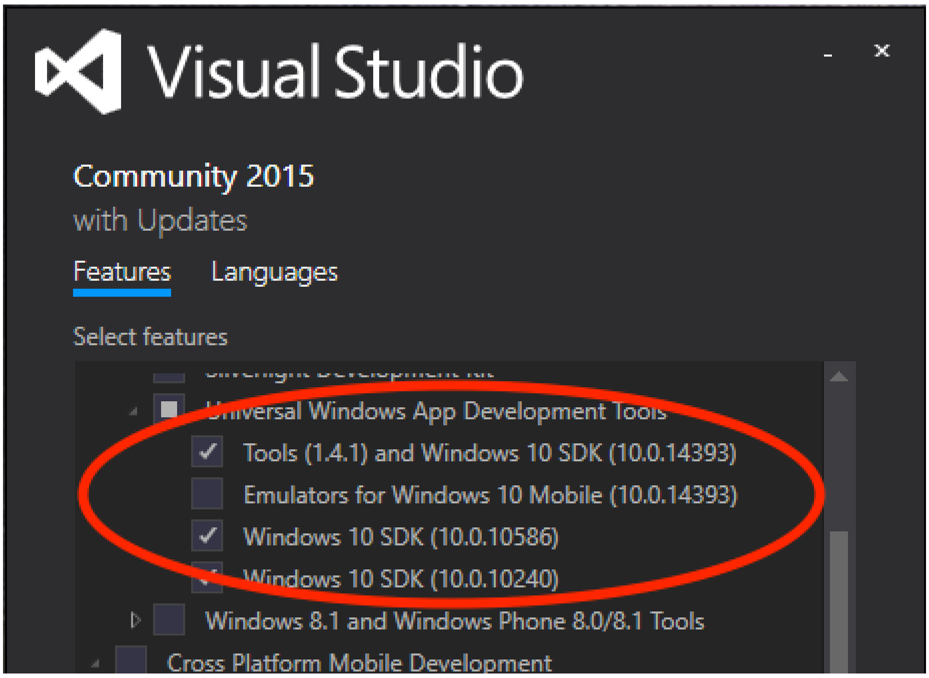
Control Panel › All Control Panel Items › Programs and Features

Search Programs
Control Panel Home
View installed updates
Turn Windows features on or off
Organize
Change

Uninstall or change a program

To uninstall a program, select it from the list and then click Uninstall, Change, or Repair.

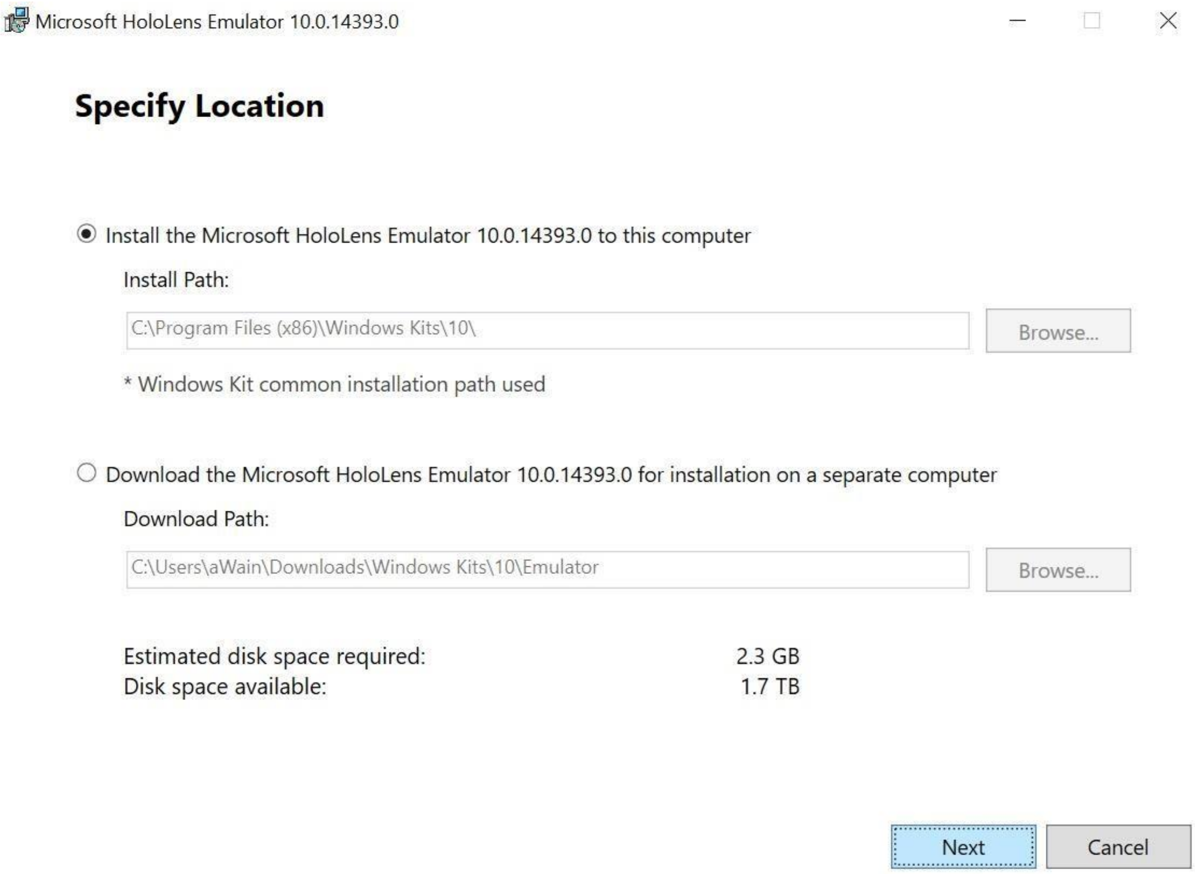
Name	Publisher	Installed On	Size	Version
Microsoft Visual Studio 2017	Microsoft Corporation	3/15/2017		1.5.30308.1
Microsoft Visual Studio Community 2015 with Updates	Microsoft Corporation	3/15/2017	5.03 GB	14.0.25420.1
Microsoft Web Deploy 3.6	Microsoft Corporation	11/4/2016	17.7 MB	3.1238.1962
MSI ODD Monitor	Micro-Star Int'l Co., Ltd.	5/14/2015	55.0 KB	1.0.0.7



Visual Studio
Community 2015
with Updates
Features
Languages

Select features

- ■ Universal Windows App Development Tools
  - ☑ Tools (1.4.1) and Windows 10 SDK (10.0.14393)
  - ☐ Emulators for Windows 10 Mobile (10.0.14393)
  - ☑ Windows 10 SDK (10.0.10586)
  - ☑ Windows 10 SDK (10.0.10240)
- ☐ Windows 8.1 and Windows Phone 8.0/8.1 Tools
- ☐ Cross Platform Mobile Development



Microsoft HoloLens Emulator 10.0.14393.0

Specify Location

● Install the Microsoft HoloLens Emulator 10.0.14393.0 to this computer

Install Path:

C:\Program Files (x86)\Windows Kits\10\

* Windows Kit common installation path used

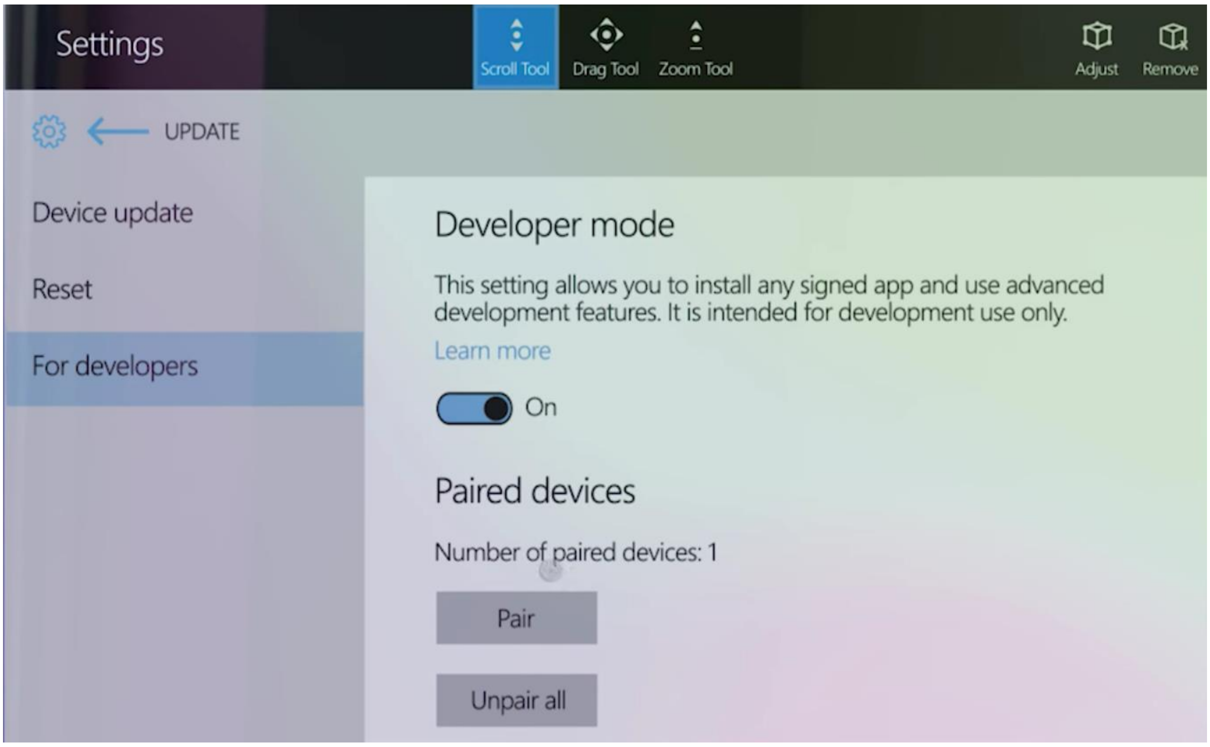
○ Download the Microsoft HoloLens Emulator 10.0.14393.0 for installation on a separate computer

Download Path:

C:\Users\aWain\Downloads\Windows Kits\10\Emulator

Estimated disk space required:	2.3 GB
Disk space available:	1.7 TB

Browse...
Browse...
Next
Cancel



Settings
Scroll Tool
Drag Tool
Zoom Tool
Adjust
Remove
UPDATE
Device update
Reset
For developers
Learn more
Pair
Unpair all

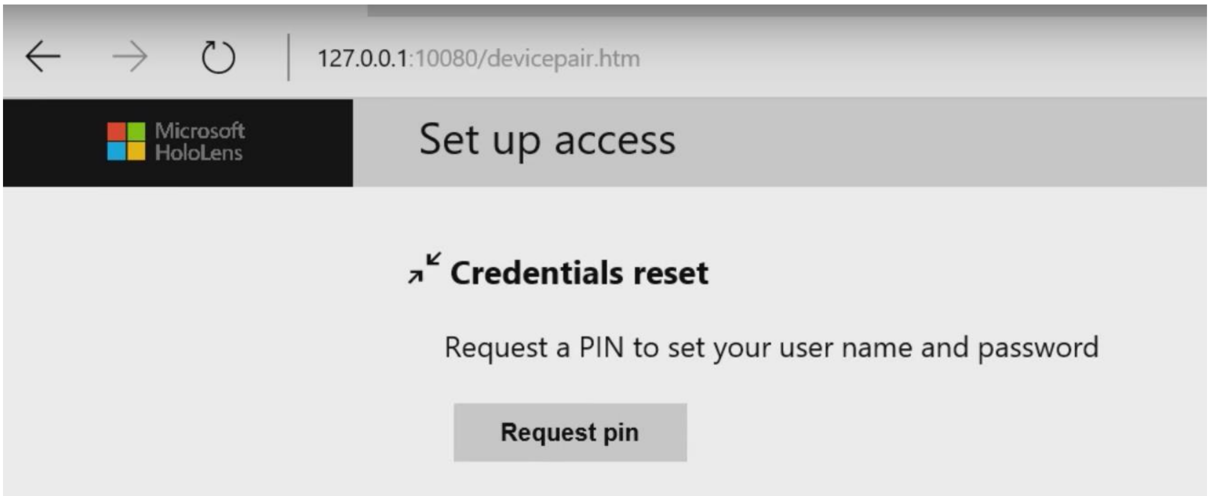
Developer mode

This setting allows you to install any signed app and use advanced development features. It is intended for development use only.

On

Paired devices

Number of paired devices: 1



127.0.0.1:10080/devicepair.htm

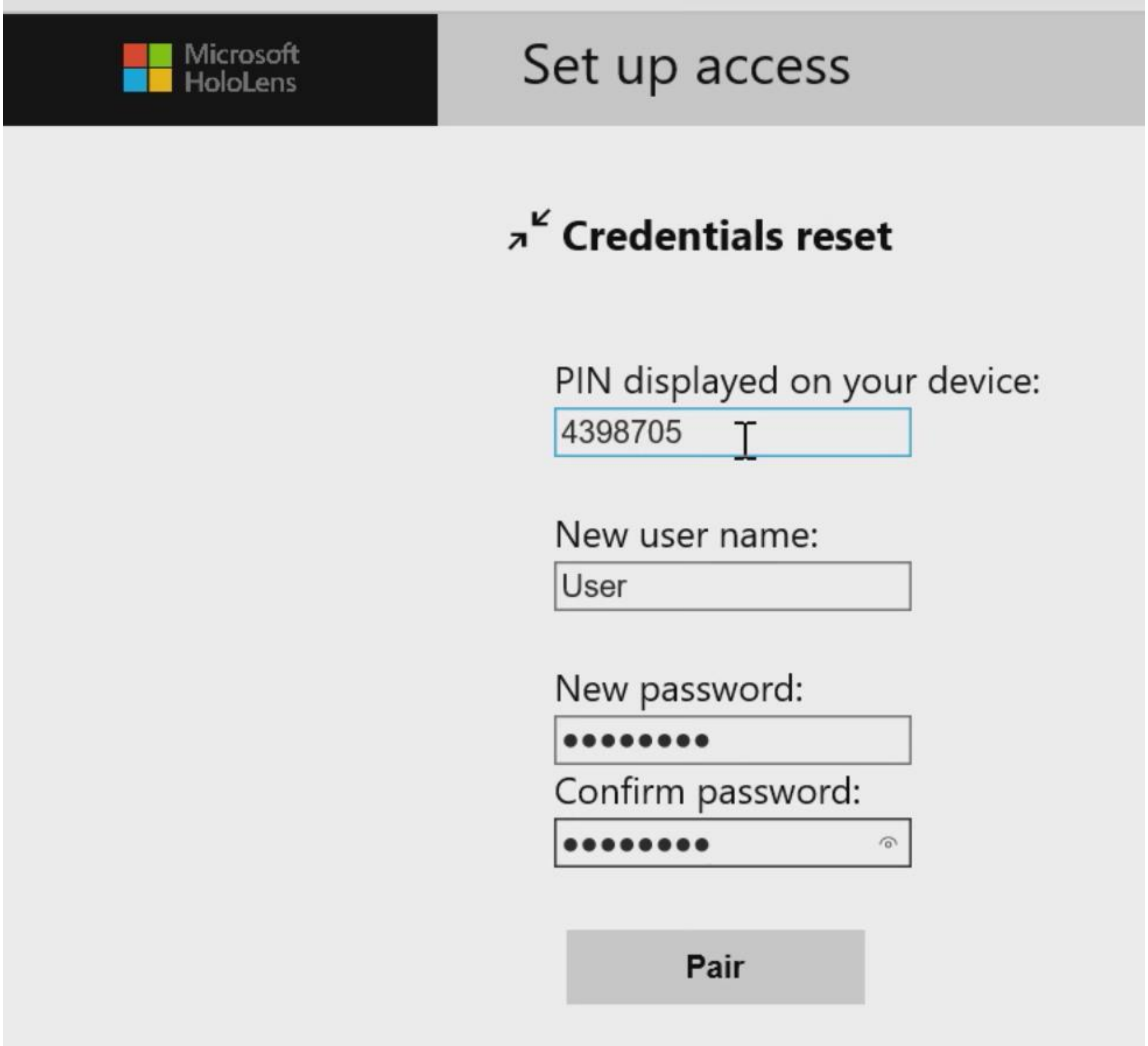
Microsoft HoloLens

Set up access

Credentials reset

Request a PIN to set your user name and password

Request pin



Microsoft HoloLens

Set up access

Credentials reset

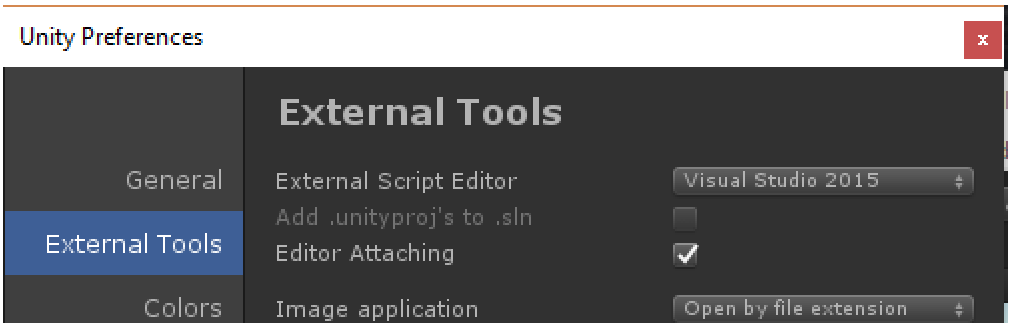
PIN displayed on your device: 4398705

New user name: User

New password: ••••••••

Confirm password: ••••••••

Pair


Unity Preferences
×
General
External Tools
Colors

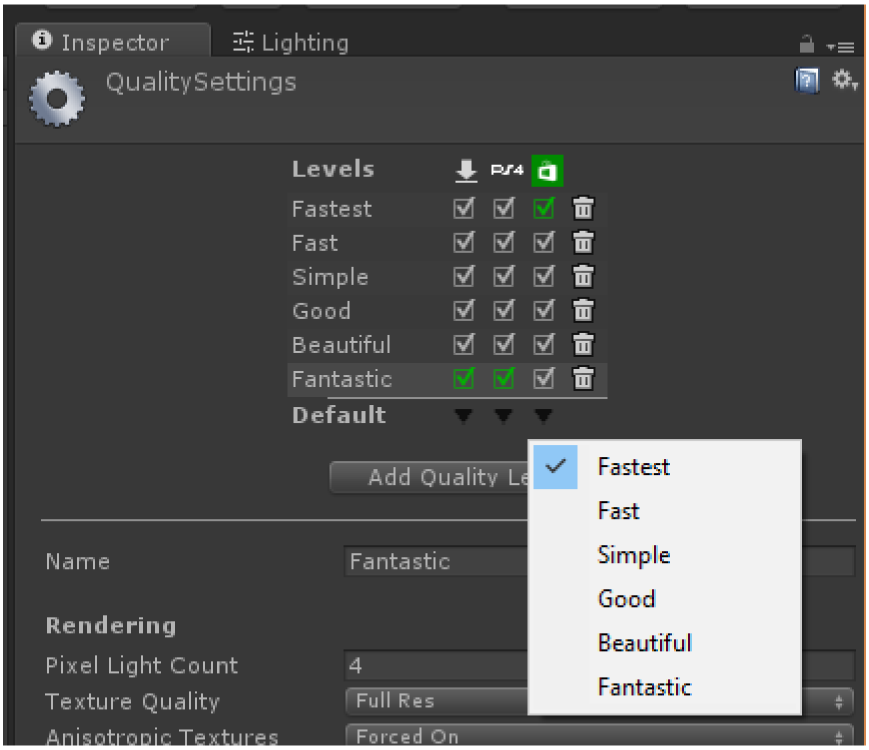
External Tools

External Script Editor: Visual Studio 2015

Add .unityproj's to .sln ☐

Editor Attaching ☑

Image application: Open by file extension


Inspector
Lighting
QualitySettings
Add Quality Le

Levels	⬇	PS4	🟩	
Fastest	☑	☑	☑	🗑
Fast	☑	☑	☑	🗑
Simple	☑	☑	☑	🗑
Good	☑	☑	☑	🗑
Beautiful	☑	☑	☑	🗑
Fantastic	☑	☑	☑	🗑
Default	▼	▼	▼	

✓ Fastest
Fast
Simple
Good
Beautiful
Fantastic

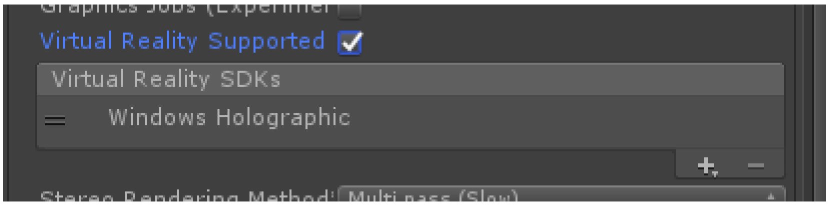
Name: Fantastic

Rendering

Pixel Light Count: 4

Texture Quality: Full Res

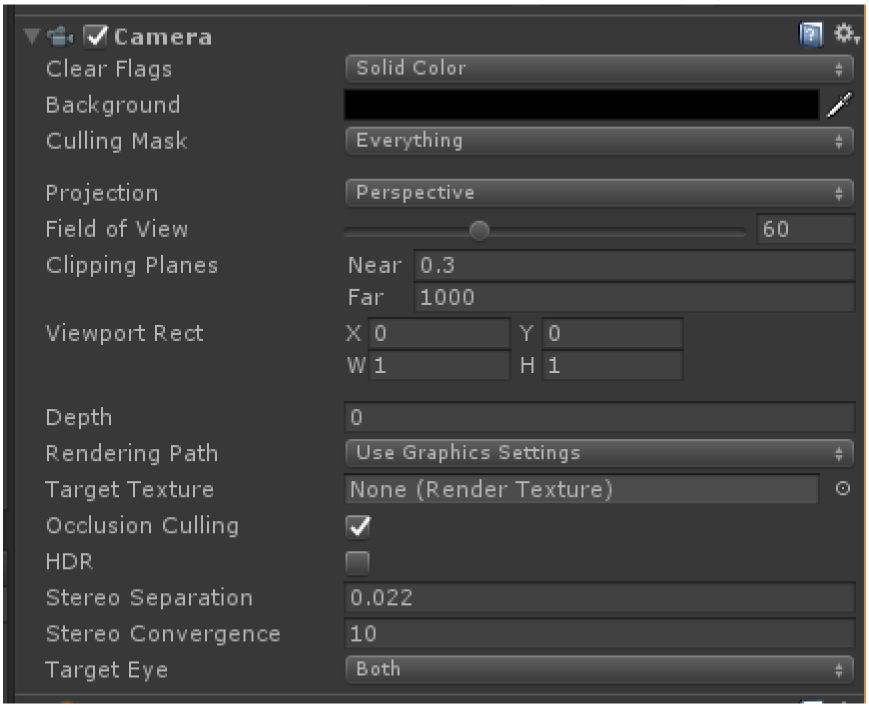
Anisotropic Textures: Forced On



Virtual Reality Supported ☑

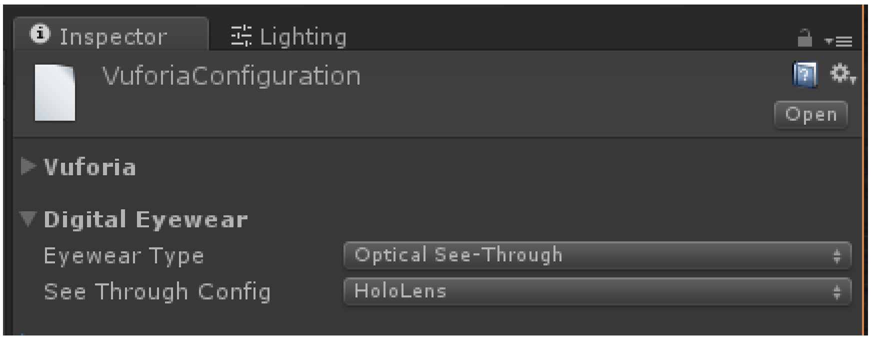
Virtual Reality SDKs: Windows Holographic

Stereo Rendering Method: Multi pass (Slow)



☑ **Camera**

Clear Flags	Solid Color
Background	
Culling Mask	Everything
Projection	Perspective
Field of View	60
Clipping Planes	Near 0.3 Far 1000
Viewport Rect	X 0 Y 0 W 1 H 1
Depth	0
Rendering Path	Use Graphics Settings
Target Texture	None (Render Texture)
Occlusion Culling	☑
HDR	☐
Stereo Separation	0.022
Stereo Convergence	10
Target Eye	Both

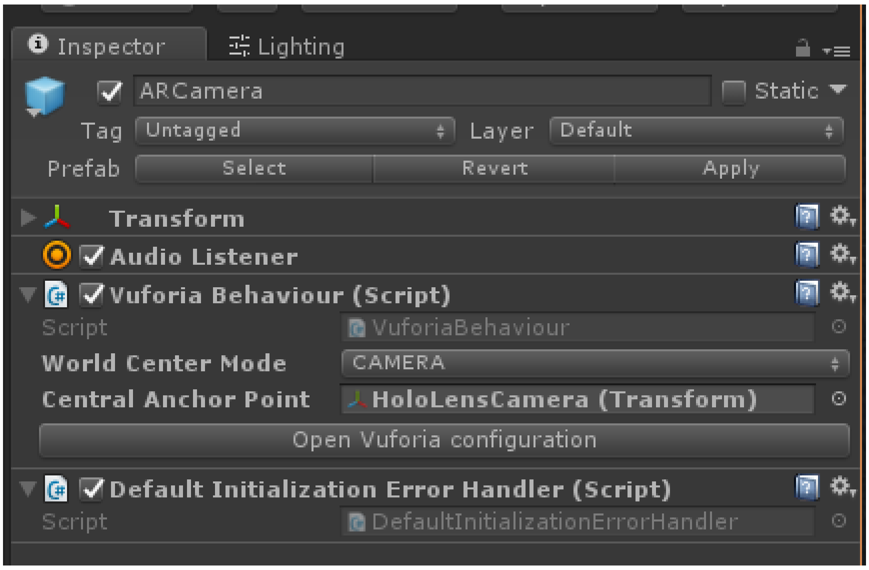

Inspector
Lighting
Open

VuforiaConfiguration

Vuforia

Digital Eyewear

Eyewear Type	Optical See-Through
See Through Config	HoloLens


Inspector
Lighting
Select
Revert
Apply
Open Vuforia configuration

☑ ARCamera ☐ Static

Tag	Untagged
Layer	Default

Transform

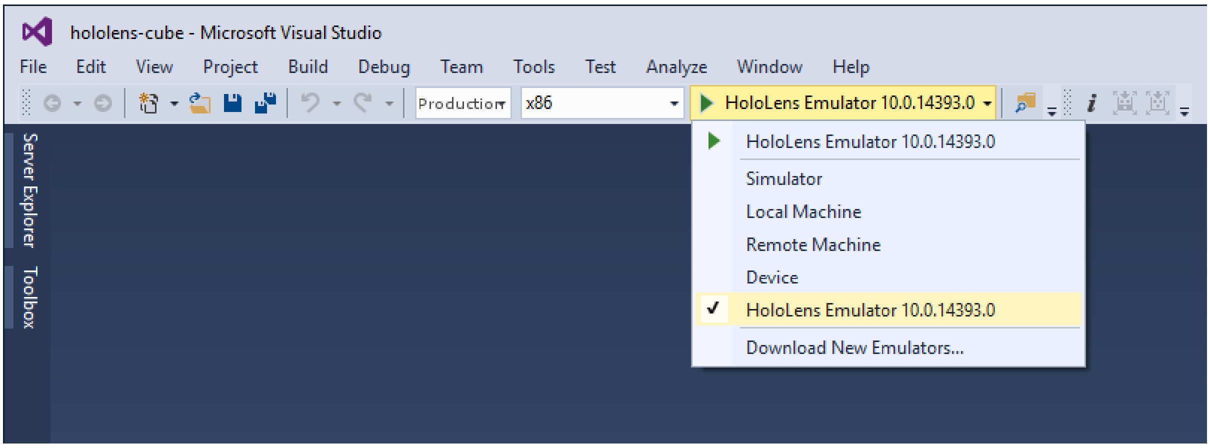
☑ **Audio Listener**

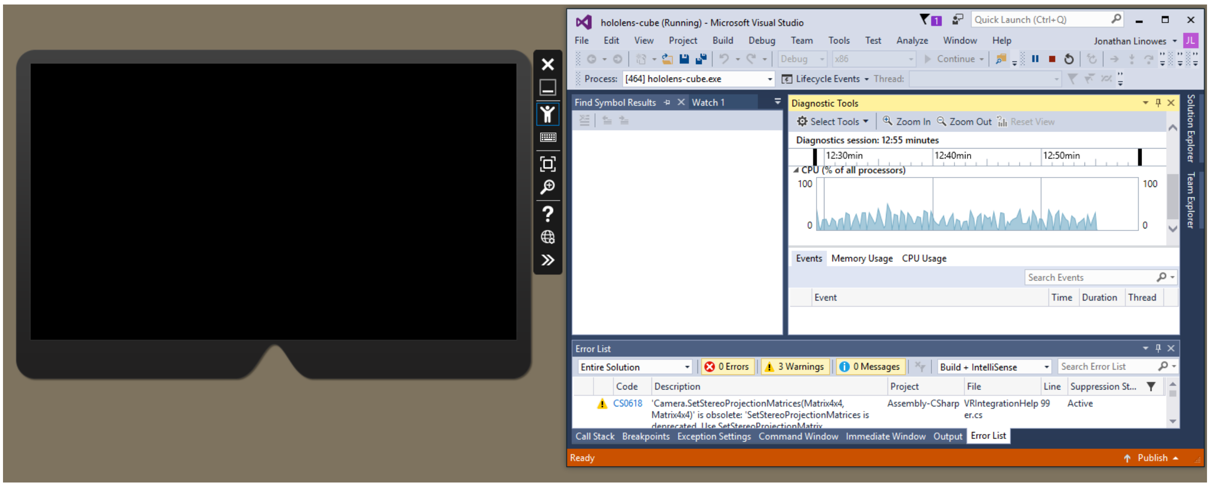
☑ **Vuforia Behaviour (Script)**

Script	VuforiaBehaviour
World Center Mode	CAMERA
Central Anchor Point	HoloLensCamera (Transform)

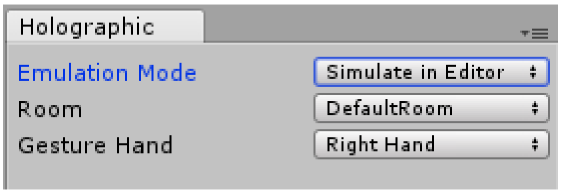
☑ **Default Initialization Error Handler (Script)**

Script	DefaultInitializationErrorHandler

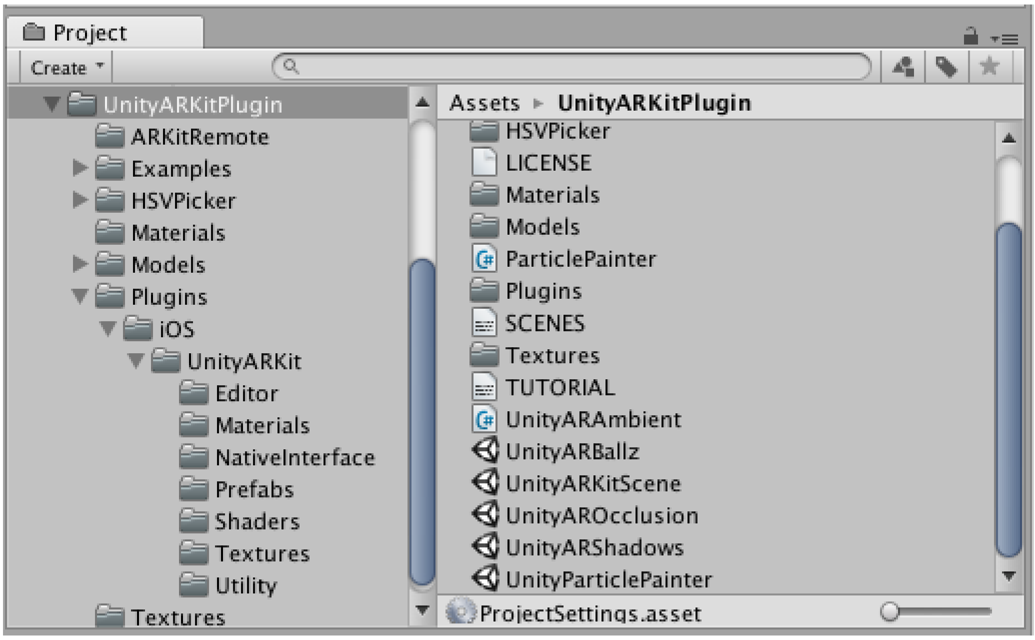

hololens-cube - Microsoft Visual Studio
File Edit View Project Build Debug Team Tools Test Analyze Window Help
Production
x86
HoloLens Emulator 10.0.14393.0
Server Explorer
Toolbox
HoloLens Emulator 10.0.14393.0
Simulator
Local Machine
Remote Machine
Device
✓ HoloLens Emulator 10.0.14393.0
Download New Emulators...

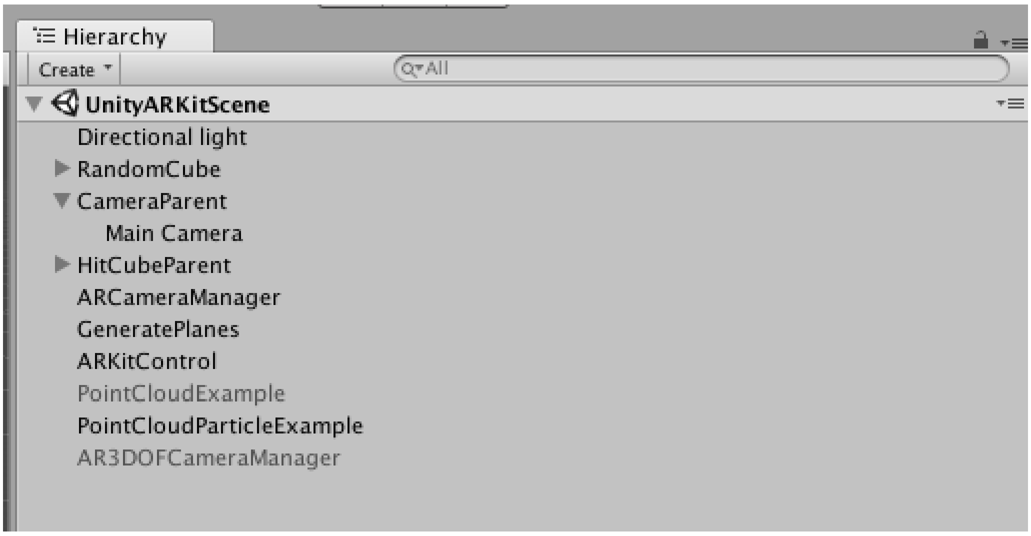

hololens-cube (Running) - Microsoft Visual Studio
Quick Launch (Ctrl+Q)
File Edit View Project Build Debug Team Tools Test Analyze Window Help
Jonathan Linowes
Debug
x86
Continue
Process: [464] hololens-cube.exe
Lifecycle Events
Thread:
Find Symbol Results
Watch 1
Diagnostic Tools
Select Tools
Zoom In
Zoom Out
Reset View
Diagnostics session: 12:55 minutes
12:30min
12:40min
12:50min
CPU (% of all processors)
100
0
100
0
Events
Memory Usage
CPU Usage
Search Events
Event
Time
Duration
Thread
Solution Explorer
Team Explorer
Error List
Entire Solution
0 Errors
3 Warnings
0 Messages
Build + IntelliSense
Search Error List
Call Stack
Breakpoints
Exception Settings
Command Window
Immediate Window
Output
Error List
Ready
Publish

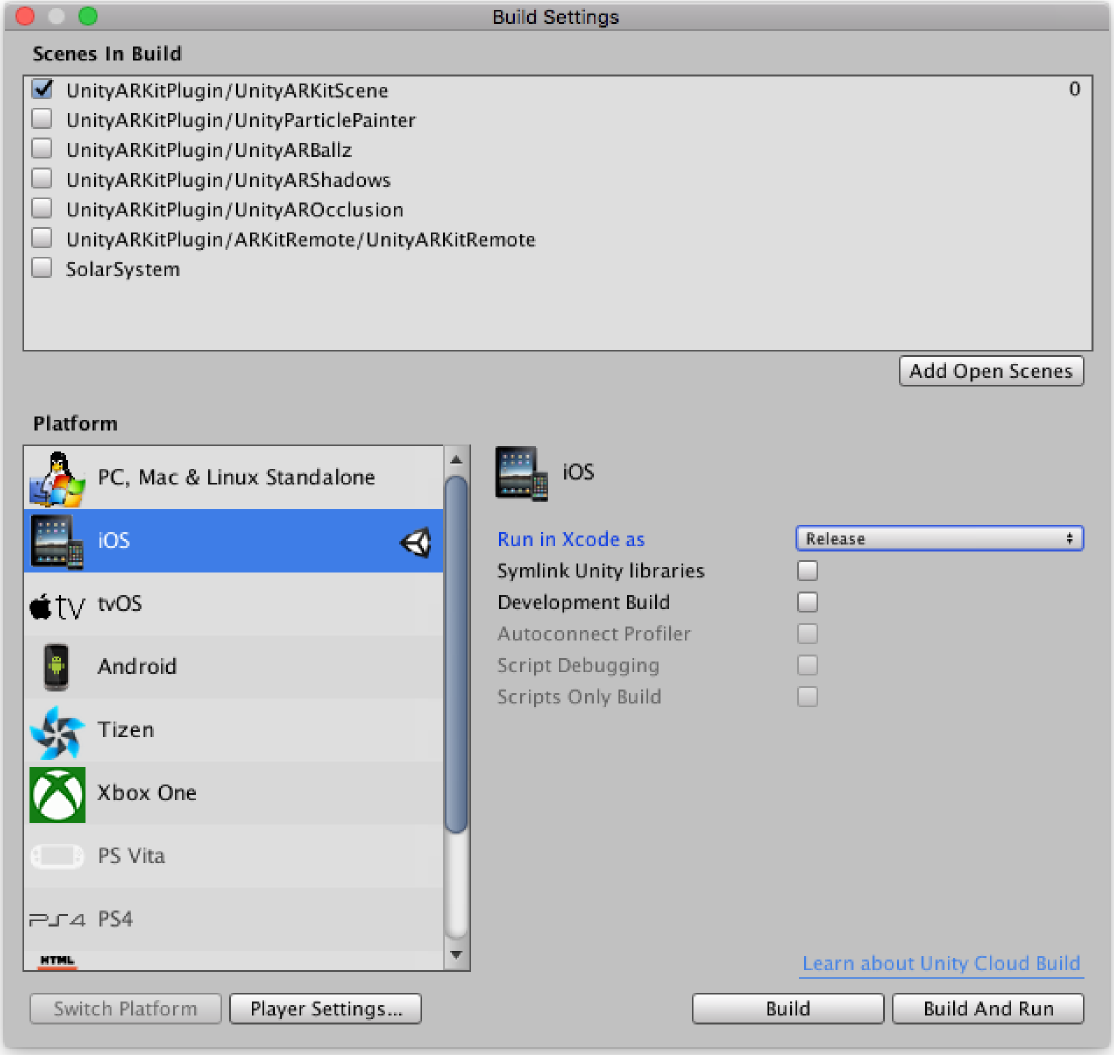
	Code	Description	Project	File	Line	Suppression St...
⚠	CS0618	'Camera.SetStereoProjectionMatrices(Matrix4x4, Matrix4x4)' is obsolete: 'SetStereoProjectionMatrices is deprecated. Use SetStereoProjectionMatrix	Assembly-CSharp	VRIntegrationHelper.cs	99	Active


Holographic

Emulation Mode: Simulate in Editor
Room: DefaultRoom
Gesture Hand: Right Hand


Project
Create
UnityARKitPlugin
ARKitRemote
Examples
HSVPicker
Materials
Models
Plugins
iOS
UnityARKit
Editor
Materials
NativeInterface
Prefabs
Shaders
Textures
Utility
Textures
Assets ▸ UnityARKitPlugin
HSVPicker
LICENSE
Materials
Models
ParticlePainter
Plugins
SCENES
Textures
TUTORIAL
UnityARAmbient
UnityARBallz
UnityARKitScene
UnityAROcclusion
UnityARShadows
UnityParticlePainter
ProjectSettings.asset


Hierarchy
Create
All
UnityARKitScene
Directional light
RandomCube
CameraParent
Main Camera
HitCubeParent
ARCameraManager
GeneratePlanes
ARKitControl
PointCloudExample
PointCloudParticleExample
AR3DOFCameraManager

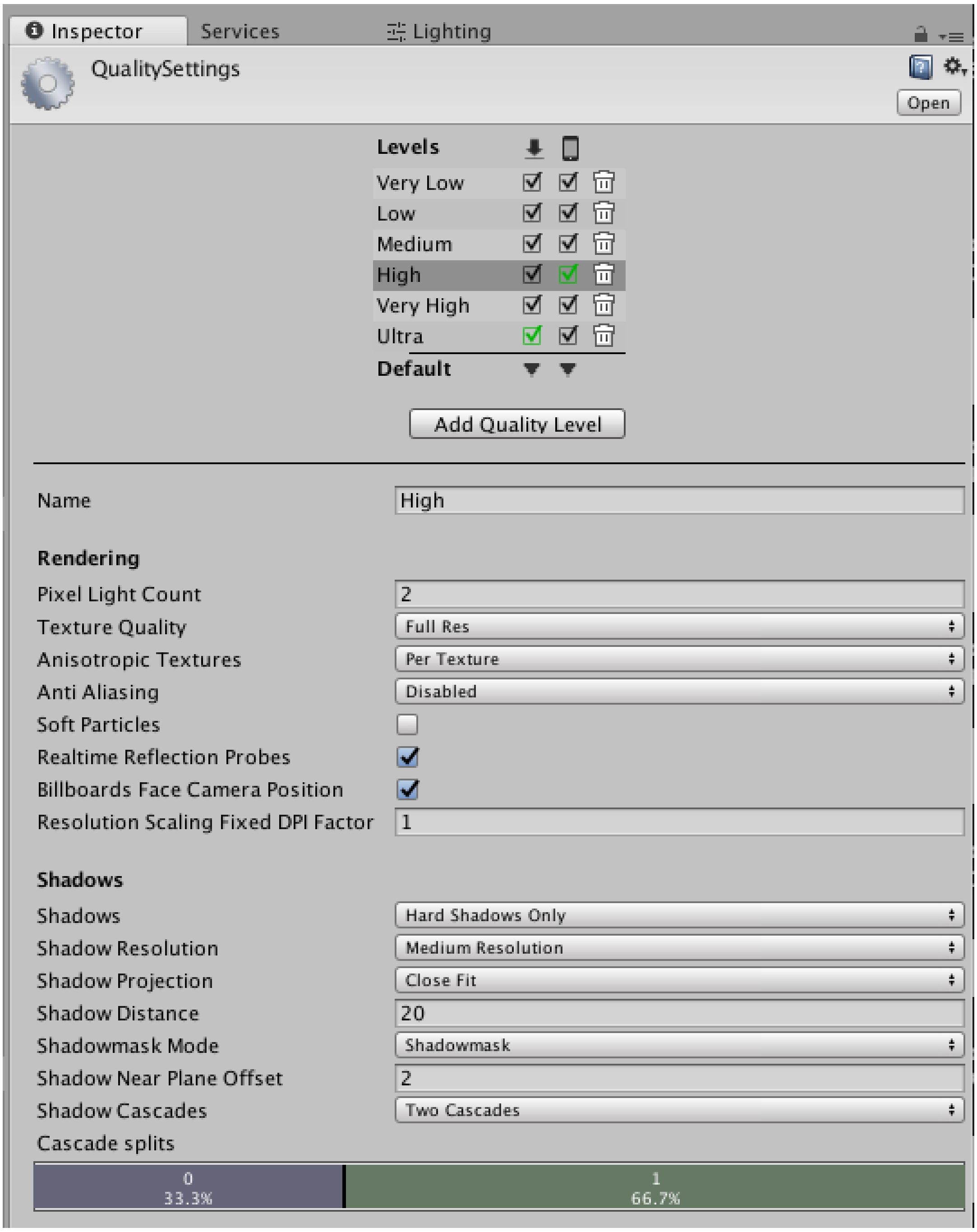

Build Settings
Add Open Scenes
Platform
PC, Mac & Linux Standalone
iOS
tvOS
Android
Tizen
Xbox One
PS Vita
PS4
HTML
Learn about Unity Cloud Build
Switch Platform
Player Settings...
Build
Build And Run

Scenes In Build

- ☑ UnityARKitPlugin/UnityARKitScene 0
- ☐ UnityARKitPlugin/UnityParticlePainter
- ☐ UnityARKitPlugin/UnityARBallz
- ☐ UnityARKitPlugin/UnityARShadows
- ☐ UnityARKitPlugin/UnityAROcclusion
- ☐ UnityARKitPlugin/ARKitRemote/UnityARKitRemote
- ☐ SolarSystem

iOS

Run in Xcode as	Release
Symlink Unity libraries	☐
Development Build	☐
Autoconnect Profiler	☐
Script Debugging	☐
Scripts Only Build	☐



QualitySettings

Levels			
Very Low	☑	☑	
Low	☑	☑	
Medium	☑	☑	
High	☑	☑	
Very High	☑	☑	
Ultra	☑	☑	
Default			

Name: High

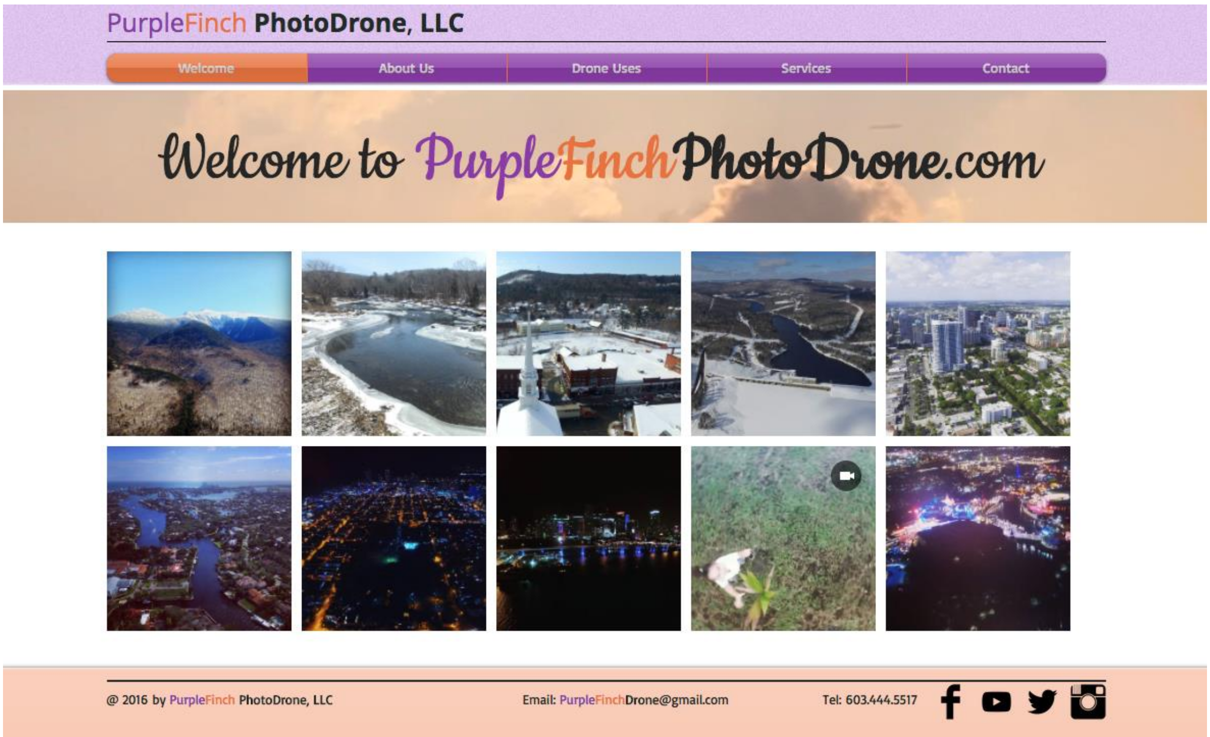
Rendering

Pixel Light Count: 2
Texture Quality: Full Res
Anisotropic Textures: Per Texture
Anti Aliasing: Disabled
Soft Particles: ☐
Realtime Reflection Probes: ☑
Billboards Face Camera Position: ☑
Resolution Scaling Fixed DPI Factor: 1

Shadows

Shadows: Hard Shadows Only
Shadow Resolution: Medium Resolution
Shadow Projection: Close Fit
Shadow Distance: 20
Shadowmask Mode: Shadowmask
Shadow Near Plane Offset: 2
Shadow Cascades: Two Cascades
Cascade splits: 0 33.3% | 1 66.7%

Chapter 4: Augmented Business Cards



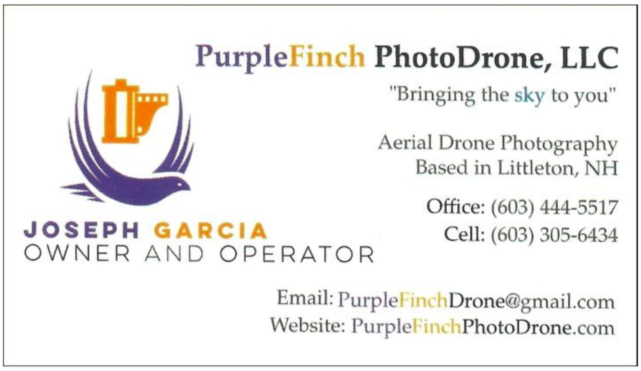
PurpleFinch PhotoDrone, LLC

Welcome to PurpleFinch PhotoDrone.com

@ 2016 by PurpleFinch PhotoDrone, LLC

Email: PurpleFinchDrone@gmail.com

Tel: 603.444.5517



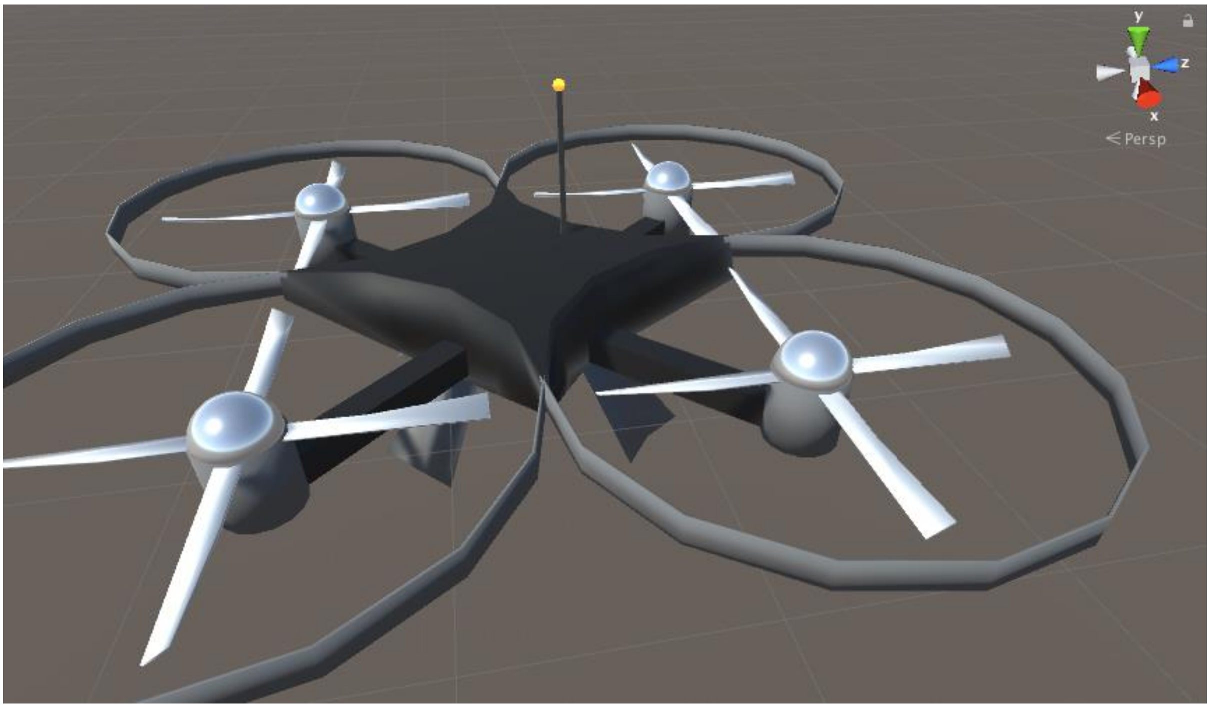
PurpleFinch PhotoDrone, LLC
"Bringing the sky to you"

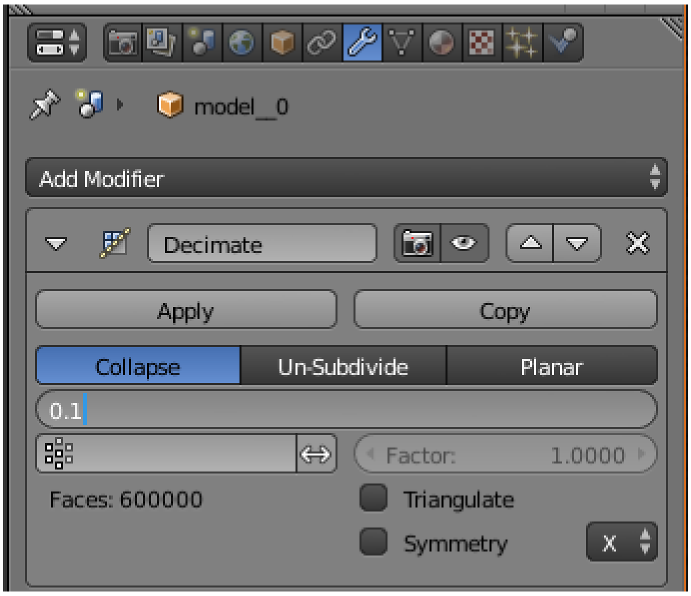
Aerial Drone Photography
Based in Littleton, NH

Office: (603) 444-5517
Cell: (603) 305-6434

JOSEPH GARCIA
OWNER AND OPERATOR

Email: PurpleFinchDrone@gmail.com
Website: PurpleFinchPhotoDrone.com




model_0

Decimate

Collapse

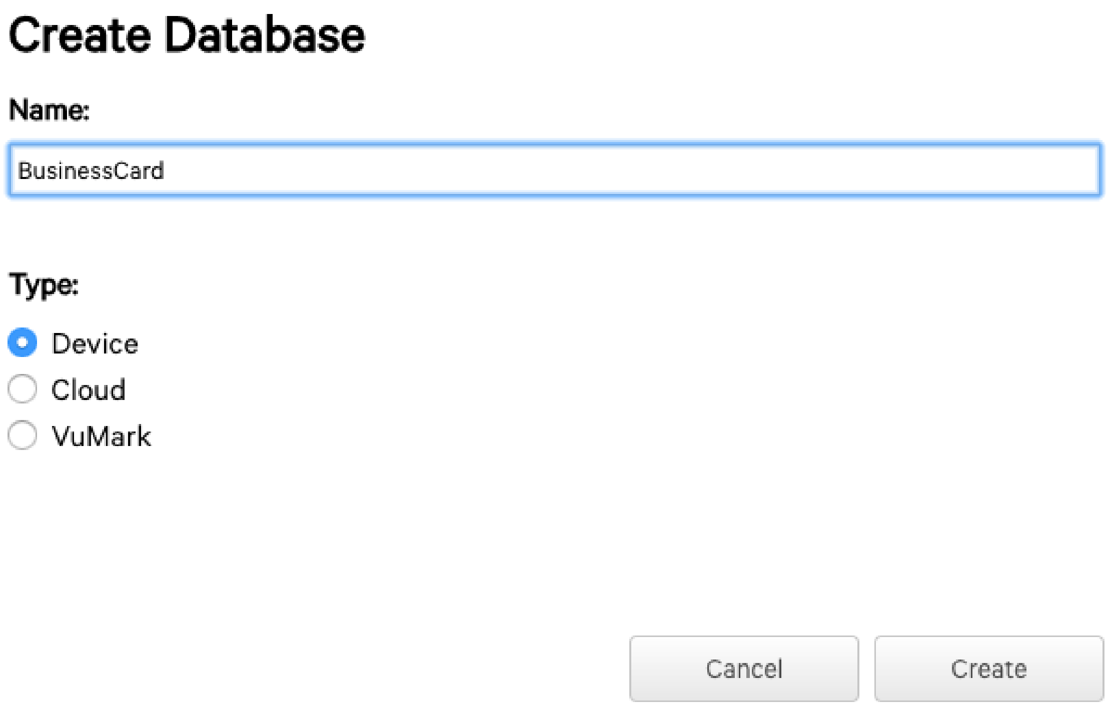
0.1

Factor: 1.0000

Faces: 600000

☐ Triangulate

☐ Symmetry X
Add Modifier
Apply
Copy
Un-Subdivide
Planar



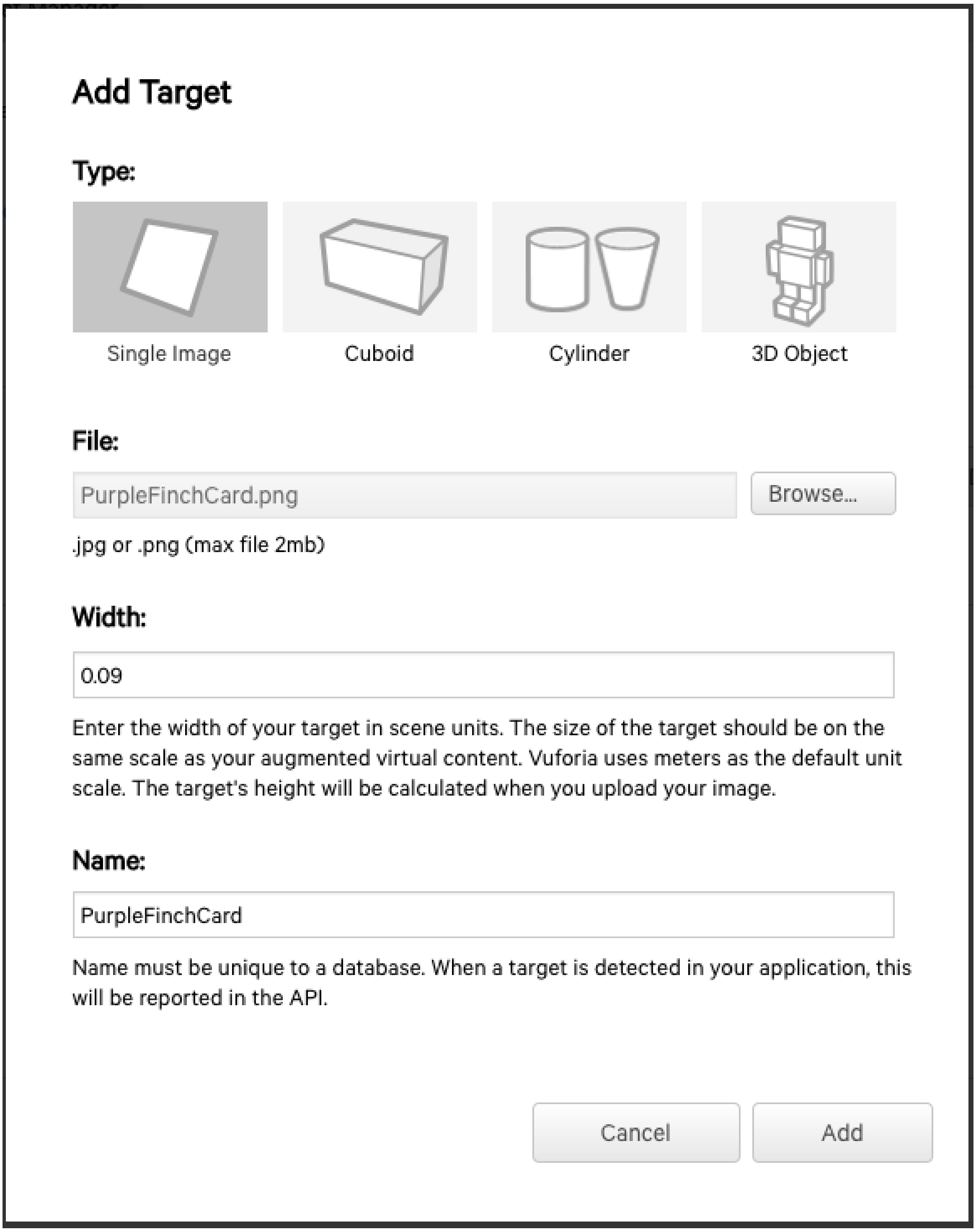
Create Database

Name: BusinessCard

Type:

● Device
○ Cloud
○ VuMark

Cancel
Create


Single Image
Cuboid
Cylinder
3D Object
Browse...
Cancel
Add

Add Target

Type: Single Image

File: PurpleFinchCard.png

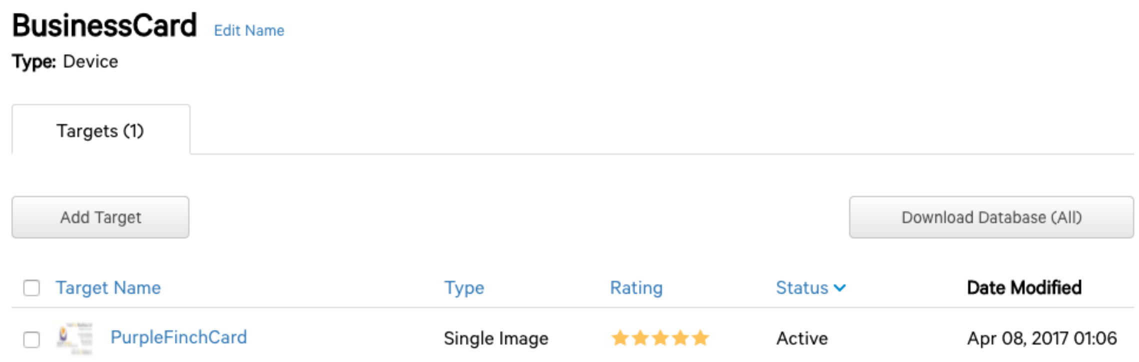
.jpg or .png (max file 2mb)

Width: 0.09

Enter the width of your target in scene units. The size of the target should be on the same scale as your augmented virtual content. Vuforia uses meters as the default unit scale. The target's height will be calculated when you upload your image.

Name: PurpleFinchCard

Name must be unique to a database. When a target is detected in your application, this will be reported in the API.



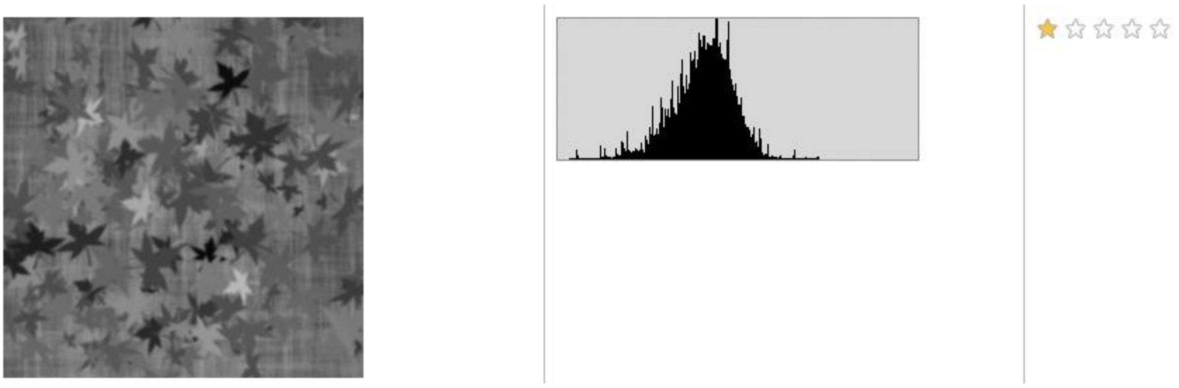
BusinessCard Edit Name

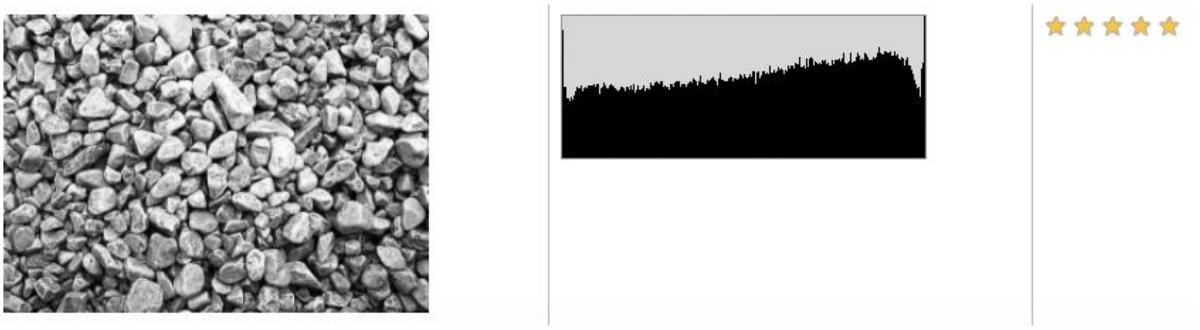
Type: Device

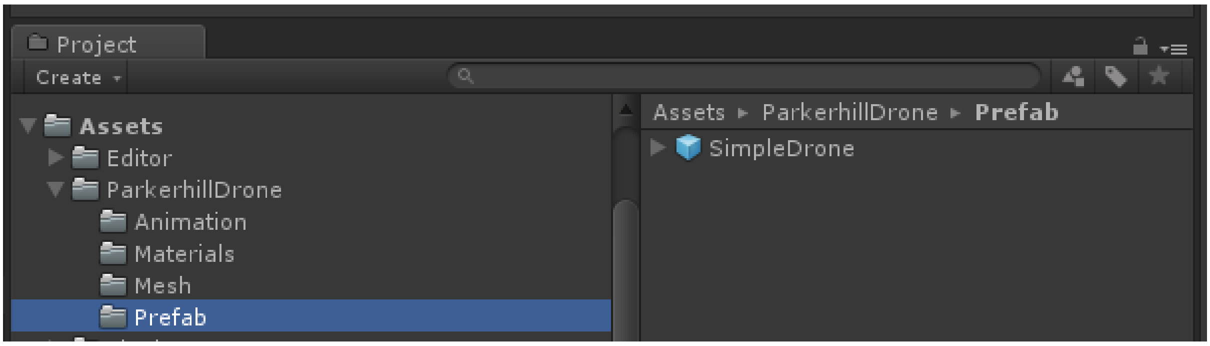
Targets (1)

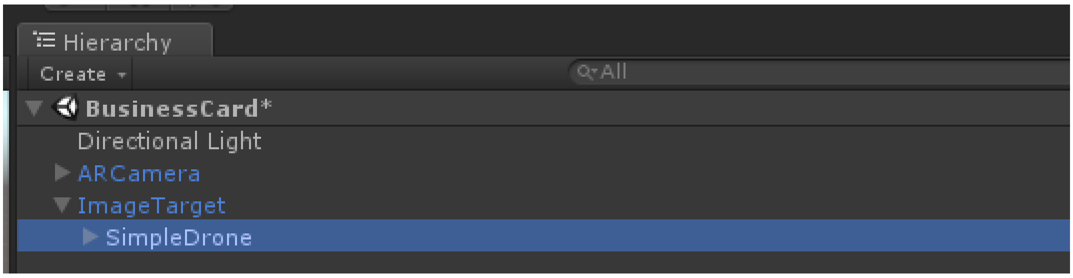
Add Target | Download Database (All)

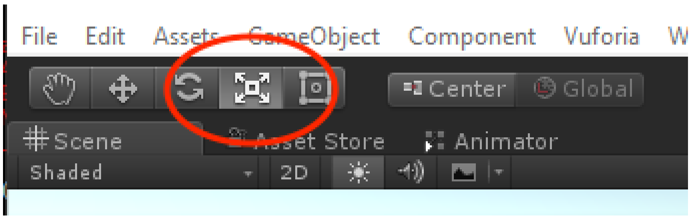
☐	Target Name	Type	Rating	Status	Date Modified
☐	PurpleFinchCard	Single Image	★★★★★	Active	Apr 08, 2017 01:06

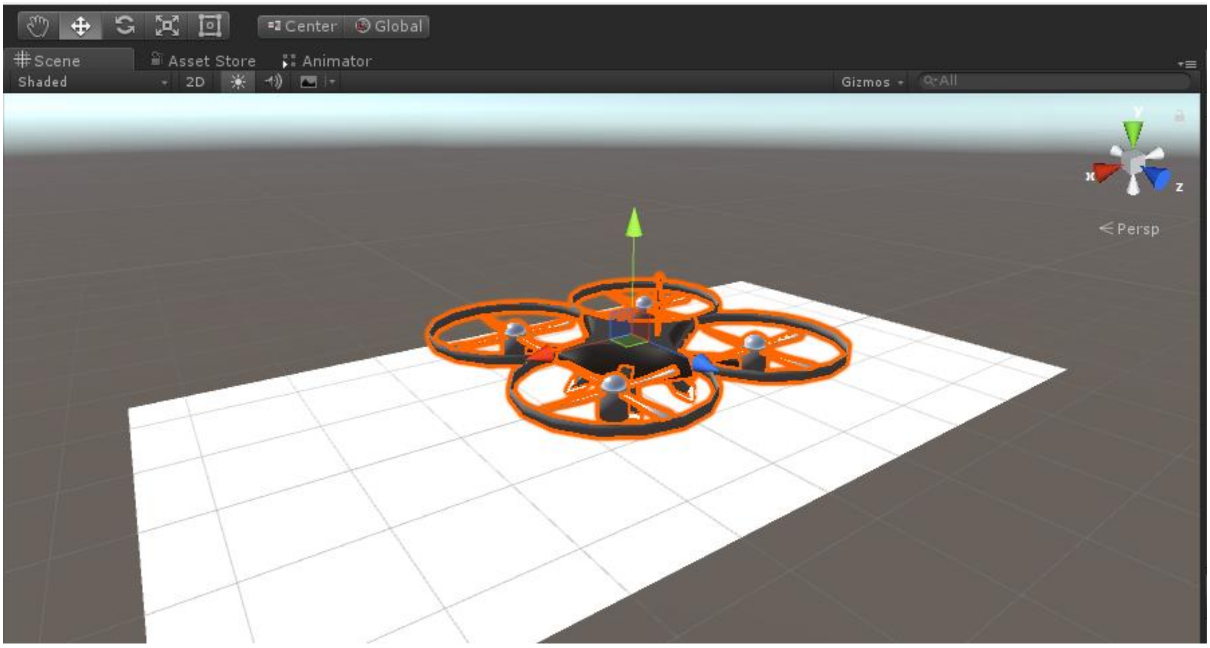


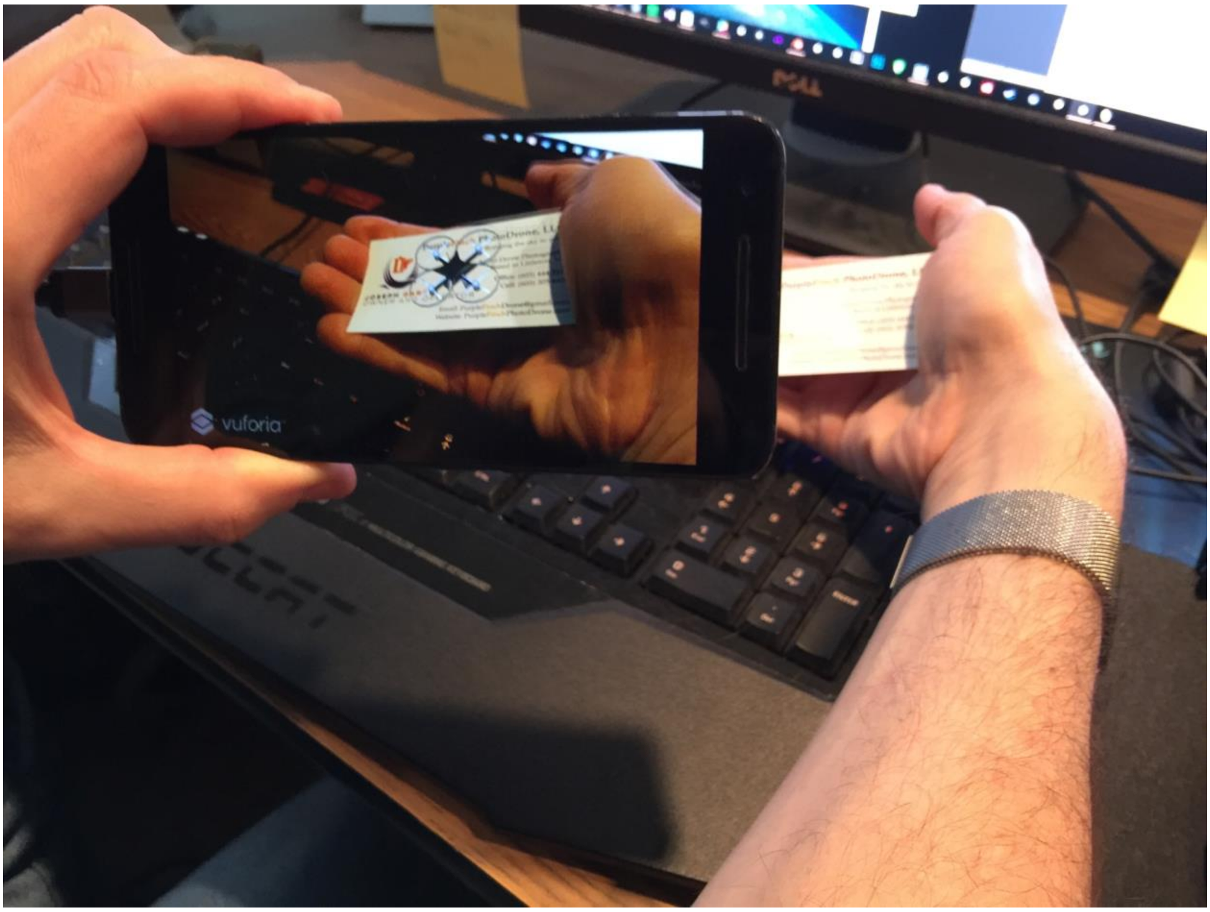


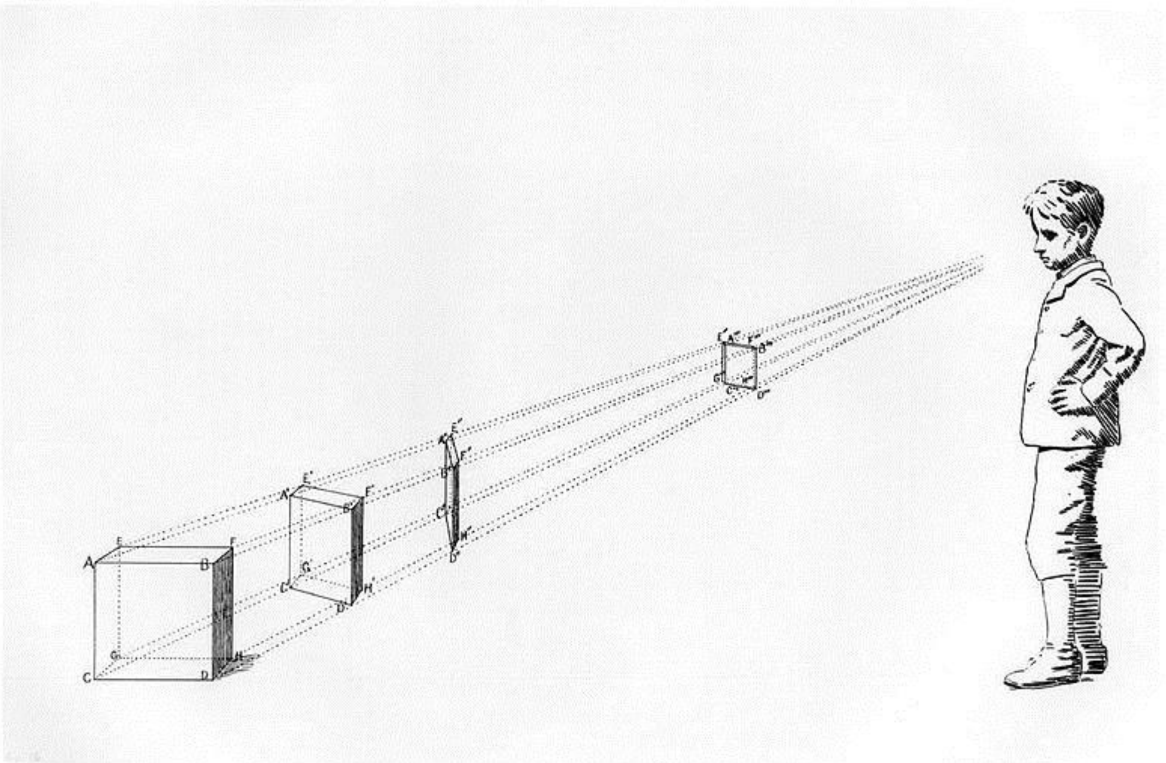

Project
Create
Assets
Editor
ParkerhillDrone
Animation
Materials
Mesh
Prefab
Assets ▸ ParkerhillDrone ▸ Prefab
SimpleDrone

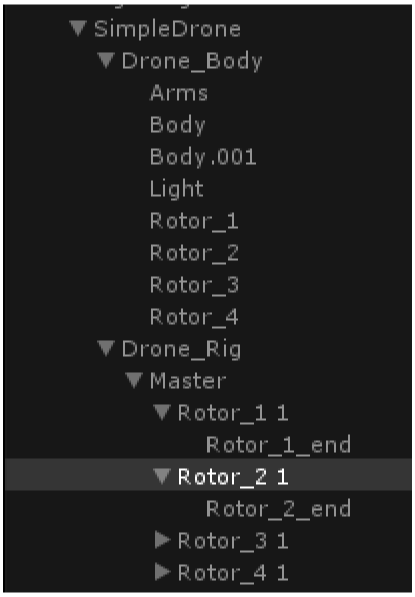

Hierarchy
Create
All
BusinessCard*
Directional Light
ARCamera
ImageTarget
SimpleDrone


File
Edit
Assets
GameObject
Component
Vuforia
W
Center
Global
Scene
Asset Store
Animator
Shaded
2D

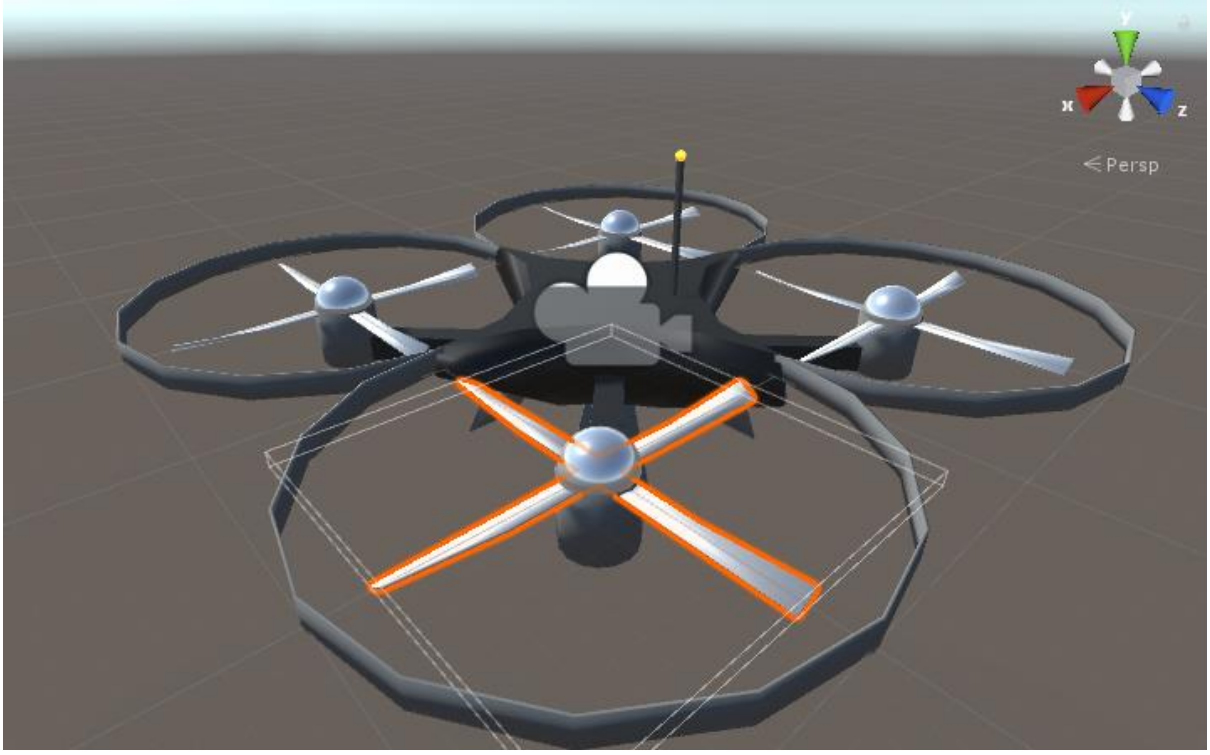

Center
Global
Scene
Asset Store
Animator
Shaded
2D
Gizmos
All
y
x
z
Persp

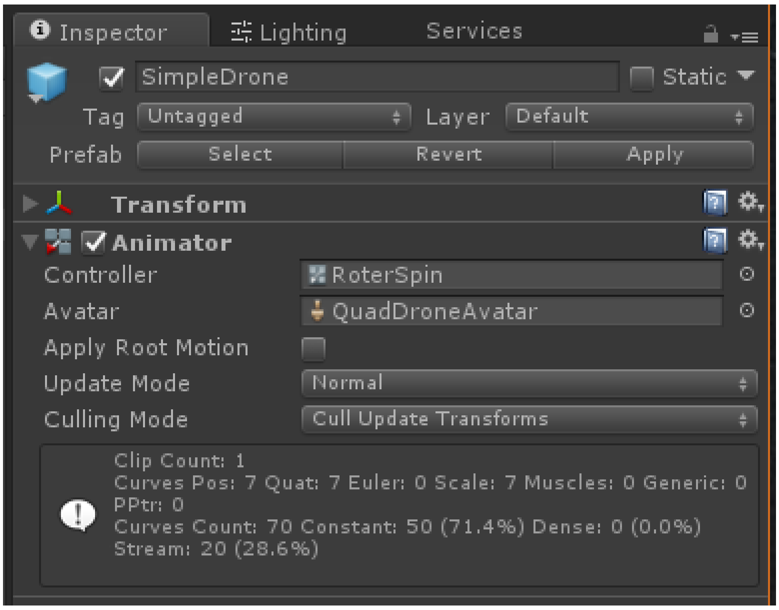

vuforia


A
E
F
B
G
H
C
D
A'
E'
F'
B'
G'
C'
H'
D'
A''
E''
F''
B''
C''
H''
D''
E'''
A'''
F'''
B'''
G'''
H'''
C'''
D'''



```
▼ SimpleDrone
  ▼ Drone_Body
      Arms
      Body
      Body.001
      Light
      Rotor_1
      Rotor_2
      Rotor_3
      Rotor_4
  ▼ Drone_Rig
    ▼ Master
      ▼ Rotor_1 1
          Rotor_1_end
      ▼ Rotor_2 1
          Rotor_2_end
      ▶ Rotor_3 1
      ▶ Rotor_4 1
```




Inspector
Lighting
Services
Prefab
Select
Revert
Apply
Transform

☑ SimpleDrone ☐ Static

Tag Untagged Layer Default

☑ Animator

Controller RoterSpin

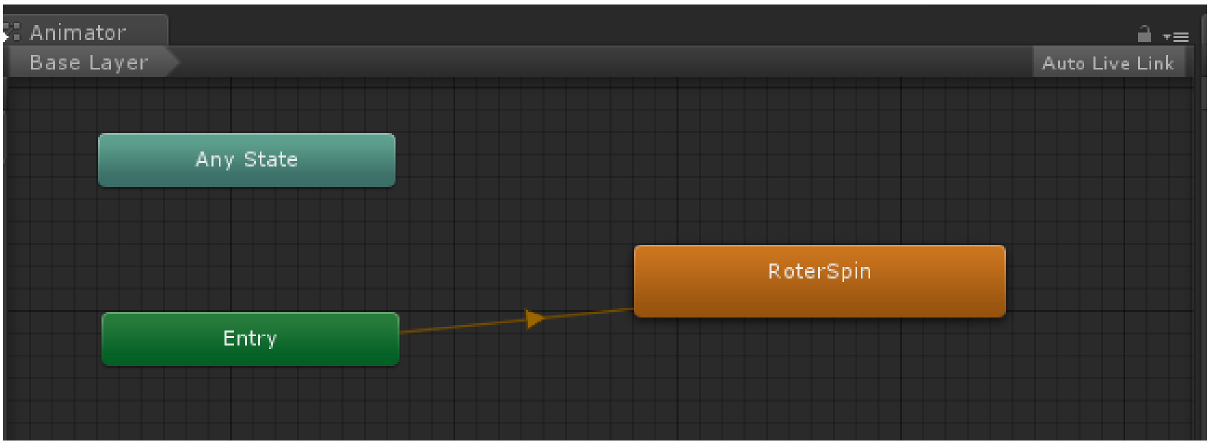
Avatar QuadDroneAvatar

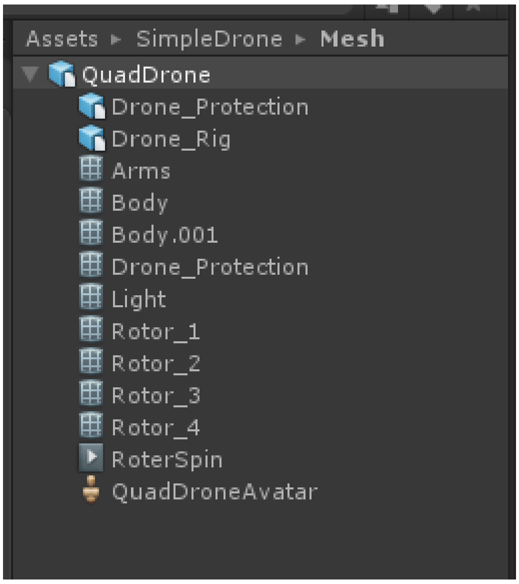
Apply Root Motion ☐

Update Mode Normal

Culling Mode Cull Update Transforms

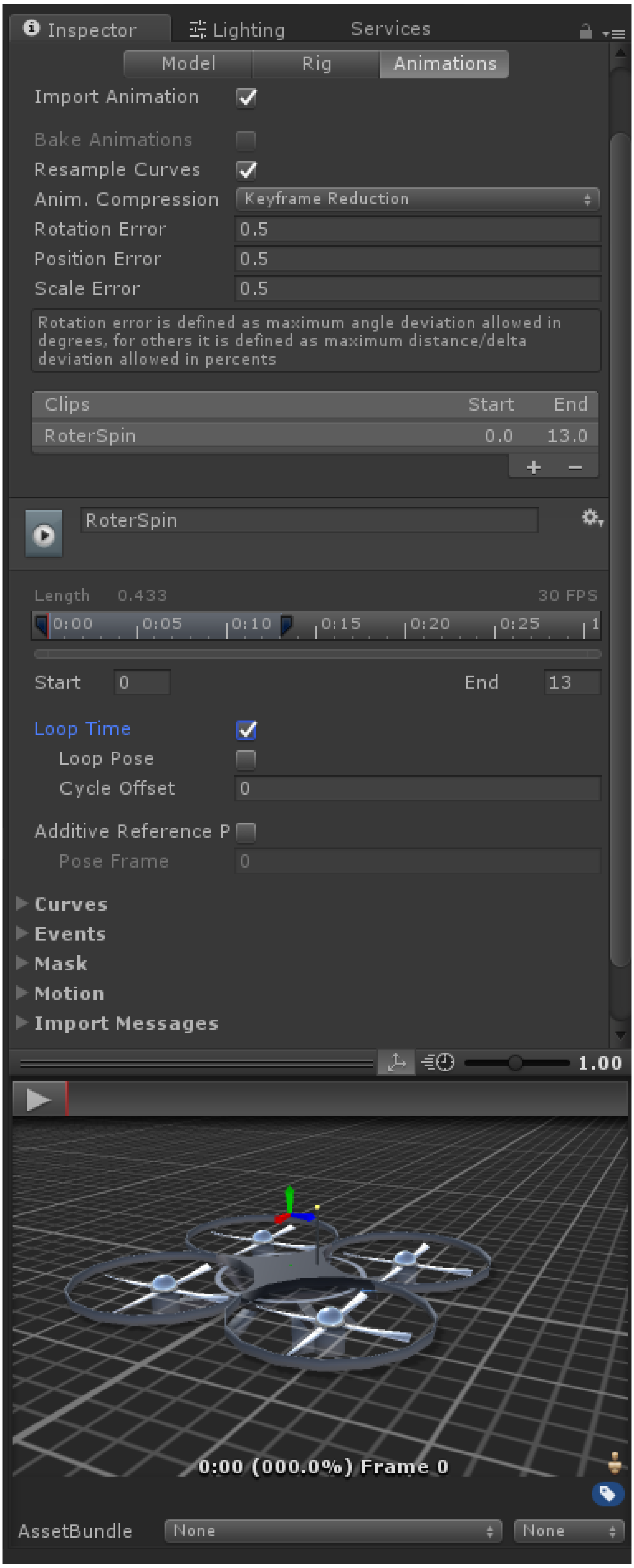
```
Clip Count: 1
Curves Pos: 7 Quat: 7 Euler: 0 Scale: 7 Muscles: 0 Generic: 0
PPtr: 0
Curves Count: 70 Constant: 50 (71.4%) Dense: 0 (0.0%)
Stream: 20 (28.6%)
```


Animator
Base Layer
Auto Live Link
Any State
RoterSpin
Entry



Assets ▸ SimpleDrone ▸ **Mesh**

- QuadDrone
  - Drone_Protection
  - Drone_Rig
  - Arms
  - Body
  - Body.001
  - Drone_Protection
  - Light
  - Rotor_1
  - Rotor_2
  - Rotor_3
  - Rotor_4
  - RoterSpin
  - QuadDroneAvatar


Inspector
Lighting
Services
Model
Rig
Animations

Import Animation ☑

Bake Animations ☐
Resample Curves ☑
Anim. Compression Keyframe Reduction
Rotation Error 0.5
Position Error 0.5
Scale Error 0.5

Rotation error is defined as maximum angle deviation allowed in degrees, for others it is defined as maximum distance/delta deviation allowed in percents

Clips	Start	End
RoterSpin	0.0	13.0

RoterSpin

Length 0.433 30 FPS

0:00
0:05
0:10
0:15
0:20
0:25
1

Start 0 End 13

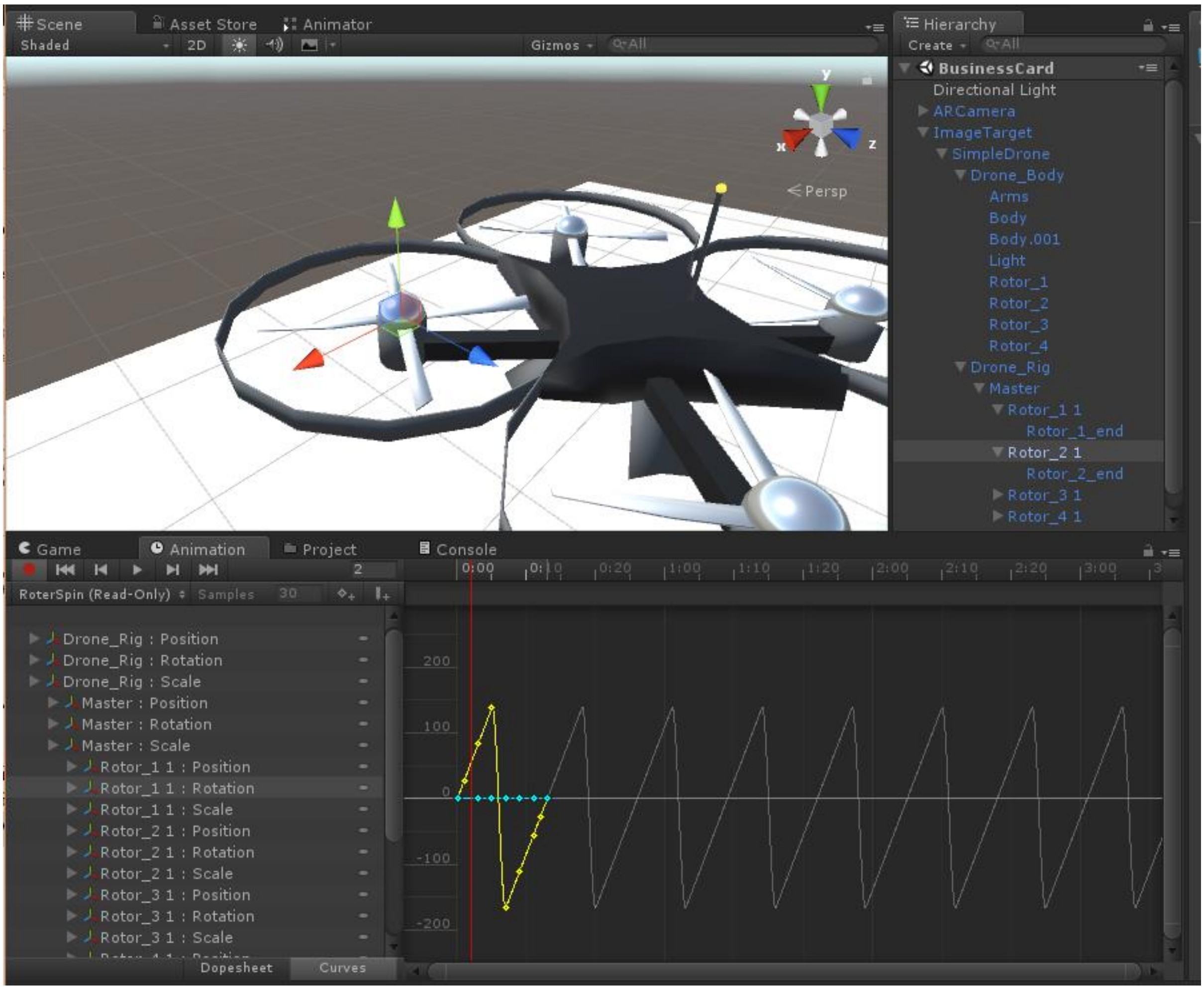
Loop Time ☑
Loop Pose ☐
Cycle Offset 0

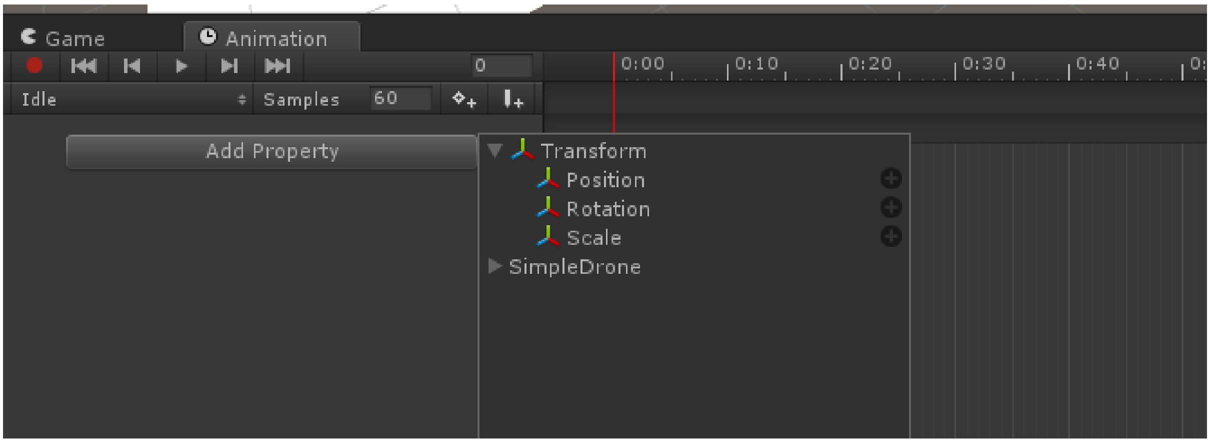
Additive Reference P ☐
Pose Frame 0

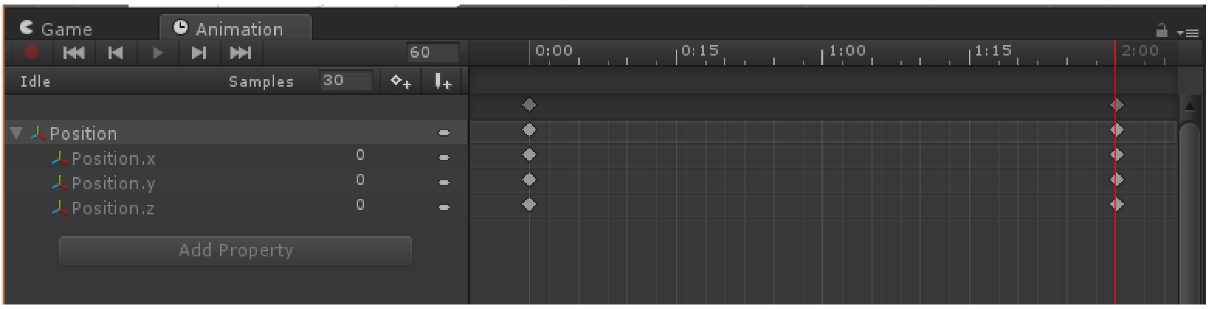
Curves
Events
Mask
Motion
Import Messages
1.00

0:00 (000.0%) Frame 0

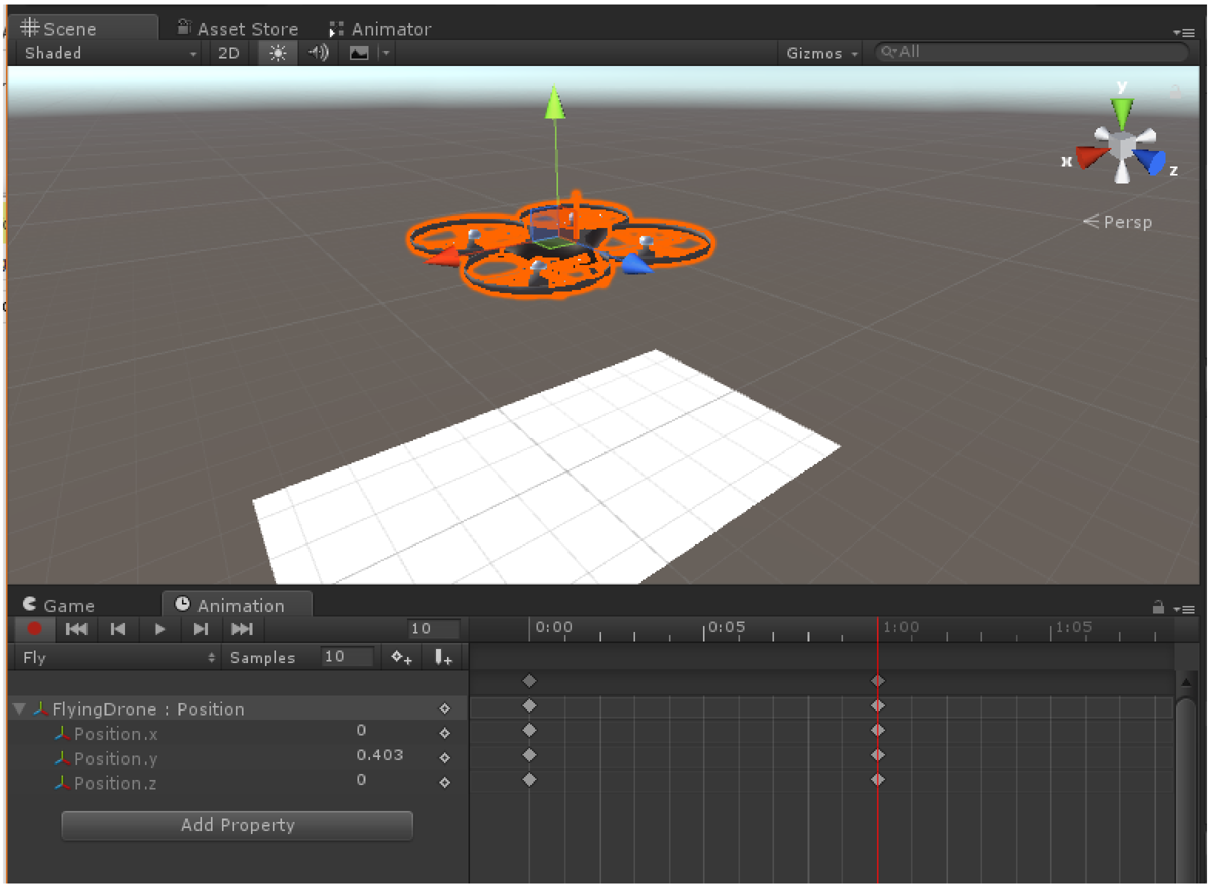
AssetBundle None None


Scene
Asset Store
Animator
Shaded
2D
Gizmos
All
Persp
Hierarchy
Create
BusinessCard
Directional Light
ARCamera
ImageTarget
SimpleDrone
Drone_Body
Arms
Body
Body.001
Light
Rotor_1
Rotor_2
Rotor_3
Rotor_4
Drone_Rig
Master
Rotor_1 1
Rotor_1_end
Rotor_2 1
Rotor_2_end
Rotor_3 1
Rotor_4 1
Game
Animation
Project
Console
2
RoterSpin (Read-Only)
Samples 30
0:00
0:10
0:20
1:00
1:10
1:20
2:00
2:10
2:20
3:00
Drone_Rig : Position
Drone_Rig : Rotation
Drone_Rig : Scale
Master : Position
Master : Rotation
Master : Scale
Rotor_1 1 : Position
Rotor_1 1 : Rotation
Rotor_1 1 : Scale
Rotor_2 1 : Position
Rotor_2 1 : Rotation
Rotor_2 1 : Scale
Rotor_3 1 : Position
Rotor_3 1 : Rotation
Rotor_3 1 : Scale
200
100
0
-100
-200
Dopesheet
Curves

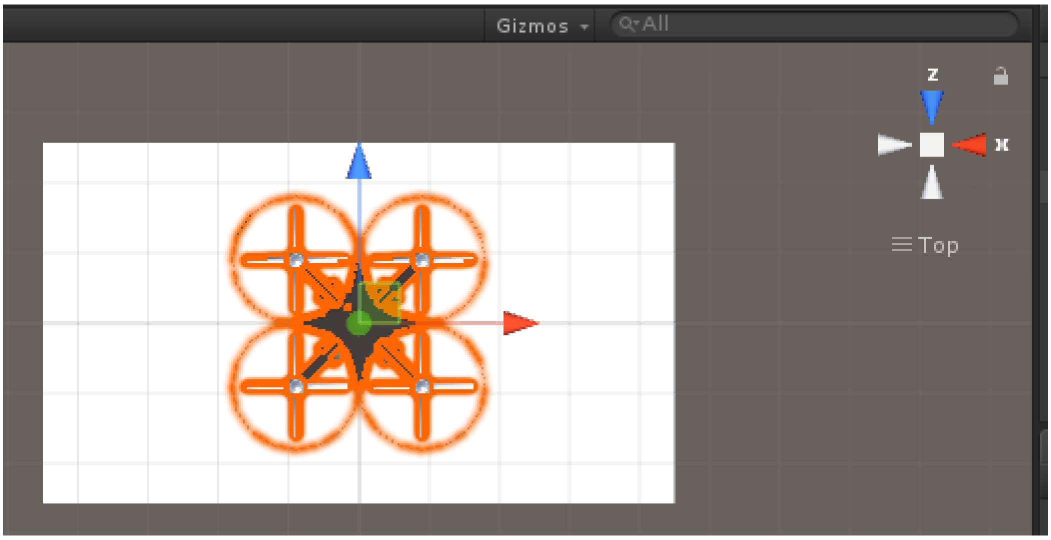

Game
Animation
0
Idle
Samples 60
0:00
0:10
0:20
0:30
0:40
Add Property
Transform
Position
Rotation
Scale
SimpleDrone

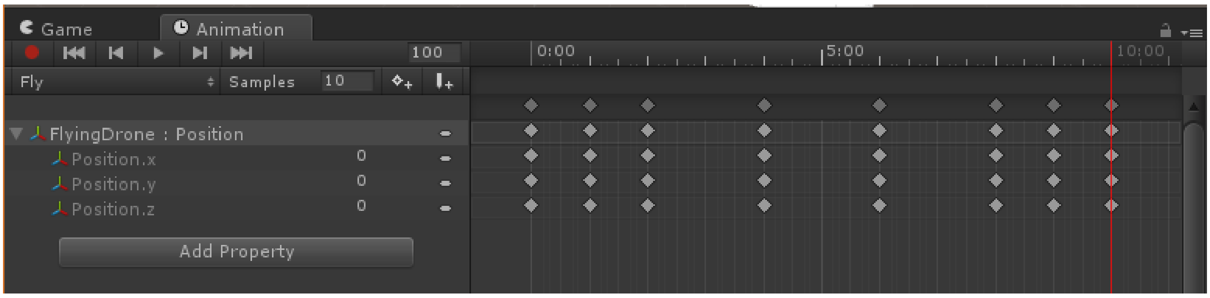

Game
Animation
0:00
0:15
1:00
1:15
2:00
Add Property

60
Idle
Samples 30
Position
Position.x 0
Position.y 0
Position.z 0


Scene
Asset Store
Animator
Shaded
2D
Gizmos
All
y
x
z
Persp
Game
Animation
0:00
0:05
1:00
1:05
Add Property

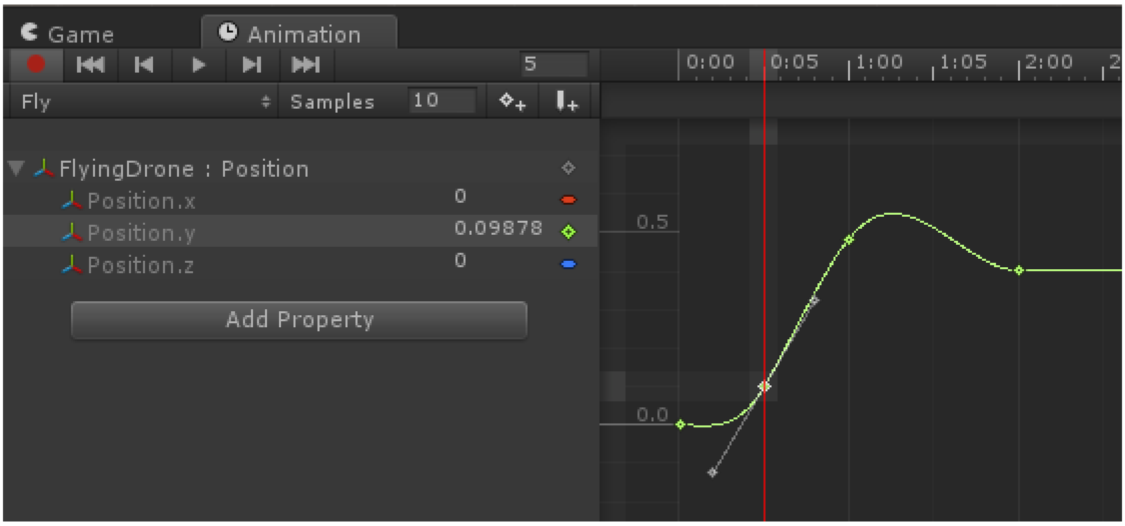
10
Fly
Samples 10
FlyingDrone : Position
Position.x 0
Position.y 0.403
Position.z 0


Gizmos
All
z
x
Top


Game
Animation
100
0:00
5:00
10:00
Add Property

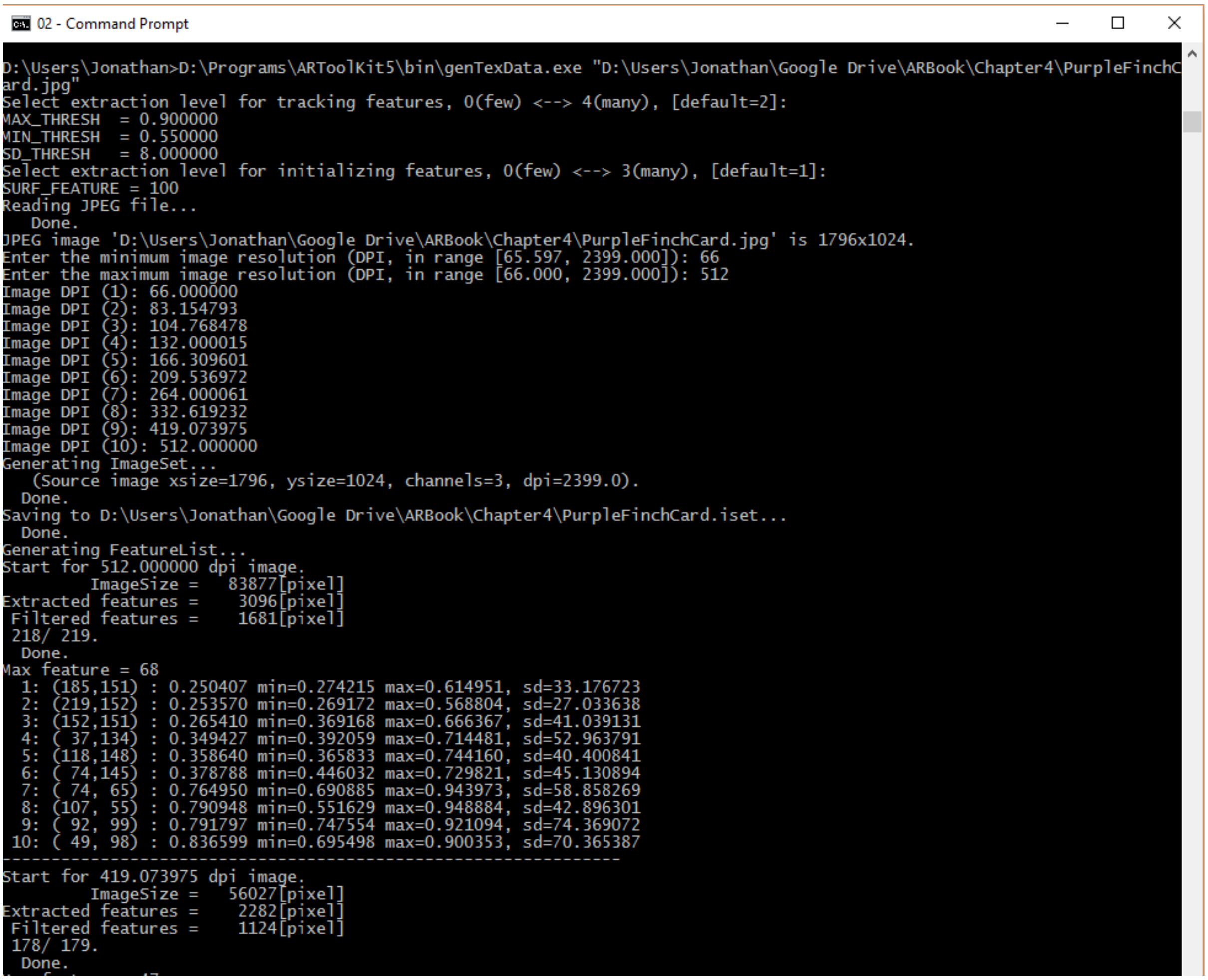
Fly
Samples 10

FlyingDrone : Position
Position.x 0
Position.y 0
Position.z 0

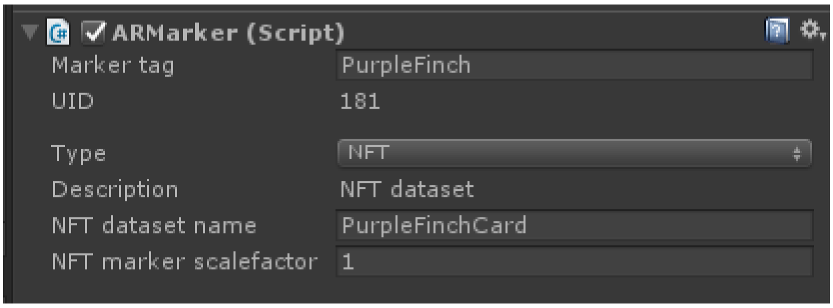

Game
Animation
5
0:00
0:05
1:00
1:05
2:00
0.5
0.0
Add Property

Fly
Samples 10

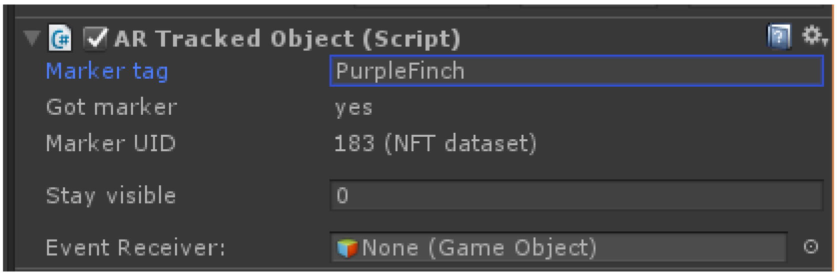
FlyingDrone : Position
Position.x 0
Position.y 0.09878
Position.z 0



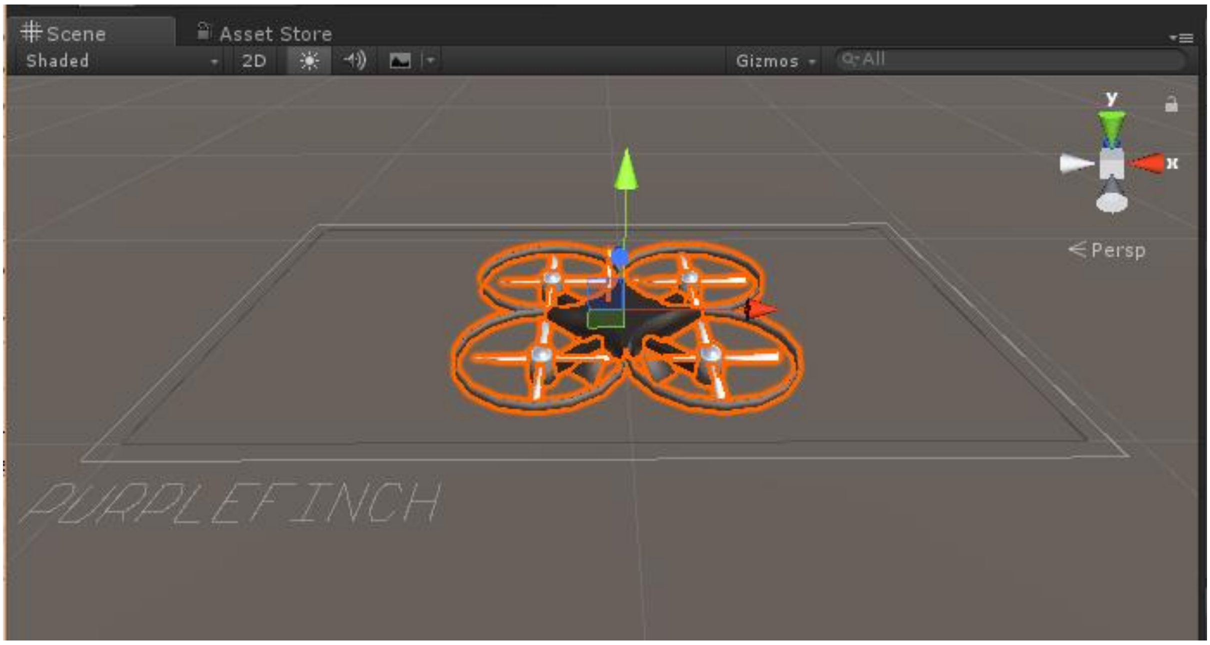
```
D:\Users\Jonathan>D:\Programs\ARToolKit5\bin\genTexData.exe "D:\Users\Jonathan\Google Drive\ARBook\Chapter4\PurpleFinchC
ard.jpg"
Select extraction level for tracking features, 0(few) <--> 4(many), [default=2]:
MAX_THRESH  = 0.900000
MIN_THRESH  = 0.550000
SD_THRESH   = 8.000000
Select extraction level for initializing features, 0(few) <--> 3(many), [default=1]:
SURF_FEATURE = 100
Reading JPEG file...
   Done.
JPEG image 'D:\Users\Jonathan\Google Drive\ARBook\Chapter4\PurpleFinchCard.jpg' is 1796x1024.
Enter the minimum image resolution (DPI, in range [65.597, 2399.000]): 66
Enter the maximum image resolution (DPI, in range [66.000, 2399.000]): 512
Image DPI (1): 66.000000
Image DPI (2): 83.154793
Image DPI (3): 104.768478
Image DPI (4): 132.000015
Image DPI (5): 166.309601
Image DPI (6): 209.536972
Image DPI (7): 264.000061
Image DPI (8): 332.619232
Image DPI (9): 419.073975
Image DPI (10): 512.000000
Generating ImageSet...
   (Source image xsize=1796, ysize=1024, channels=3, dpi=2399.0).
  Done.
Saving to D:\Users\Jonathan\Google Drive\ARBook\Chapter4\PurpleFinchCard.iset...
  Done.
Generating FeatureList...
Start for 512.000000 dpi image.
         ImageSize =    83877[pixel]
Extracted features =     3096[pixel]
 Filtered features =     1681[pixel]
 218/ 219.
  Done.
Max feature = 68
  1: (185,151) : 0.250407 min=0.274215 max=0.614951, sd=33.176723
  2: (219,152) : 0.253570 min=0.269172 max=0.568804, sd=27.033638
  3: (152,151) : 0.265410 min=0.369168 max=0.666367, sd=41.039131
  4: ( 37,134) : 0.349427 min=0.392059 max=0.714481, sd=52.963791
  5: (118,148) : 0.358640 min=0.365833 max=0.744160, sd=40.400841
  6: ( 74,145) : 0.378788 min=0.446032 max=0.729821, sd=45.130894
  7: ( 74, 65) : 0.764950 min=0.690885 max=0.943973, sd=58.858269
  8: (107, 55) : 0.790948 min=0.551629 max=0.948884, sd=42.896301
  9: ( 92, 99) : 0.791797 min=0.747554 max=0.921094, sd=74.369072
 10: ( 49, 98) : 0.836599 min=0.695498 max=0.900353, sd=70.365387
---------------------------------------------------------------
Start for 419.073975 dpi image.
         ImageSize =    56027[pixel]
Extracted features =     2282[pixel]
 Filtered features =     1124[pixel]
 178/ 179.
  Done.
```

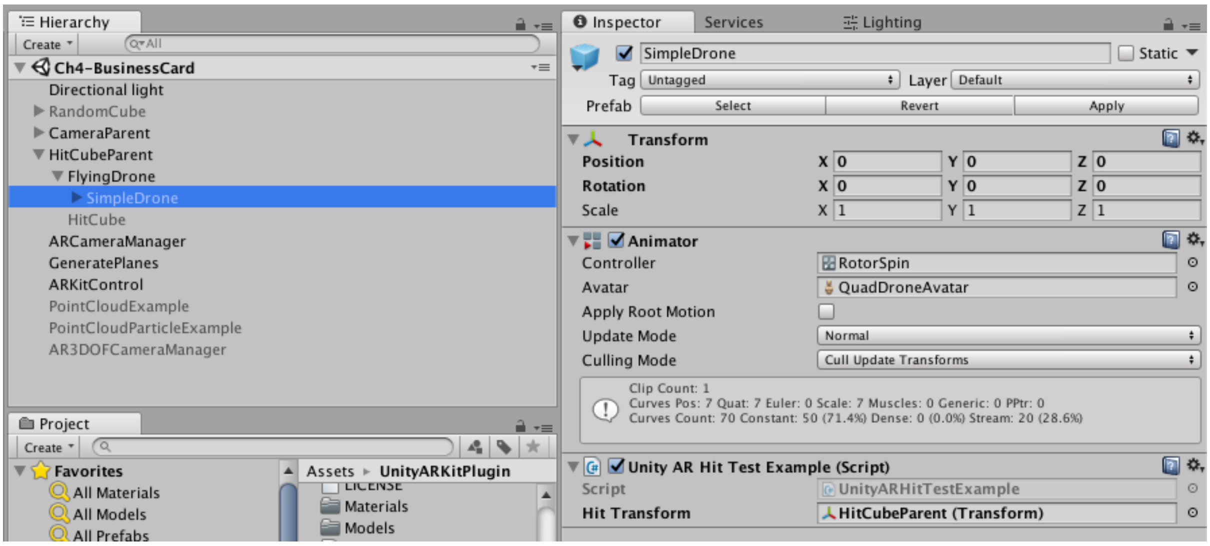


Marker tag	PurpleFinch
UID	181
Type	NFT
Description	NFT dataset
NFT dataset name	PurpleFinchCard
NFT marker scalefactor	1



Marker tag	PurpleFinch
Got marker	yes
Marker UID	183 (NFT dataset)
Stay visible	0
Event Receiver:	None (Game Object)


Scene
Asset Store
Shaded
2D
Gizmos
All
y
x
Persp
PURPLEFINCH


Hierarchy
Create
All
Project
Create
Inspector
Services
Lighting

Ch4-BusinessCard
- Directional light
- RandomCube
- CameraParent
- HitCubeParent
  - FlyingDrone
    - SimpleDrone
  - HitCube
- ARCameraManager
- GeneratePlanes
- ARKitControl
- PointCloudExample
- PointCloudParticleExample
- AR3DOFCameraManager

Favorites
- All Materials
- All Models
- All Prefabs

Assets ▸ UnityARKitPlugin
- LICENSE
- Materials
- Models

☑ SimpleDrone ☐ Static

Tag: Untagged Layer: Default

Prefab: Select Revert Apply

Transform

	X	Y	Z
Position	0	0	0
Rotation	0	0	0
Scale	1	1	1

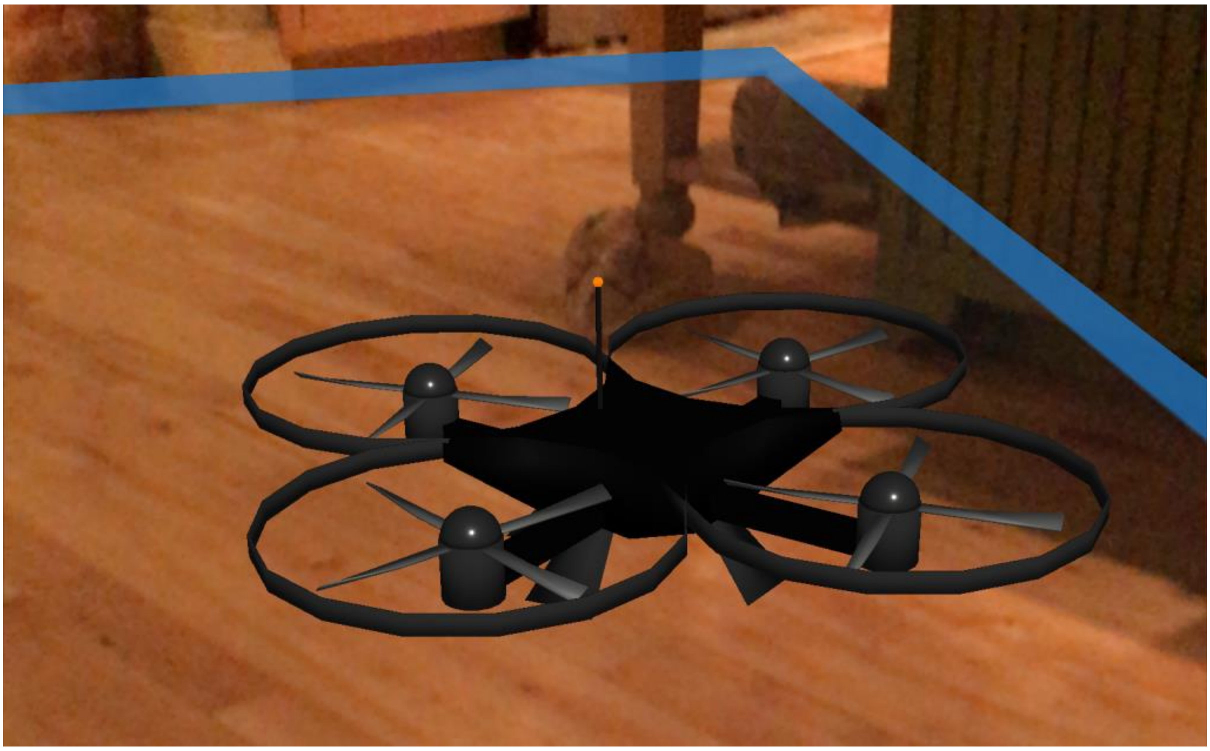
☑ **Animator**

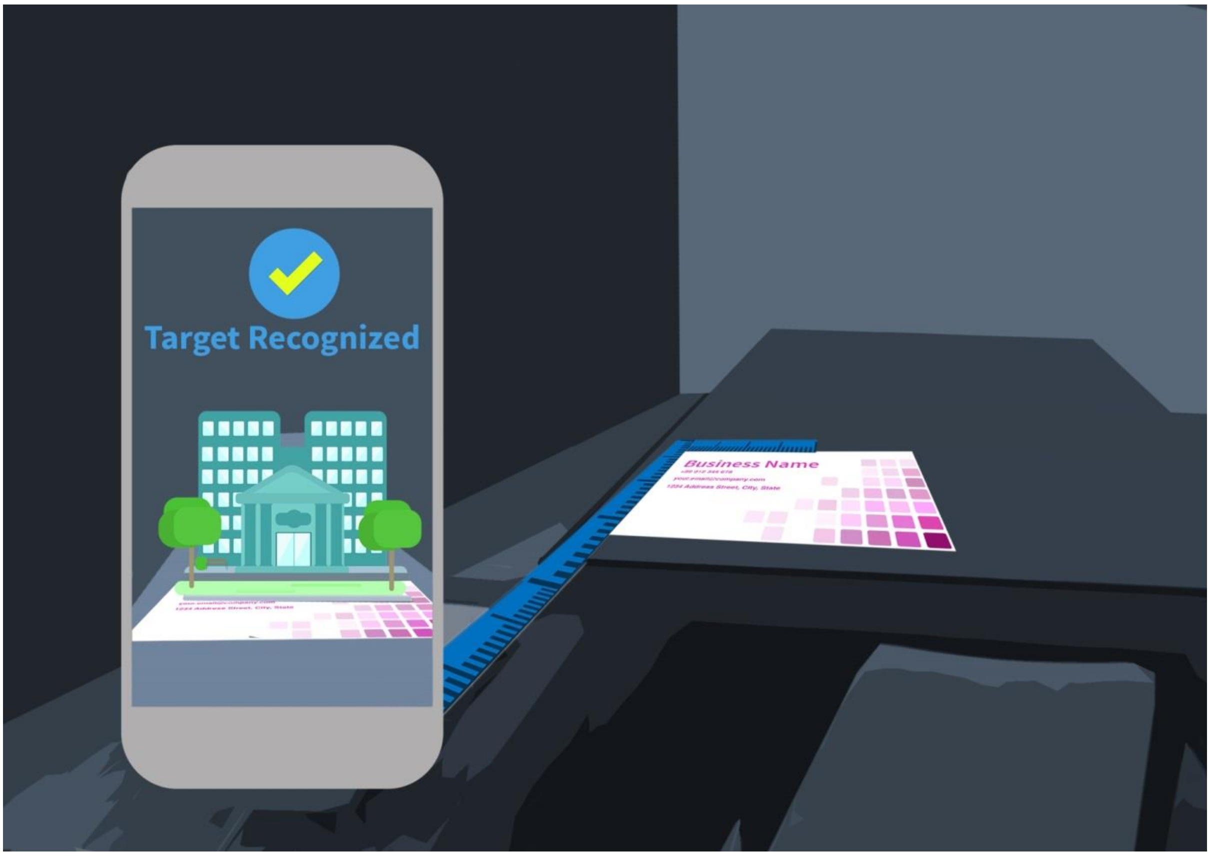
Controller: RotorSpin
Avatar: QuadDroneAvatar
Apply Root Motion: ☐
Update Mode: Normal
Culling Mode: Cull Update Transforms

```
Clip Count: 1
Curves Pos: 7 Quat: 7 Euler: 0 Scale: 7 Muscles: 0 Generic: 0 PPtr: 0
Curves Count: 70 Constant: 50 (71.4%) Dense: 0 (0.0%) Stream: 20 (28.6%)
```

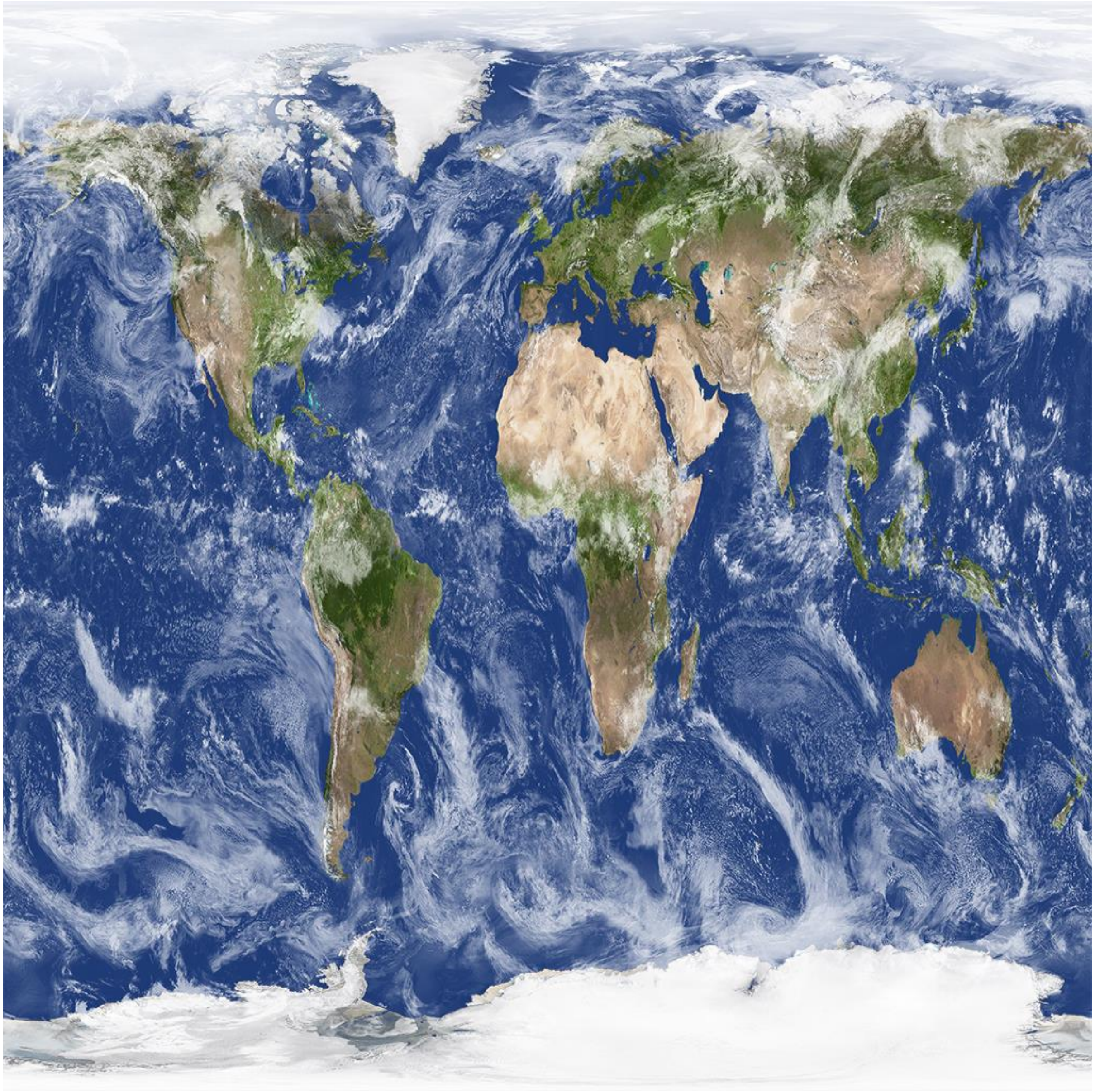
☑ **Unity AR Hit Test Example (Script)**

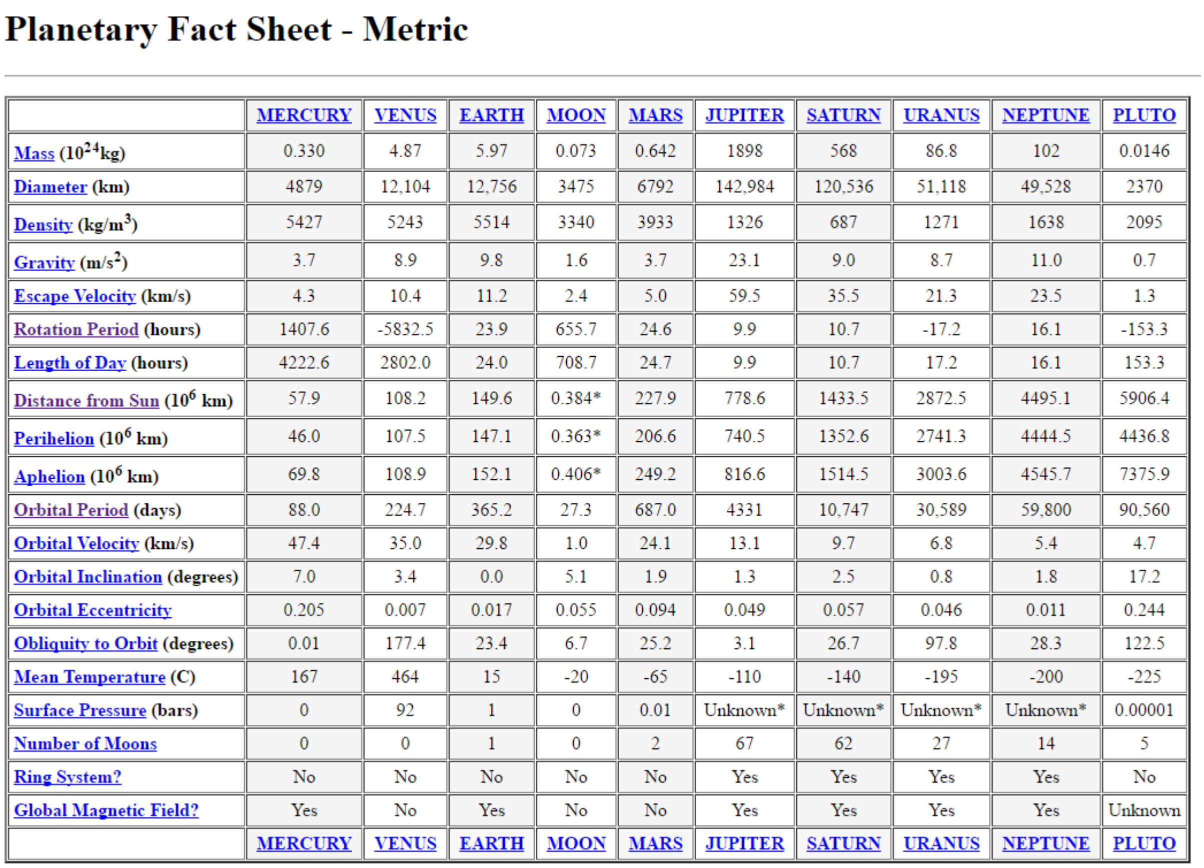
Script: UnityARHitTestExample
Hit Transform: HitCubeParent (Transform)




Target Recognized
Business Name
your.email@company.com
1234 Address Street, City, State

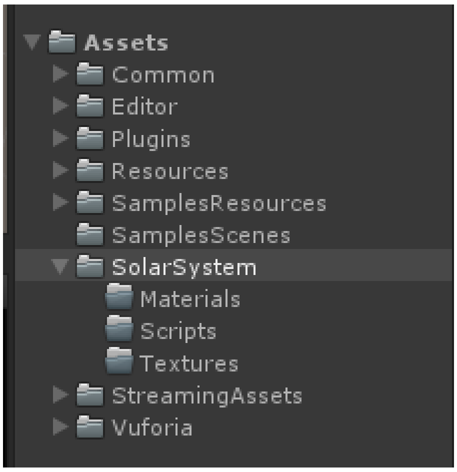
Chapter 5: AR Solar System

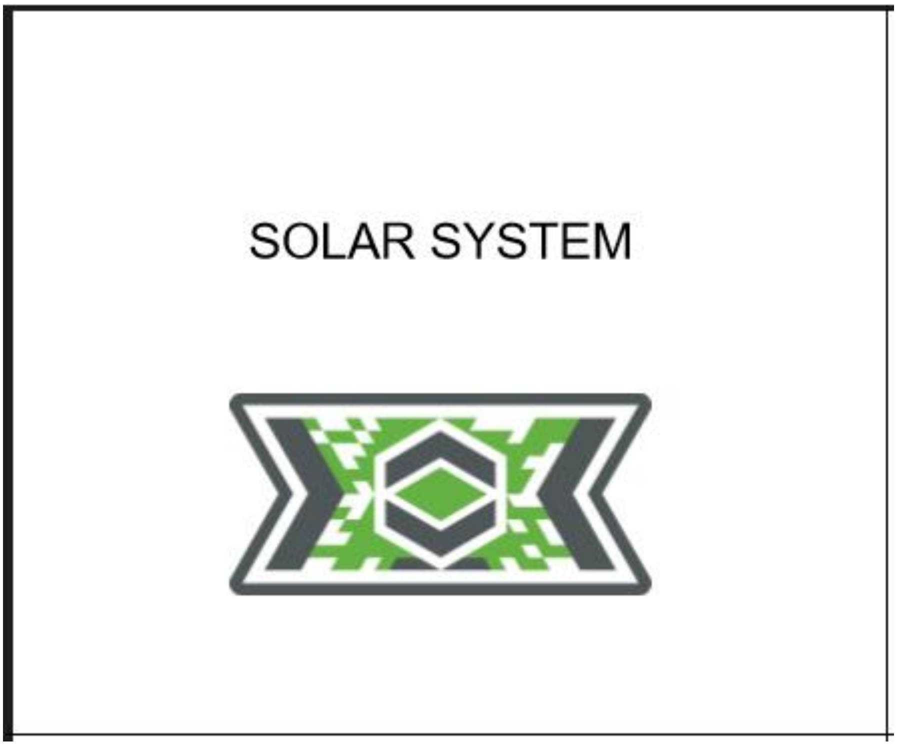


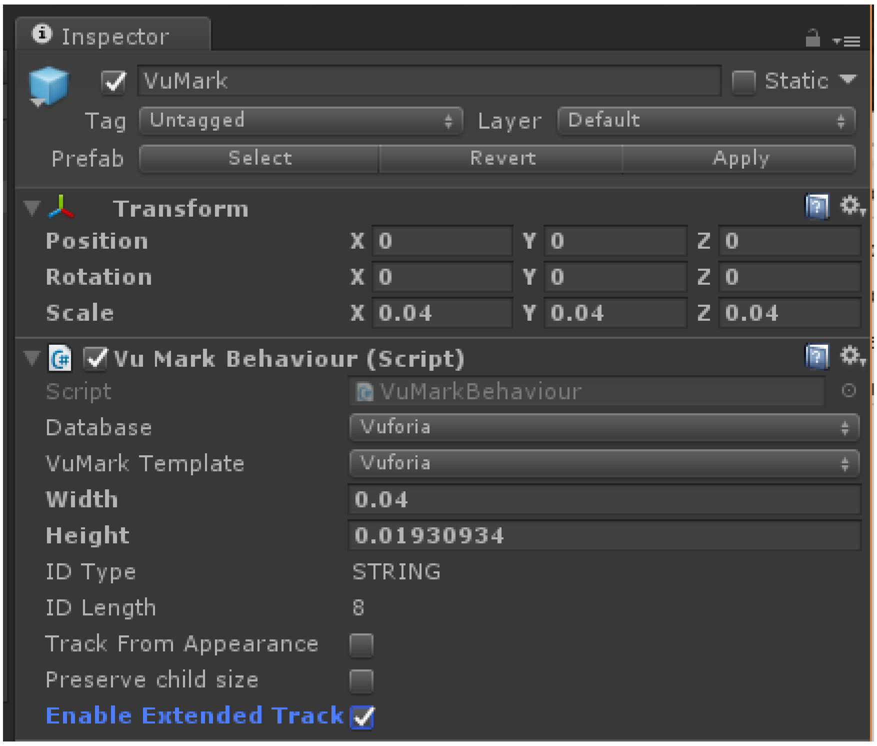


Planetary Fact Sheet - Metric

	MERCURY	VENUS	EARTH	MOON	MARS	JUPITER	SATURN	URANUS	NEPTUNE	PLUTO
Mass (10^{24}kg)	0.330	4.87	5.97	0.073	0.642	1898	568	86.8	102	0.0146
Diameter (km)	4879	12,104	12,756	3475	6792	142,984	120,536	51,118	49,528	2370
Density (kg/m^3)	5427	5243	5514	3340	3933	1326	687	1271	1638	2095
Gravity (m/s^2)	3.7	8.9	9.8	1.6	3.7	23.1	9.0	8.7	11.0	0.7
Escape Velocity (km/s)	4.3	10.4	11.2	2.4	5.0	59.5	35.5	21.3	23.5	1.3
Rotation Period (hours)	1407.6	-5832.5	23.9	655.7	24.6	9.9	10.7	-17.2	16.1	-153.3
Length of Day (hours)	4222.6	2802.0	24.0	708.7	24.7	9.9	10.7	17.2	16.1	153.3
Distance from Sun (10^6 km)	57.9	108.2	149.6	0.384*	227.9	778.6	1433.5	2872.5	4495.1	5906.4
Perihelion (10^6 km)	46.0	107.5	147.1	0.363*	206.6	740.5	1352.6	2741.3	4444.5	4436.8
Aphelion (10^6 km)	69.8	108.9	152.1	0.406*	249.2	816.6	1514.5	3003.6	4545.7	7375.9
Orbital Period (days)	88.0	224.7	365.2	27.3	687.0	4331	10,747	30,589	59,800	90,560
Orbital Velocity (km/s)	47.4	35.0	29.8	1.0	24.1	13.1	9.7	6.8	5.4	4.7
Orbital Inclination (degrees)	7.0	3.4	0.0	5.1	1.9	1.3	2.5	0.8	1.8	17.2
Orbital Eccentricity	0.205	0.007	0.017	0.055	0.094	0.049	0.057	0.046	0.011	0.244
Obliquity to Orbit (degrees)	0.01	177.4	23.4	6.7	25.2	3.1	26.7	97.8	28.3	122.5
Mean Temperature (C)	167	464	15	-20	-65	-110	-140	-195	-200	-225
Surface Pressure (bars)	0	92	1	0	0.01	Unknown*	Unknown*	Unknown*	Unknown*	0.00001
Number of Moons	0	0	1	0	2	67	62	27	14	5
Ring System?	No	No	No	No	No	Yes	Yes	Yes	Yes	No
Global Magnetic Field?	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	Unknown
	MERCURY	VENUS	EARTH	MOON	MARS	JUPITER	SATURN	URANUS	NEPTUNE	PLUTO




SOLAR SYSTEM


Inspector
Static
Prefab
Select
Revert
Apply

☑ VuMark

Tag: Untagged

Layer: Default

Transform

Position X 0 Y 0 Z 0

Rotation X 0 Y 0 Z 0

Scale X 0.04 Y 0.04 Z 0.04

☑ **Vu Mark Behaviour (Script)**

Script: VuMarkBehaviour

Database: Vuforia

VuMark Template: Vuforia

Width: 0.04

Height: 0.01930934

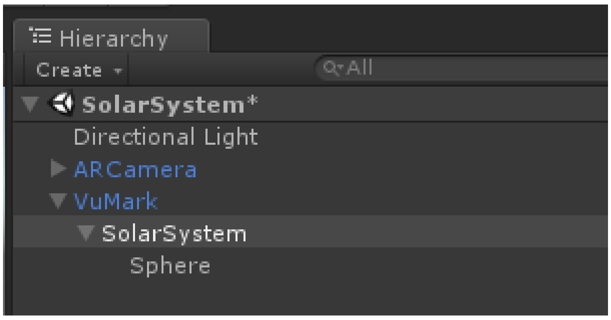
ID Type: STRING

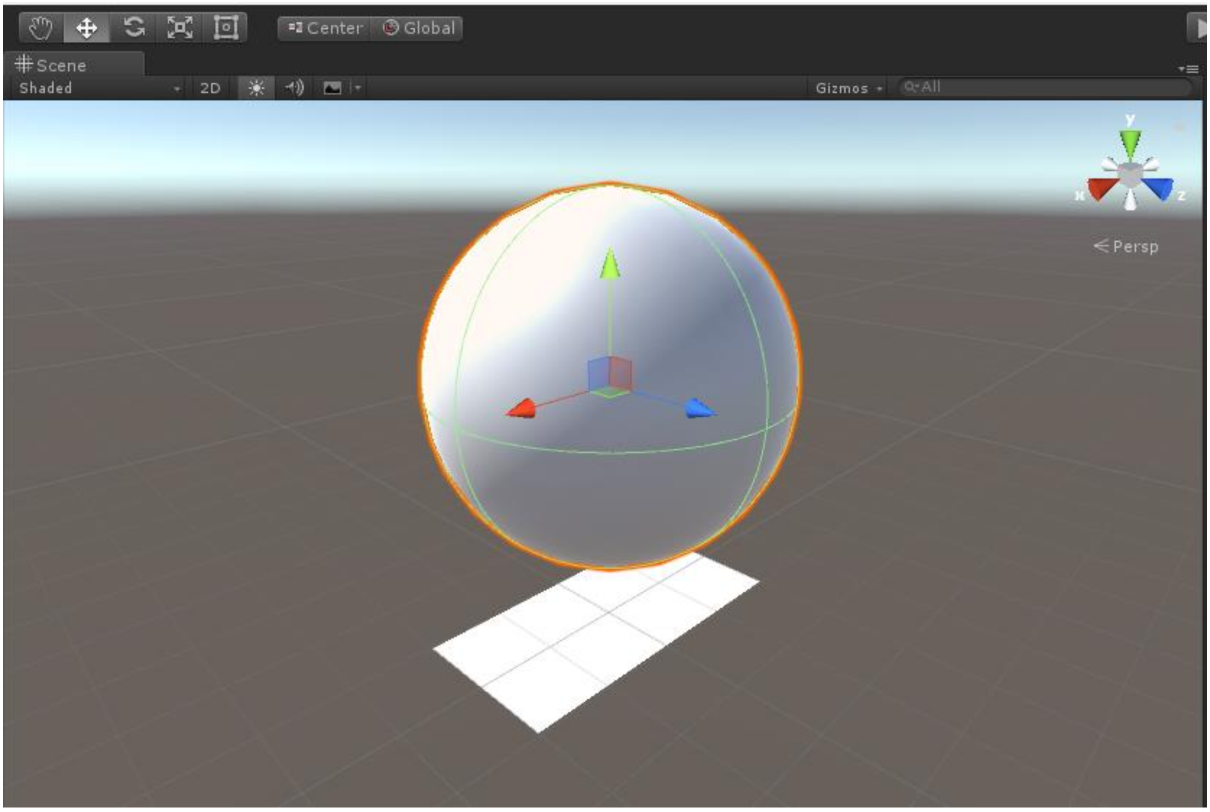
ID Length: 8

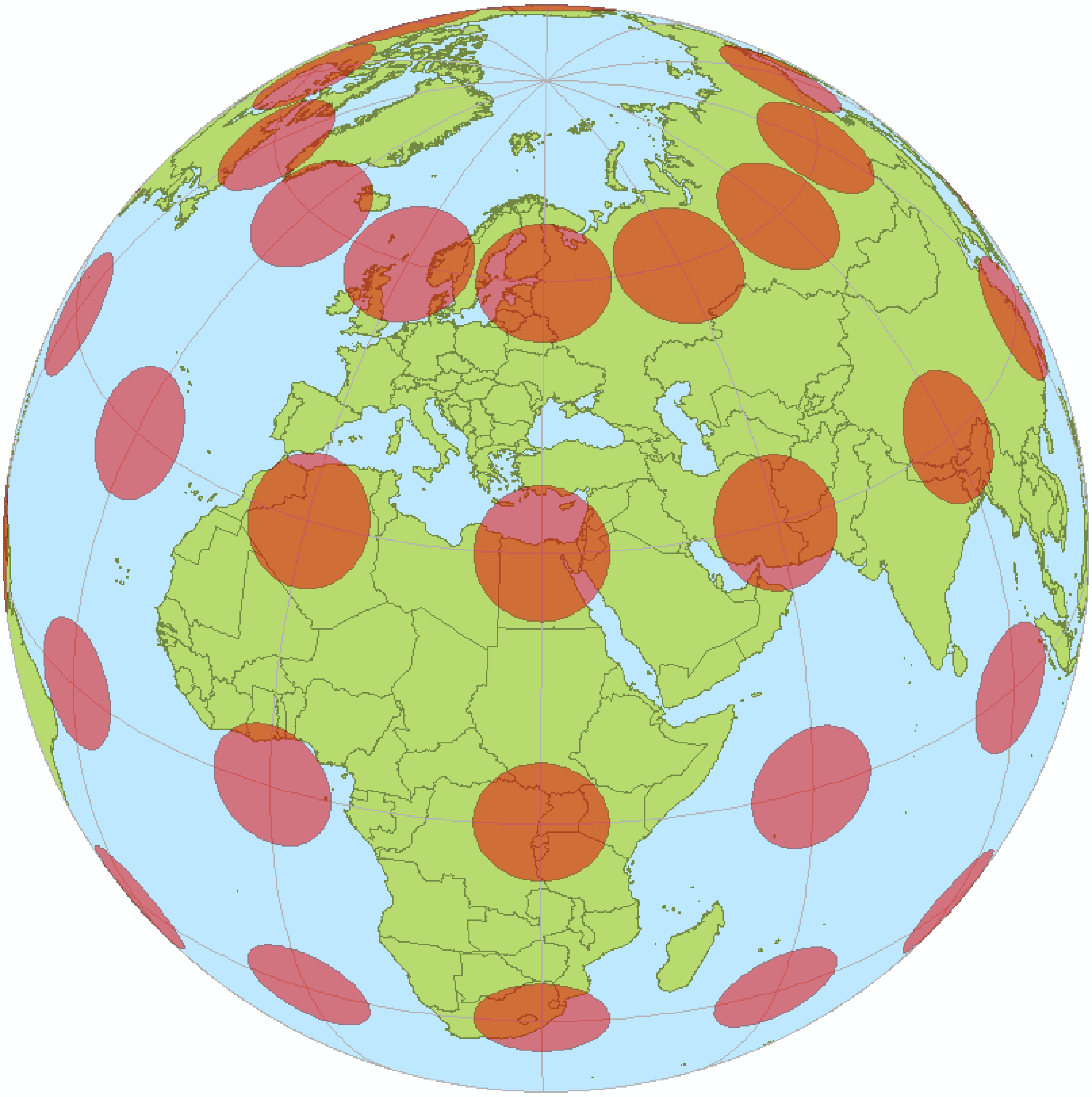
Track From Appearance ☐

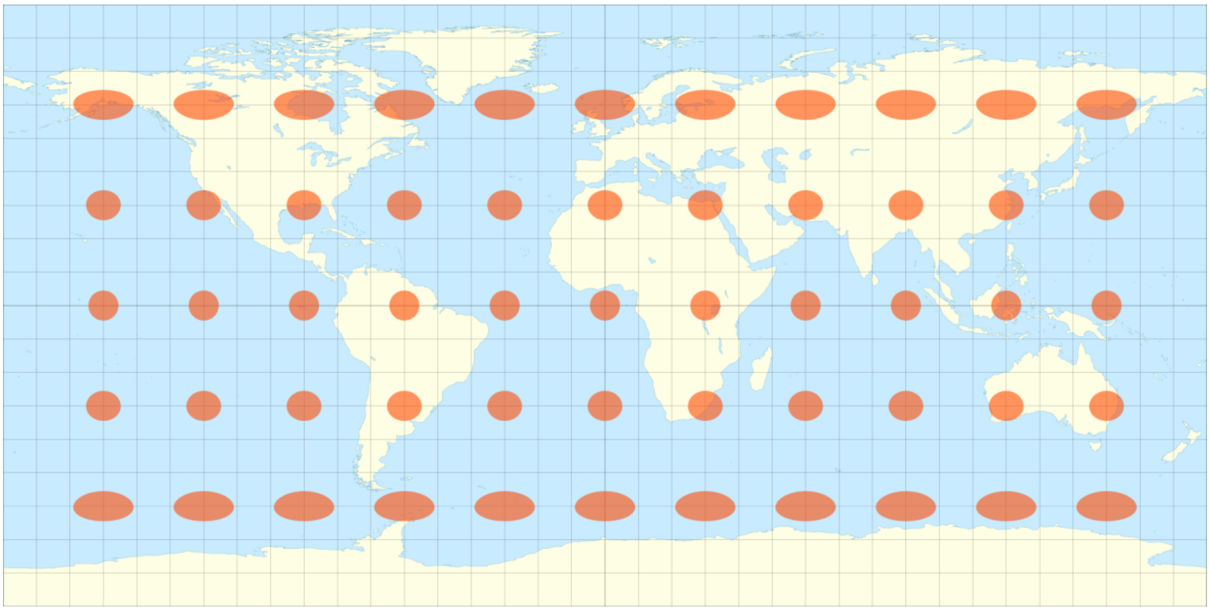
Preserve child size ☐

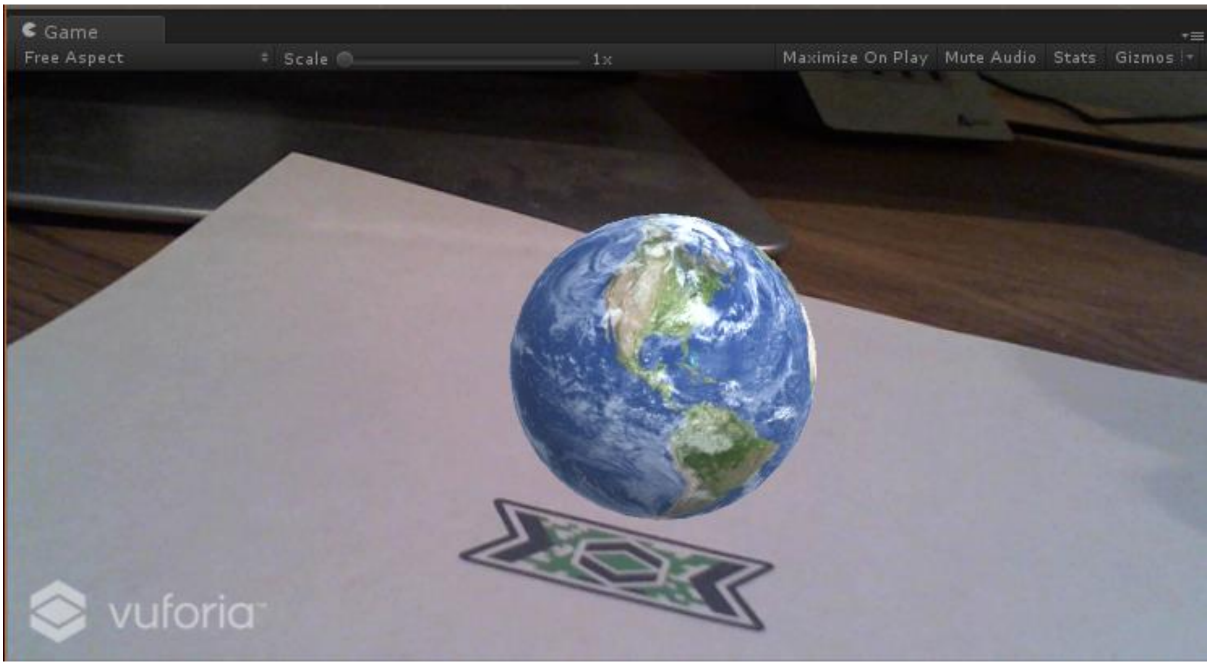
Enable Extended Track ☑

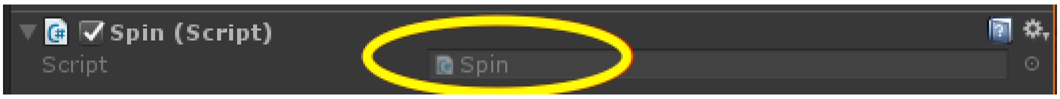

Hierarchy
Create
All
SolarSystem*
Directional Light
ARCamera
VuMark
SolarSystem
Sphere


Center
Global
Scene
Shaded
2D
Gizmos
All
y
x
z
Persp

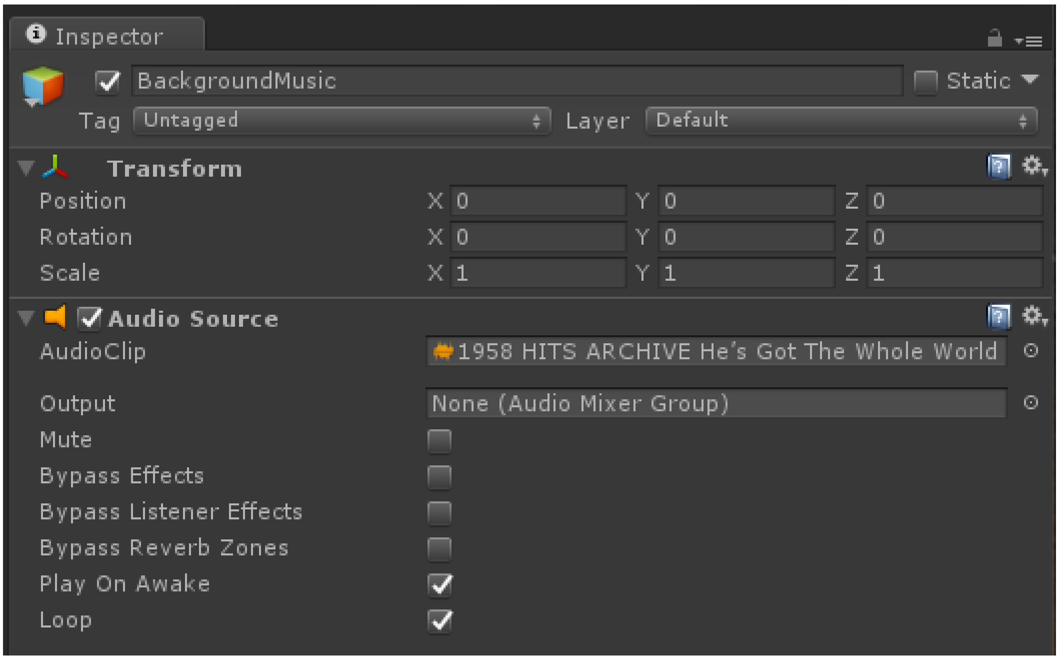





Game
Free Aspect
Scale
1x
Maximize On Play
Mute Audio
Stats
Gizmos
vuforia


Spin (Script)

Script Spin



☑ BackgroundMusic ☐ Static

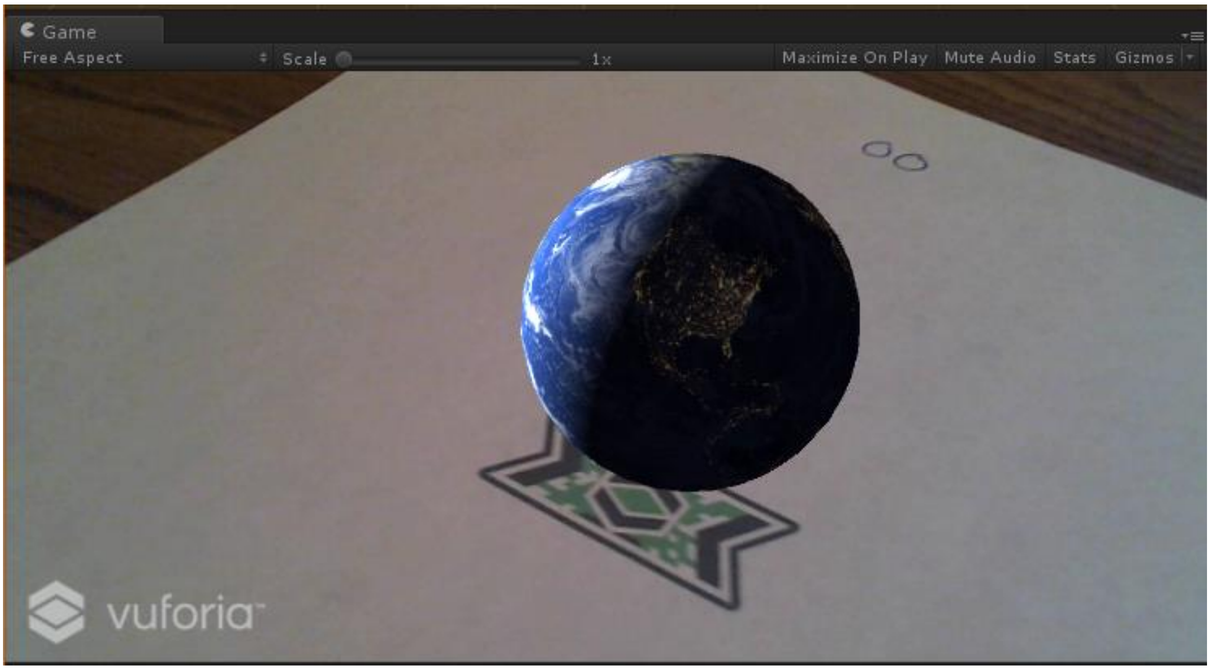
Tag Untagged Layer Default

Transform

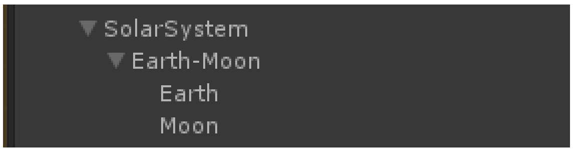
Position	X 0	Y 0	Z 0
Rotation	X 0	Y 0	Z 0
Scale	X 1	Y 1	Z 1

☑ **Audio Source**

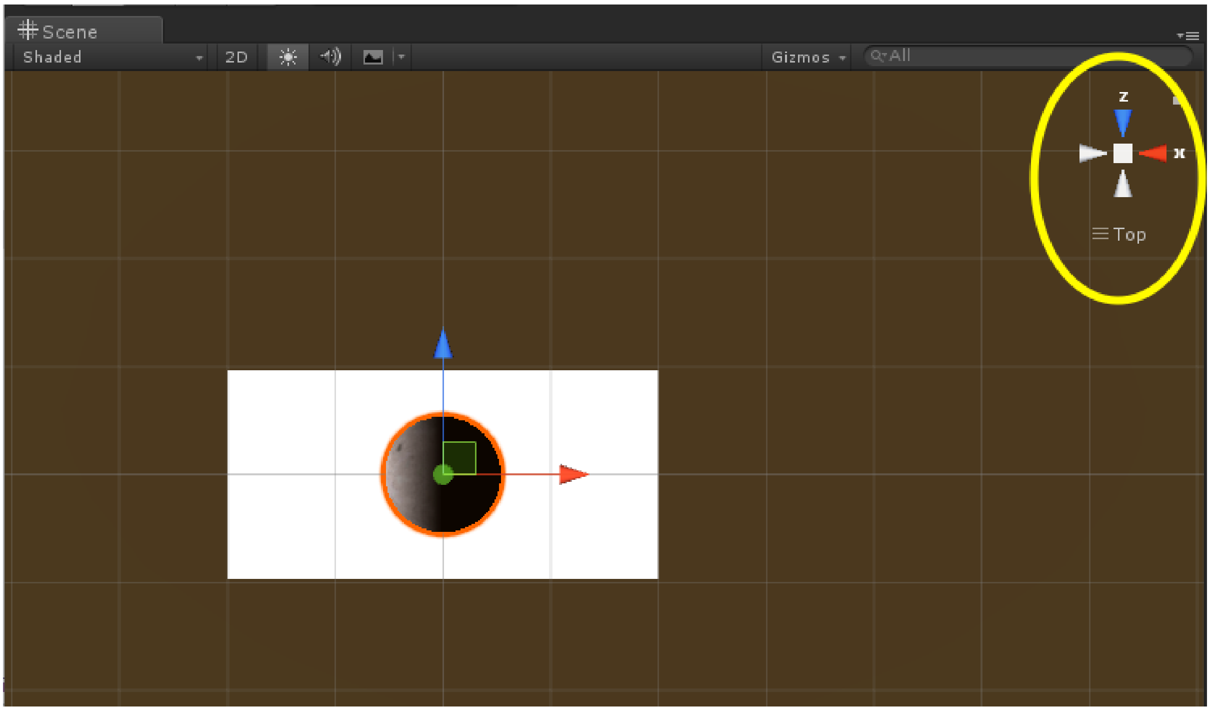
AudioClip	1958 HITS ARCHIVE He's Got The Whole World
Output	None (Audio Mixer Group)
Mute	☐
Bypass Effects	☐
Bypass Listener Effects	☐
Bypass Reverb Zones	☐
Play On Awake	☑
Loop	☑

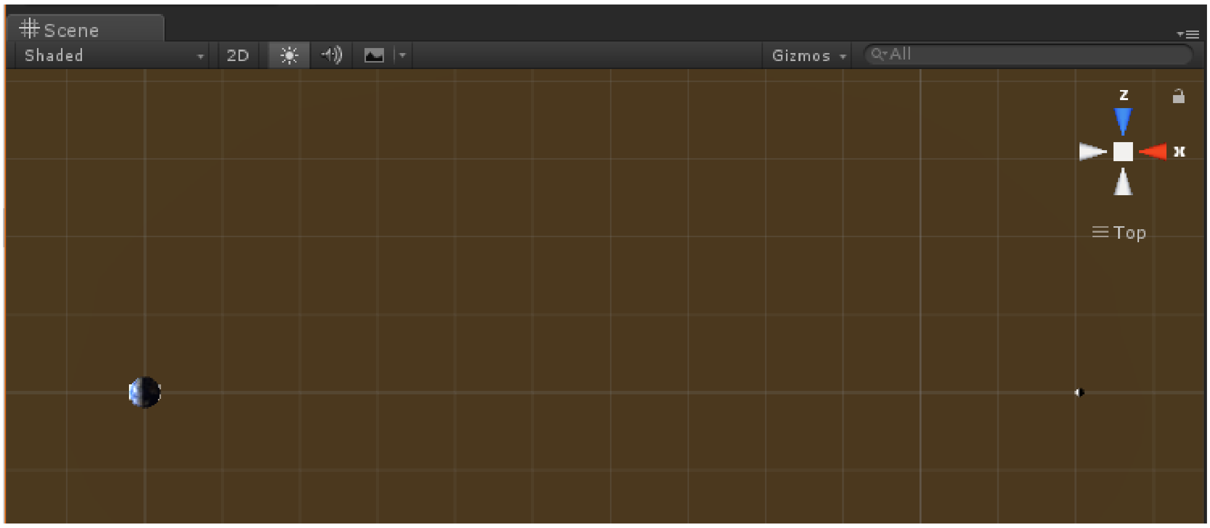


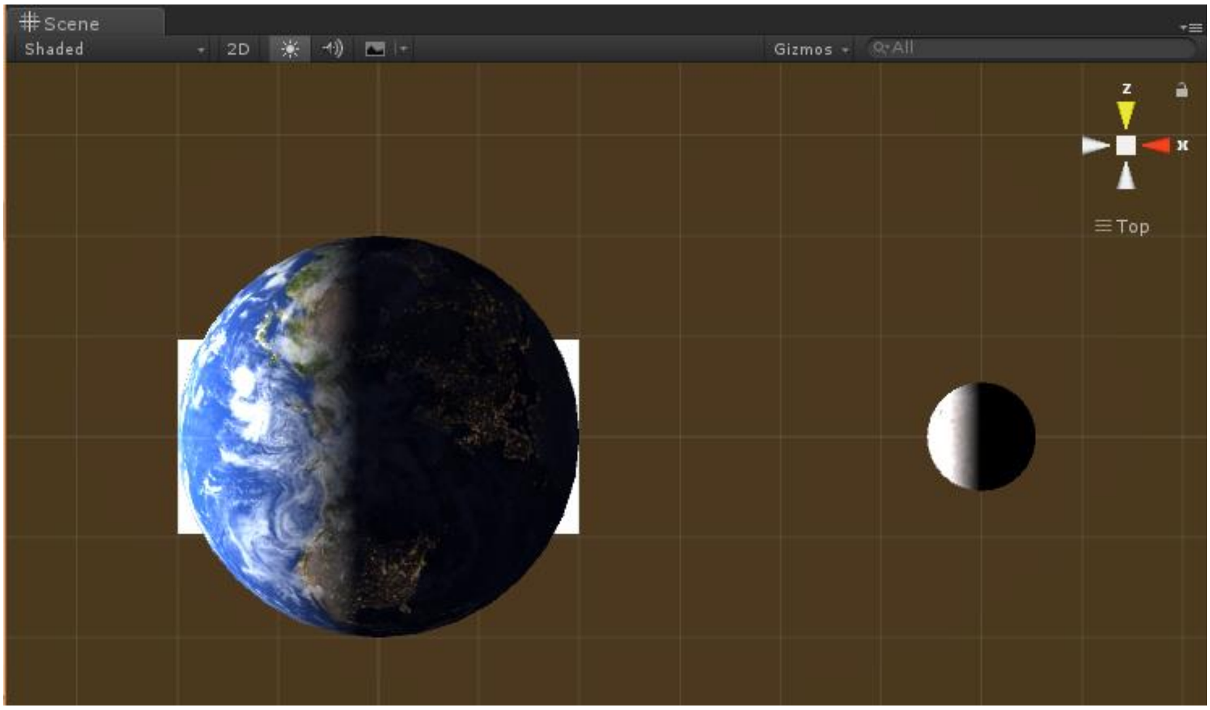
Game
Free Aspect
Scale
1x
Maximize On Play
Mute Audio
Stats
Gizmos
vuforia

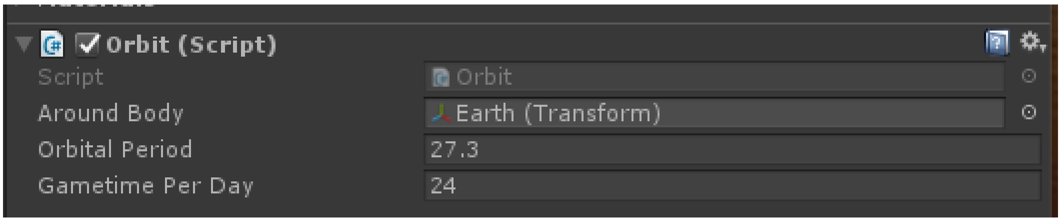


- SolarSystem
  - Earth-Moon
    - Earth
    - Moon


Scene
Shaded
2D
Gizmos
All
z
x
Top


Scene
Shaded
2D
Gizmos
All
z
x
Top


Scene
Shaded
2D
Gizmos
All
z
x
Top

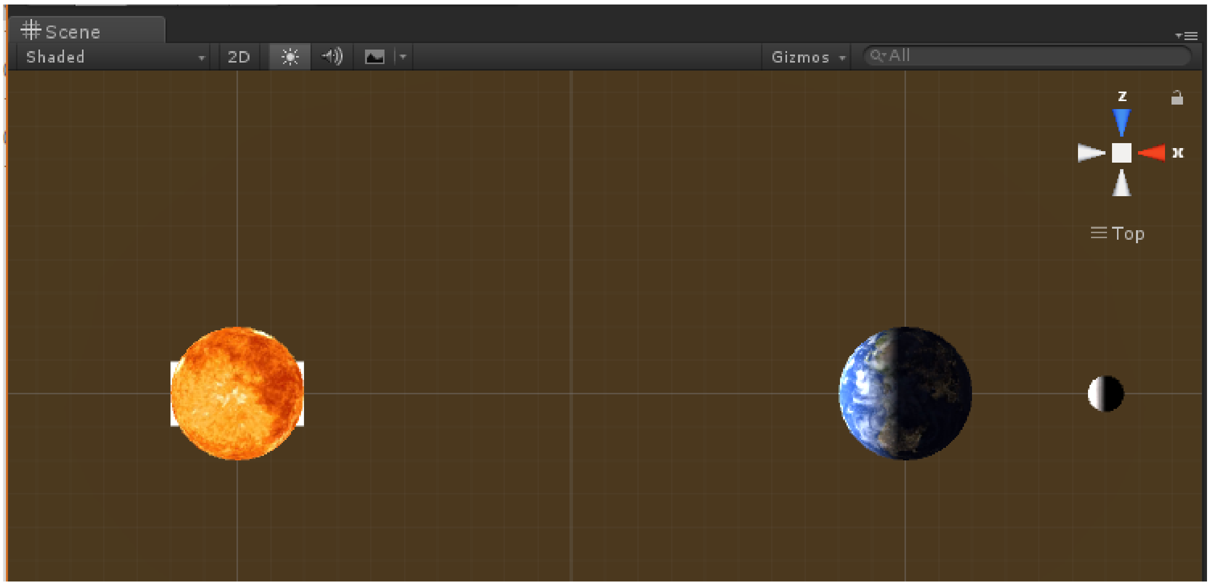

Orbit (Script)

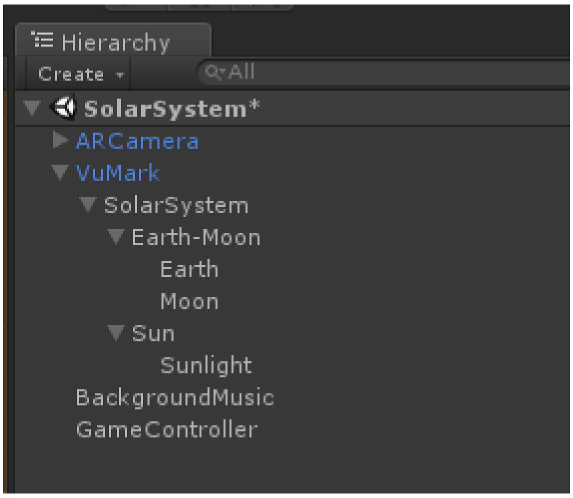
Script: Orbit

Around Body: Earth (Transform)

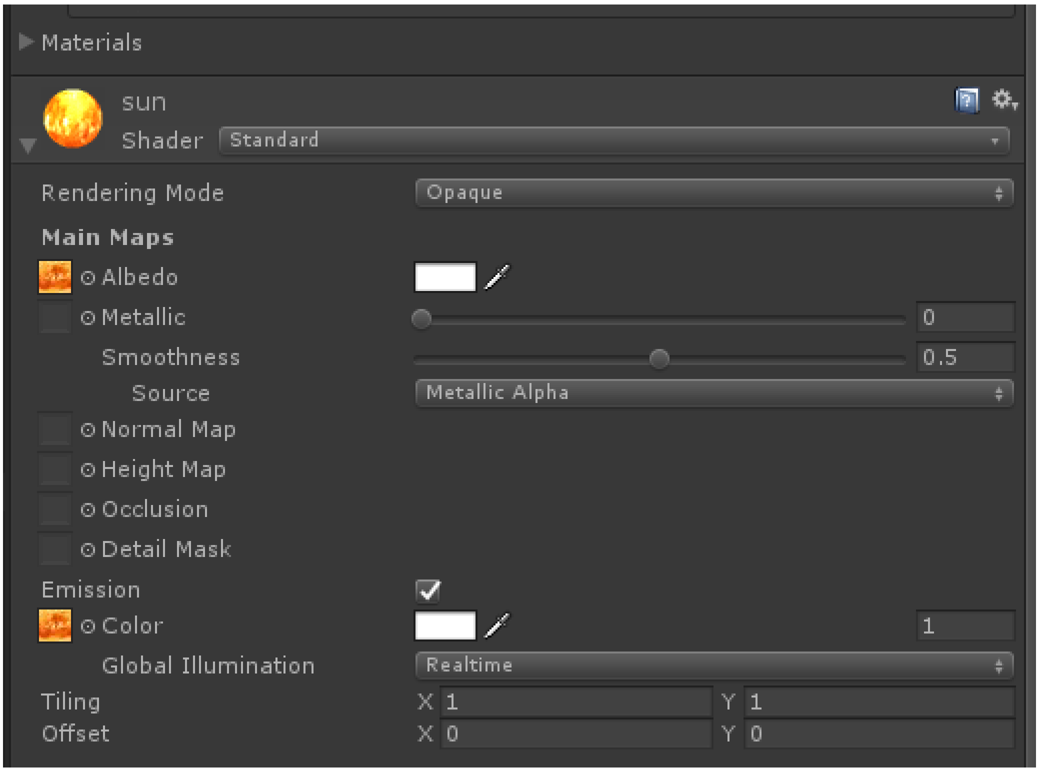
Orbital Period: 27.3

Gametime Per Day: 24


Scene
Shaded
2D
Gizmos
All
z
x
Top



- SolarSystem*
  - ARCamera
  - VuMark
    - SolarSystem
      - Earth-Moon
        - Earth
        - Moon
      - Sun
        - Sunlight
    - BackgroundMusic
    - GameController



sun

Shader: Standard

Rendering Mode: Opaque

Main Maps

Albedo

Metallic: 0

Smoothness: 0.5

Source: Metallic Alpha

Normal Map

Height Map

Occlusion

Detail Mask

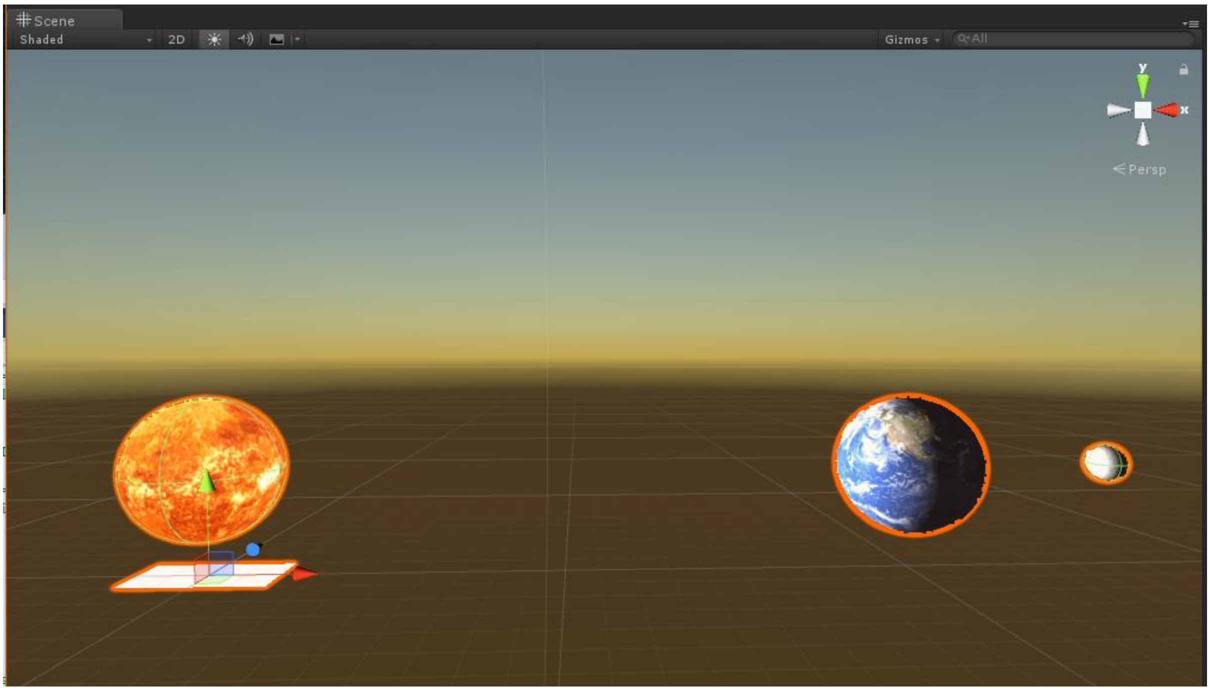
Emission ☑

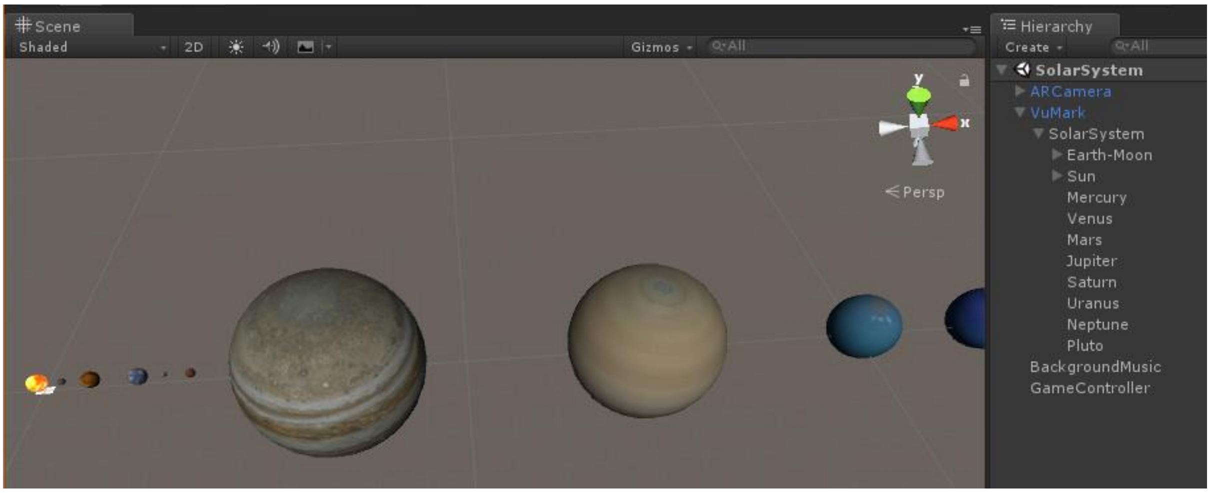
Color: 1

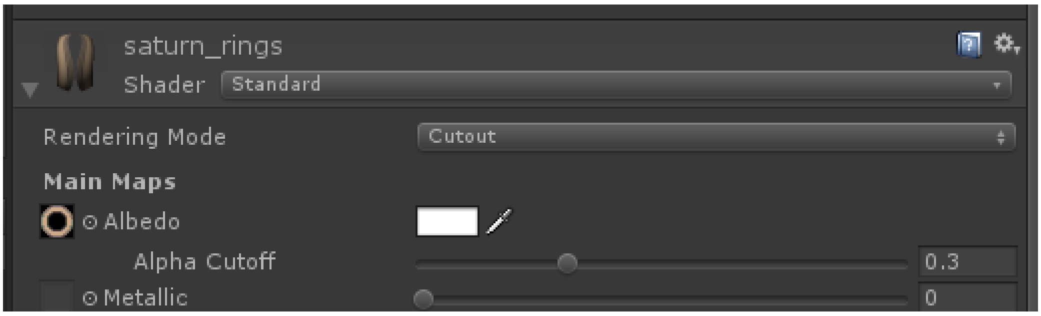
Global Illumination: Realtime

Tiling: X 1 Y 1

Offset: X 0 Y 0


Scene
Shaded
2D
Gizmos
All
y
x
Persp


Scene
Shaded
2D
Gizmos
All
y
x
Persp
Hierarchy
Create
All
SolarSystem
ARCamera
VuMark
SolarSystem
Earth-Moon
Sun
Mercury
Venus
Mars
Jupiter
Saturn
Uranus
Neptune
Pluto
BackgroundMusic
GameController


saturn_rings

Shader Standard

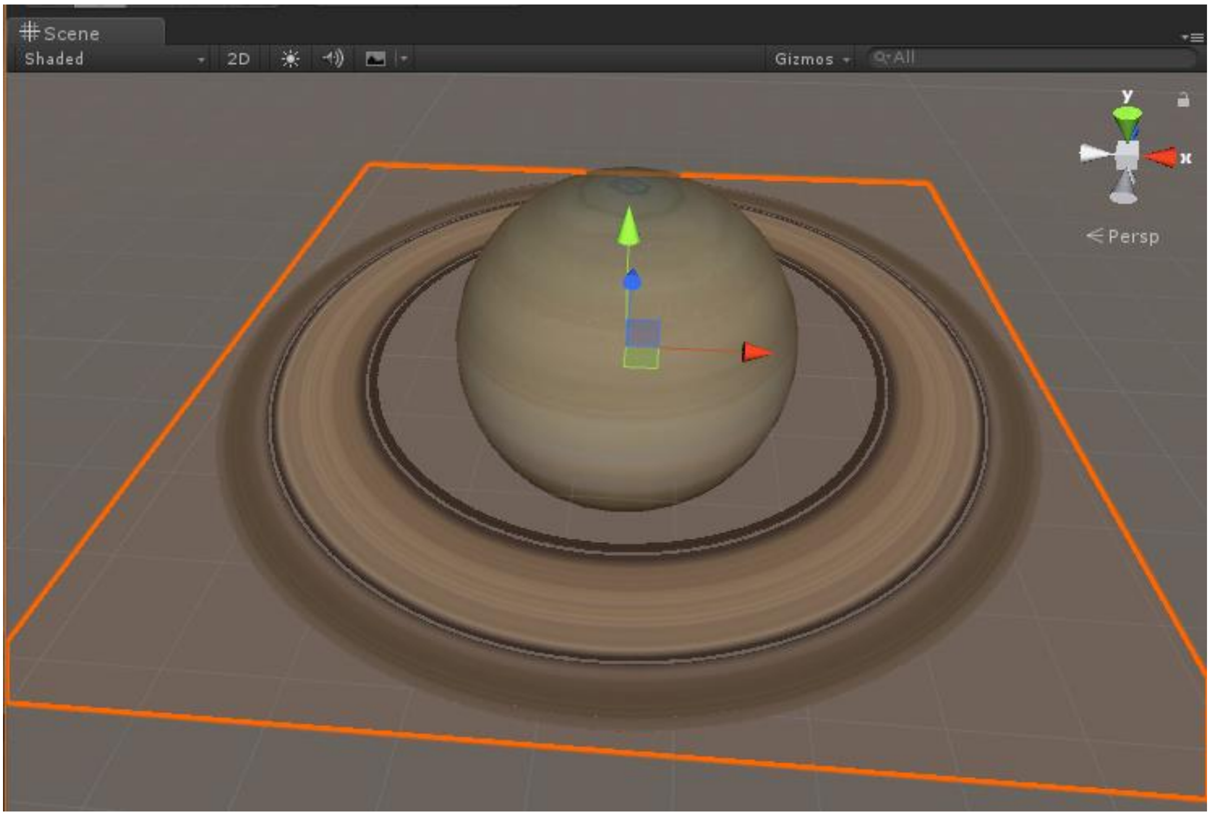
Rendering Mode Cutout

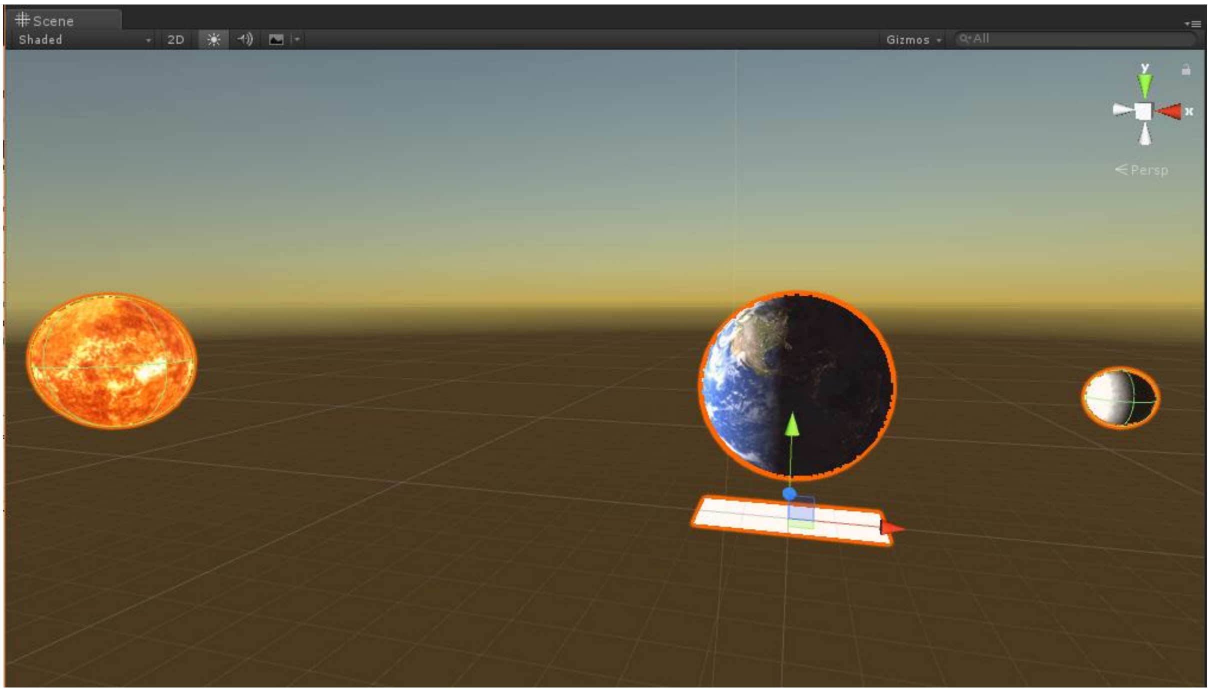
Main Maps

Albedo

Alpha Cutoff 0.3

Metallic 0


Scene
Shaded
2D
Gizmos
All
y
x
Persp


Scene
Shaded
2D
Gizmos
All
y
x
Persp

SOLAR SYSTEM

MERCURY

Diameter: 4879 km
Distance from Sun: 57.9 million km
Length of day: 4222.6 hours
Length of year: 88.0 days

VENUS

Diameter: 12,104 km
Distance from Sun: 108.2 million km
Length of day: 2802.0 hours
Length of year: 224.7 days

EARTH

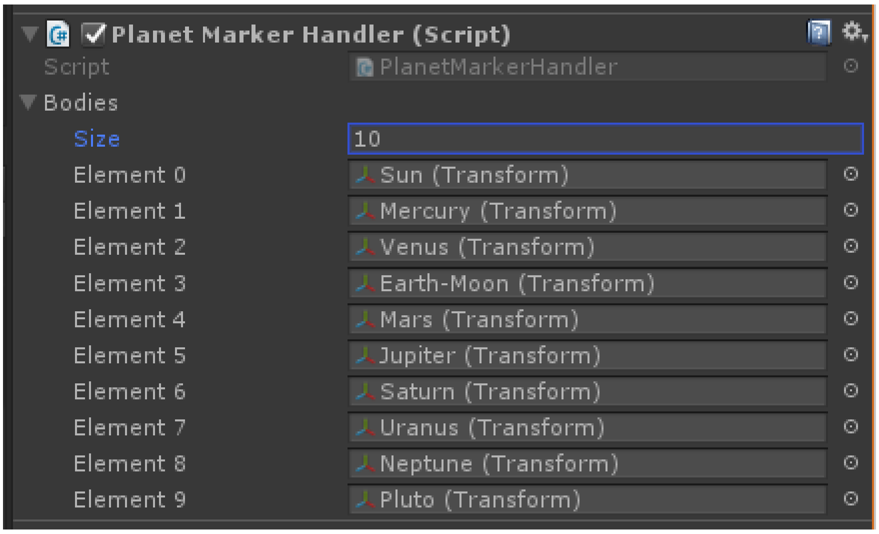
Diameter: 12,756 km
Distance from Sun: 149.6 million km
Length of day: 24 hours
Length of year: 365.25 days

MARS

Diameter: 6792 km
Distance from Sun: 227.9 million km
Length of day: 24.7 hours
Length of year: 687.0 days

JUPITER

Diameter: 142,984 km
Distance from Sun: 778.6 million km
Length of day: 9.9 hours
Length of year: 4331 days



Planet Marker Handler (Script)

Script: PlanetMarkerHandler

Bodies

Size: 10

Element 0: Sun (Transform)

Element 1: Mercury (Transform)

Element 2: Venus (Transform)

Element 3: Earth-Moon (Transform)

Element 4: Mars (Transform)

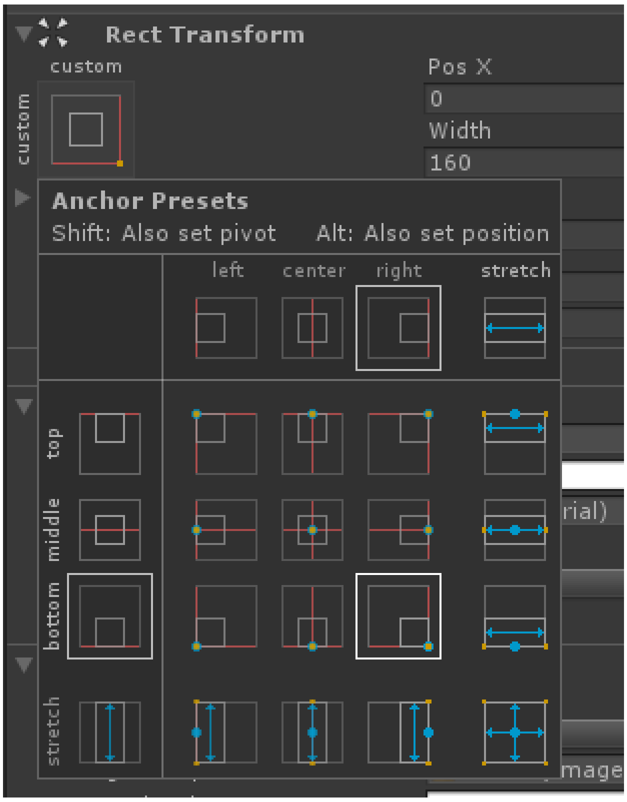
Element 5: Jupiter (Transform)

Element 6: Saturn (Transform)

Element 7: Uranus (Transform)

Element 8: Neptune (Transform)

Element 9: Pluto (Transform)



Rect Transform

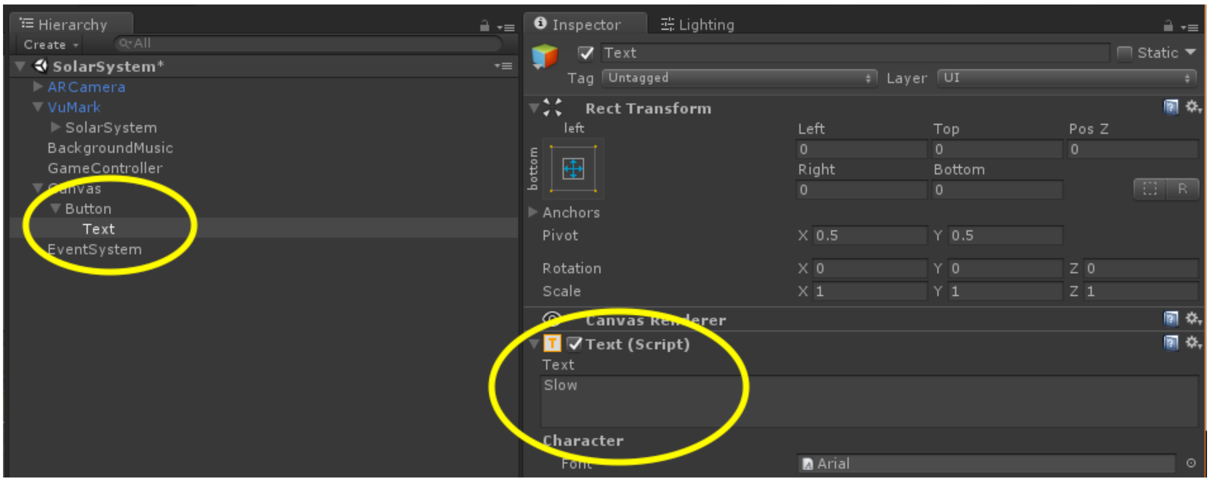
Pos X: 0

Width: 160

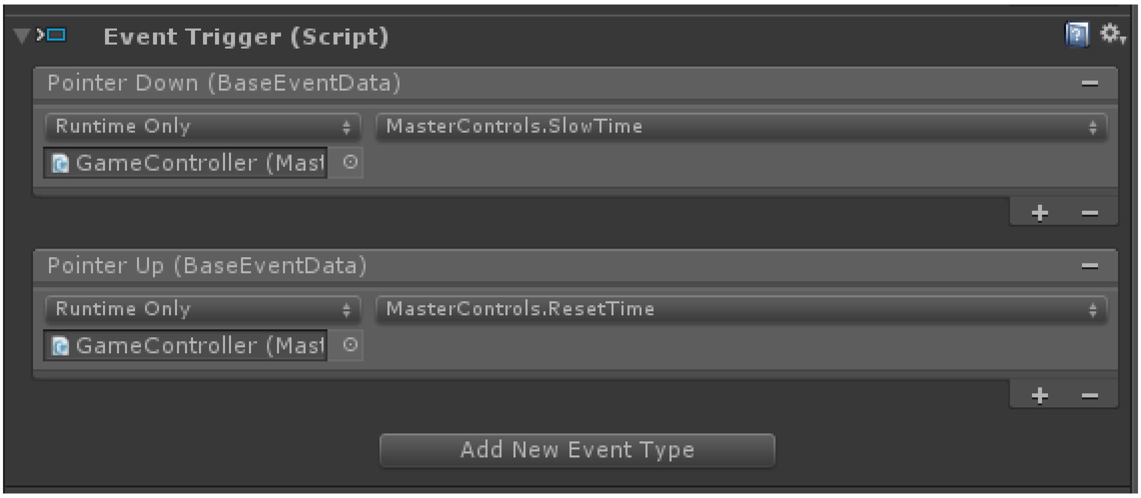
Anchor Presets

Shift: Also set pivot   Alt: Also set position

custom
custom
left
center
right
stretch
top
middle
bottom
stretch
rial)
mage

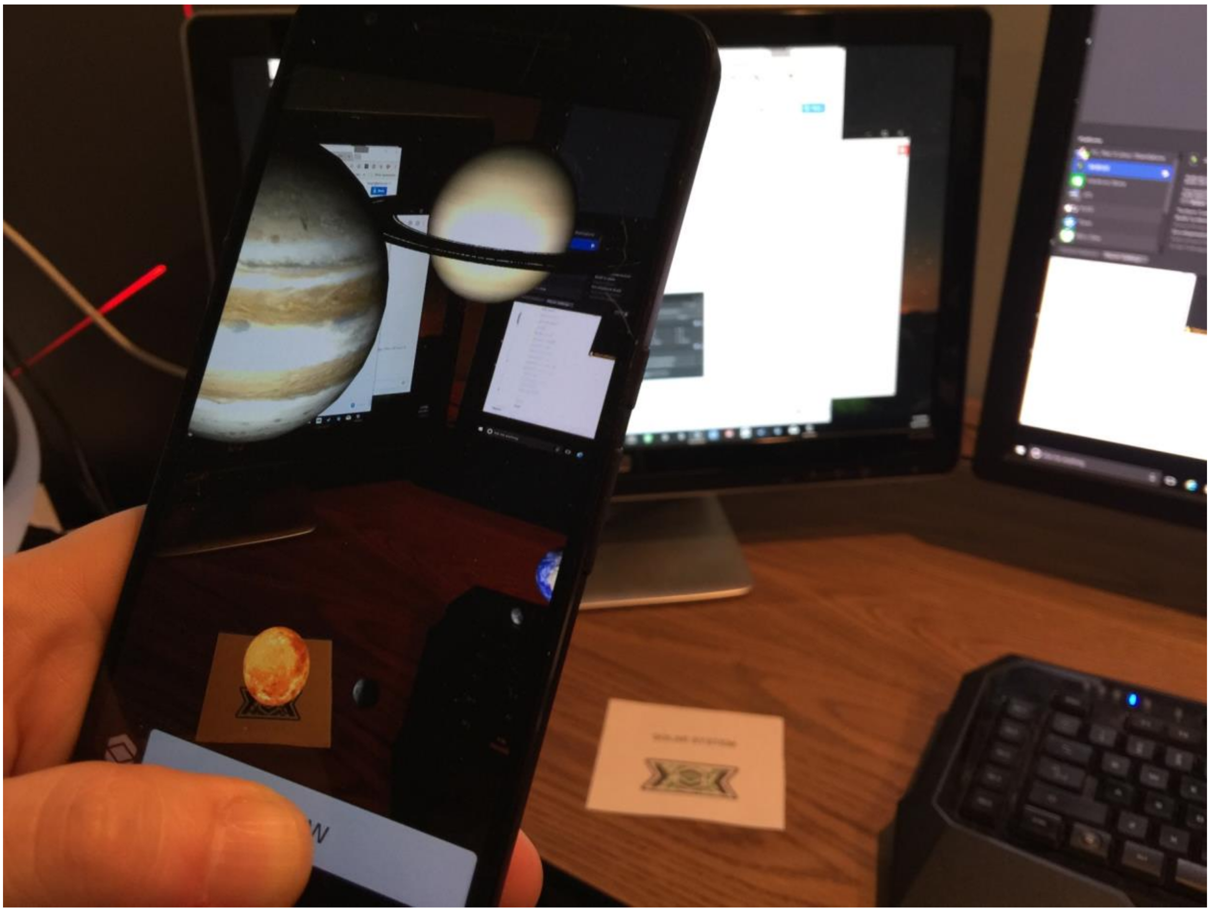

Hierarchy
Create
All
SolarSystem*
ARCamera
VuMark
SolarSystem
BackgroundMusic
GameController
Canvas
Button
Text
EventSystem
Inspector
Lighting
Static
Rect Transform
left
bottom
Anchors
Canvas Renderer
Text (Script)
Character

Text
Tag: Untagged
Layer: UI
Left: 0
Top: 0
Pos Z: 0
Right: 0
Bottom: 0
Pivot: X 0.5 Y 0.5
Rotation: X 0 Y 0 Z 0
Scale: X 1 Y 1 Z 1
Text: Slow
Font: Arial

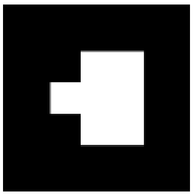

Event Trigger (Script)
Add New Event Type

Pointer Down (BaseEventData)
Runtime Only — MasterControls.SlowTime
GameController (Mast

Pointer Up (BaseEventData)
Runtime Only — MasterControls.ResetTime
GameController (Mast



SOLAR SYSTEM



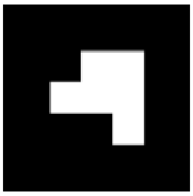
MERCURY

Diameter: 4879 km

Distance from Sun: 57.9 million km

Length of day: 4222.6 hours

Length of year: 88.0 days



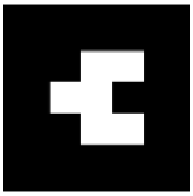
VENUS

Diameter: 12,104 km

Distance from Sun: 108.2 million km

Length of day: 2802.0 hours

Length of year: 224.7 days



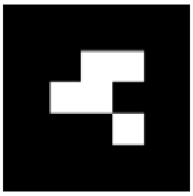
EARTH

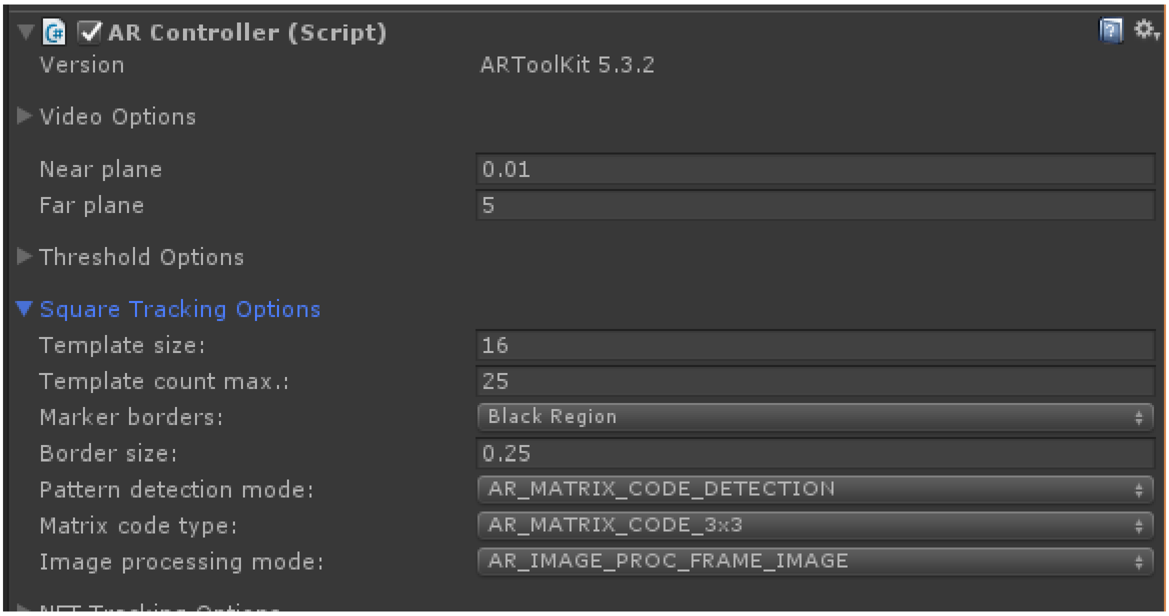
Diameter: 12,756 km

Distance from Sun: 149.6 million km

Length of day: 24 hours

Length of year: 365.25 days





AR Controller (Script)

Version ARToolKit 5.3.2

Near plane 0.01

Far plane 5

Template size: 16

Template count max.: 25

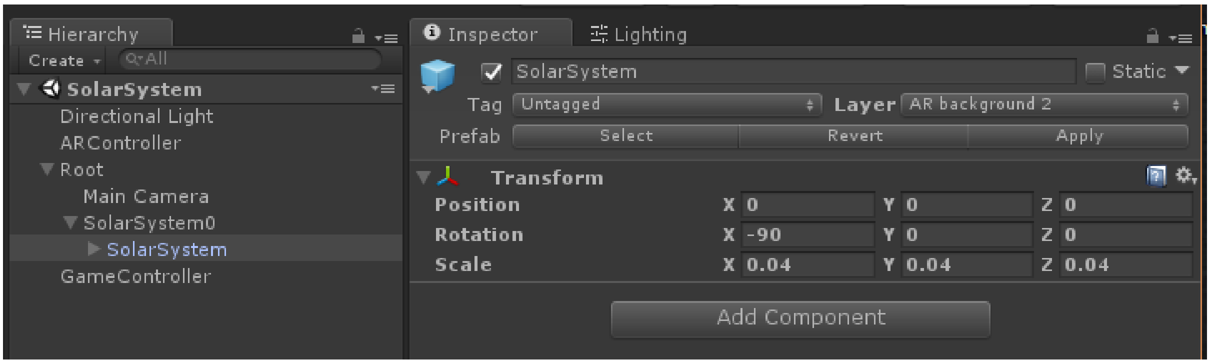
Marker borders: Black Region

Border size: 0.25

Pattern detection mode: AR_MATRIX_CODE_DETECTION

Matrix code type: AR_MATRIX_CODE_3x3

Image processing mode: AR_IMAGE_PROC_FRAME_IMAGE


Hierarchy
Create
All
Inspector
Lighting
Select
Revert
Apply
Add Component

- SolarSystem
  - Directional Light
  - ARController
  - Root
    - Main Camera
    - SolarSystem0
      - SolarSystem
  - GameController

SolarSystem ☑ ☐ Static

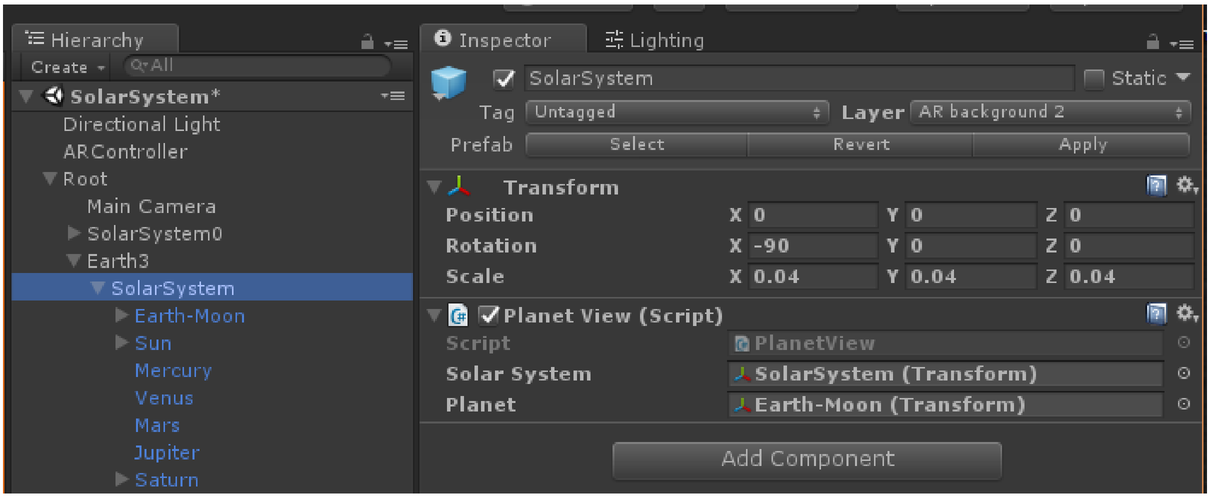
Tag: Untagged

Layer: AR background 2

Prefab

Transform

	X	Y	Z
Position	0	0	0
Rotation	-90	0	0
Scale	0.04	0.04	0.04


Hierarchy
Create
All
Inspector
Lighting
Select
Revert
Apply
Add Component

- SolarSystem*
  - Directional Light
  - ARController
  - Root
    - Main Camera
    - SolarSystem0
    - Earth3
      - SolarSystem
        - Earth-Moon
        - Sun
        - Mercury
        - Venus
        - Mars
        - Jupiter
        - Saturn

SolarSystem ☑ ☐ Static

Tag: Untagged

Layer: AR background 2

Prefab

Transform

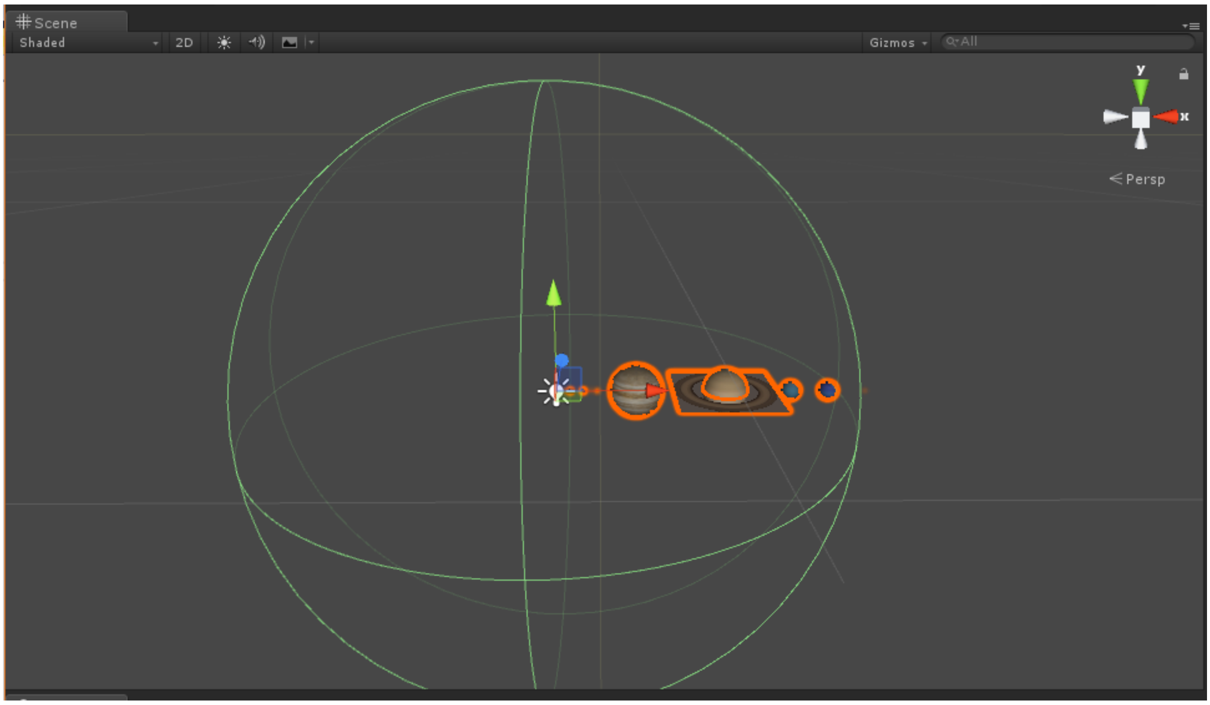
	X	Y	Z
Position	0	0	0
Rotation	-90	0	0
Scale	0.04	0.04	0.04

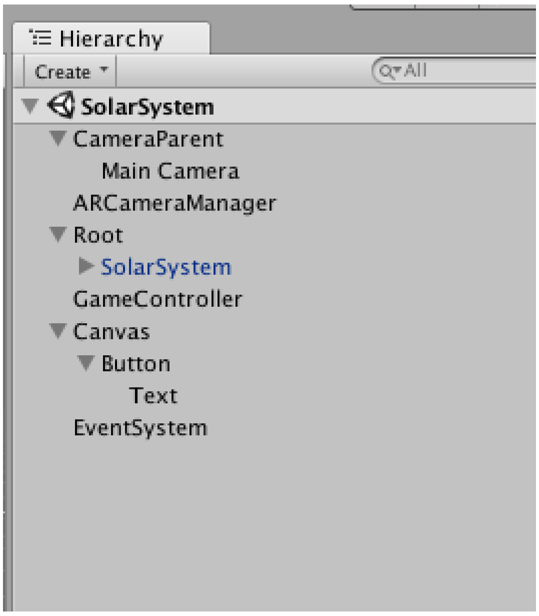
☑ Planet View (Script)

Script: PlanetView

Solar System: SolarSystem (Transform)

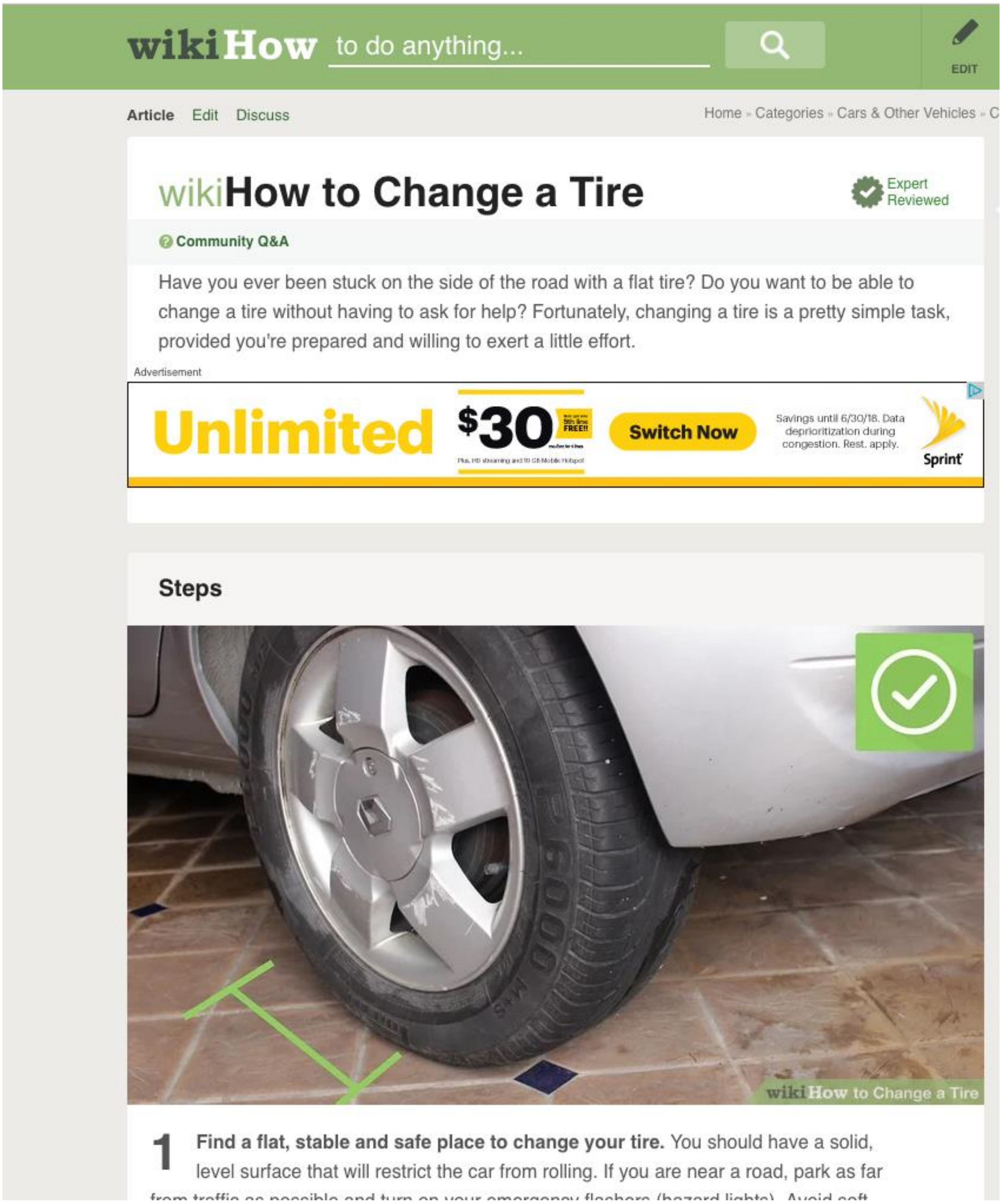
Planet: Earth-Moon (Transform)


Scene
Shaded
2D
Gizmos
All
y
x
Persp


Hierarchy
Create
All

```
▼ SolarSystem
  ▼ CameraParent
      Main Camera
    ARCameraManager
  ▼ Root
    ▶ SolarSystem
    GameController
  ▼ Canvas
    ▼ Button
        Text
    EventSystem
```

Chapter 6: How to Change a Flat Tire


wikiHow
to do anything...
EDIT
Article
Edit
Discuss
Home » Categories » Cars & Other Vehicles » C

wikiHow to Change a Tire

Expert Reviewed
Community Q&A

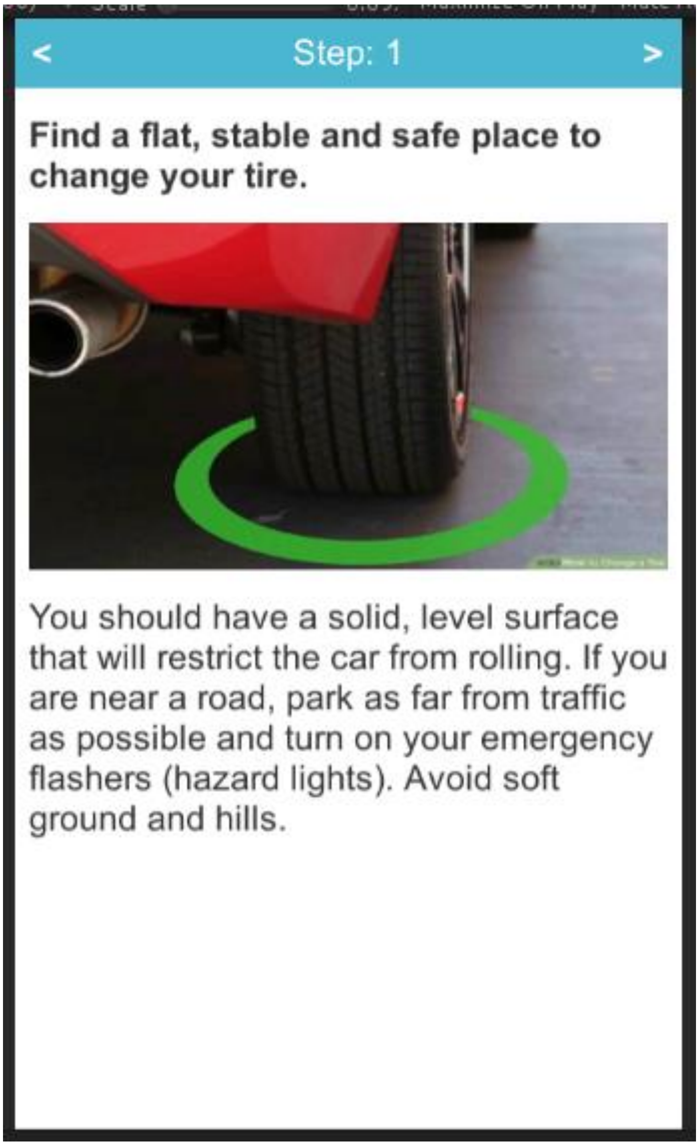
Have you ever been stuck on the side of the road with a flat tire? Do you want to be able to change a tire without having to ask for help? Fortunately, changing a tire is a pretty simple task, provided you're prepared and willing to exert a little effort.

Advertisement
Unlimited $30 Switch Now
Savings until 6/30/18. Data deprioritization during congestion. Rest. apply.
Sprint

Steps

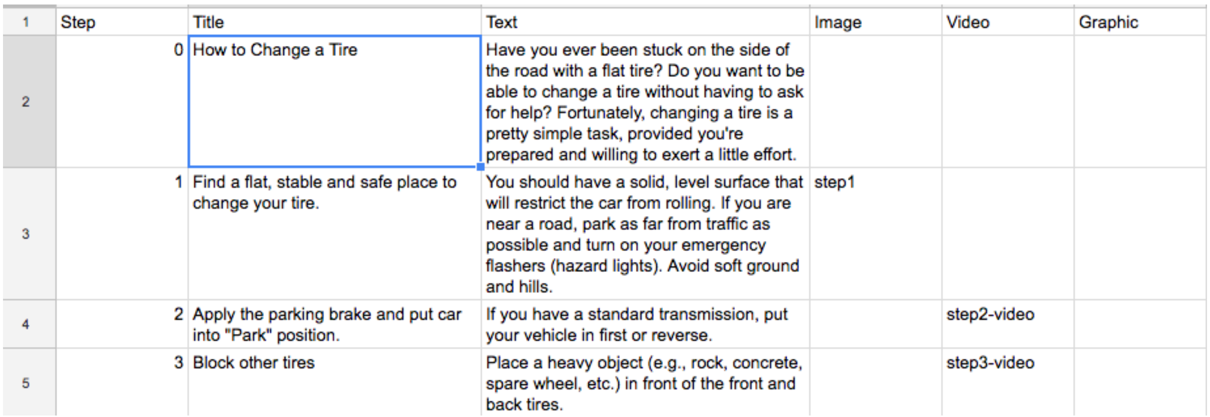
wikiHow to Change a Tire

1 **Find a flat, stable and safe place to change your tire.** You should have a solid, level surface that will restrict the car from rolling. If you are near a road, park as far from traffic as possible and turn on your emergency flashers (hazard lights). Avoid soft

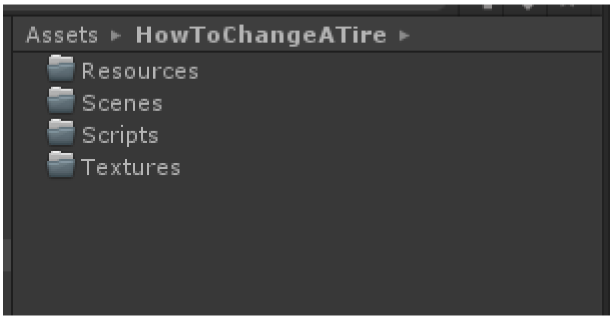


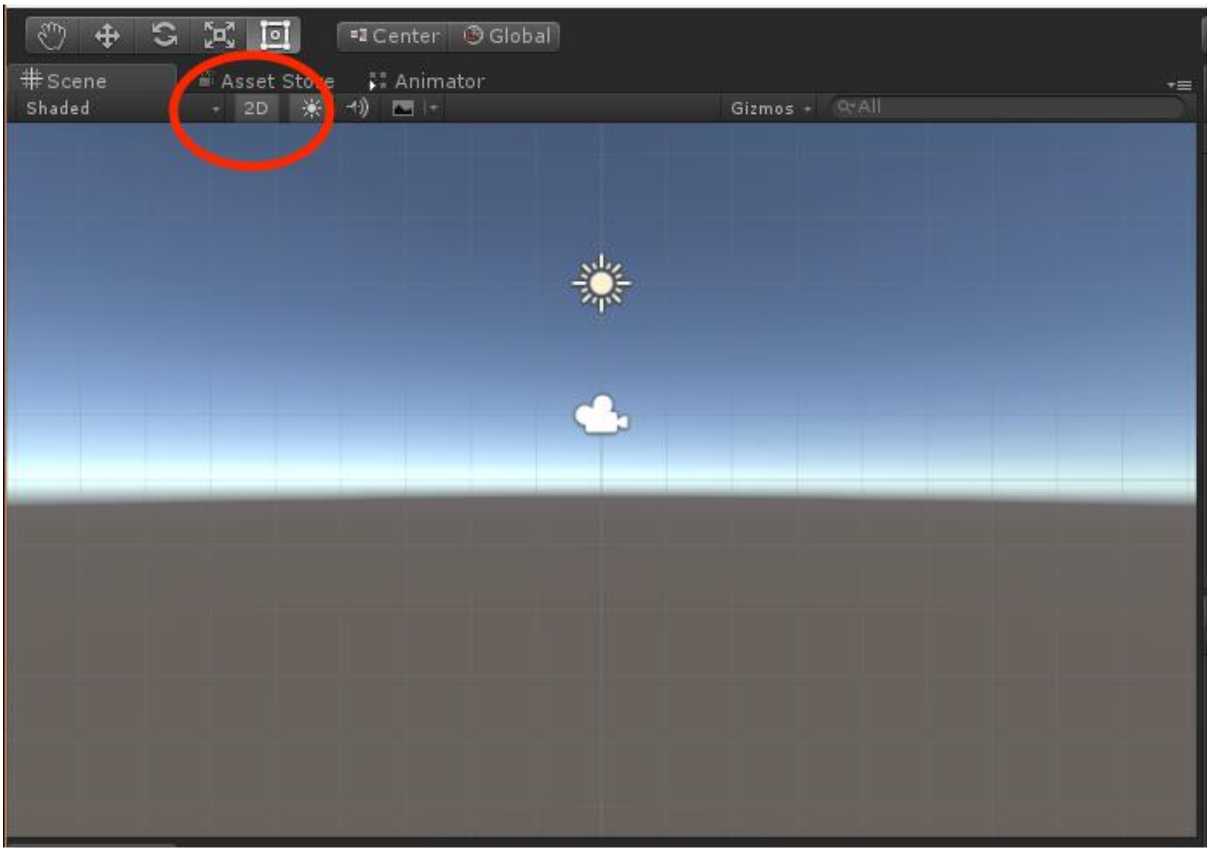
Find a flat, stable and safe place to change your tire.

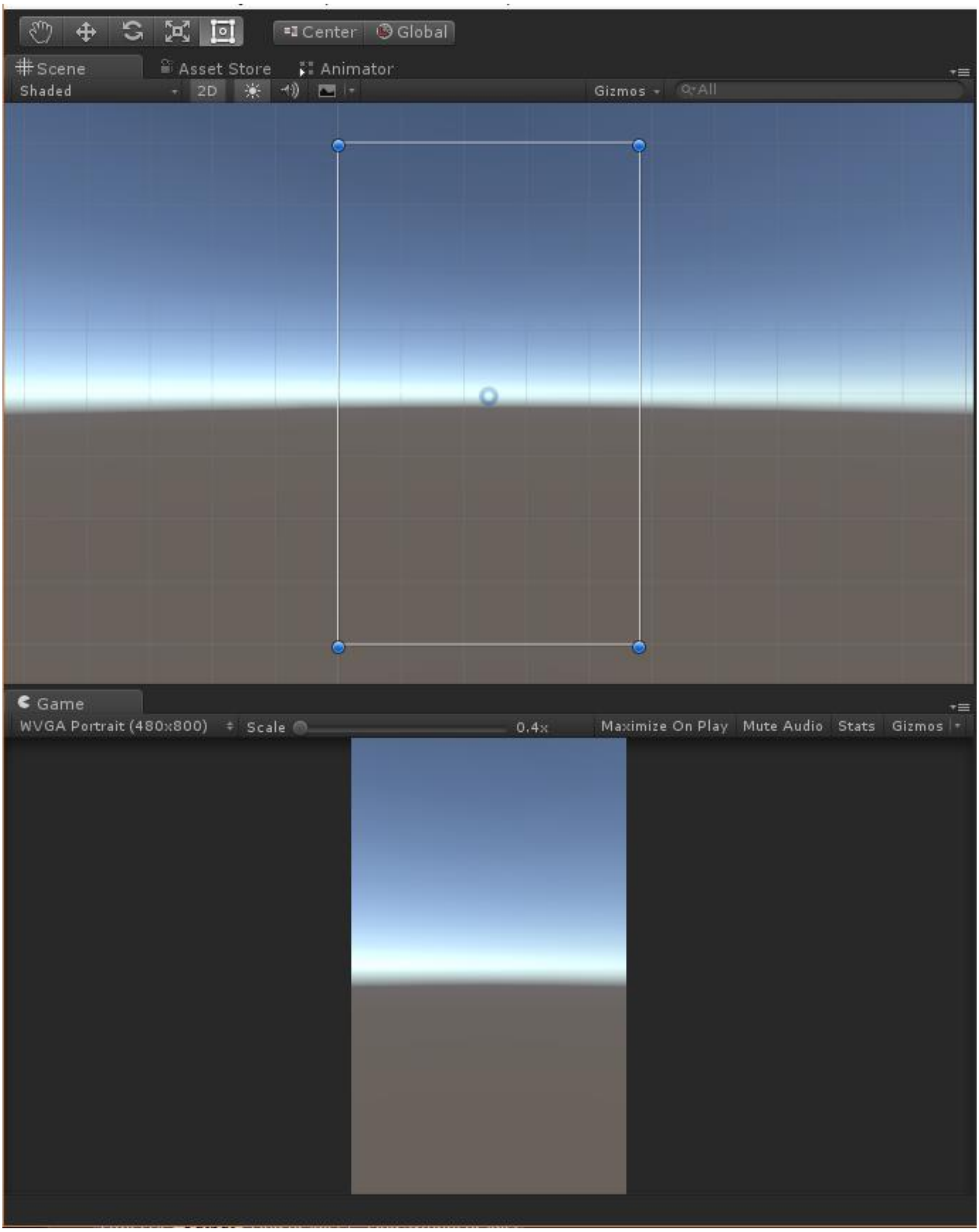
You should have a solid, level surface that will restrict the car from rolling. If you are near a road, park as far from traffic as possible and turn on your emergency flashers (hazard lights). Avoid soft ground and hills.

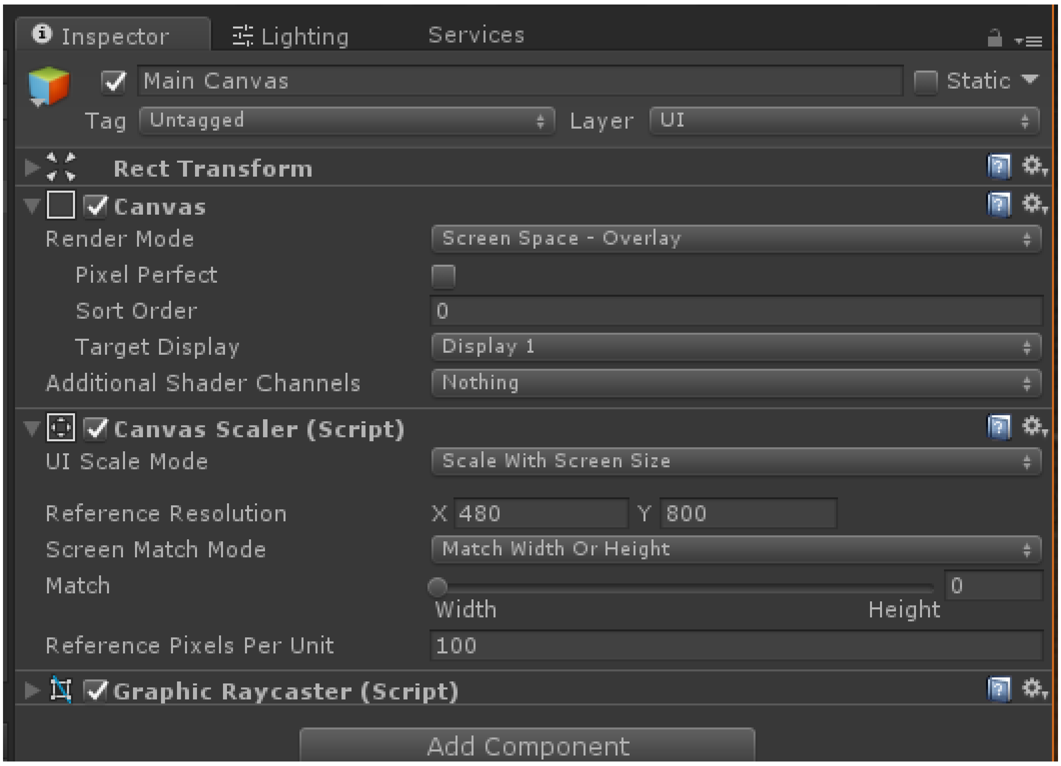


1	Step	Title	Text	Image	Video	Graphic
2	0	How to Change a Tire	Have you ever been stuck on the side of the road with a flat tire? Do you want to be able to change a tire without having to ask for help? Fortunately, changing a tire is a pretty simple task, provided you're prepared and willing to exert a little effort.			
3	1	Find a flat, stable and safe place to change your tire.	You should have a solid, level surface that will restrict the car from rolling. If you are near a road, park as far from traffic as possible and turn on your emergency flashers (hazard lights). Avoid soft ground and hills.	step1		
4	2	Apply the parking brake and put car into "Park" position.	If you have a standard transmission, put your vehicle in first or reverse.		step2-video	
5	3	Block other tires	Place a heavy object (e.g., rock, concrete, spare wheel, etc.) in front of the front and back tires.		step3-video	


Assets ▸ HowToChangeATire ▸
Resources
Scenes
Scripts
Textures


Center
Global
Scene
Asset Store
Animator
Shaded
2D
Gizmos
All


Center
Global
Scene
Asset Store
Animator
Shaded
2D
Gizmos
All
Game
WVGA Portrait (480x800)
Scale
0.4x
Maximize On Play
Mute Audio
Stats
Gizmos


Inspector
Lighting
Services
Add Component

☑ Main Canvas ☐ Static

Tag Untagged Layer UI

Rect Transform

☑ **Canvas**

Render Mode: Screen Space - Overlay

Pixel Perfect ☐

Sort Order 0

Target Display: Display 1

Additional Shader Channels: Nothing

☑ **Canvas Scaler (Script)**

UI Scale Mode: Scale With Screen Size

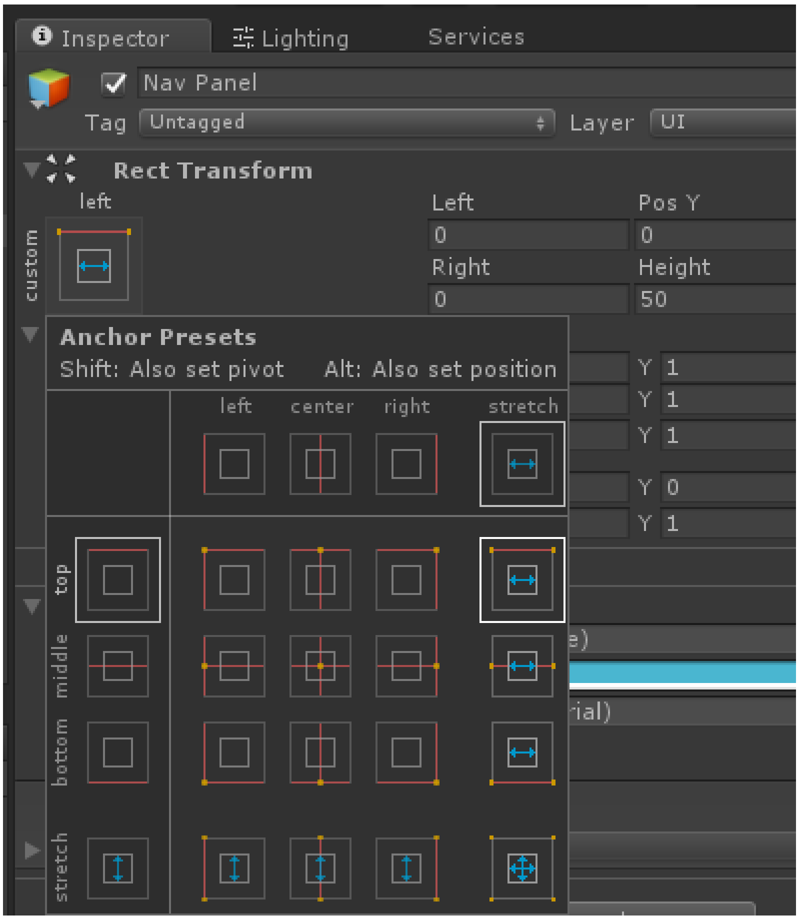
Reference Resolution X 480 Y 800

Screen Match Mode: Match Width Or Height

Match 0 (Width — Height)

Reference Pixels Per Unit 100

☑ **Graphic Raycaster (Script)**


Inspector
Lighting
Services
custom
left
center
right
stretch
top
middle
bottom
stretch
e)
ial)

☑ Nav Panel

Tag Untagged Layer UI

Rect Transform

left

Left 0 Pos Y 0

Right 0 Height 50

Anchor Presets

Shift: Also set pivot Alt: Also set position

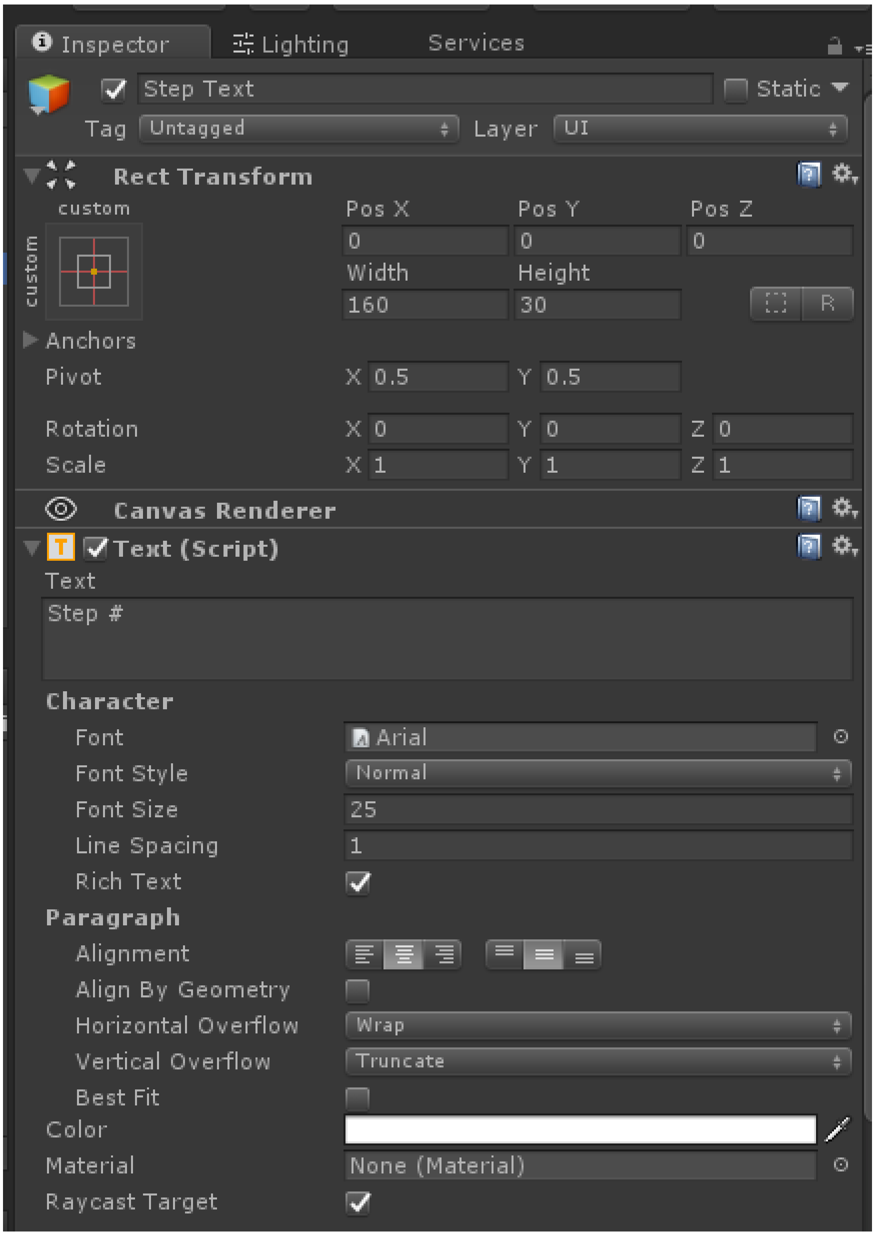
Y 1

Y 1

Y 1

Y 0

Y 1


Inspector
Lighting
Services
Rect Transform
Canvas Renderer
Text (Script)
Character
Paragraph

☑ Step Text ☐ Static
Tag Untagged Layer UI

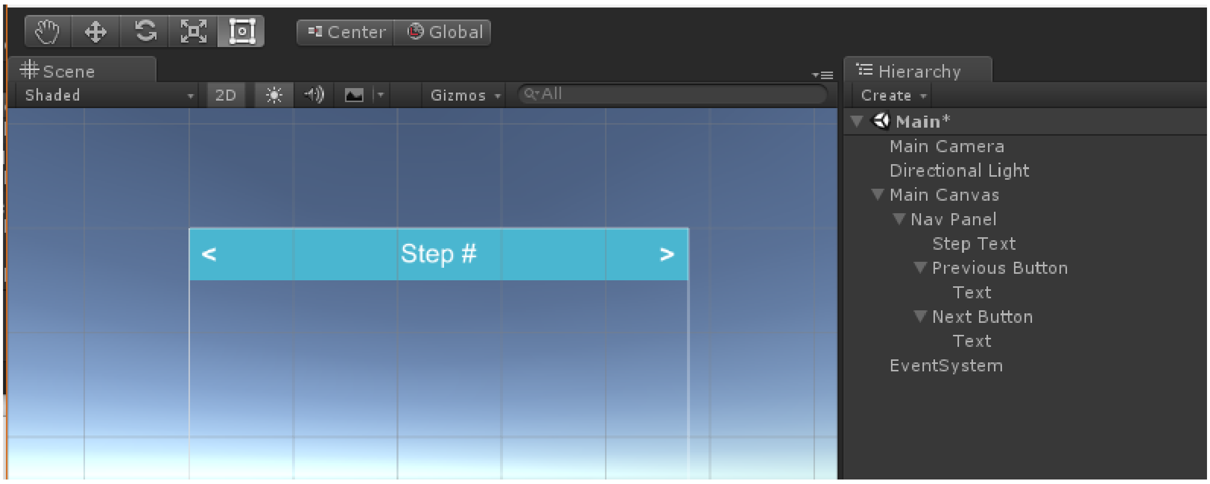
Rect Transform
custom
Pos X 0 Pos Y 0 Pos Z 0
Width 160 Height 30
Anchors
Pivot X 0.5 Y 0.5
Rotation X 0 Y 0 Z 0
Scale X 1 Y 1 Z 1

Canvas Renderer

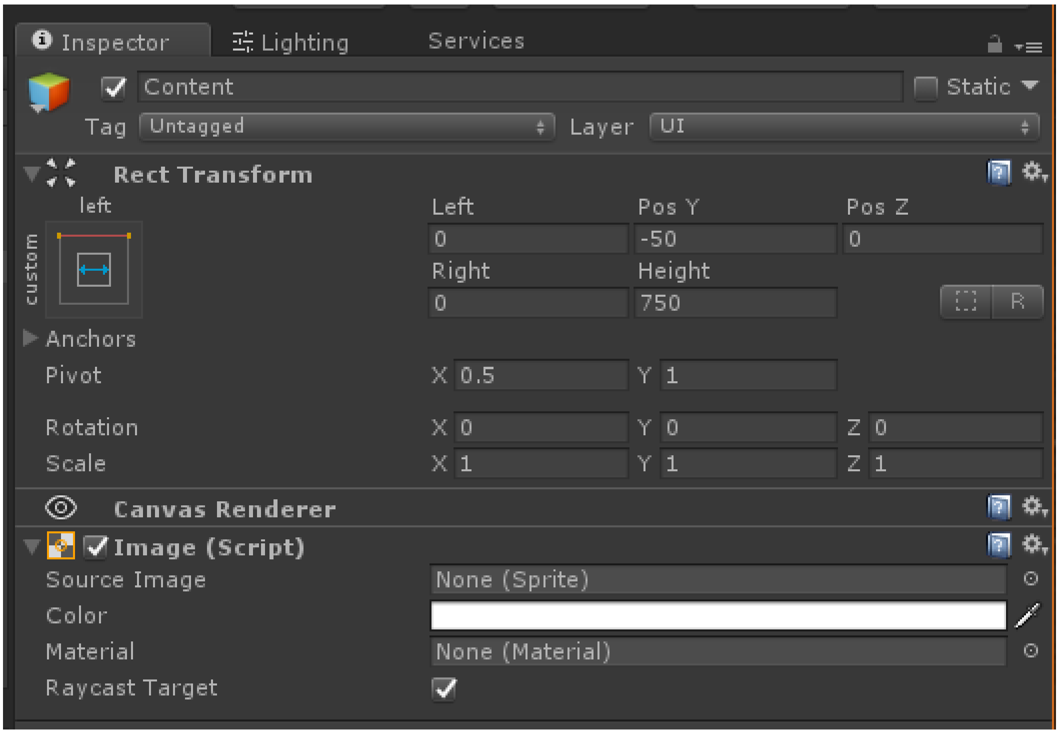
☑ Text (Script)
Text
Step #

Character
Font Arial
Font Style Normal
Font Size 25
Line Spacing 1
Rich Text ☑

Paragraph
Alignment
Align By Geometry ☐
Horizontal Overflow Wrap
Vertical Overflow Truncate
Best Fit ☐
Color
Material None (Material)
Raycast Target ☑


Center
Global
Scene
Shaded
2D
Gizmos
All
<
Step #
>
Hierarchy
Create

Main*
- Main Camera
- Directional Light
- Main Canvas
  - Nav Panel
    - Step Text
    - Previous Button
      - Text
    - Next Button
      - Text
- EventSystem



Inspector
Lighting
Services
Static

Content

Tag Untagged Layer UI

Rect Transform

custom left

Left 0 Pos Y -50 Pos Z 0

Right 0 Height 750

Anchors

Pivot X 0.5 Y 1

Rotation X 0 Y 0 Z 0

Scale X 1 Y 1 Z 1

Canvas Renderer

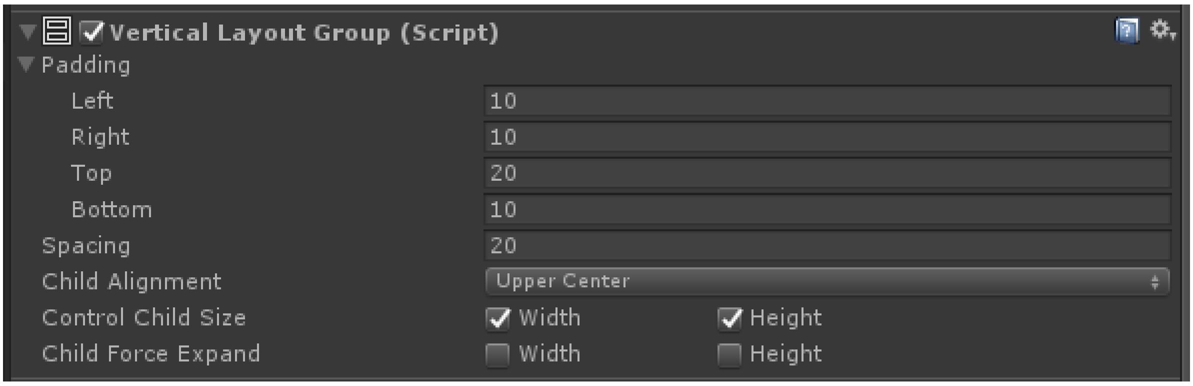
Image (Script)

Source Image None (Sprite)

Color

Material None (Material)

Raycast Target ☑



Vertical Layout Group (Script)

Padding

Left 10

Right 10

Top 20

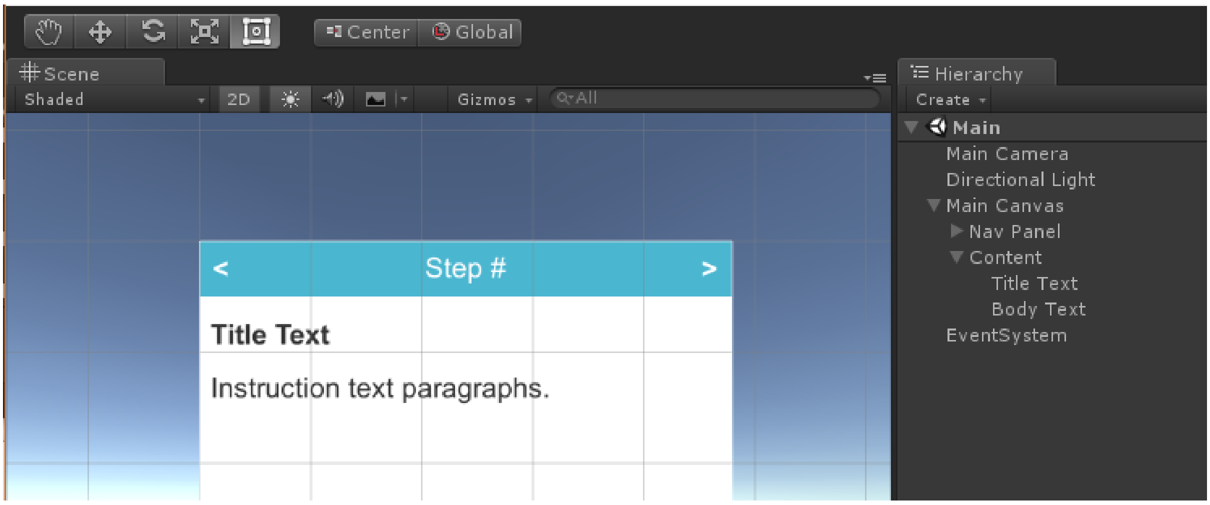
Bottom 10

Spacing 20

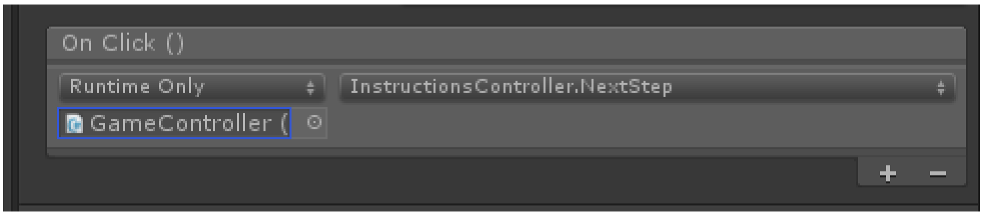
Child Alignment Upper Center

Control Child Size ☑ Width ☑ Height

Child Force Expand ☐ Width ☐ Height

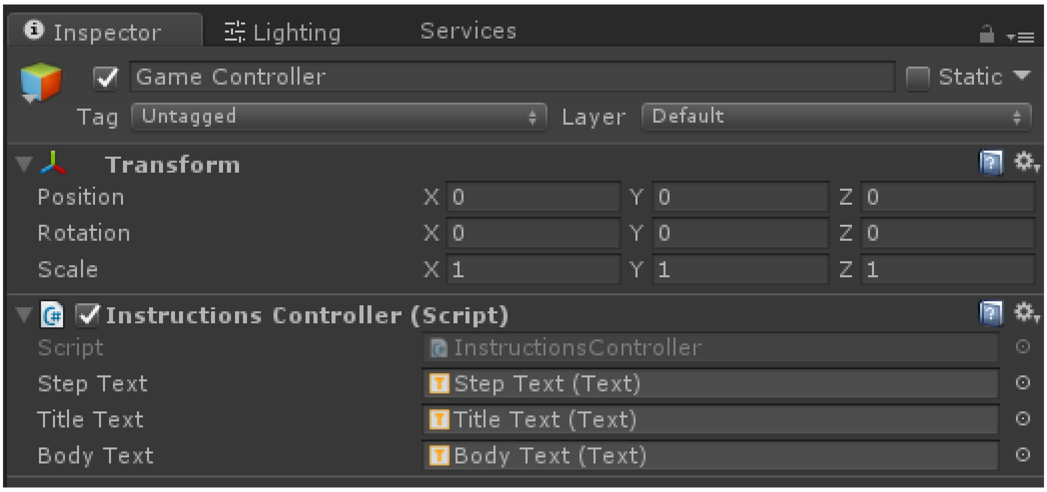


Center
Global
Scene
Shaded
2D
Gizmos
All
Hierarchy
Create
Main
Main Camera
Directional Light
Main Canvas
Nav Panel
Content
Title Text
Body Text
EventSystem
<
Step #
>
Title Text
Instruction text paragraphs.


On Click ()

Runtime Only | InstructionsController.NextStep

GameController (


Inspector
Lighting
Services

Game Controller ☐ Static

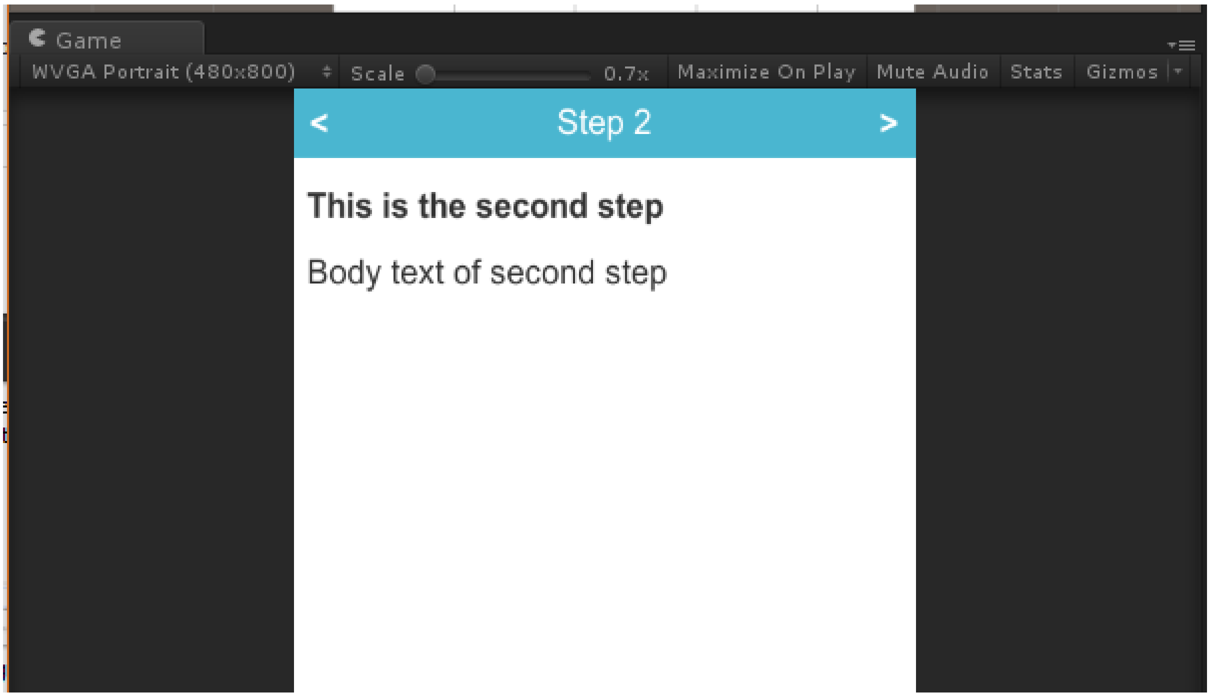
Tag Untagged Layer Default

Transform

Position	X 0	Y 0	Z 0
Rotation	X 0	Y 0	Z 0
Scale	X 1	Y 1	Z 1

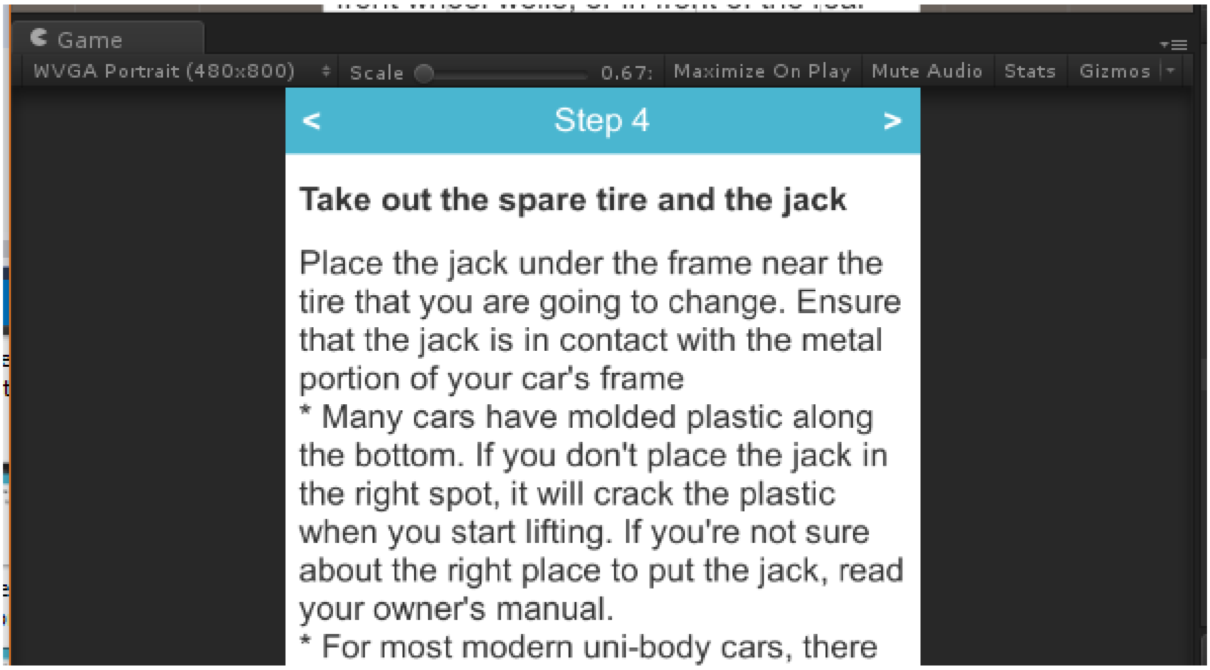
☑ **Instructions Controller (Script)**

Script	InstructionsController
Step Text	Step Text (Text)
Title Text	Title Text (Text)
Body Text	Body Text (Text)


Game
WVGA Portrait (480x800)
Scale 0.7x
Maximize On Play
Mute Audio
Stats
Gizmos
<
Step 2
>

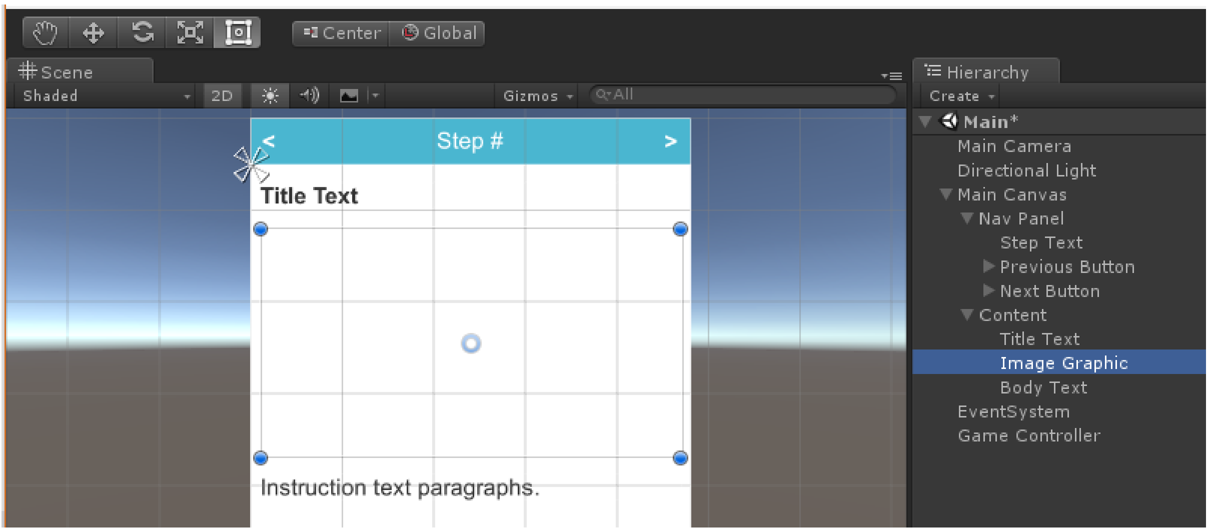
This is the second step

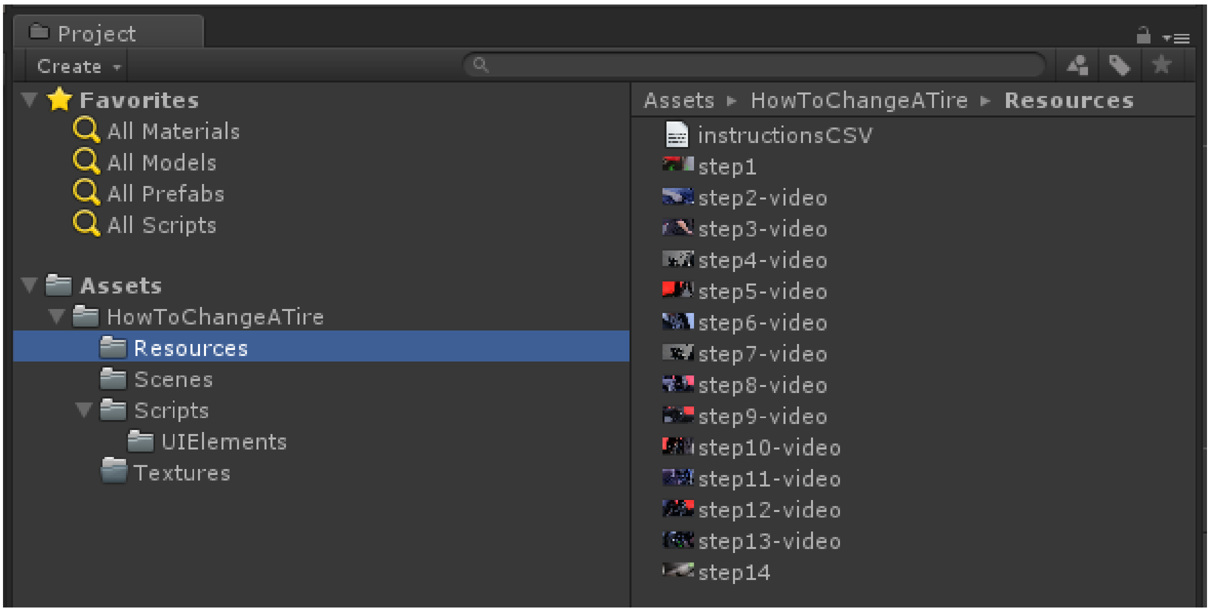
Body text of second step


Game
WVGA Portrait (480x800)
Scale
0.67x
Maximize On Play
Mute Audio
Stats
Gizmos
<
Step 4
>

Take out the spare tire and the jack

Place the jack under the frame near the tire that you are going to change. Ensure that the jack is in contact with the metal portion of your car's frame
* Many cars have molded plastic along the bottom. If you don't place the jack in the right spot, it will crack the plastic when you start lifting. If you're not sure about the right place to put the jack, read your owner's manual.
* For most modern uni-body cars, there


Center
Global
Scene
Shaded
2D
Gizmos
All
Hierarchy
Create
<
Step #
>
Title Text
Instruction text paragraphs.
Main*
Main Camera
Directional Light
Main Canvas
Nav Panel
Step Text
Previous Button
Next Button
Content
Title Text
Image Graphic
Body Text
EventSystem
Game Controller



Project

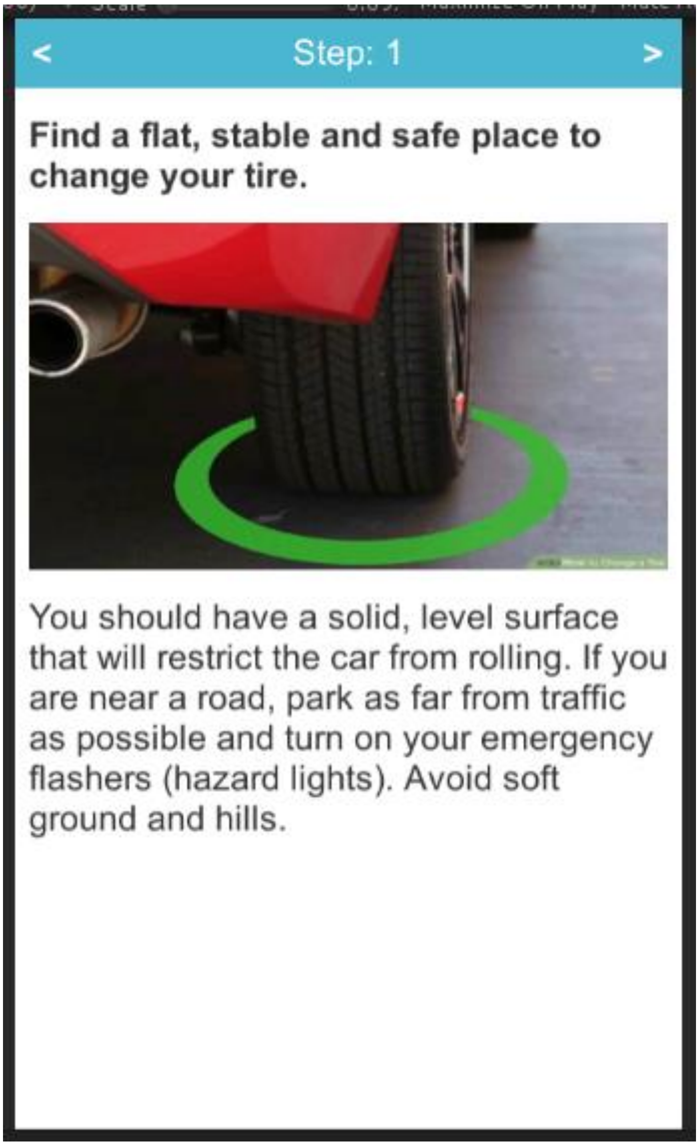
Create

Favorites
All Materials
All Models
All Prefabs
All Scripts

Assets
HowToChangeATire
Resources
Scenes
Scripts
UIElements
Textures

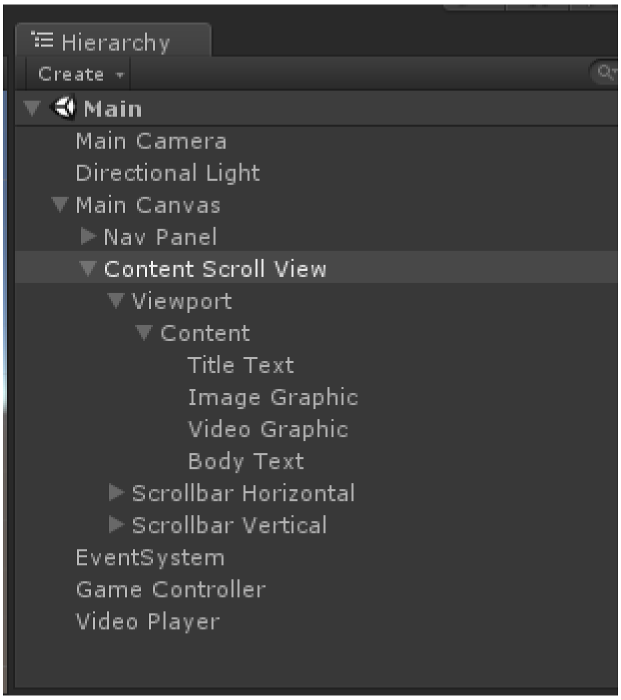
Assets ▸ HowToChangeATire ▸ Resources

instructionsCSV
step1
step2-video
step3-video
step4-video
step5-video
step6-video
step7-video
step8-video
step9-video
step10-video
step11-video
step12-video
step13-video
step14

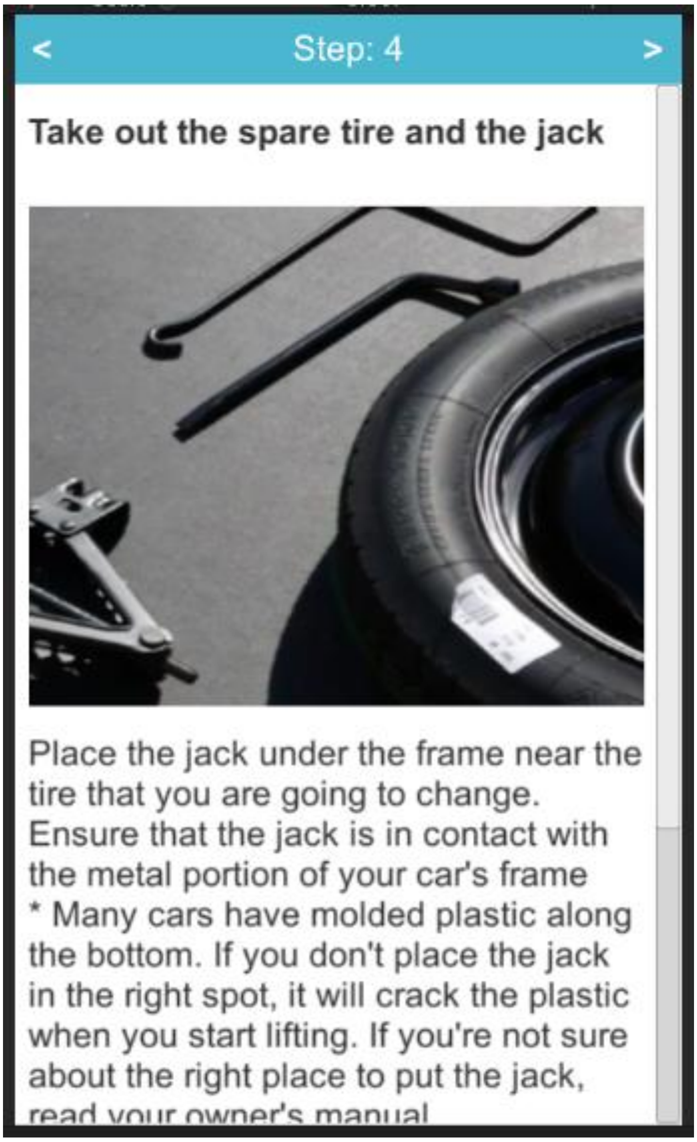


Find a flat, stable and safe place to change your tire.

You should have a solid, level surface that will restrict the car from rolling. If you are near a road, park as far from traffic as possible and turn on your emergency flashers (hazard lights). Avoid soft ground and hills.



- Main
  - Main Camera
  - Directional Light
  - Main Canvas
    - Nav Panel
    - Content Scroll View
      - Viewport
        - Content
          - Title Text
          - Image Graphic
          - Video Graphic
          - Body Text
      - Scrollbar Horizontal
      - Scrollbar Vertical
  - EventSystem
  - Game Controller
  - Video Player



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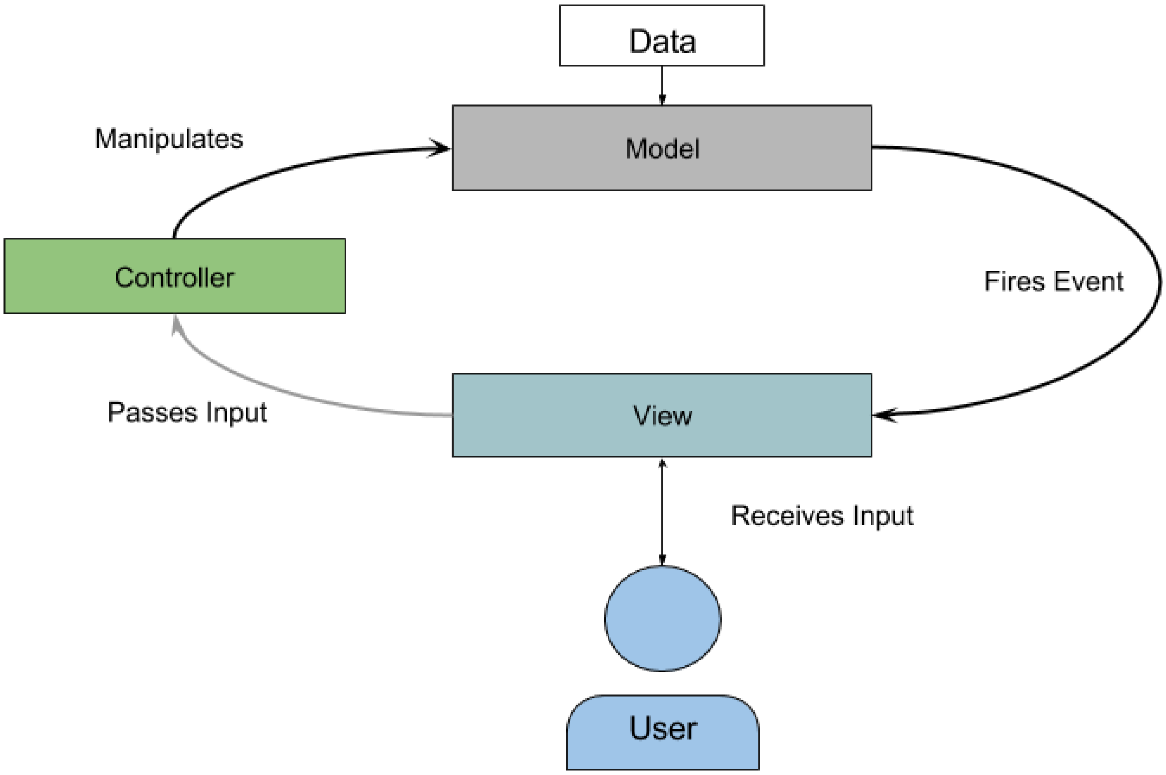
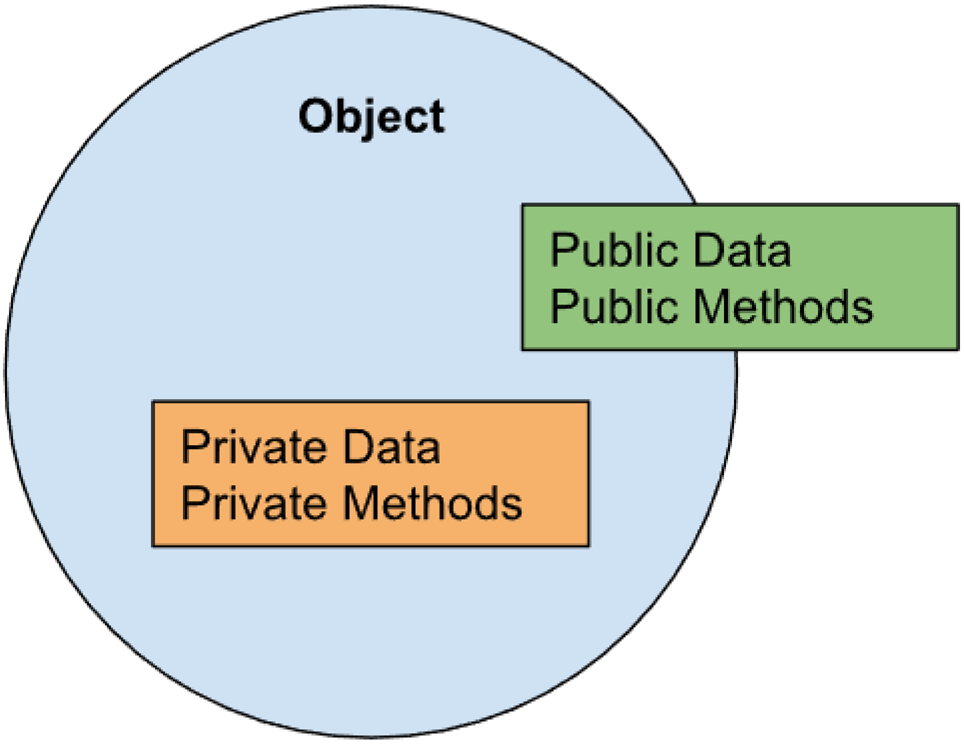
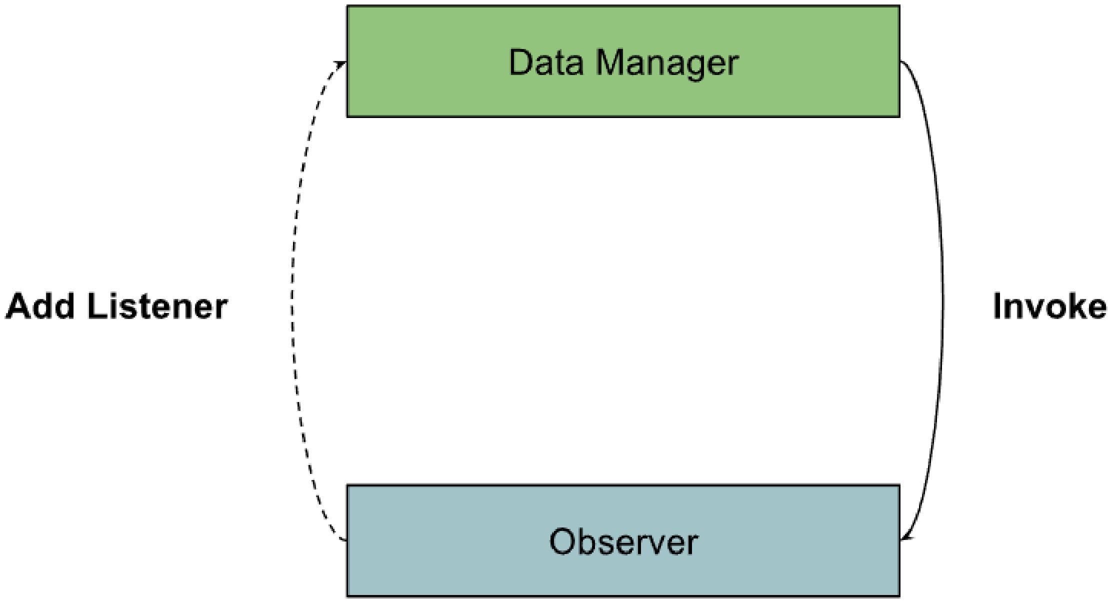
MVC


Data
Manipulates
Model
Controller
Fires Event
Passes Input
View
Receives Input
User



Object Encapsulation

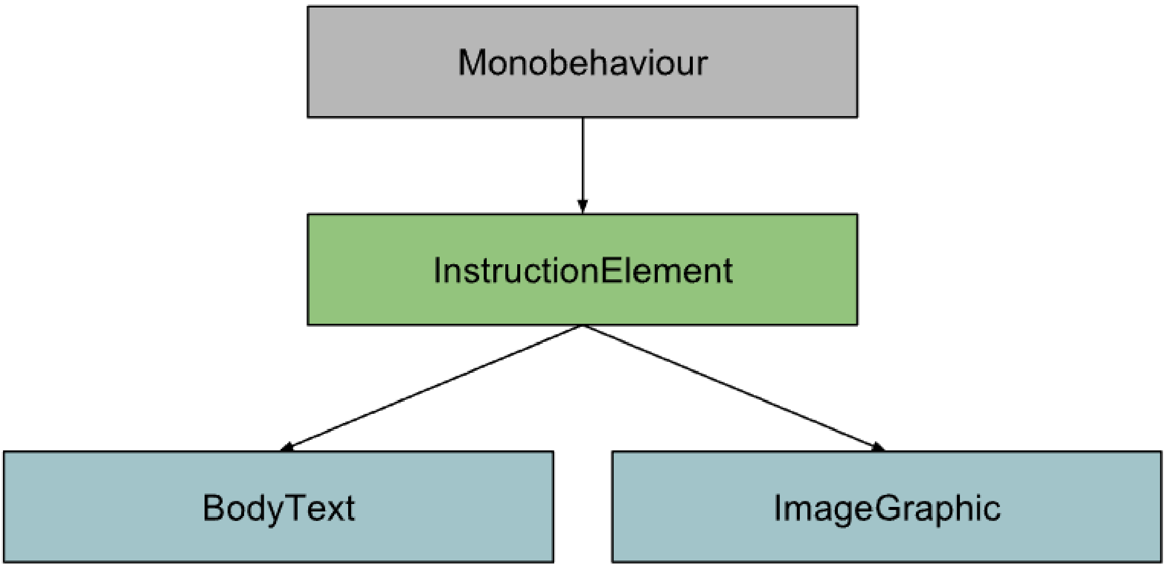
Object
Public Data
Public Methods
Private Data
Private Methods



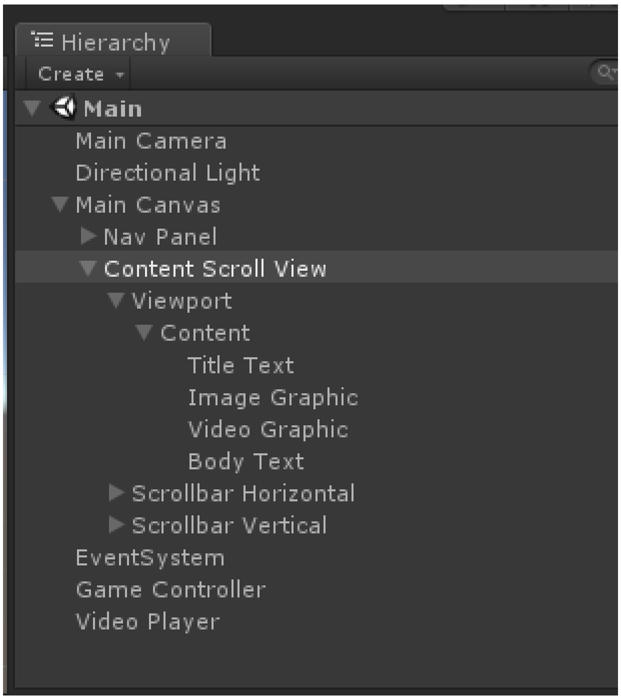
Event Observer Pattern

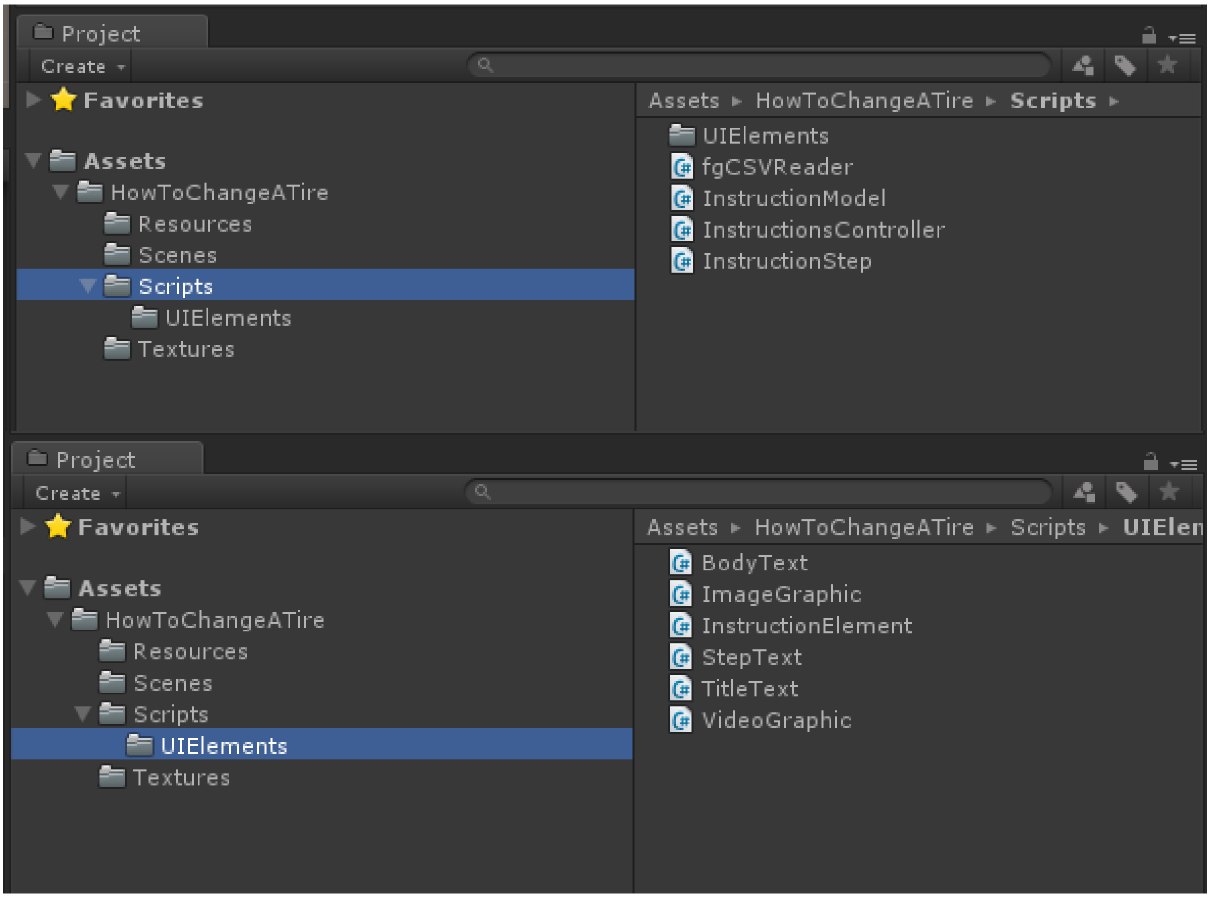
Data Manager
Add Listener
Invoke
Observer

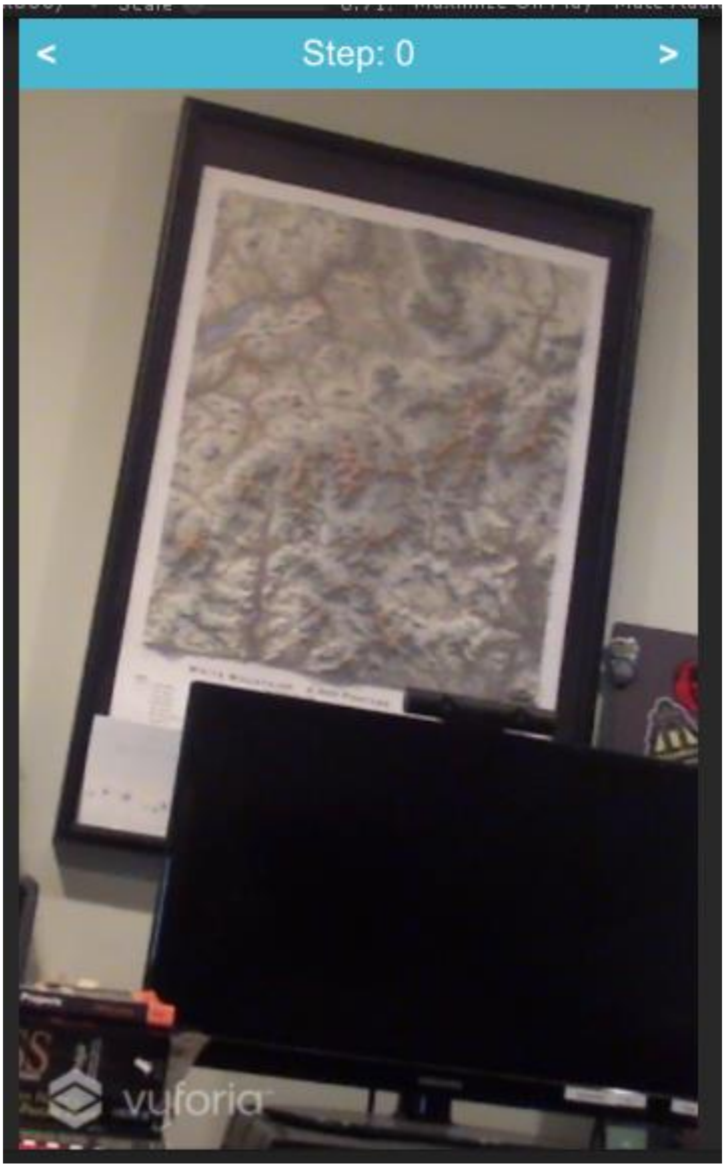
Inheritance

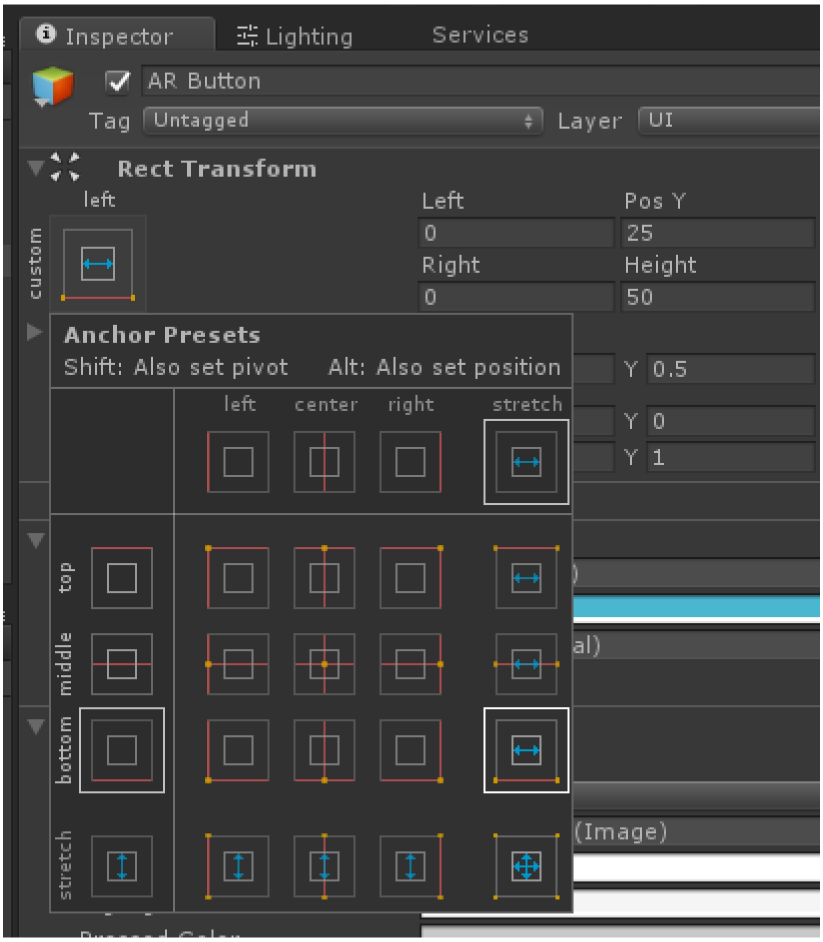

Monobehaviour
InstructionElement
BodyText
ImageGraphic

Chapter 7: Augmenting the Instruction Manual


Hierarchy
Create
Main
Main Camera
Directional Light
Main Canvas
Nav Panel
Content Scroll View
Viewport
Content
Title Text
Image Graphic
Video Graphic
Body Text
Scrollbar Horizontal
Scrollbar Vertical
EventSystem
Game Controller
Video Player


Project
Create
Favorites
Assets
HowToChangeATire
Resources
Scenes
Scripts
UIElements
Textures
Assets ▸ HowToChangeATire ▸ Scripts ▸
UIElements
fgCSVReader
InstructionModel
InstructionsController
InstructionStep
Project
Create
Favorites
Assets
HowToChangeATire
Resources
Scenes
Scripts
UIElements
Textures
Assets ▸ HowToChangeATire ▸ Scripts ▸ UIElen
BodyText
ImageGraphic
InstructionElement
StepText
TitleText
VideoGraphic


<
Step: 0
>
vuforia


Inspector
Lighting
Services
Rect Transform
custom
left
top
middle
bottom
stretch
left
center
right
stretch
(Image)

AR Button

Tag Untagged

Layer UI

Left 0

Pos Y 25

Right 0

Height 50

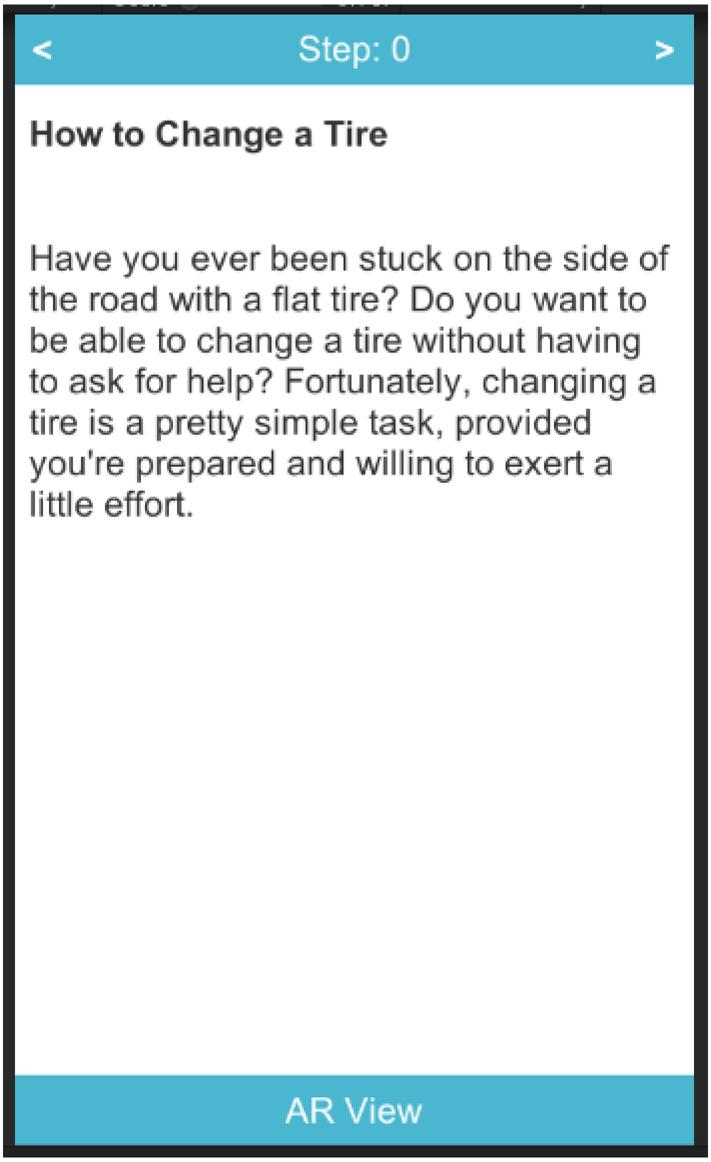
Y 0.5

Y 0

Y 1

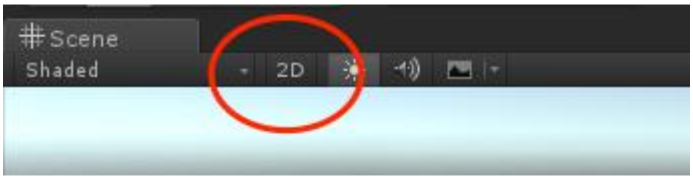
Anchor Presets

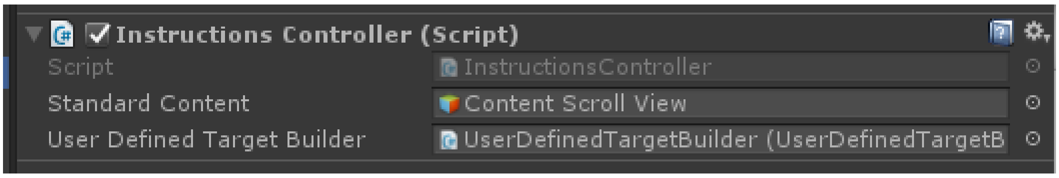
Shift: Also set pivot Alt: Also set position

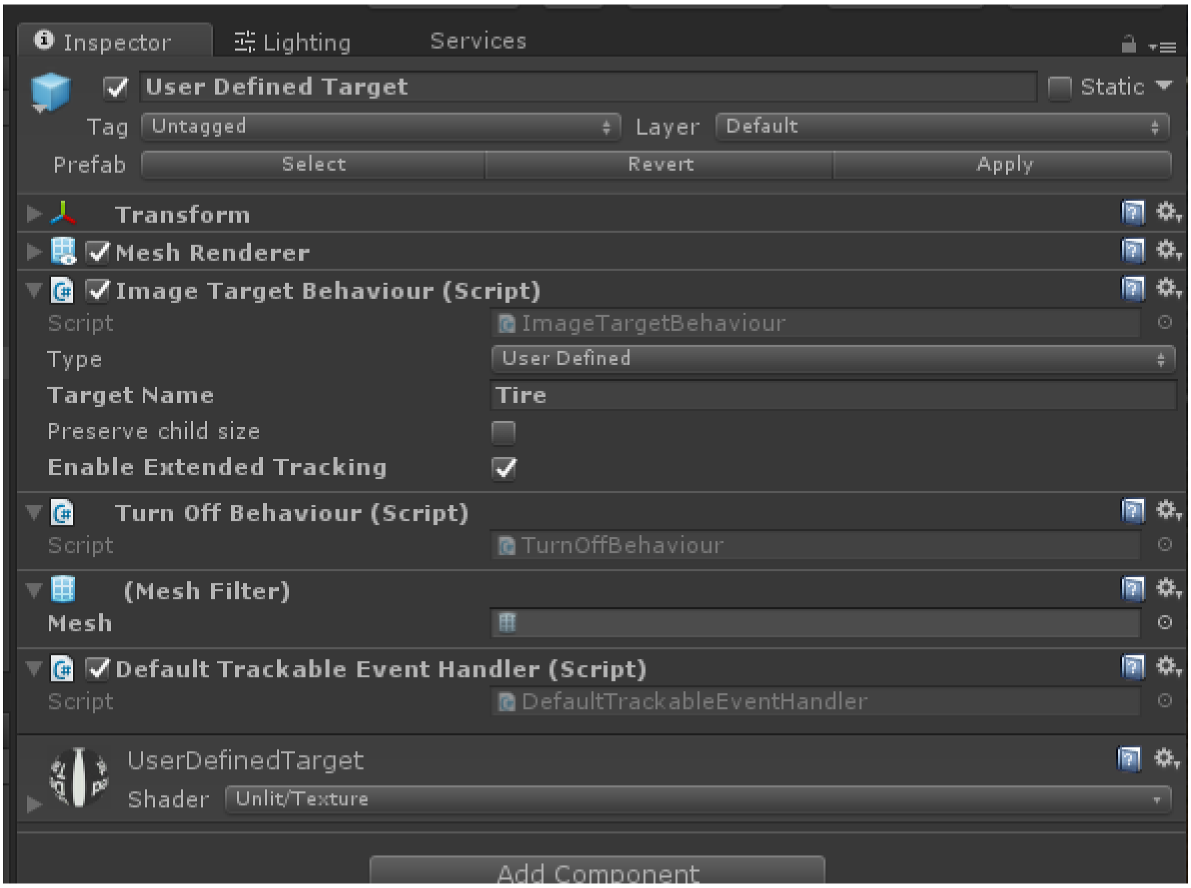


How to Change a Tire

Have you ever been stuck on the side of the road with a flat tire? Do you want to be able to change a tire without having to ask for help? Fortunately, changing a tire is a pretty simple task, provided you're prepared and willing to exert a little effort.




Instructions Controller (Script)
Script InstructionsController
Standard Content Content Scroll View
User Defined Target Builder UserDefinedTargetBuilder (UserDefinedTargetB


Inspector
Lighting
Services
Static
Select
Revert
Apply
Add Component

☑ User Defined Target

Tag: Untagged

Layer: Default

Prefab

Transform

☑ Mesh Renderer

☑ Image Target Behaviour (Script)

Script: ImageTargetBehaviour

Type: User Defined

Target Name: Tire

Preserve child size: ☐

Enable Extended Tracking: ☑

Turn Off Behaviour (Script)

Script: TurnOffBehaviour

(Mesh Filter)

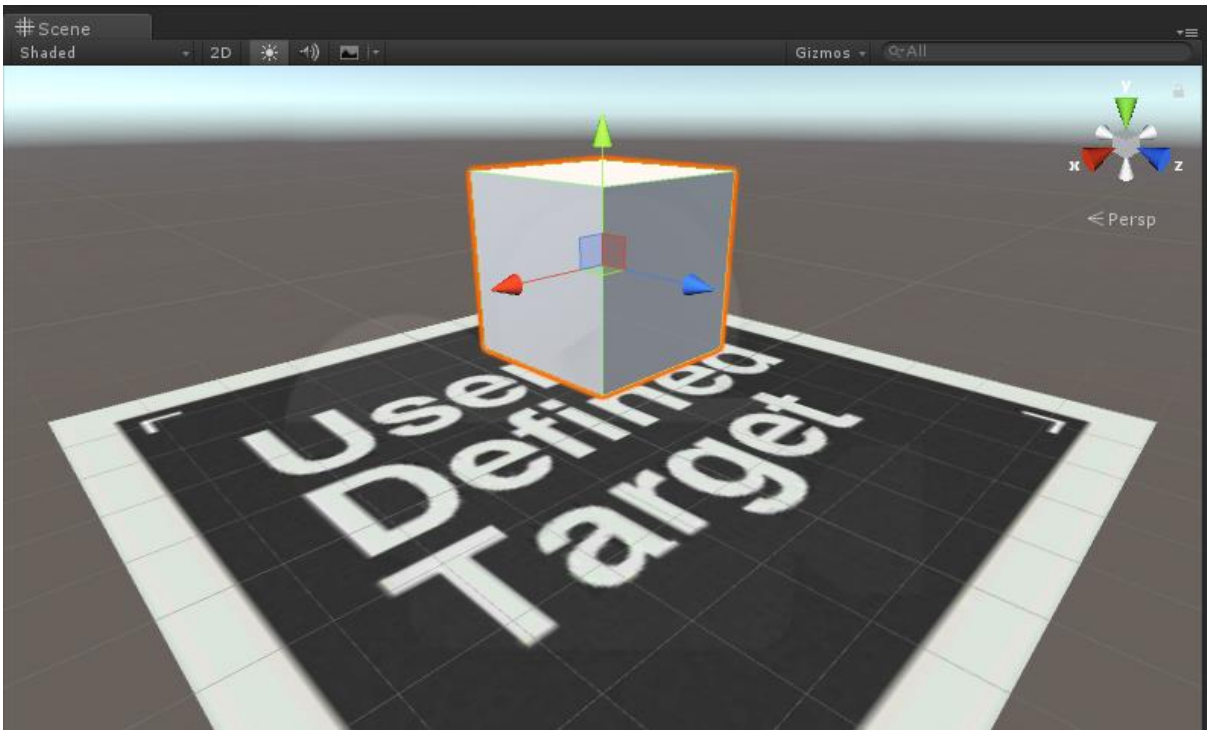
Mesh

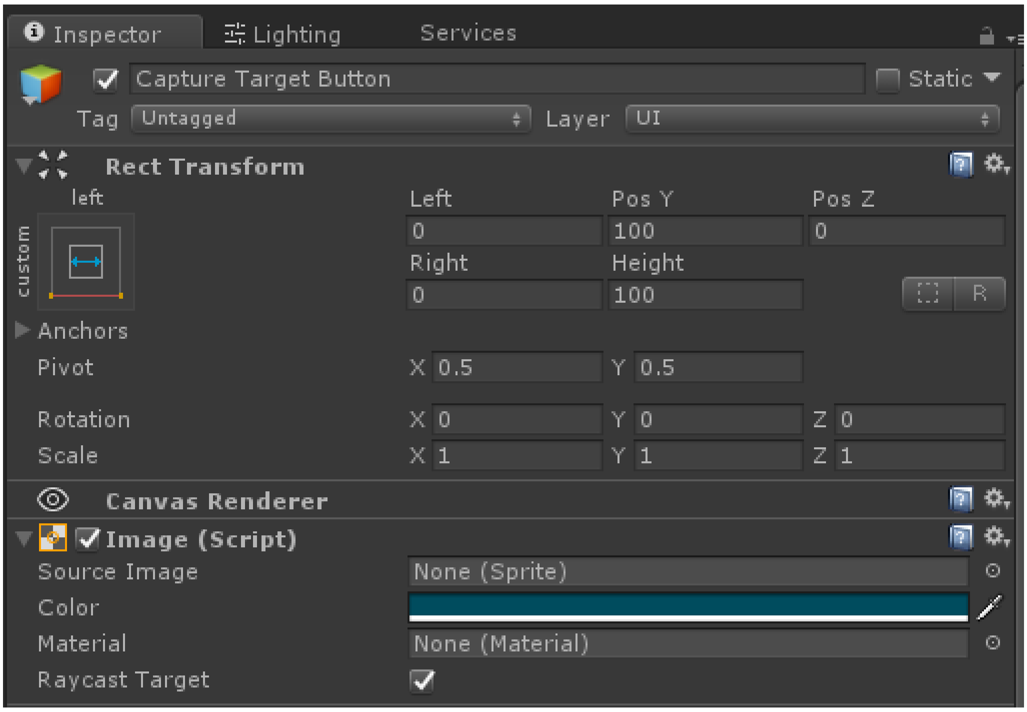
☑ Default Trackable Event Handler (Script)

Script: DefaultTrackableEventHandler

UserDefinedTarget

Shader: Unlit/Texture


Scene
Shaded
2D
Gizmos
All
y
x
z
Persp
User Defined Target


Inspector
Lighting
Services
Rect Transform
Canvas Renderer
Anchors

☑ Capture Target Button ☐ Static

Tag Untagged Layer UI

Rect Transform

left

custom

Left	Pos Y	Pos Z
0	100	0
Right	Height	
0	100	

Pivot X 0.5 Y 0.5

Rotation X 0 Y 0 Z 0

Scale X 1 Y 1 Z 1

Canvas Renderer

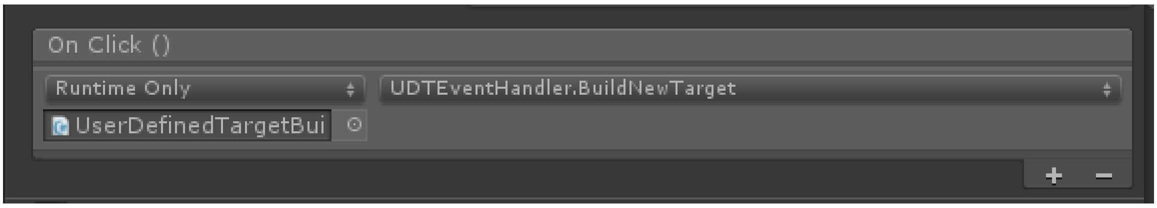
☑ **Image (Script)**

Source Image None (Sprite)

Color

Material None (Material)

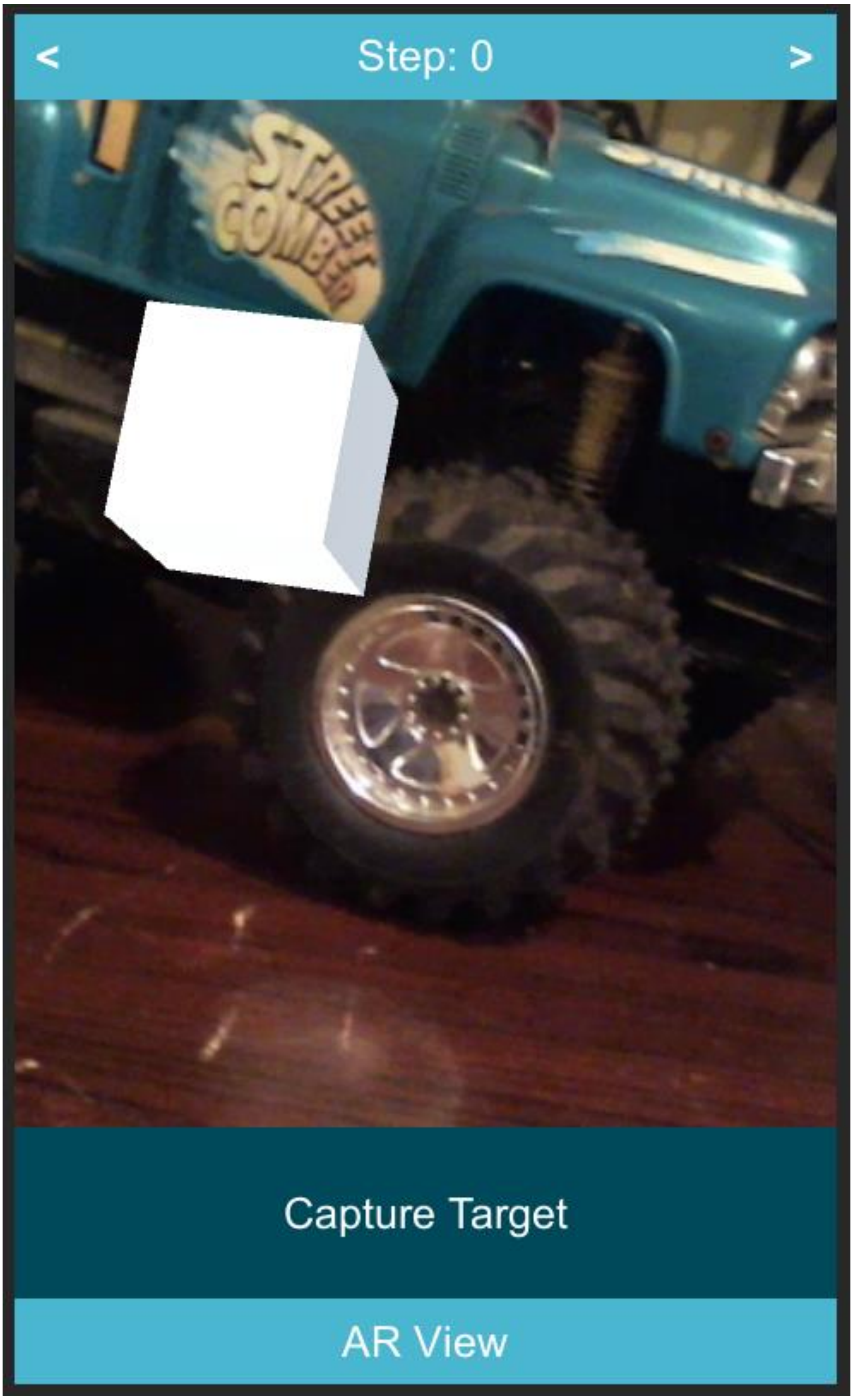
Raycast Target ☑



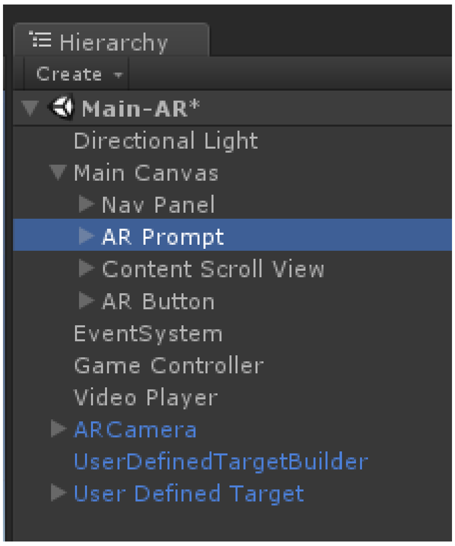
On Click ()

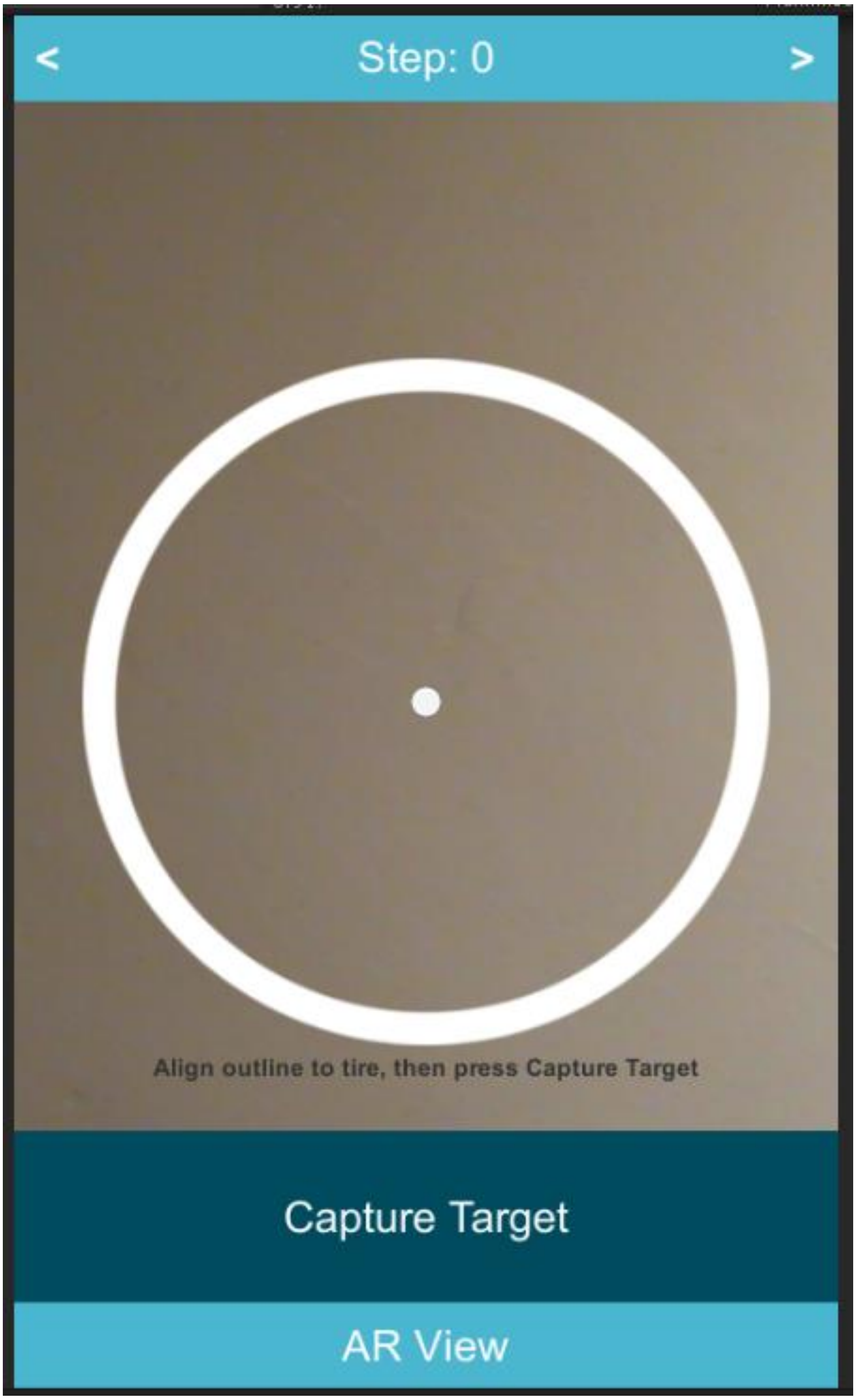
Runtime Only UDTEventHandler.BuildNewTarget

UserDefinedTargetBui



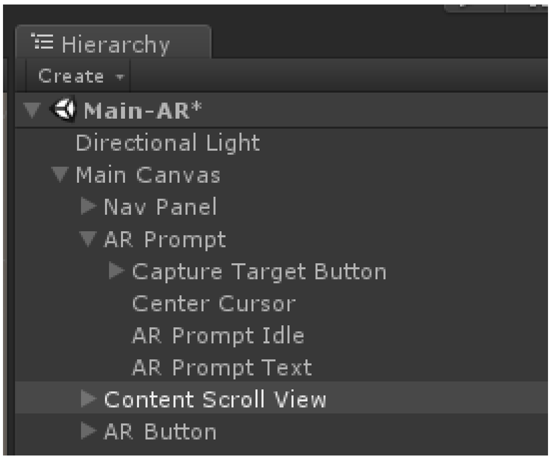
<
Step: 0
>
STREET COMBER
Capture Target
AR View

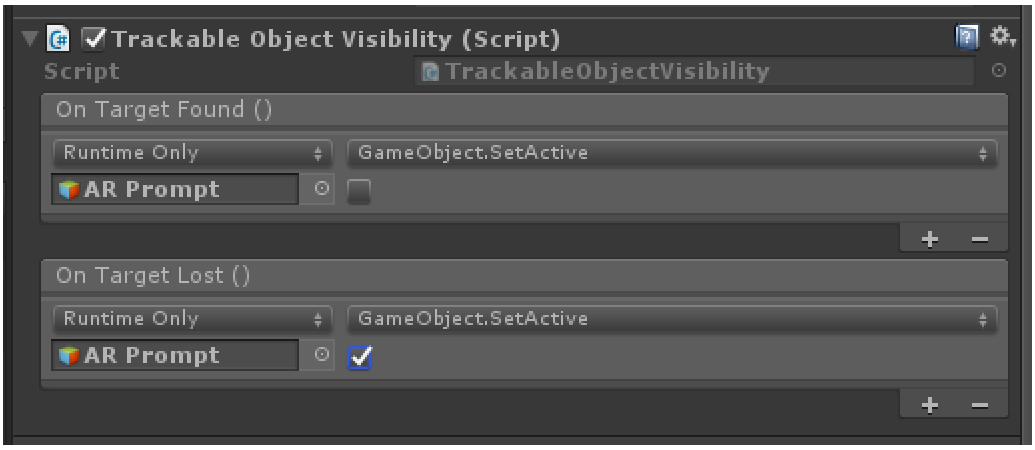

Hierarchy
Create
Main-AR*
Directional Light
Main Canvas
Nav Panel
AR Prompt
Content Scroll View
AR Button
EventSystem
Game Controller
Video Player
ARCamera
UserDefinedTargetBuilder
User Defined Target


<
Step: 0
>

Align outline to tire, then press Capture Target

Capture Target
AR View


Hierarchy
Create
Main-AR*
Directional Light
Main Canvas
Nav Panel
AR Prompt
Capture Target Button
Center Cursor
AR Prompt Idle
AR Prompt Text
Content Scroll View
AR Button



☑ Trackable Object Visibility (Script)

Script: TrackableObjectVisibility

On Target Found ()

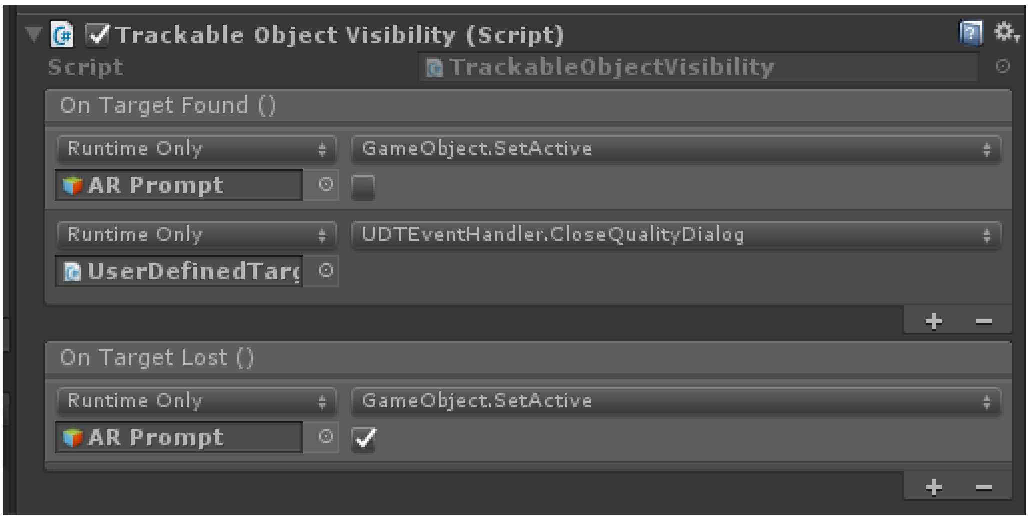
Runtime Only | GameObject.SetActive

AR Prompt ☐

On Target Lost ()

Runtime Only | GameObject.SetActive

AR Prompt ☑



☑ Trackable Object Visibility (Script)

Script: TrackableObjectVisibility

On Target Found ()

Runtime Only | GameObject.SetActive

AR Prompt ☐

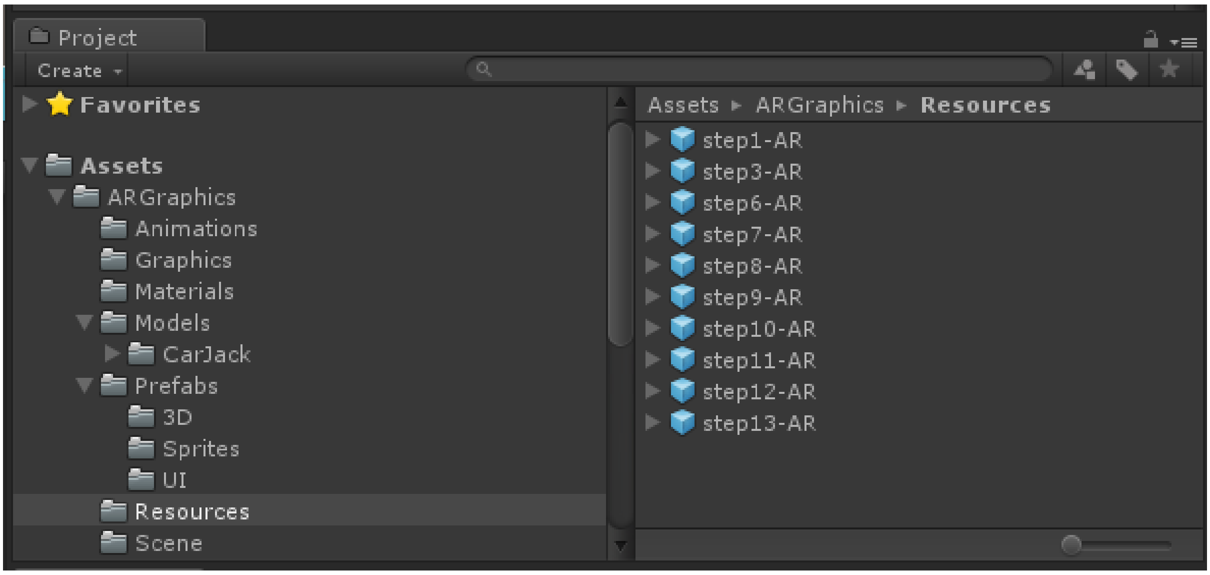
Runtime Only | UDTEventHandler.CloseQualityDialog

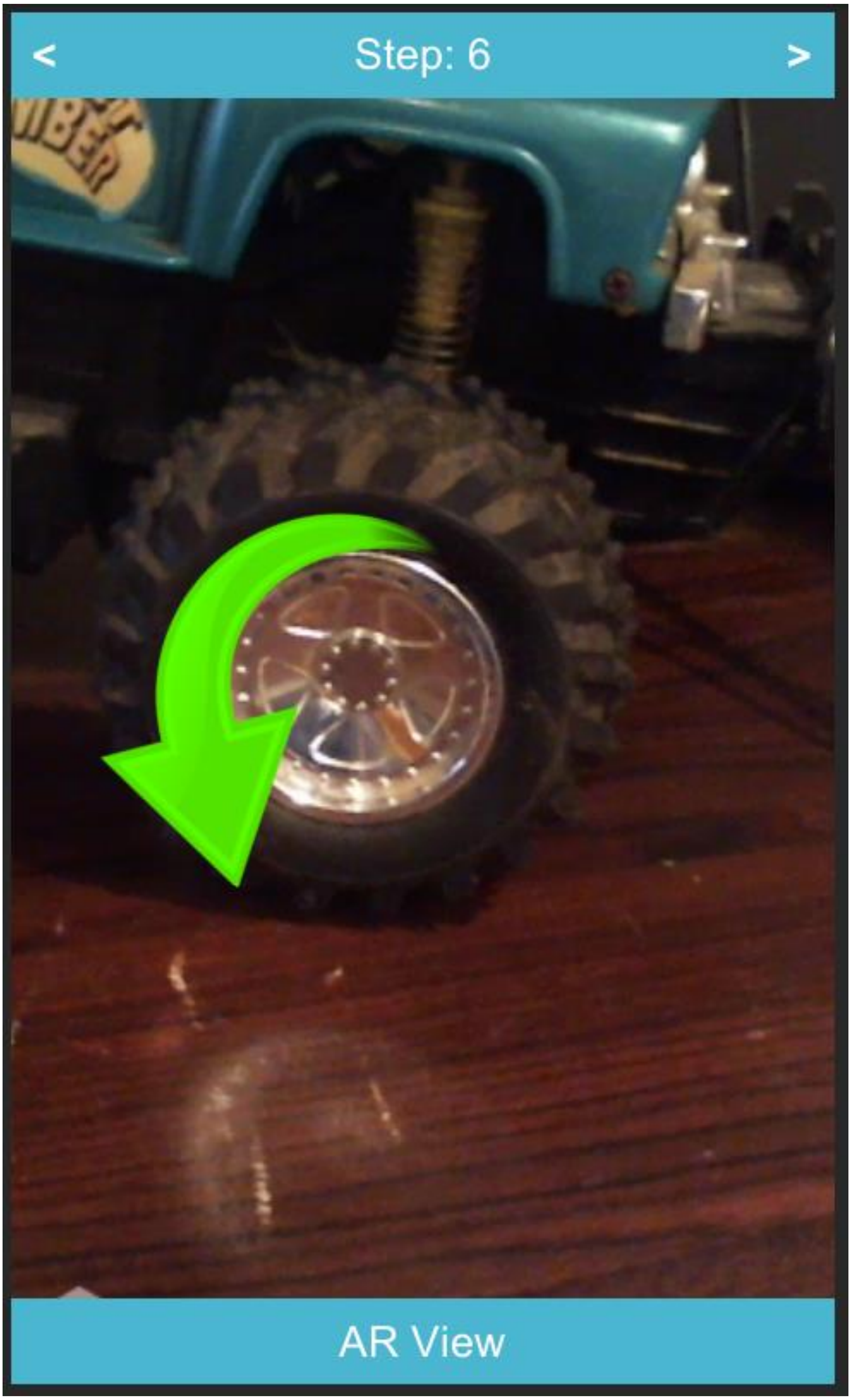
UserDefinedTarg

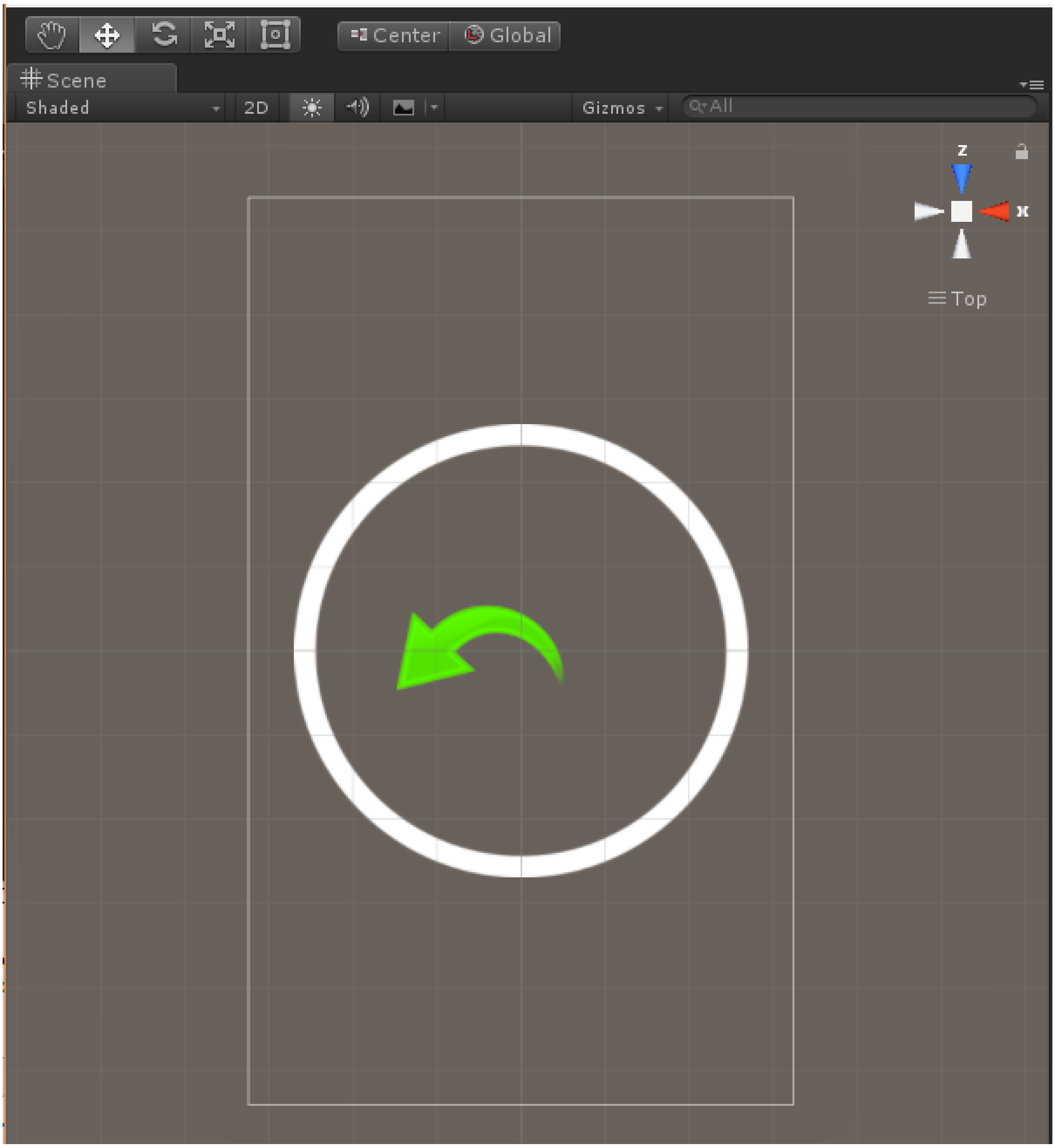
On Target Lost ()

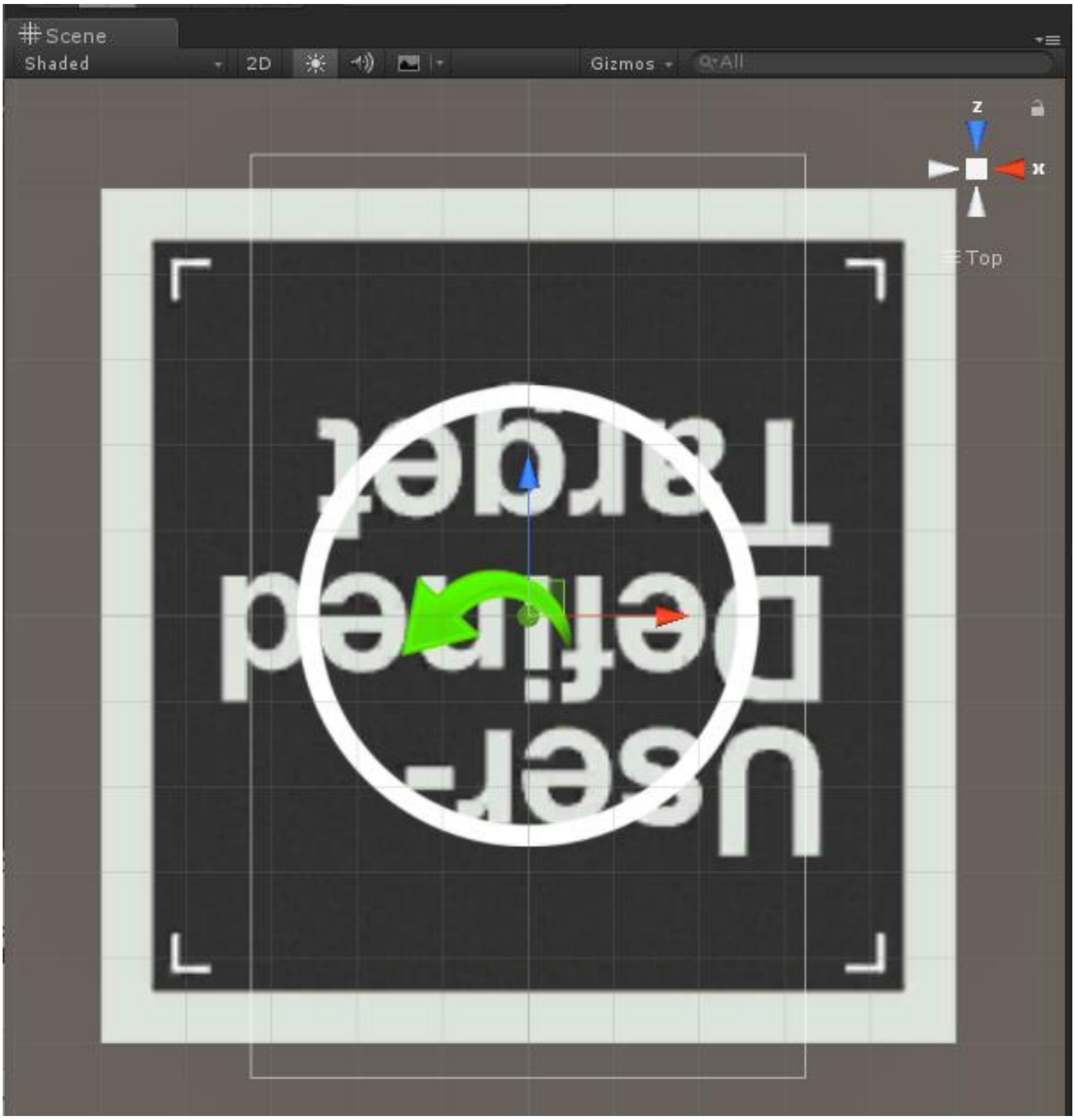
Runtime Only | GameObject.SetActive

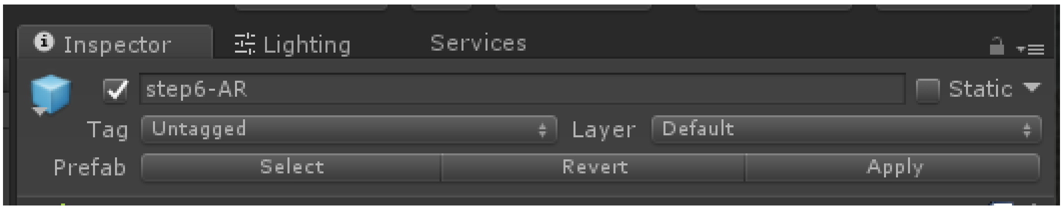
AR Prompt ☑


Project
Create
Favorites
Assets
ARGraphics
Animations
Graphics
Materials
Models
CarJack
Prefabs
3D
Sprites
UI
Resources
Scene
Assets ▸ ARGraphics ▸ Resources
step1-AR
step3-AR
step6-AR
step7-AR
step8-AR
step9-AR
step10-AR
step11-AR
step12-AR
step13-AR


<
Step: 6
>
AR View


Center
Global
Scene
Shaded
2D
Gizmos
All
z
x
Top


Scene
Shaded
2D
Gizmos
All
z
x
Top
User-Defined Target

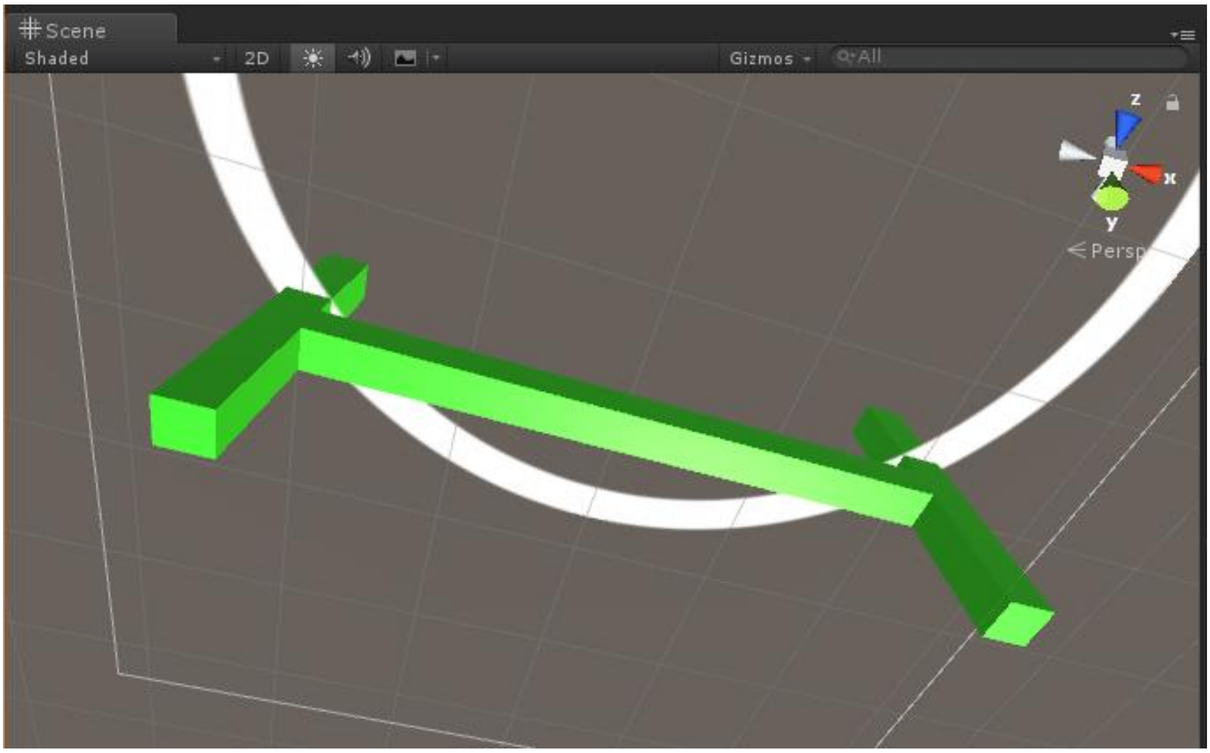

Inspector
Lighting
Services
Static
Select
Revert
Apply

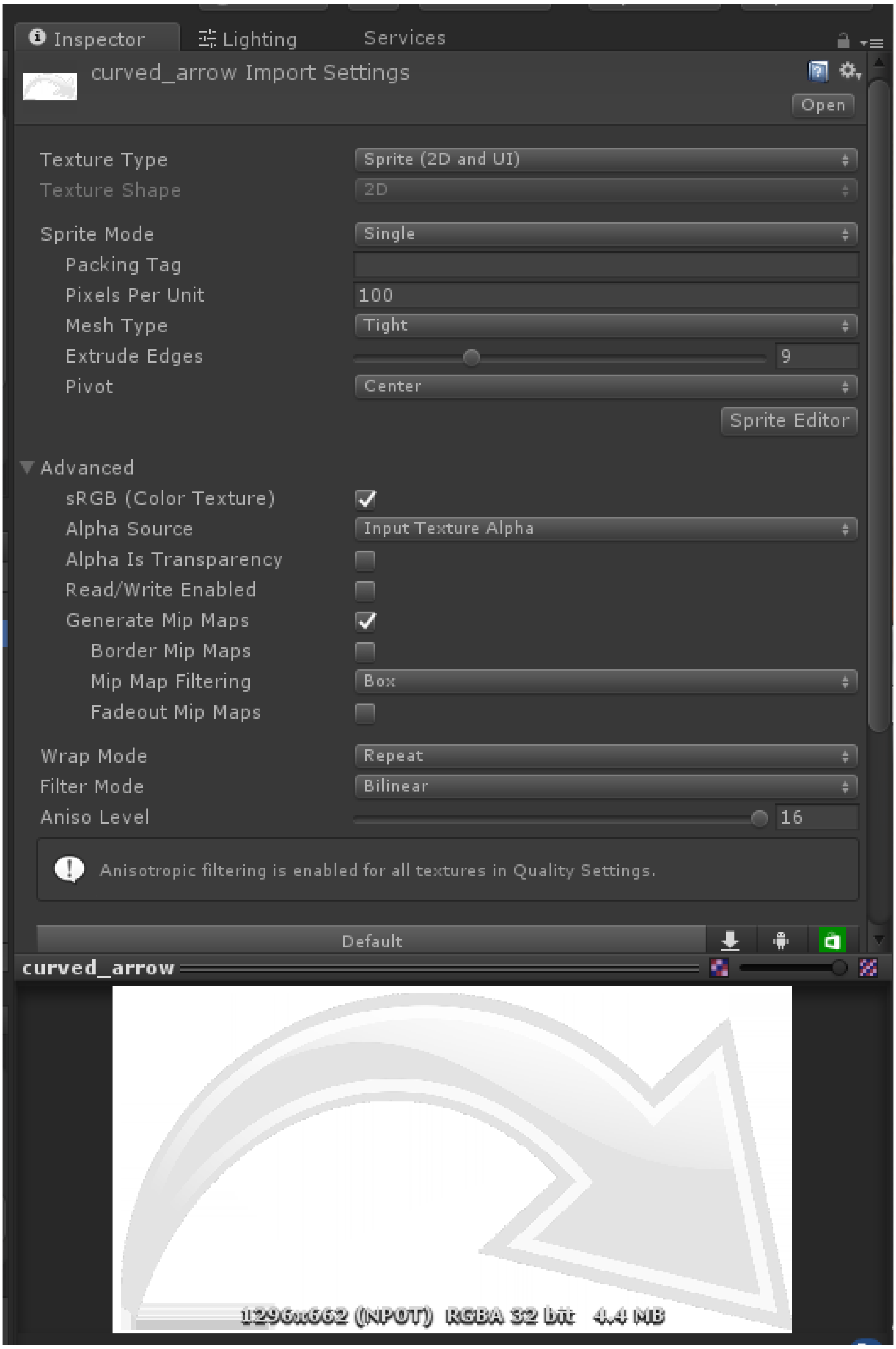
☑ step6-AR

Tag Untagged

Layer Default

Prefab


Scene
Shaded
2D
Gizmos
All
z
x
y
Persp


Inspector
Lighting
Services
Open
Sprite Editor
Default

curved_arrow Import Settings

Texture Type: Sprite (2D and UI)
Texture Shape: 2D

Sprite Mode: Single
Packing Tag:
Pixels Per Unit: 100
Mesh Type: Tight
Extrude Edges: 9
Pivot: Center

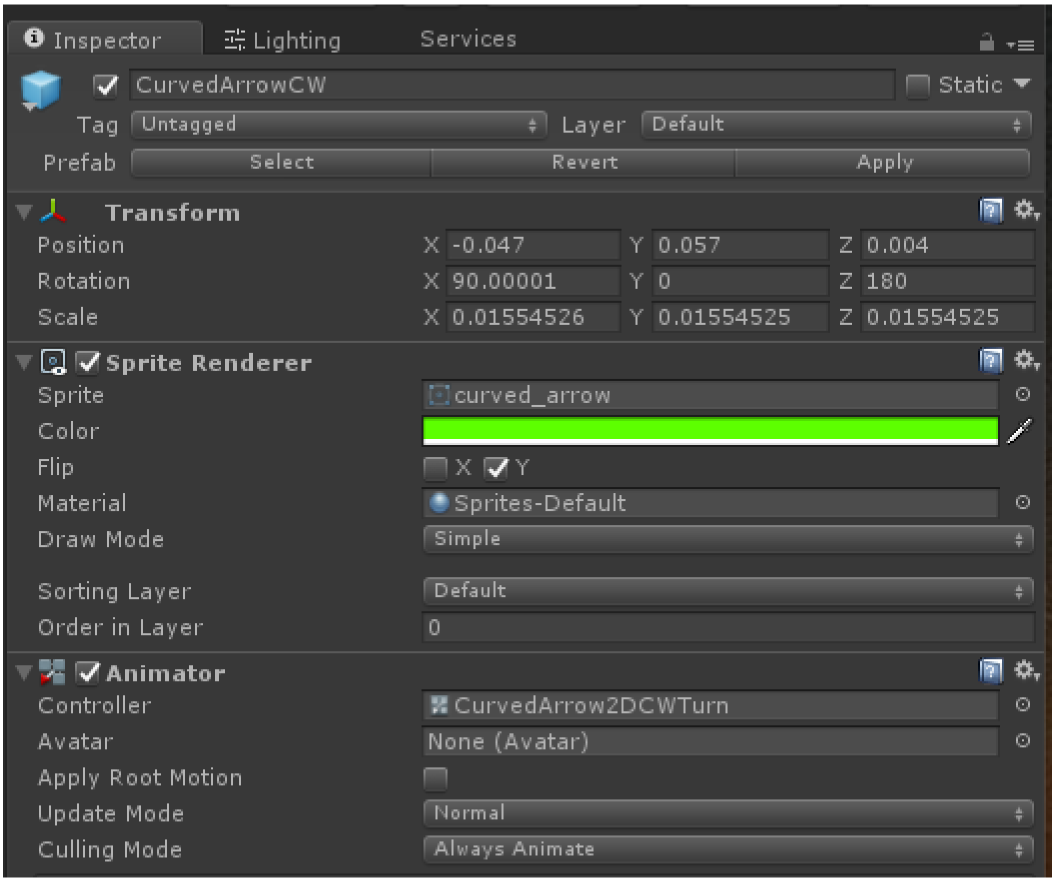
Advanced
sRGB (Color Texture) ☑
Alpha Source: Input Texture Alpha
Alpha Is Transparency ☐
Read/Write Enabled ☐
Generate Mip Maps ☑
Border Mip Maps ☐
Mip Map Filtering: Box
Fadeout Mip Maps ☐

Wrap Mode: Repeat
Filter Mode: Bilinear
Aniso Level: 16

Anisotropic filtering is enabled for all textures in Quality Settings.

curved_arrow

1296x662 (NPOT) RGBA 32 bit 4.4 MB


Inspector
Lighting
Services
Select
Revert
Apply

CurvedArrowCW ☐ Static

Tag Untagged Layer Default

Prefab

Transform

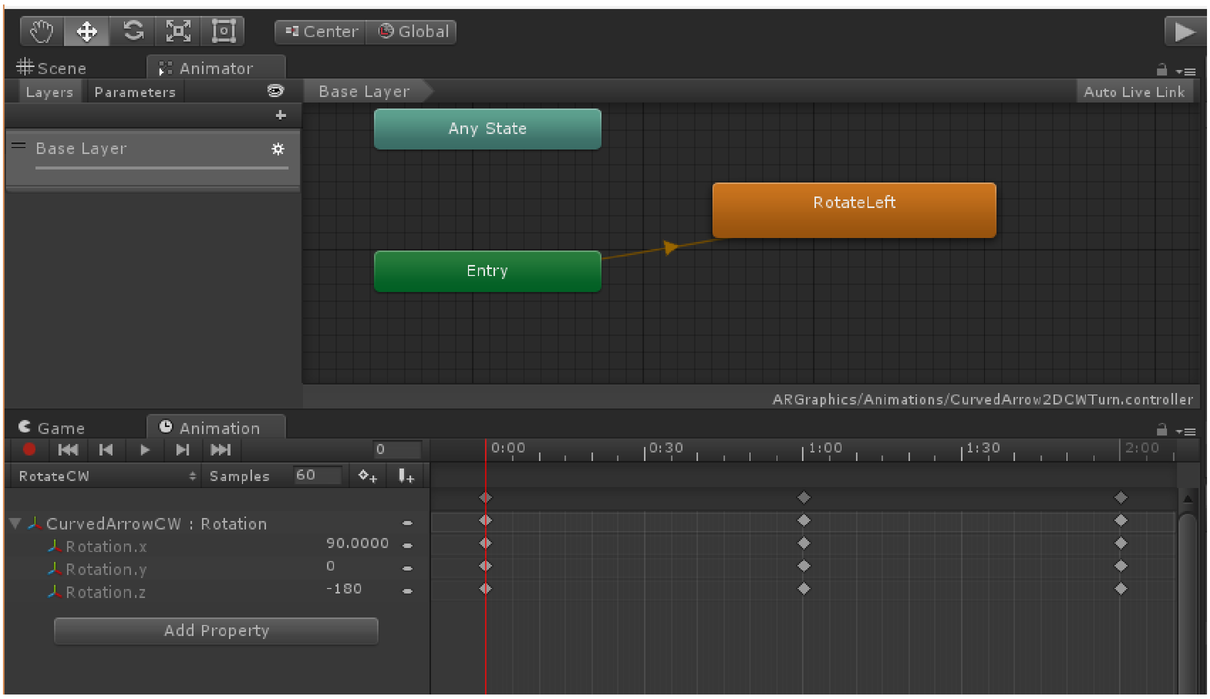
Position	X -0.047	Y 0.057	Z 0.004
Rotation	X 90.00001	Y 0	Z 180
Scale	X 0.01554526	Y 0.01554525	Z 0.01554525

☑ **Sprite Renderer**

Sprite: curved_arrow
Color: 🟩
Flip: ☐ X ☑ Y
Material: Sprites-Default
Draw Mode: Simple
Sorting Layer: Default
Order in Layer: 0

☑ **Animator**

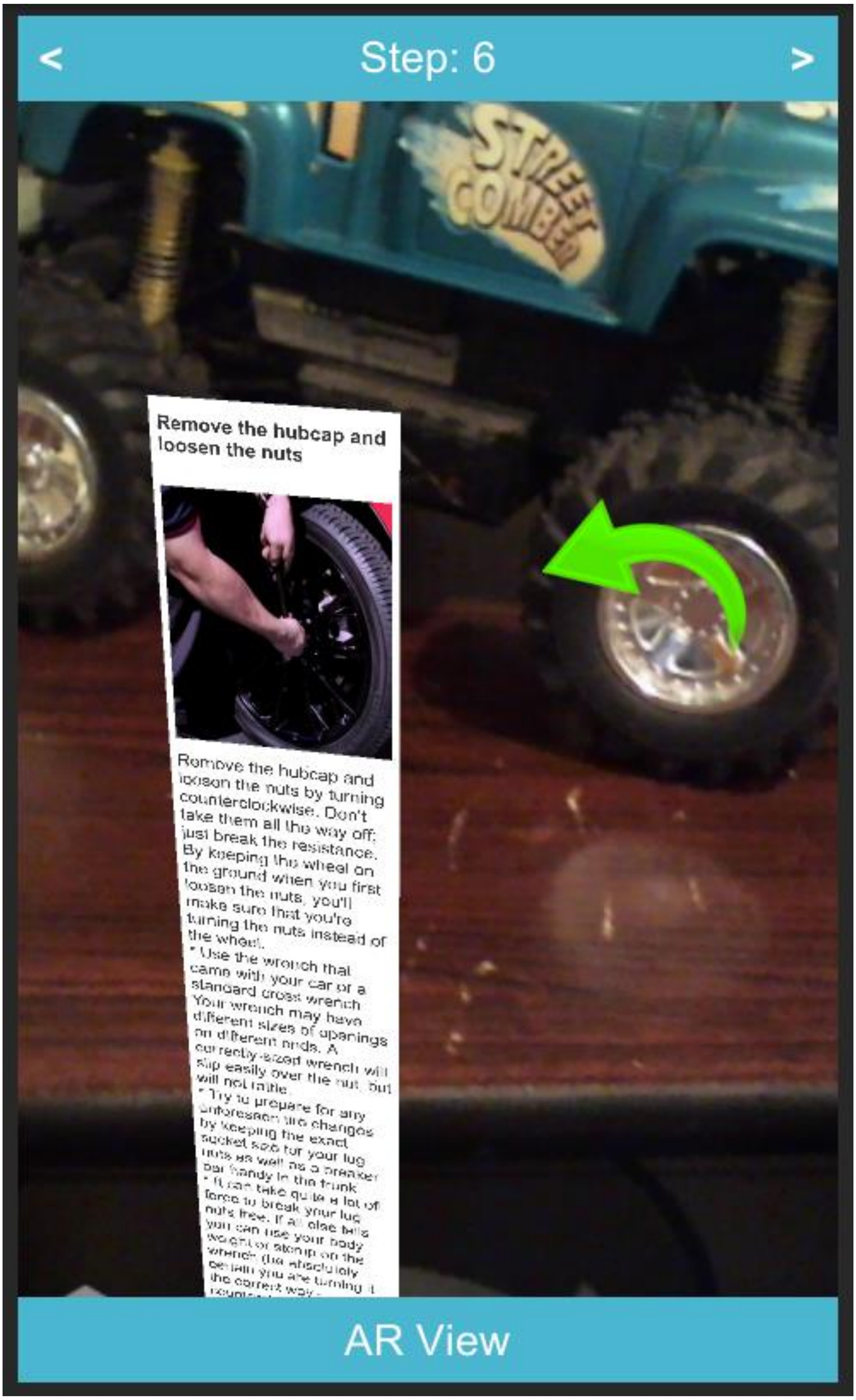
Controller: CurvedArrow2DCWTurn
Avatar: None (Avatar)
Apply Root Motion: ☐
Update Mode: Normal
Culling Mode: Always Animate


Center
Global
Scene
Animator
Layers
Parameters
Base Layer
Auto Live Link
Base Layer
Any State
RotateLeft
Entry
Game
Animation
0:00
0:30
1:00
1:30
2:00
Add Property

ARGraphics/Animations/CurvedArrow2DCWTurn.controller

RotateCW Samples 60

CurvedArrowCW : Rotation
Rotation.x 90.0000
Rotation.y 0
Rotation.z -180



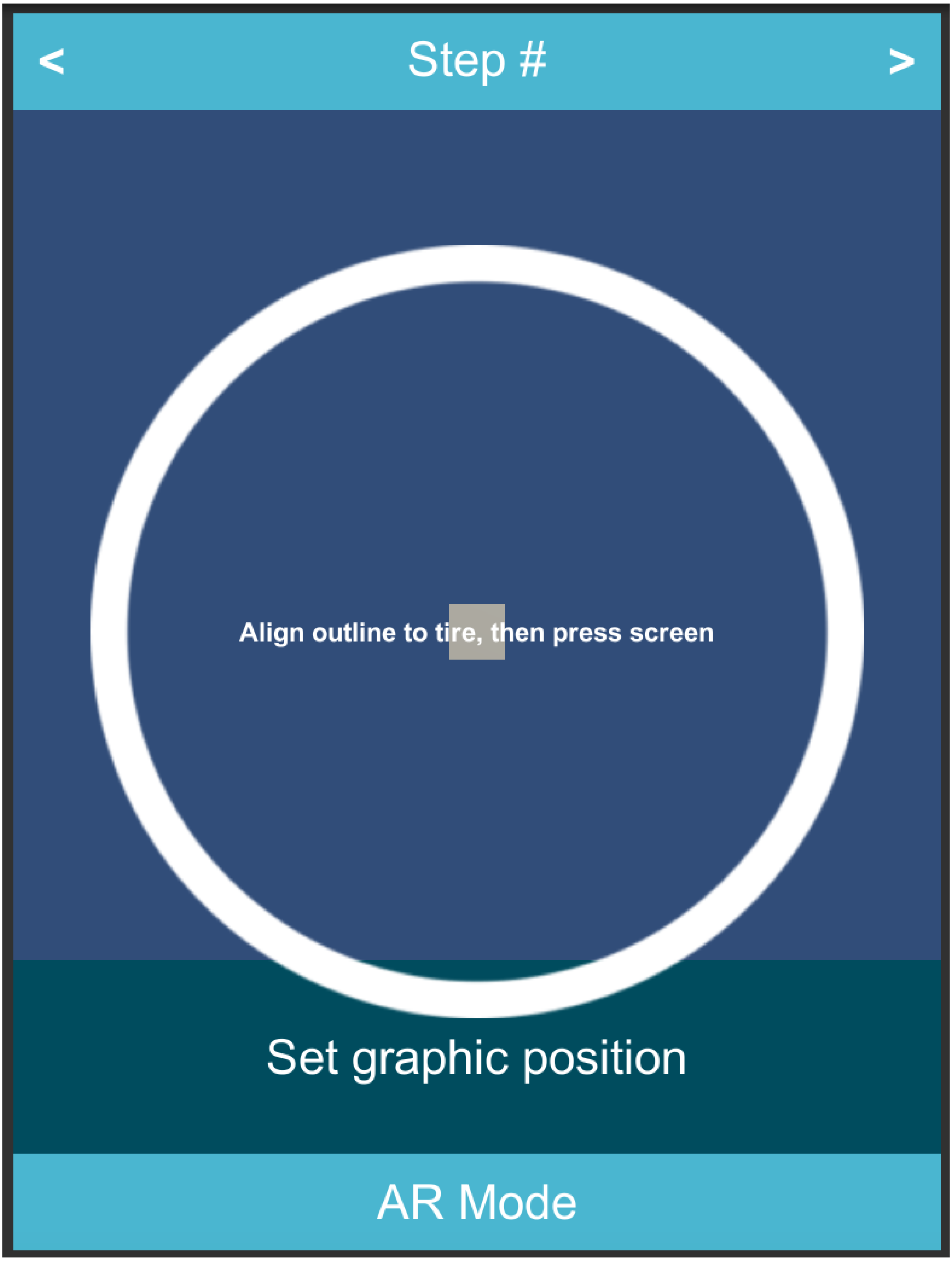
Remove the hubcap and loosen the nuts

Remove the hubcap and loosen the nuts by turning counterclockwise. Don't take them all the way off; just break the resistance. By keeping the wheel on the ground when you first loosen the nuts, you'll make sure that you're turning the nuts instead of the wheel.

* Use the wrench that came with your car or a standard cross wrench. Your wrench may have different sizes of openings on different ends. A correctly-sized wrench will slip easily over the nut, but will not rattle.

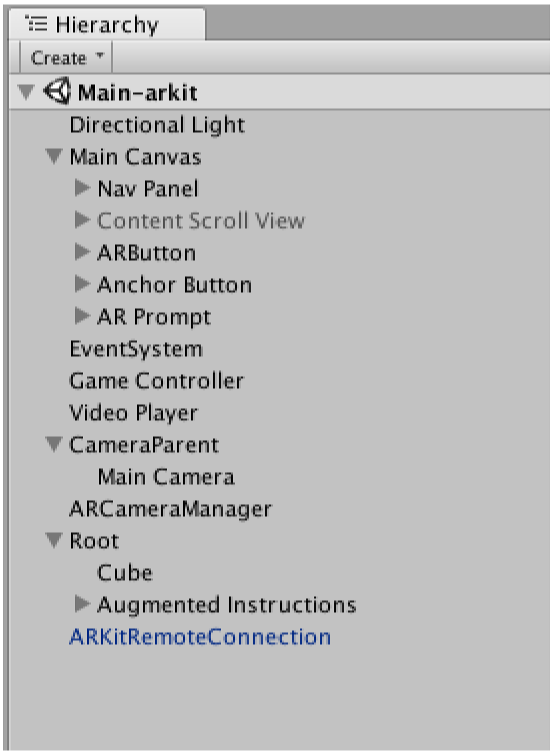
* Try to prepare for any unforeseen tire changes by keeping the exact socket size for your lug nuts as well as a breaker bar handy in the trunk.

* It can take quite a lot of force to break your lug nuts free. If all else fails, you can use your body weight or stomp on the wrench (be absolutely certain you are turning it the correct way -


<
Step #
>
AR Mode

Align outline to tire, then press screen

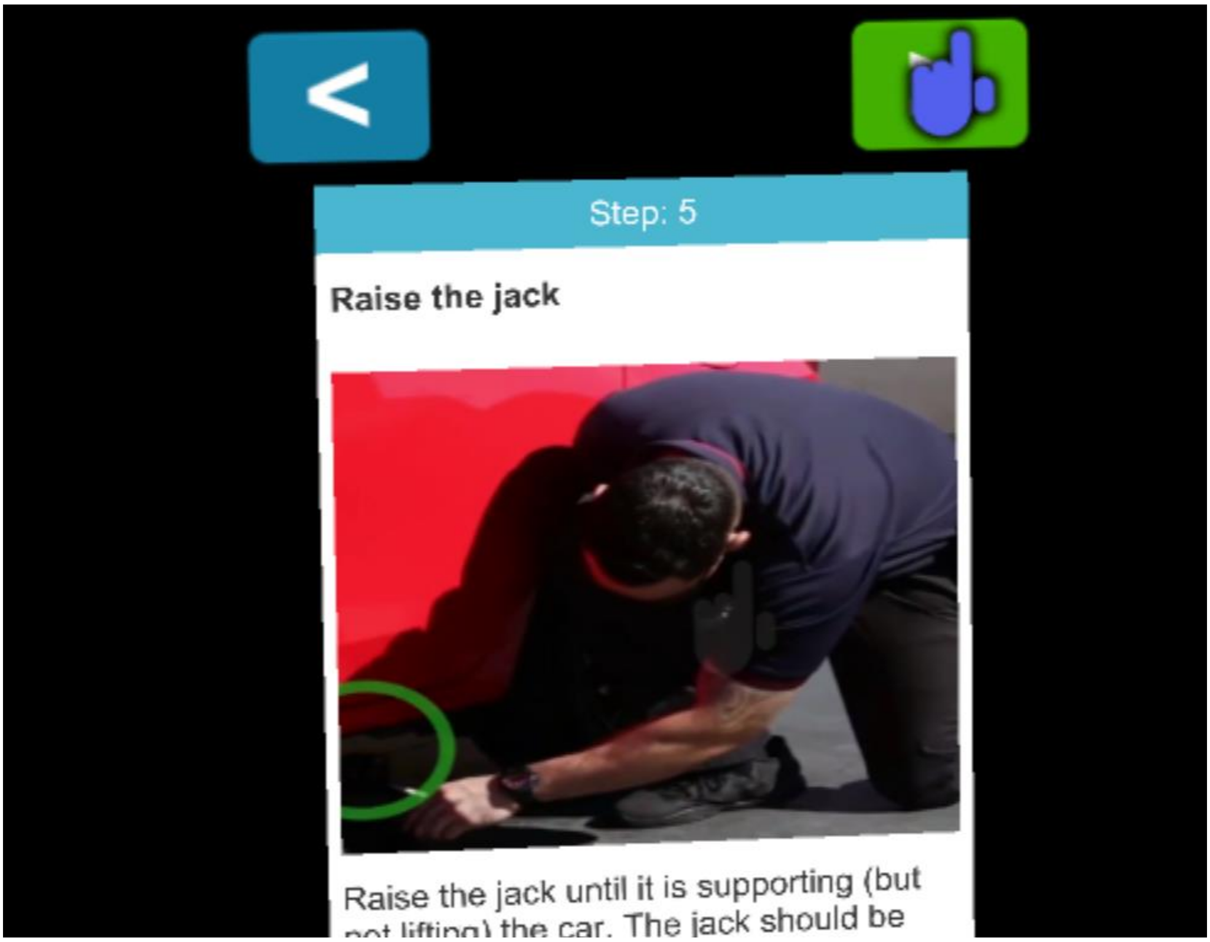
Set graphic position



Hierarchy

Create

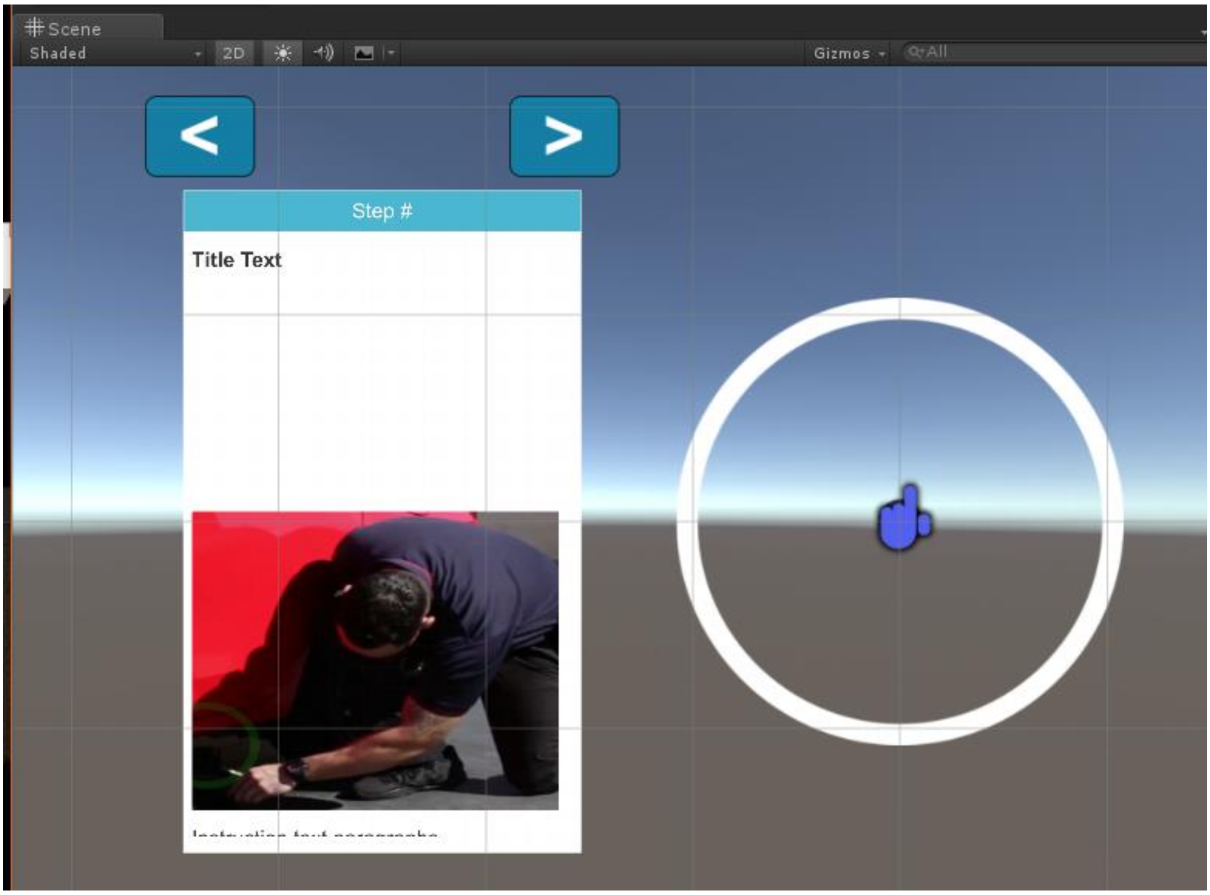
- Main-arkit
  - Directional Light
  - Main Canvas
    - Nav Panel
    - Content Scroll View
    - ARButton
    - Anchor Button
    - AR Prompt
  - EventSystem
  - Game Controller
  - Video Player
  - CameraParent
    - Main Camera
  - ARCameraManager
  - Root
    - Cube
    - Augmented Instructions
  - ARKitRemoteConnection

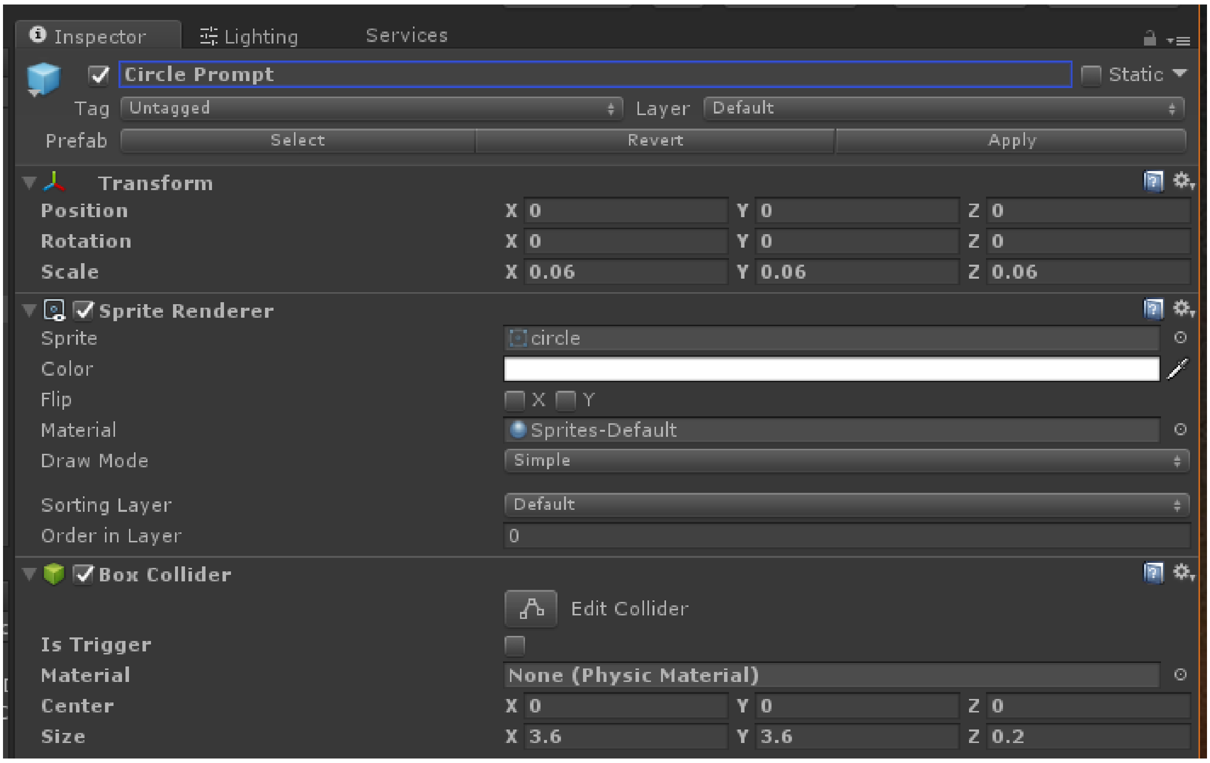


Step: 5

Raise the jack

Raise the jack until it is supporting (but not lifting) the car. The jack should be


Scene
Shaded
2D
Gizmos
All
<
>
Step #
Title Text


Inspector
Lighting
Services

☑ Circle Prompt ☐ Static

Tag Untagged Layer Default

Prefab Select Revert Apply

Transform

	X	Y	Z
Position	0	0	0
Rotation	0	0	0
Scale	0.06	0.06	0.06

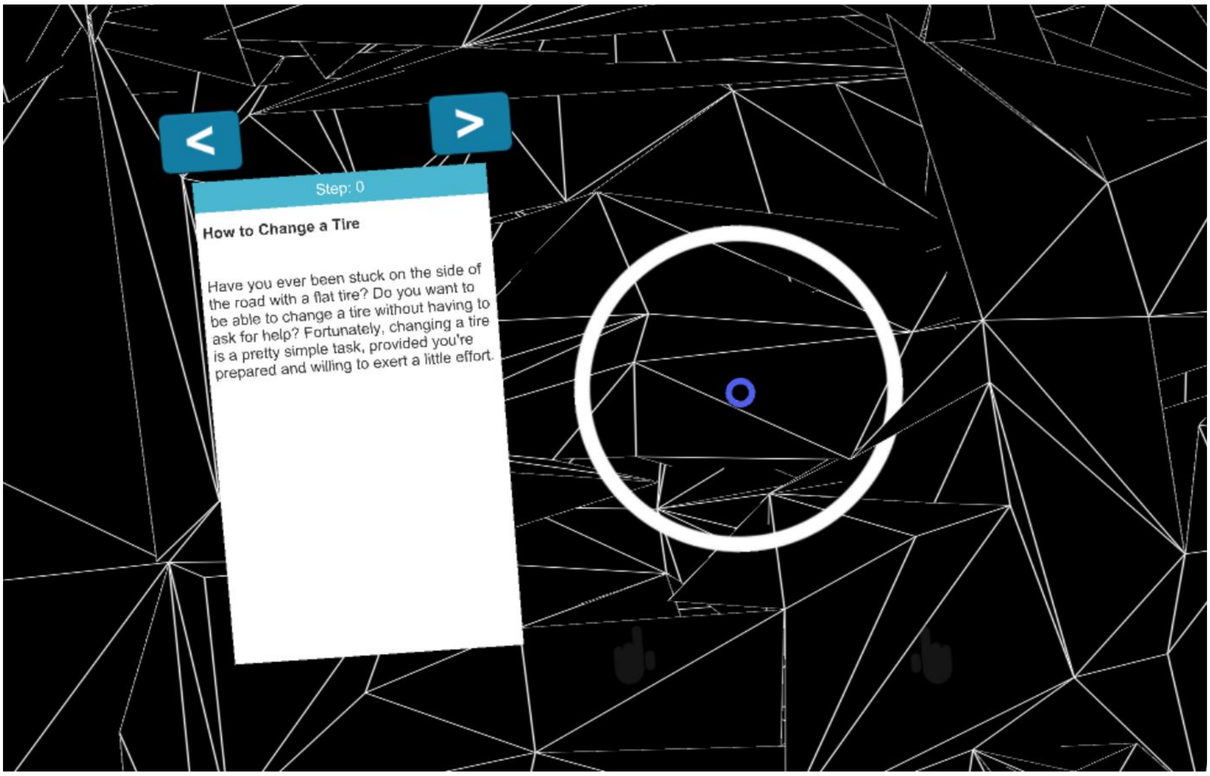
☑ **Sprite Renderer**

Sprite	circle
Color	
Flip	☐ X ☐ Y
Material	Sprites-Default
Draw Mode	Simple
Sorting Layer	Default
Order in Layer	0

☑ **Box Collider**

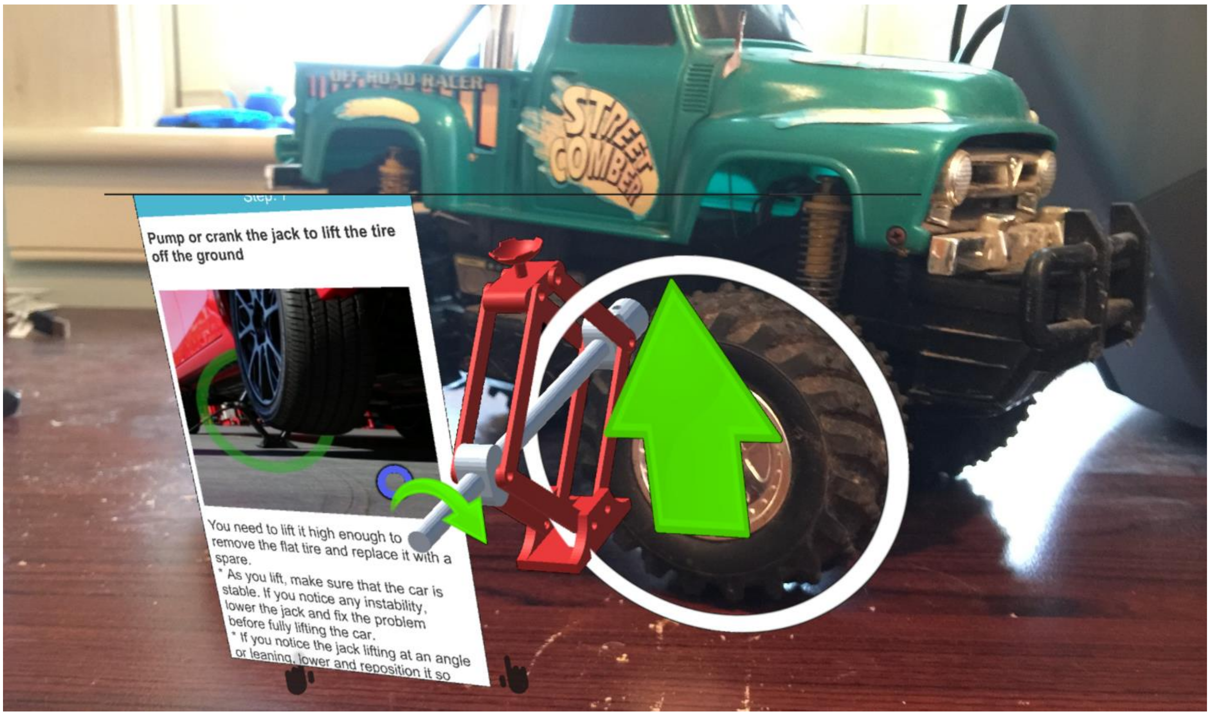
Edit Collider

	X	Y	Z
Is Trigger	☐		
Material	None (Physic Material)		
Center	0	0	0
Size	3.6	3.6	0.2



How to Change a Tire

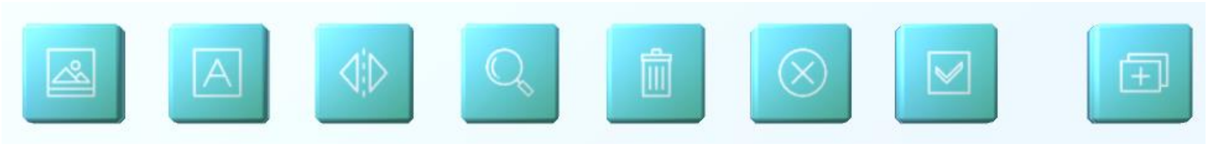
Have you ever been stuck on the side of the road with a flat tire? Do you want to be able to change a tire without having to ask for help? Fortunately, changing a tire is a pretty simple task, provided you're prepared and willing to exert a little effort.

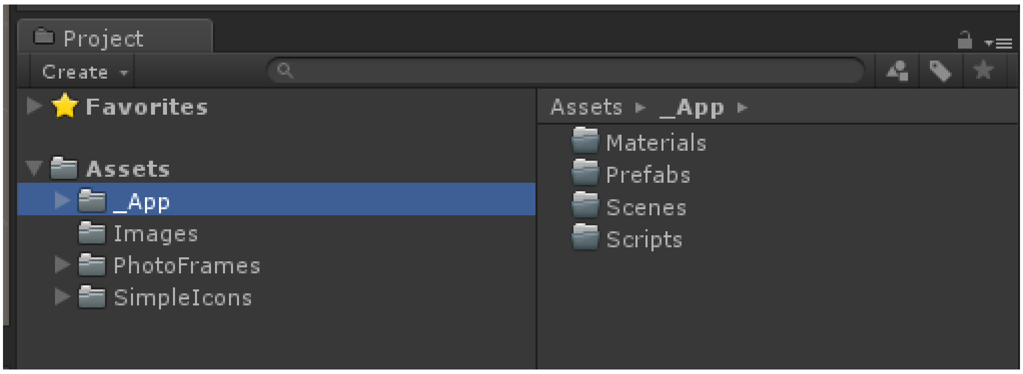


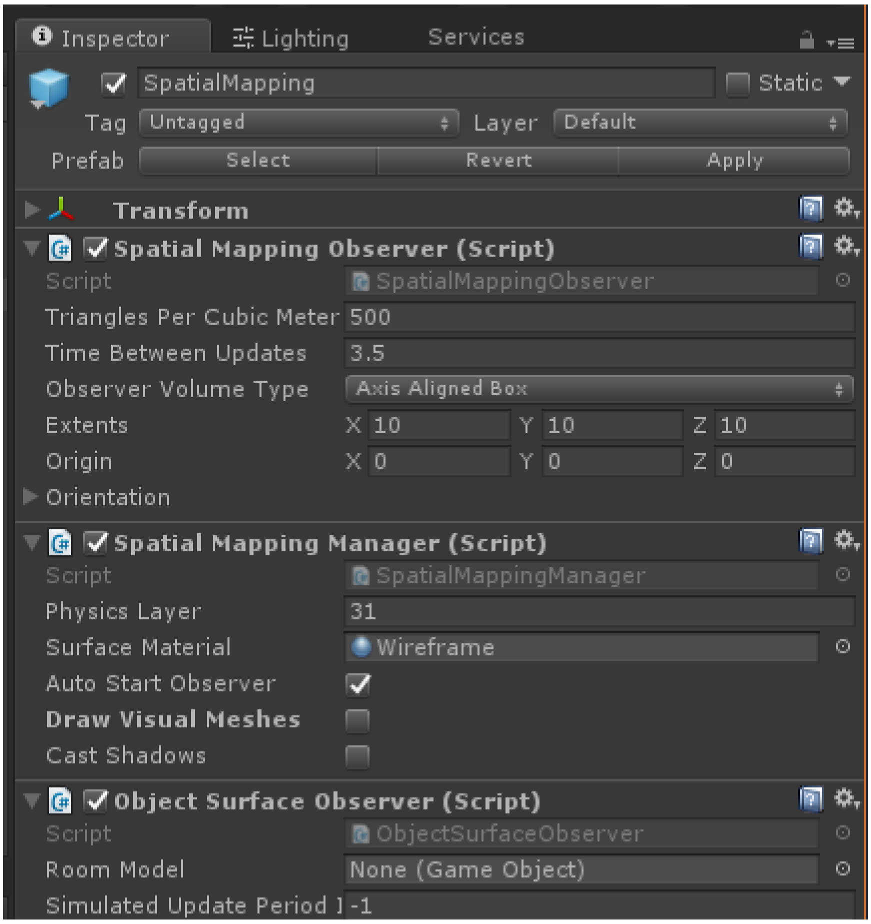
Pump or crank the jack to lift the tire off the ground

You need to lift it high enough to remove the flat tire and replace it with a spare.
* As you lift, make sure that the car is stable. If you notice any instability, lower the jack and fix the problem before fully lifting the car.
* If you notice the jack lifting at an angle or leaning, lower and reposition it so

Chapter 8: Room Decoration with AR




Project
Create
Favorites
Assets
_App
Images
PhotoFrames
SimpleIcons
Assets ▸ _App ▸
Materials
Prefabs
Scenes
Scripts



☑ SpatialMapping ☐ Static

Tag Untagged Layer Default

Transform

☑ Spatial Mapping Observer (Script)

Script SpatialMappingObserver

Triangles Per Cubic Meter 500

Time Between Updates 3.5

Observer Volume Type Axis Aligned Box

Extents X 10 Y 10 Z 10

Origin X 0 Y 0 Z 0

Orientation

☑ Spatial Mapping Manager (Script)

Script SpatialMappingManager

Physics Layer 31

Surface Material Wireframe

Auto Start Observer ☑

Draw Visual Meshes ☐

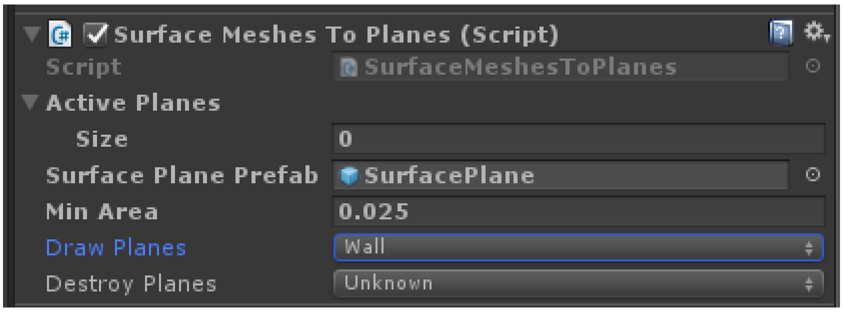
Cast Shadows ☐

☑ Object Surface Observer (Script)

Script ObjectSurfaceObserver

Room Model None (Game Object)

Simulated Update Period I -1



Surface Meshes To Planes (Script)

Script: SurfaceMeshesToPlanes

Active Planes

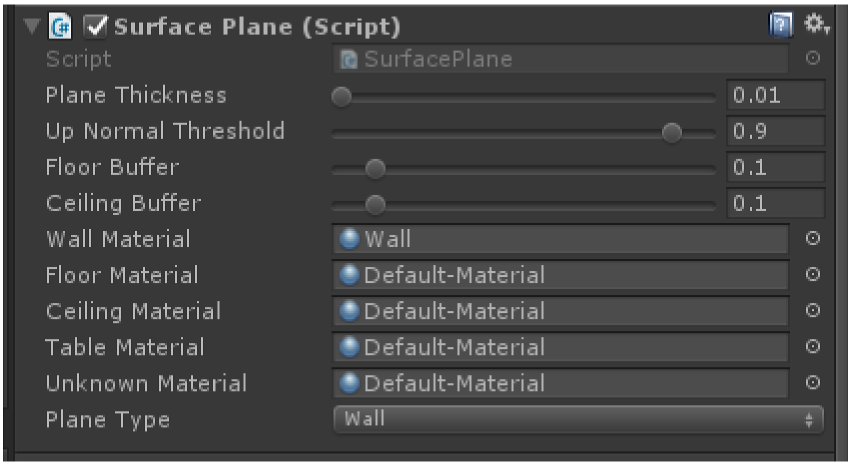
Size: 0

Surface Plane Prefab: SurfacePlane

Min Area: 0.025

Draw Planes: Wall

Destroy Planes: Unknown



Surface Plane (Script)

Script: SurfacePlane

Plane Thickness: 0.01

Up Normal Threshold: 0.9

Floor Buffer: 0.1

Ceiling Buffer: 0.1

Wall Material: Wall

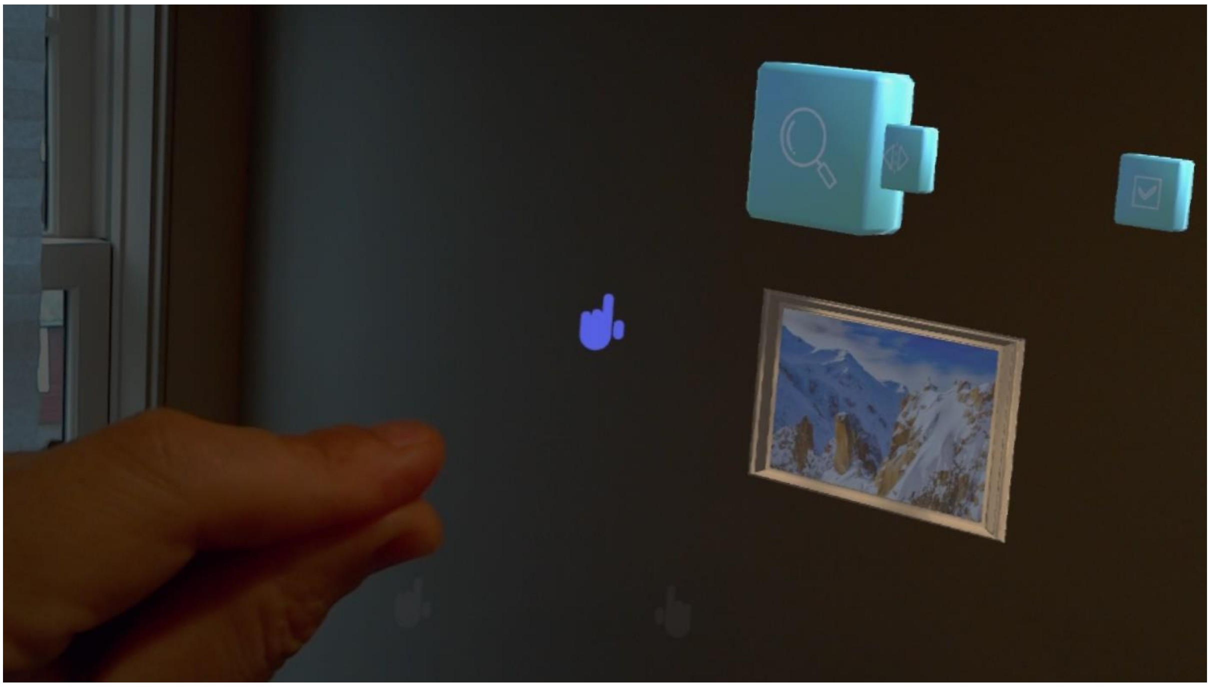
Floor Material: Default-Material

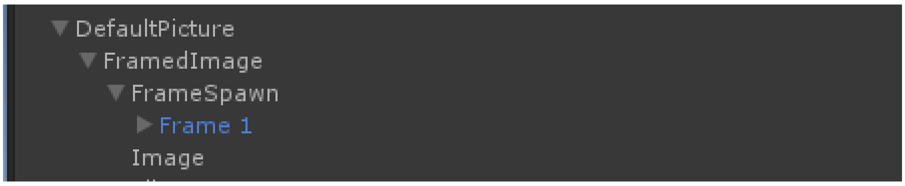
Ceiling Material: Default-Material

Table Material: Default-Material

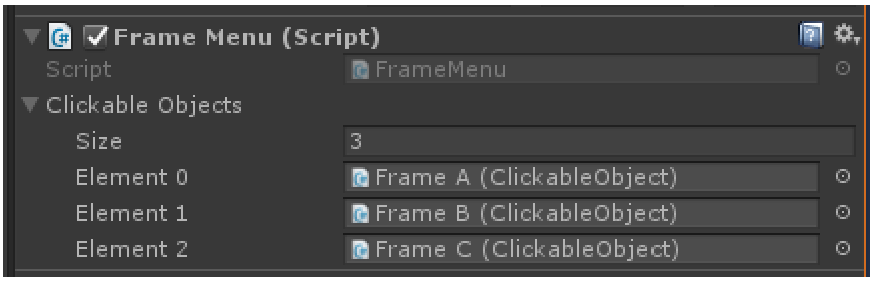
Unknown Material: Default-Material

Plane Type: Wall



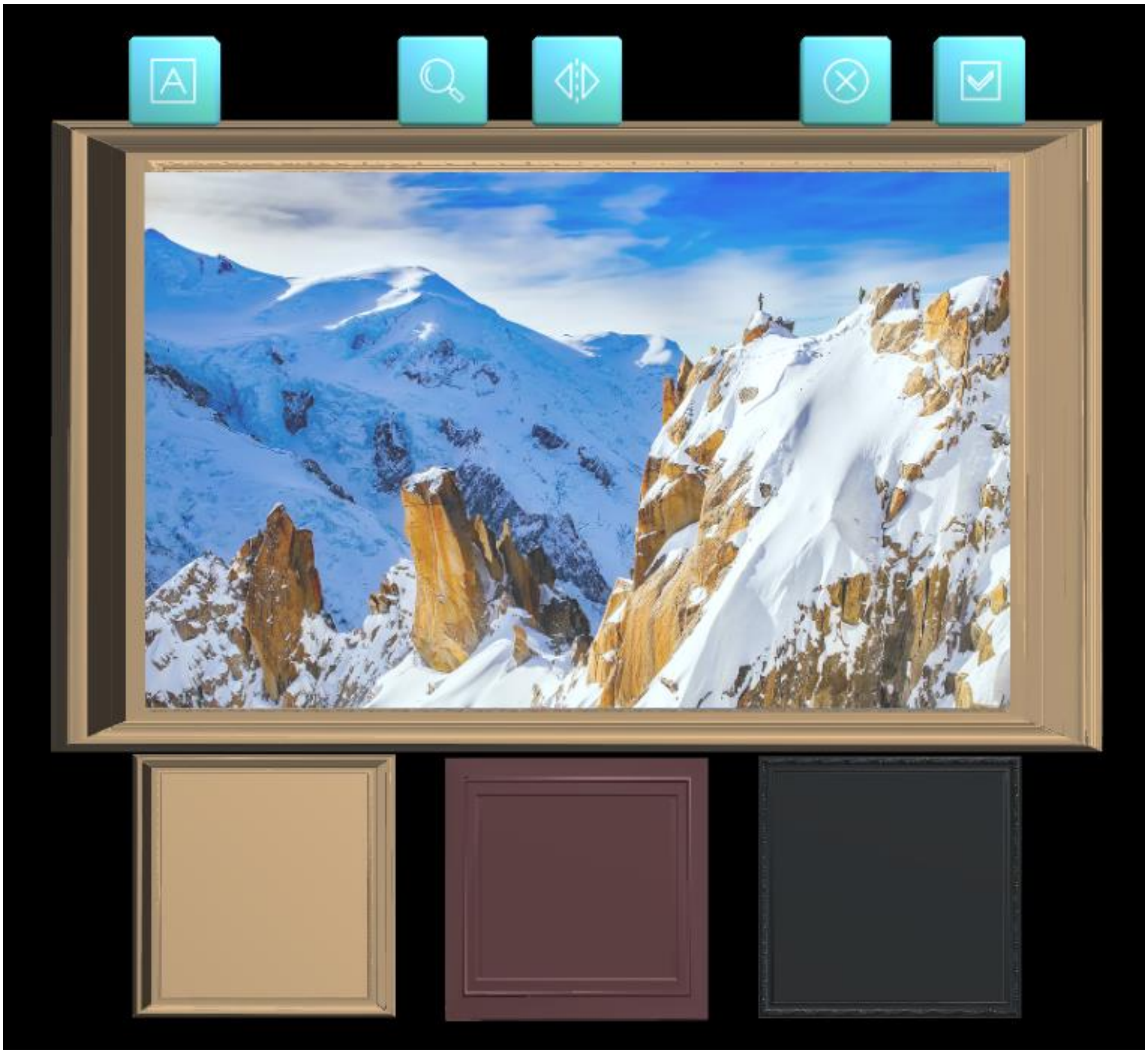


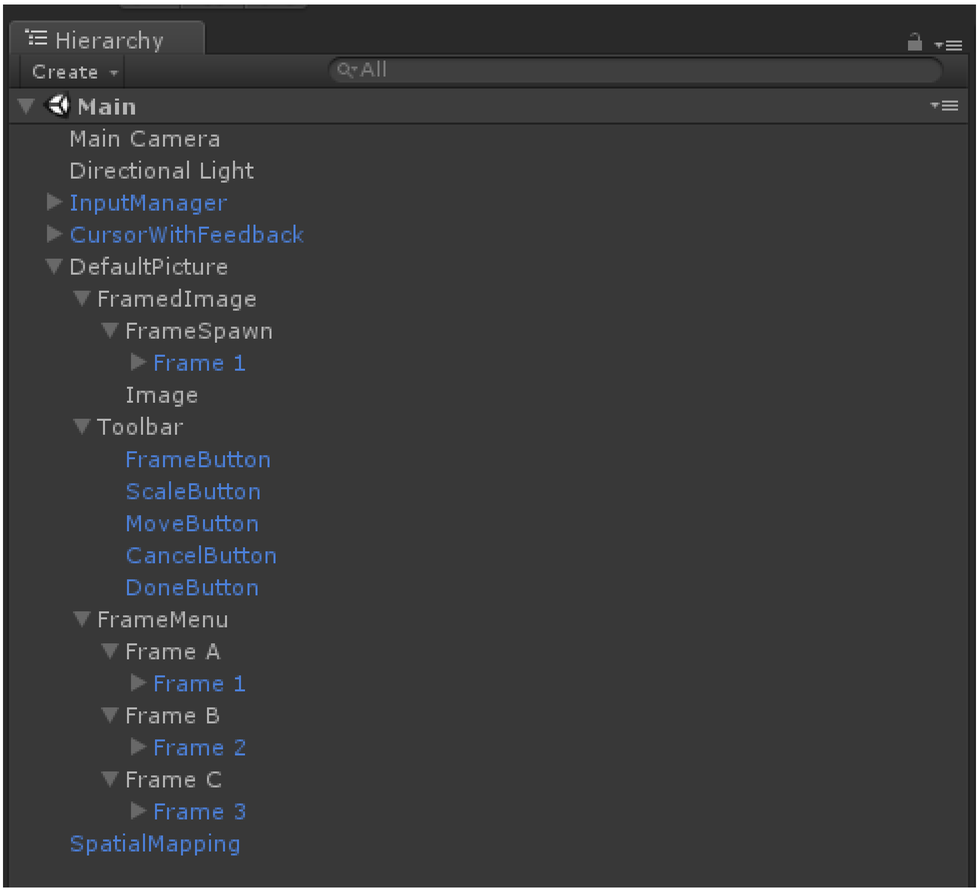
- DefaultPicture
  - FramedImage
    - FrameSpawn
      - Frame 1
    - Image



Frame Menu (Script)

Script	FrameMenu
Clickable Objects	
Size	3
Element 0	Frame A (ClickableObject)
Element 1	Frame B (ClickableObject)
Element 2	Frame C (ClickableObject)





- Main
  - Main Camera
  - Directional Light
  - InputManager
  - CursorWithFeedback
  - DefaultPicture
    - FramedImage
      - FrameSpawn
        - Frame 1
      - Image
    - Toolbar
      - FrameButton
      - ScaleButton
      - MoveButton
      - CancelButton
      - DoneButton
    - FrameMenu
      - Frame A
        - Frame 1
      - Frame B
        - Frame 2
      - Frame C
        - Frame 3
  - SpatialMapping

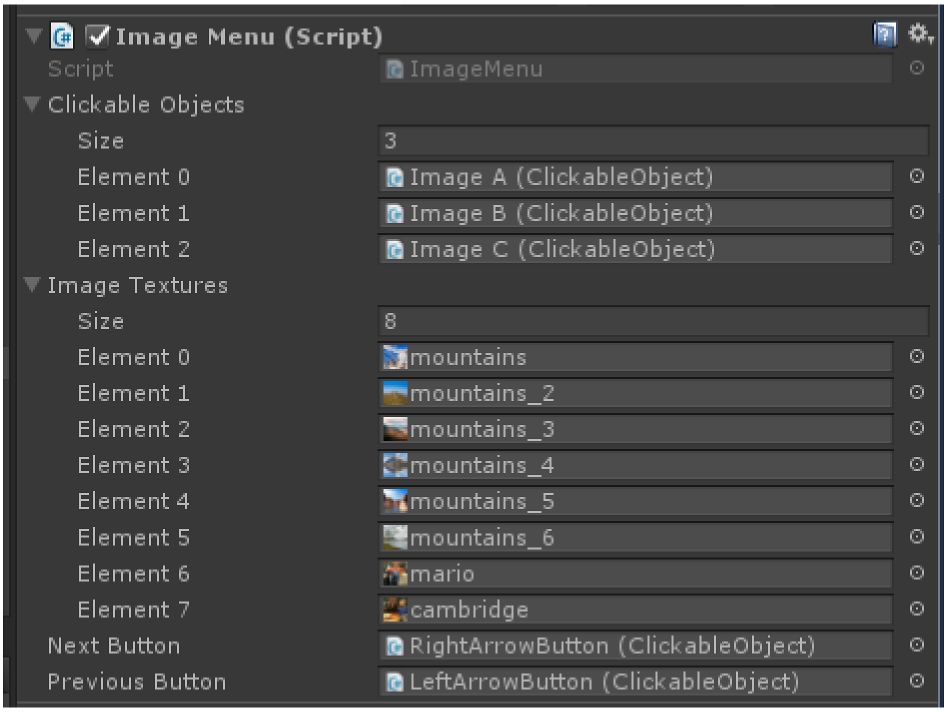
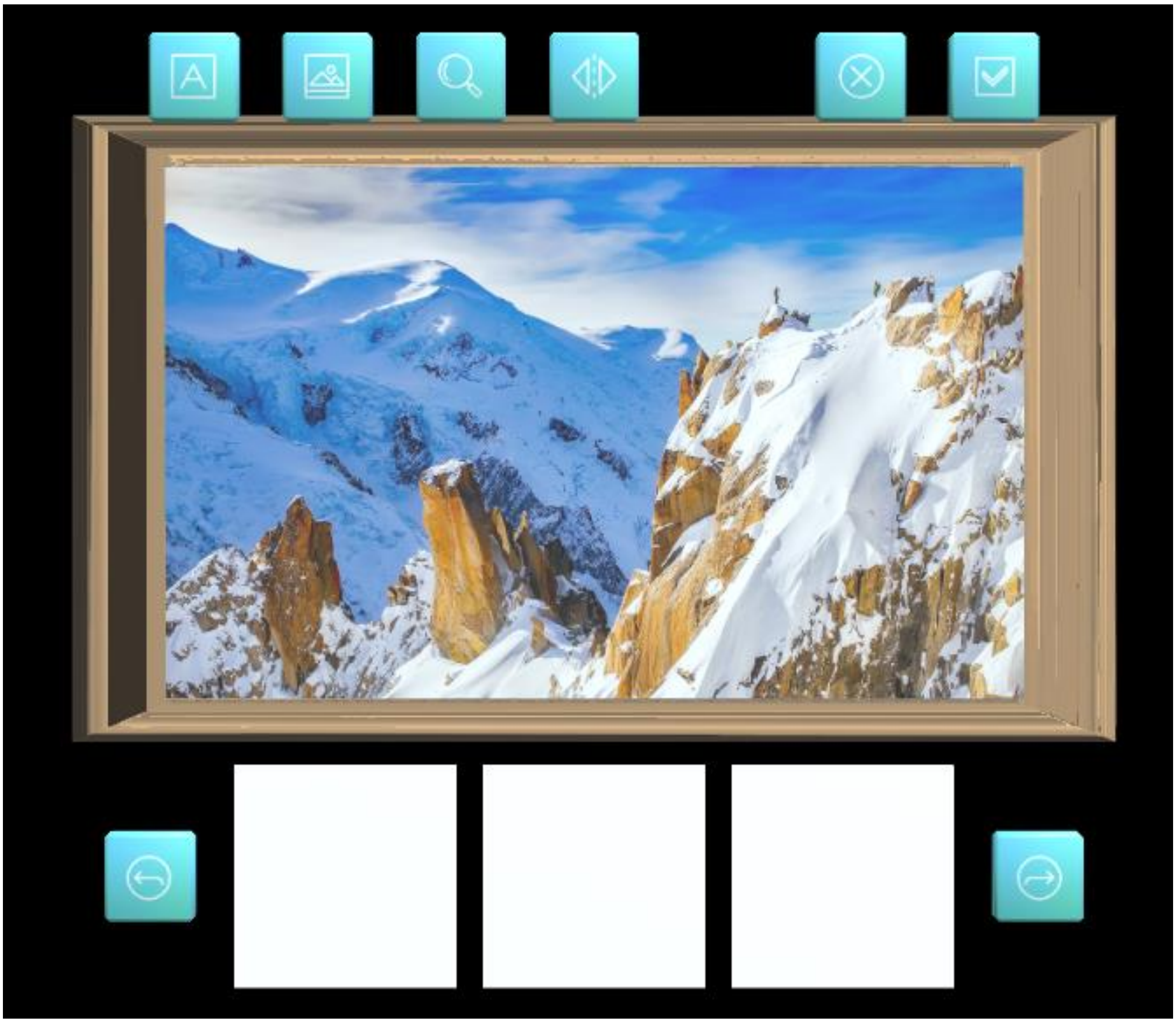
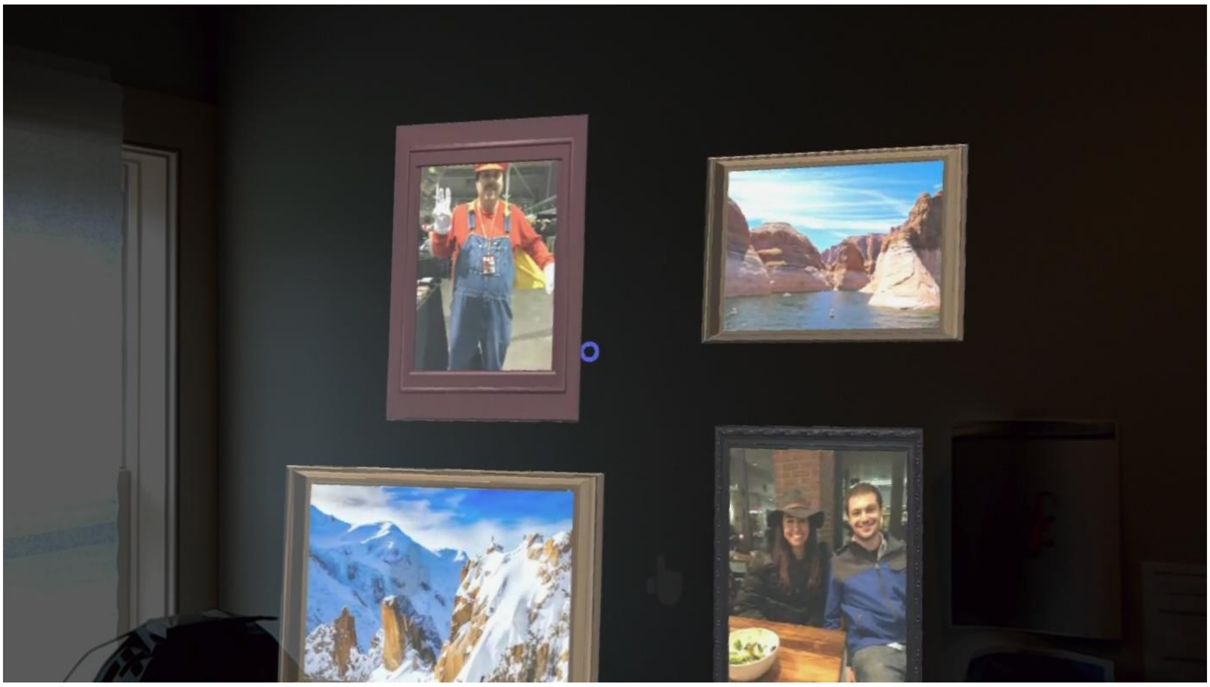
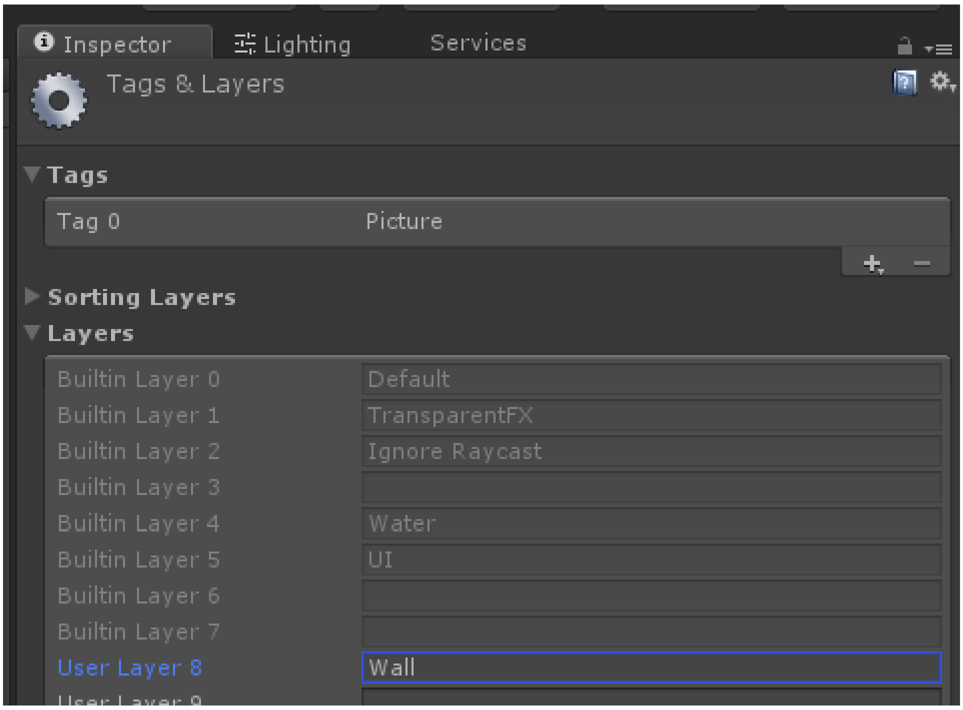


Image Menu (Script)

Script	ImageMenu
Clickable Objects	
Size	3
Element 0	Image A (ClickableObject)
Element 1	Image B (ClickableObject)
Element 2	Image C (ClickableObject)
Image Textures	
Size	8
Element 0	mountains
Element 1	mountains_2
Element 2	mountains_3
Element 3	mountains_4
Element 4	mountains_5
Element 5	mountains_6
Element 6	mario
Element 7	cambridge
Next Button	RightArrowButton (ClickableObject)
Previous Button	LeftArrowButton (ClickableObject)






Inspector
Lighting
Services
Tags & Layers

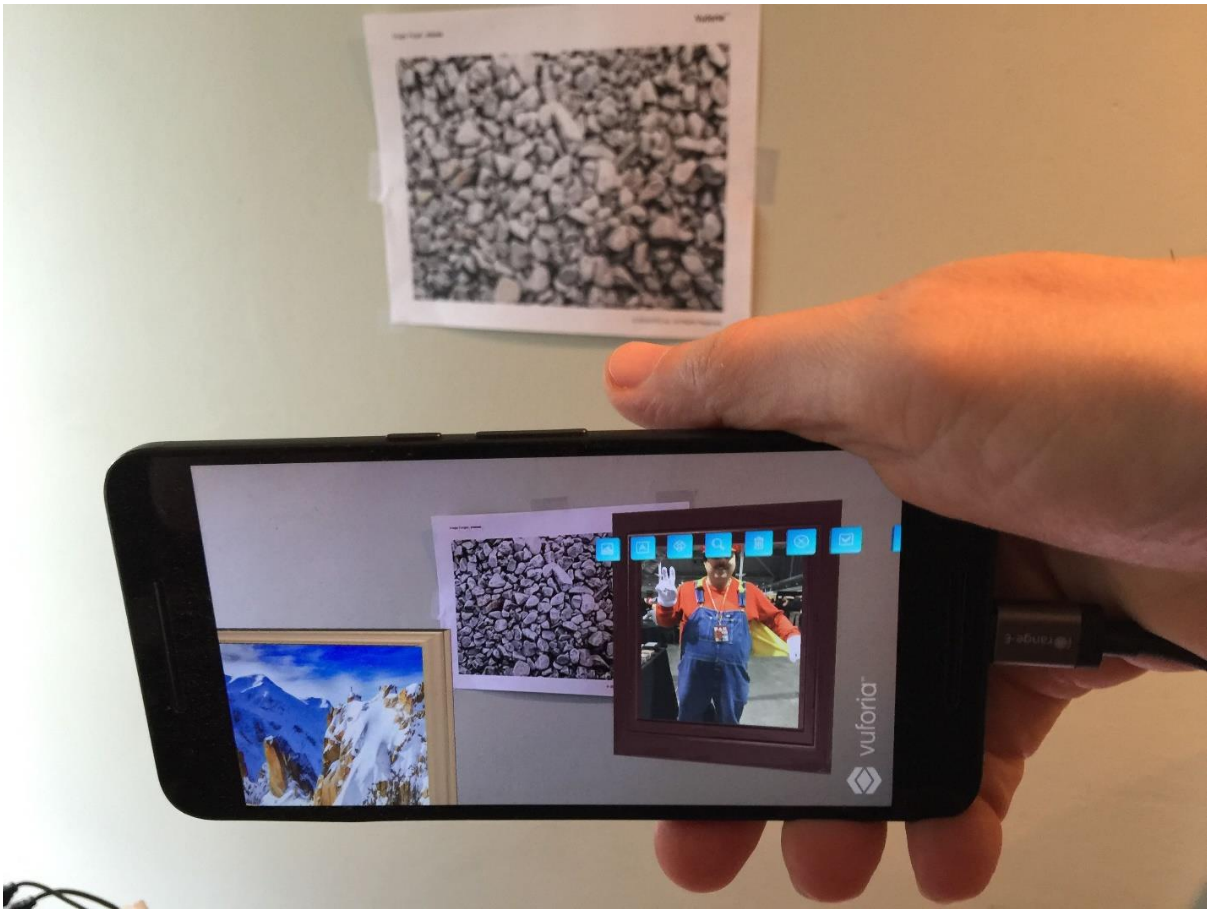
Tags

Tag 0	Picture

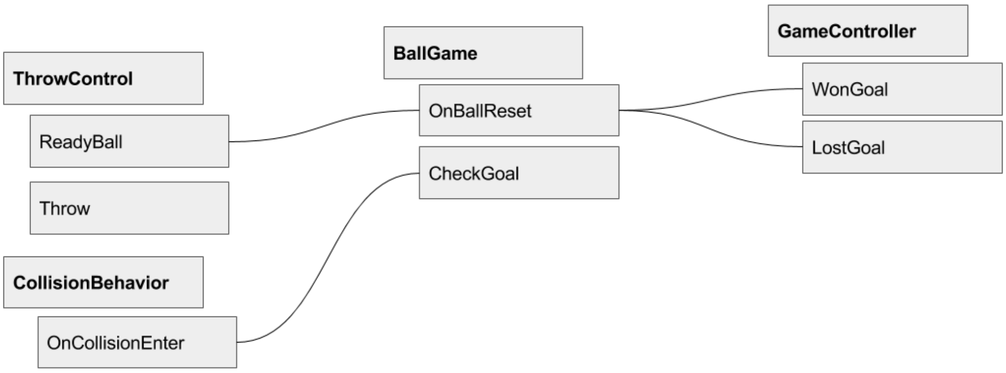
Sorting Layers

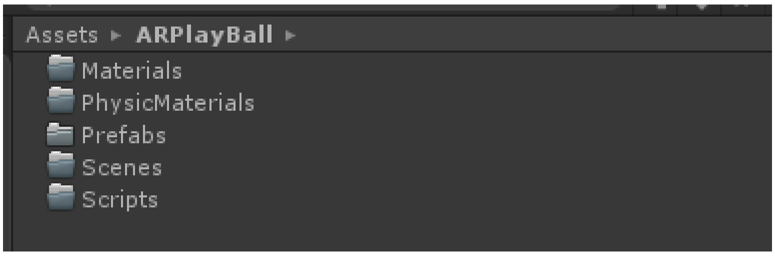
Layers

Builtin Layer 0	Default
Builtin Layer 1	TransparentFX
Builtin Layer 2	Ignore Raycast
Builtin Layer 3	
Builtin Layer 4	Water
Builtin Layer 5	UI
Builtin Layer 6	
Builtin Layer 7	
User Layer 8	Wall
User Layer 9	


vuforia

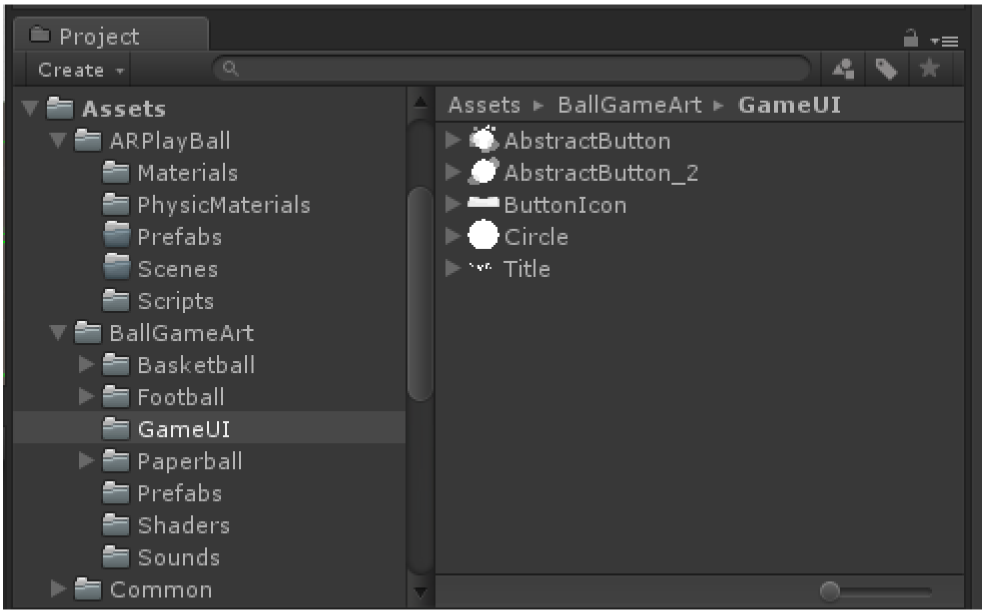
Chapter 9: Poke the Ball Game

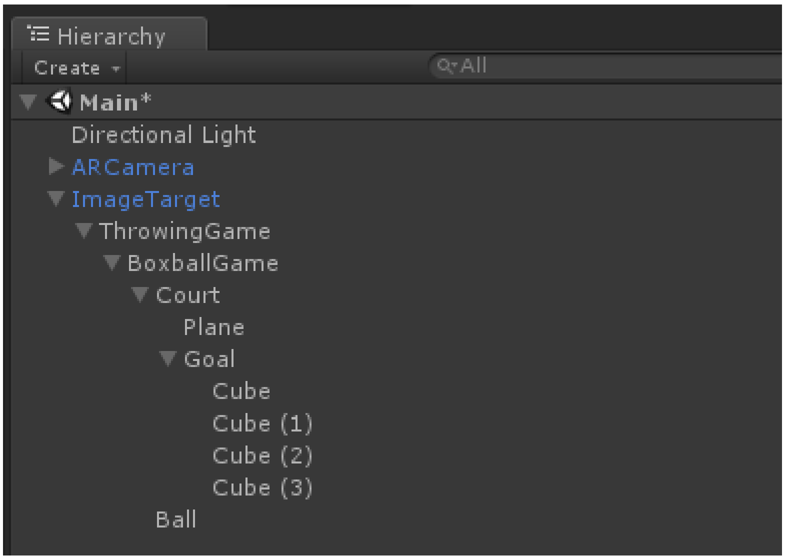

ThrowControl
ReadyBall
Throw
CollisionBehavior
OnCollisionEnter
BallGame
OnBallReset
CheckGoal
GameController
WonGoal
LostGoal

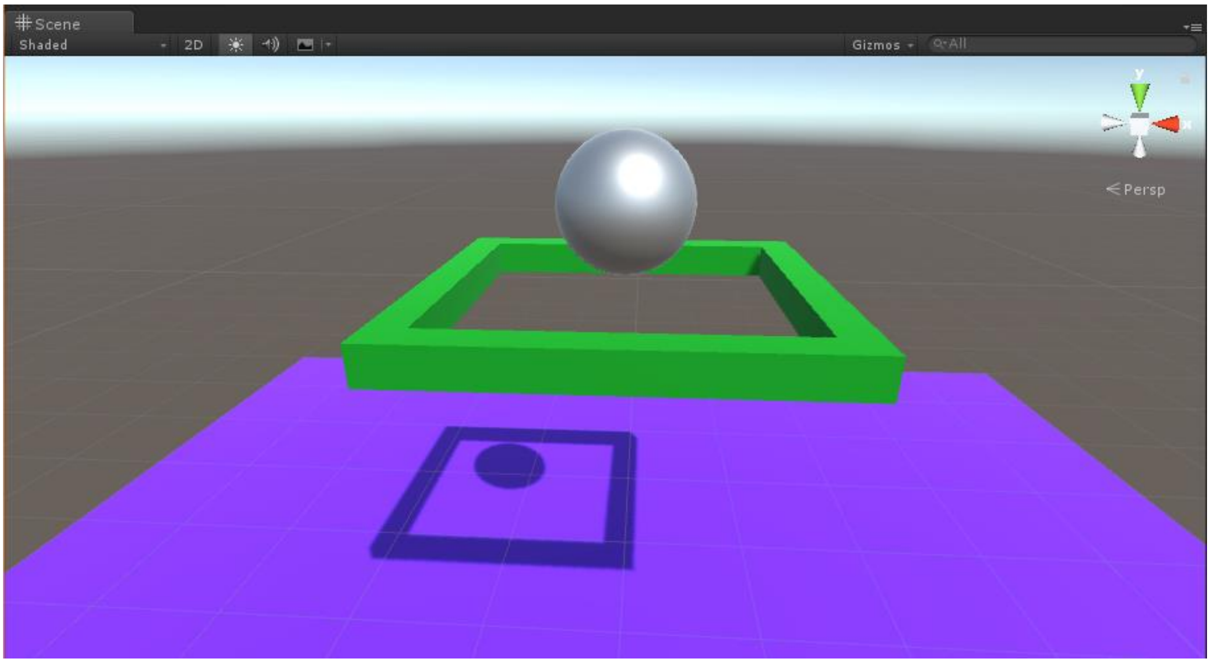


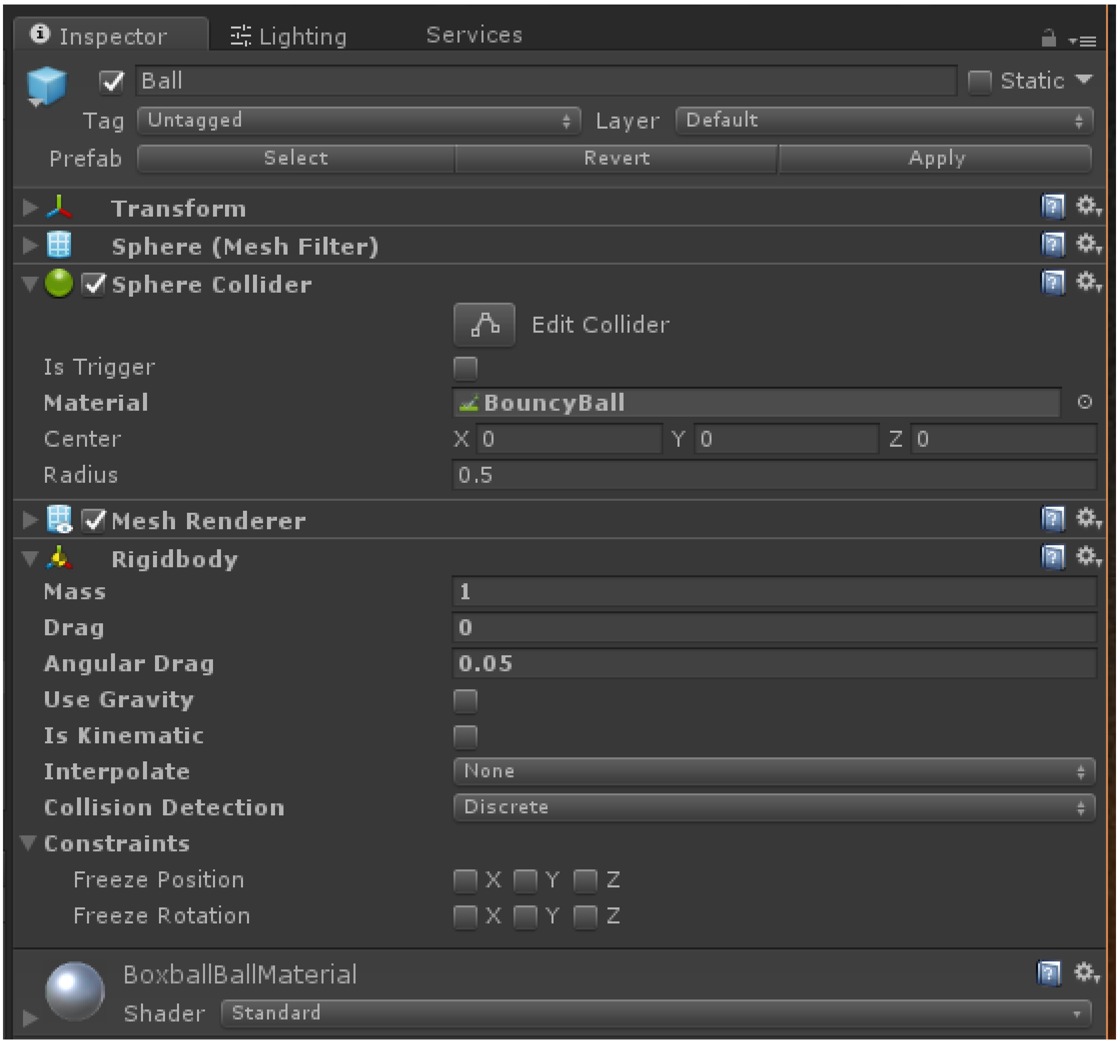
Assets ▸ ARPlayBall ▸

- Materials
- PhysicMaterials
- Prefabs
- Scenes
- Scripts


Project
Create
Assets
ARPlayBall
Materials
PhysicMaterials
Prefabs
Scenes
Scripts
BallGameArt
Basketball
Football
GameUI
Paperball
Prefabs
Shaders
Sounds
Common
Assets ▸ BallGameArt ▸ GameUI
AbstractButton
AbstractButton_2
ButtonIcon
Circle
Title


Hierarchy
Create
All
Main*
Directional Light
ARCamera
ImageTarget
ThrowingGame
BoxballGame
Court
Plane
Goal
Cube
Cube (1)
Cube (2)
Cube (3)
Ball


Scene
Shaded
2D
Gizmos
All
y
x
Persp


Inspector
Lighting
Services

☑ Ball ☐ Static

Tag: Untagged

Layer: Default

Prefab: Select | Revert | Apply

Transform

Sphere (Mesh Filter)

☑ **Sphere Collider**

Edit Collider

Is Trigger ☐

Material BouncyBall

Center X 0 Y 0 Z 0

Radius 0.5

☑ **Mesh Renderer**

Rigidbody

Mass 1

Drag 0

Angular Drag 0.05

Use Gravity ☐

Is Kinematic ☐

Interpolate None

Collision Detection Discrete

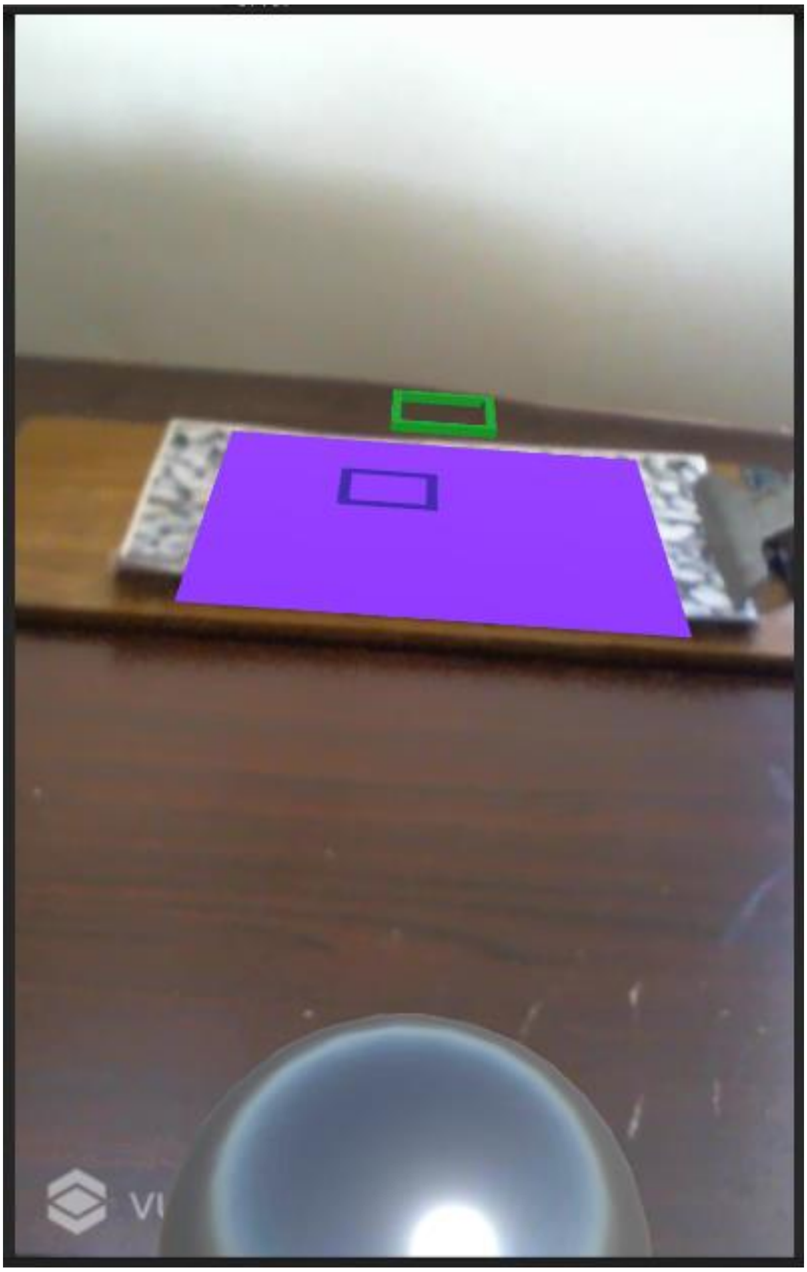
Constraints

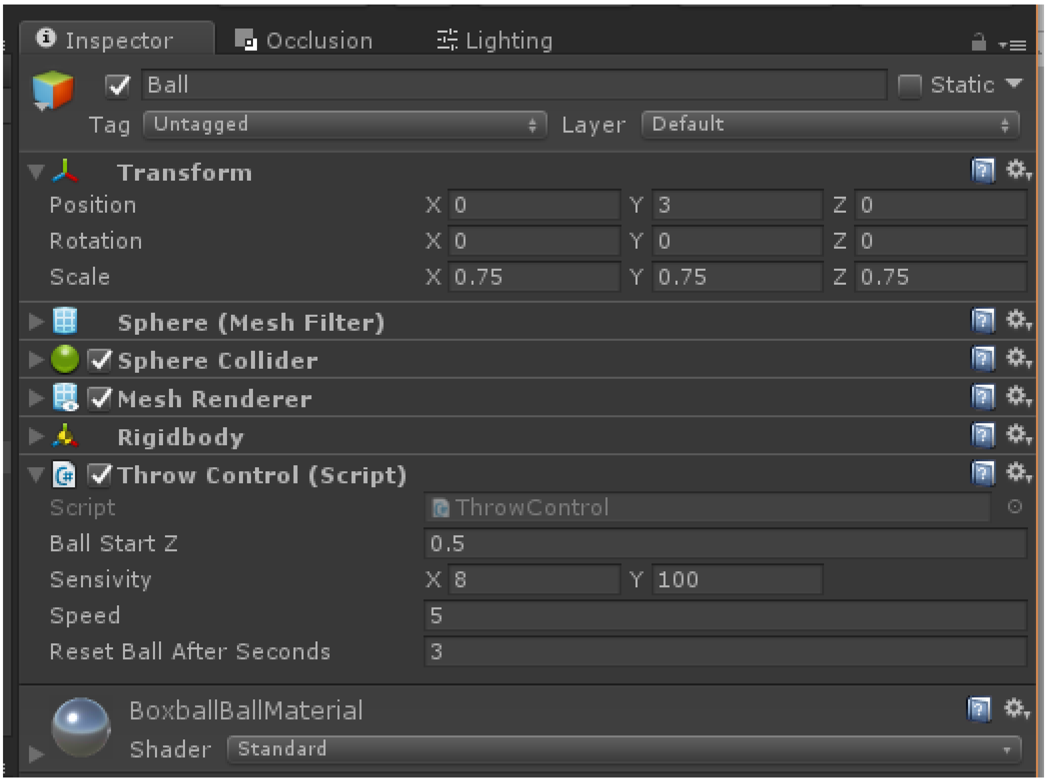
Freeze Position ☐ X ☐ Y ☐ Z

Freeze Rotation ☐ X ☐ Y ☐ Z

BoxballBallMaterial

Shader Standard





Inspector | Occlusion | Lighting

☑ Ball ☐ Static

Tag Untagged Layer Default

Transform

	X	Y	Z
Position	0	3	0
Rotation	0	0	0
Scale	0.75	0.75	0.75

Sphere (Mesh Filter)

☑ **Sphere Collider**

☑ **Mesh Renderer**

Rigidbody

☑ **Throw Control (Script)**

Script ThrowControl

Ball Start Z 0.5

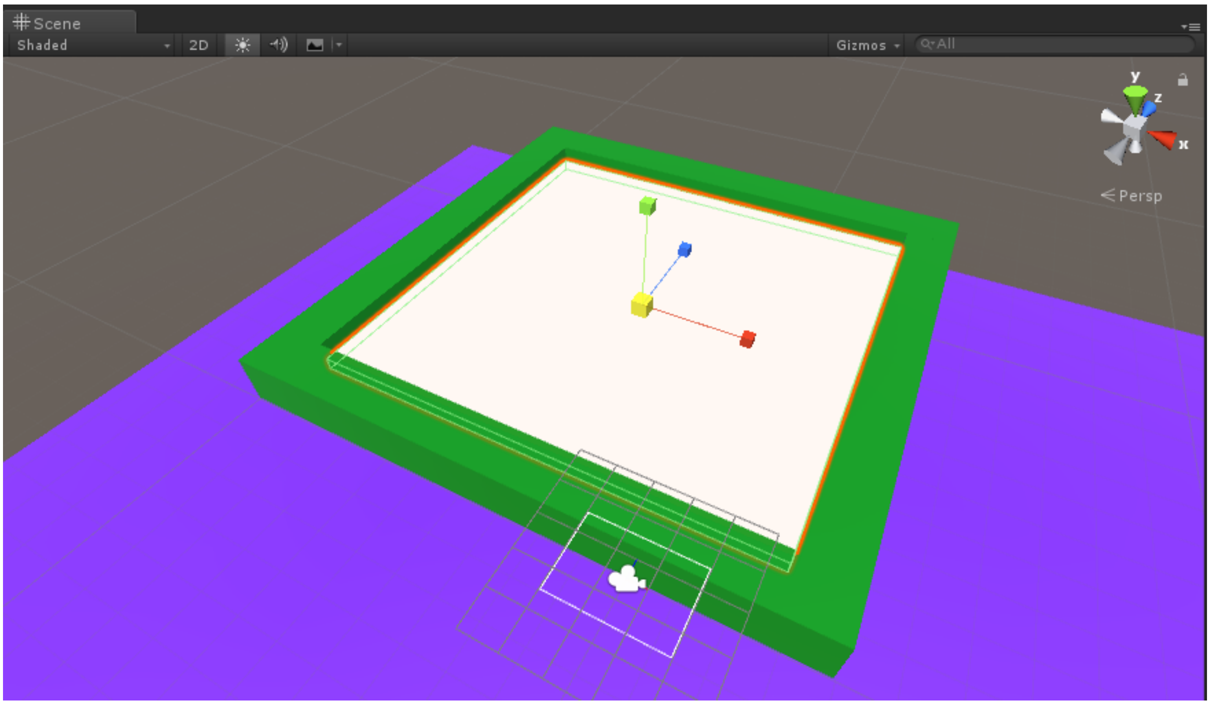
Sensivity X 8 Y 100

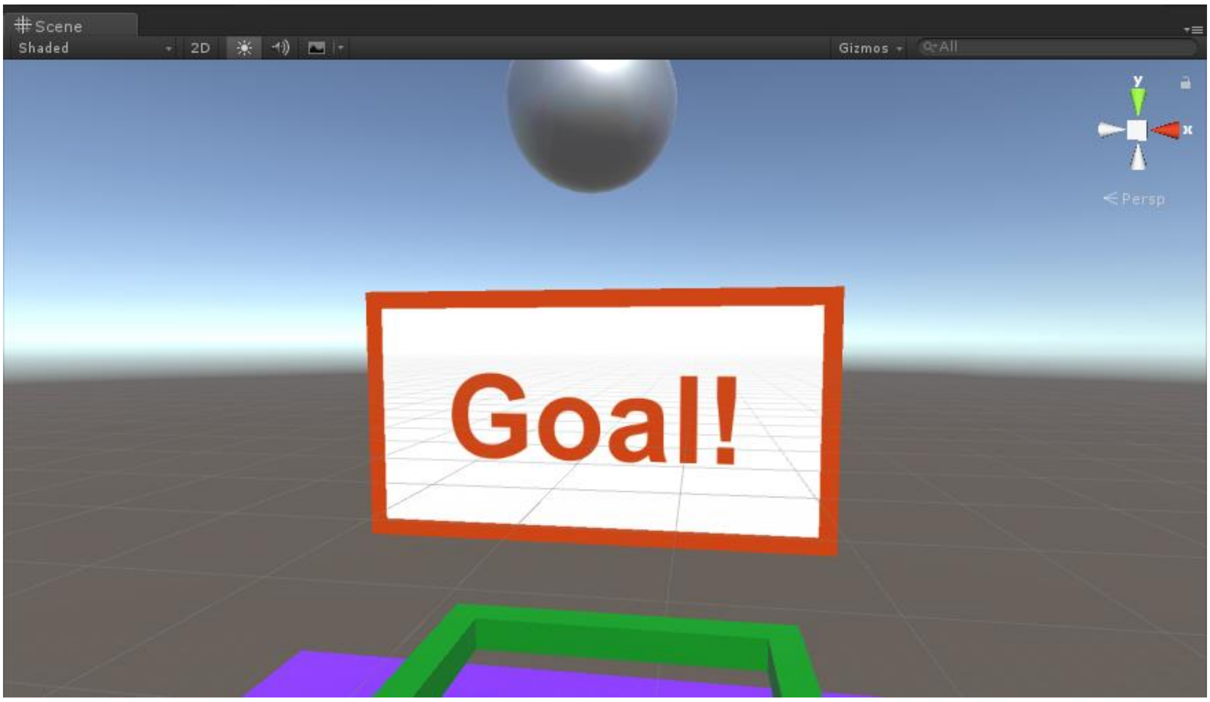
Speed 5

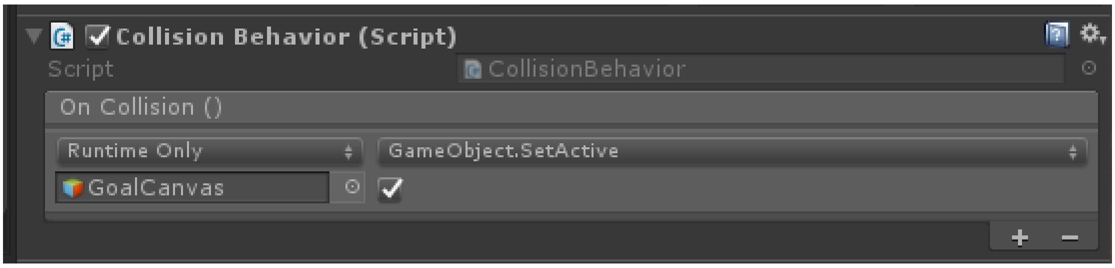
Reset Ball After Seconds 3

BoxballBallMaterial

Shader Standard




Scene
Shaded
2D
Gizmos
All
y
x
Persp
Goal!



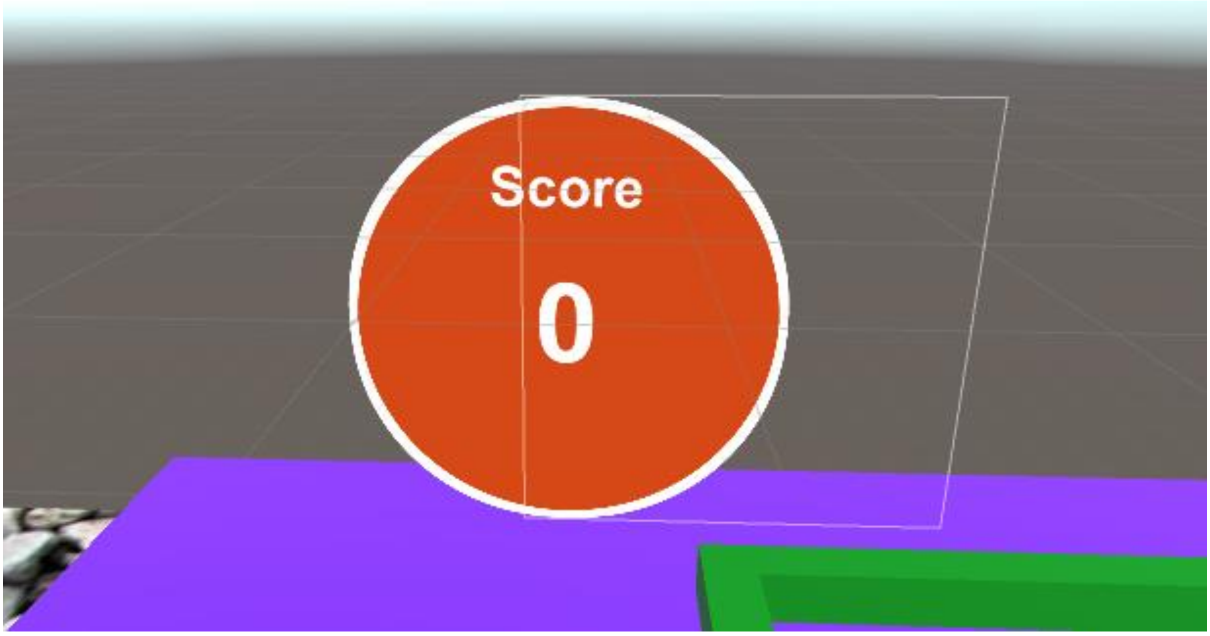
Collision Behavior (Script) ☑

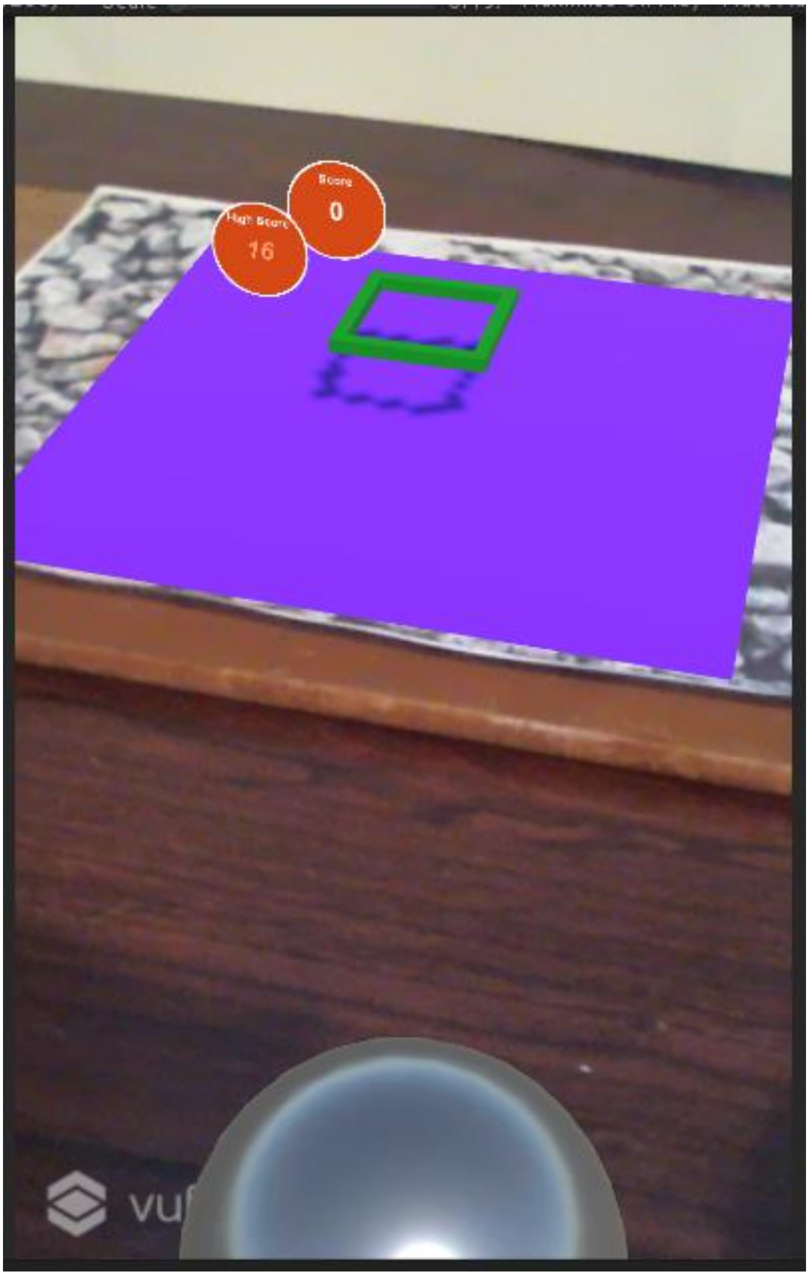
Script: CollisionBehavior

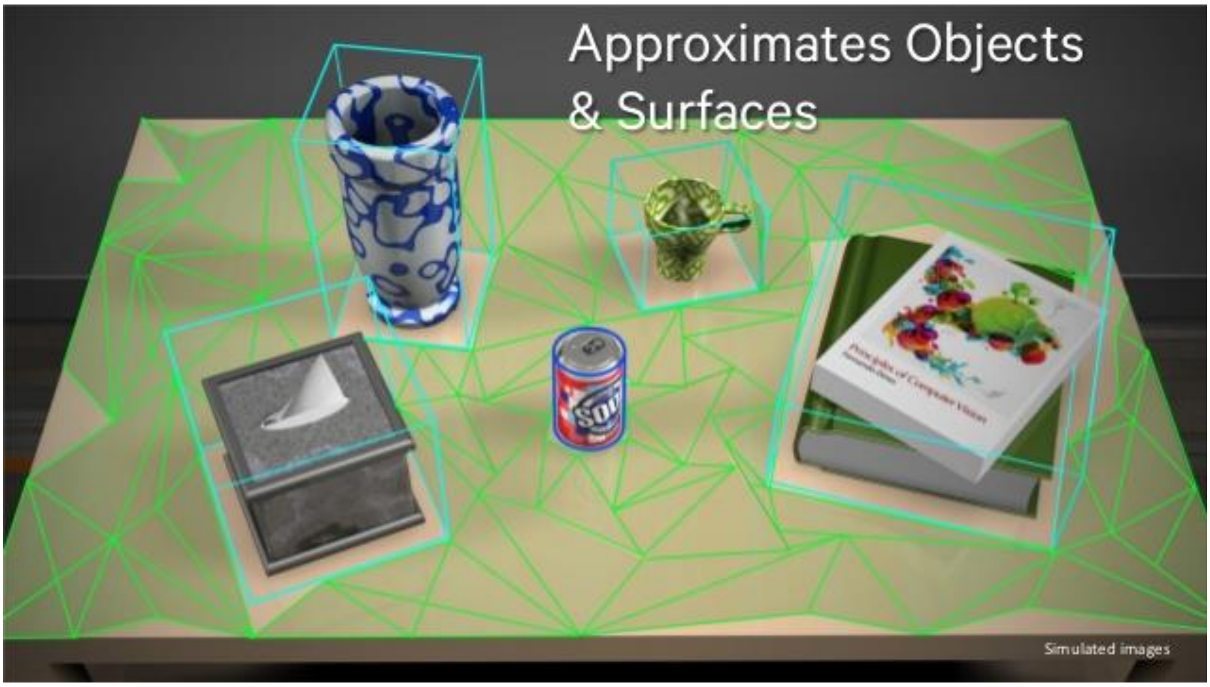
On Collision ()

Runtime Only | GameObject.SetActive

GoalCanvas ☑

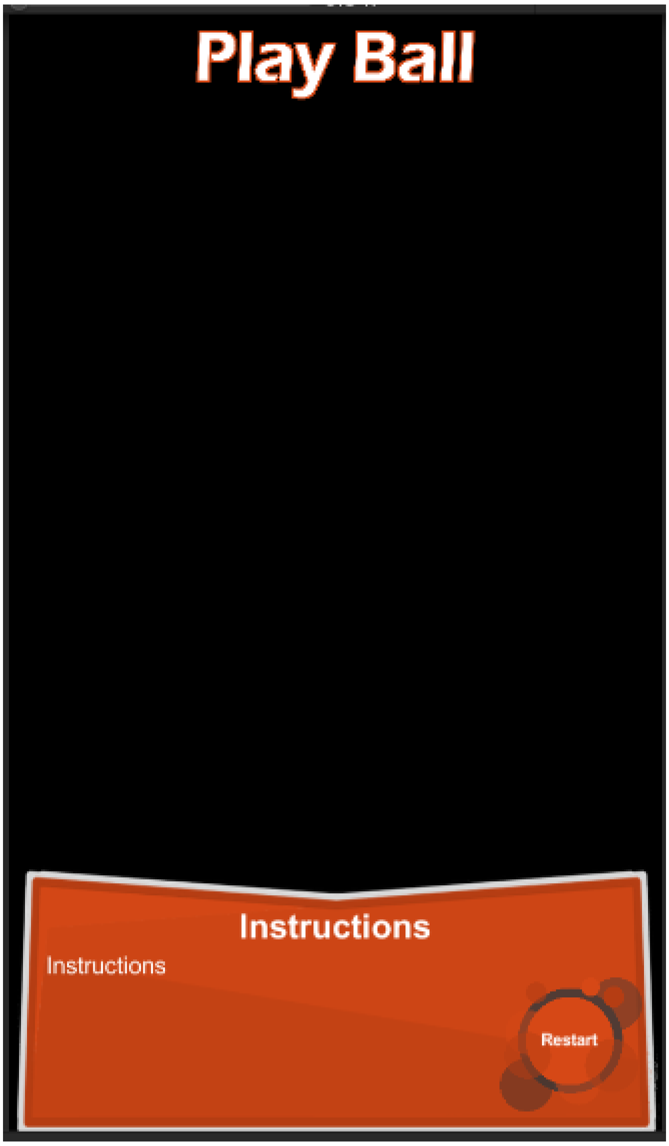


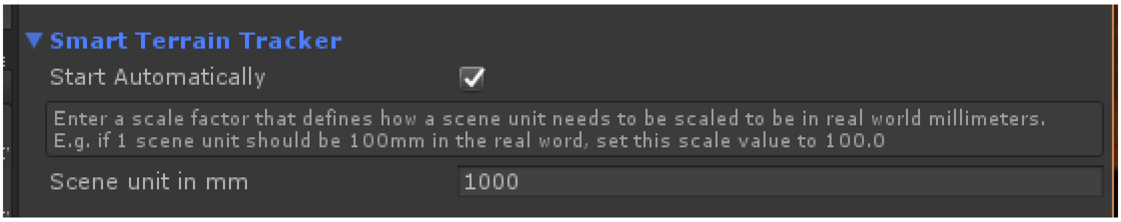

High Score
16
Score
0



Approximates Objects & Surfaces

Simulated images


Play Ball
Instructions
Instructions
Restart

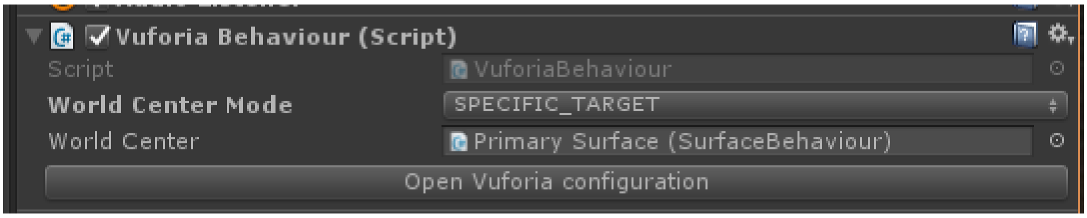


▼ Smart Terrain Tracker

Start Automatically ☑

Enter a scale factor that defines how a scene unit needs to be scaled to be in real world millimeters.
E.g. if 1 scene unit should be 100mm in the real word, set this scale value to 100.0

Scene unit in mm 1000



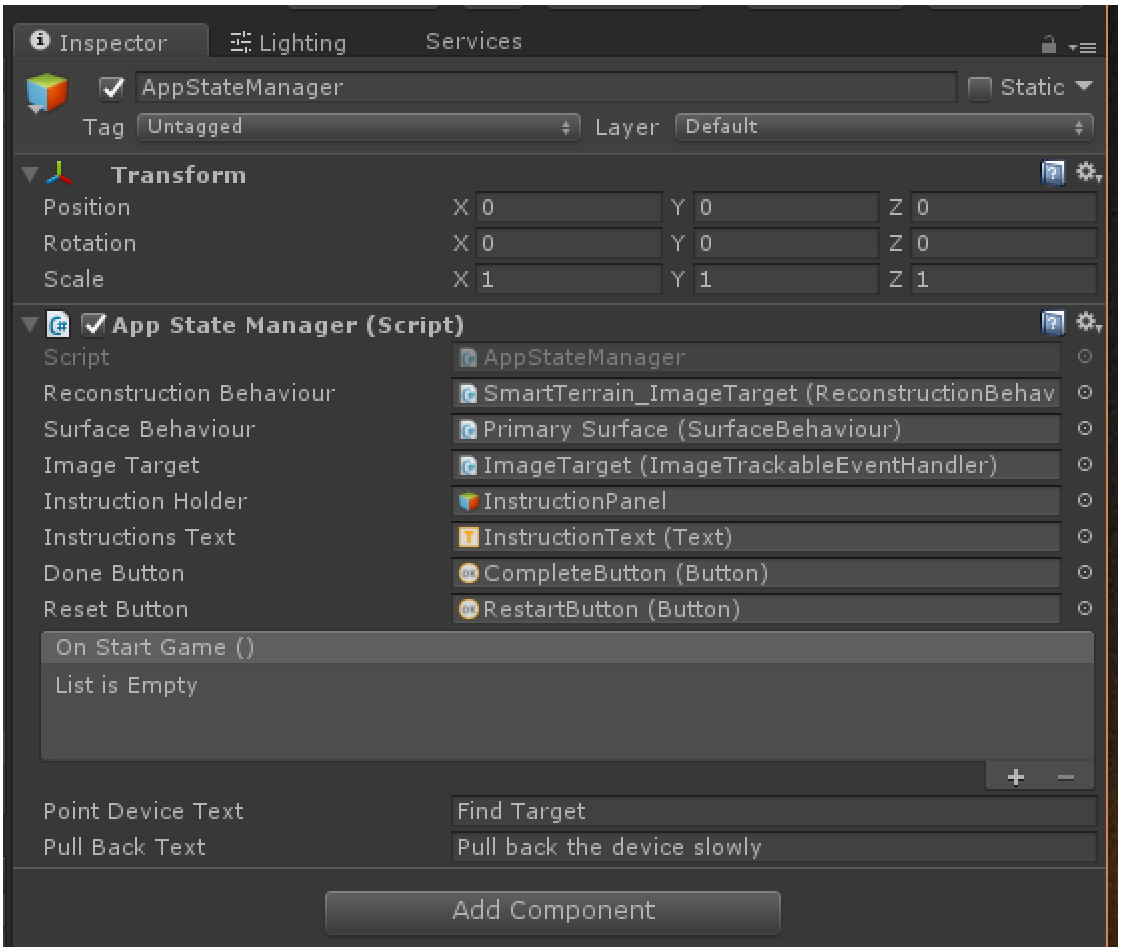
☑ Vuforia Behaviour (Script)

Script VuforiaBehaviour

World Center Mode SPECIFIC_TARGET

World Center Primary Surface (SurfaceBehaviour)

Open Vuforia configuration



AppStateManager

Tag: Untagged

Layer: Default

Transform

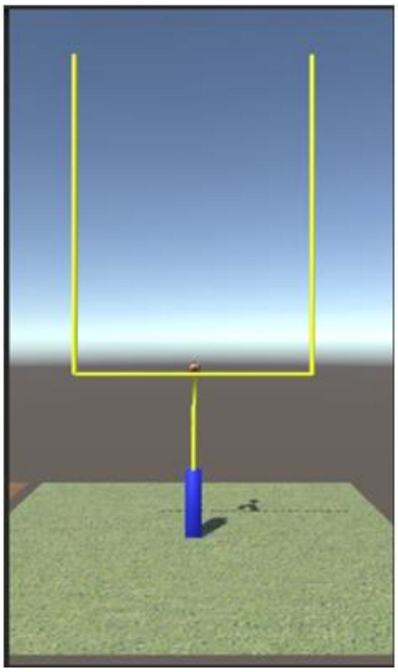
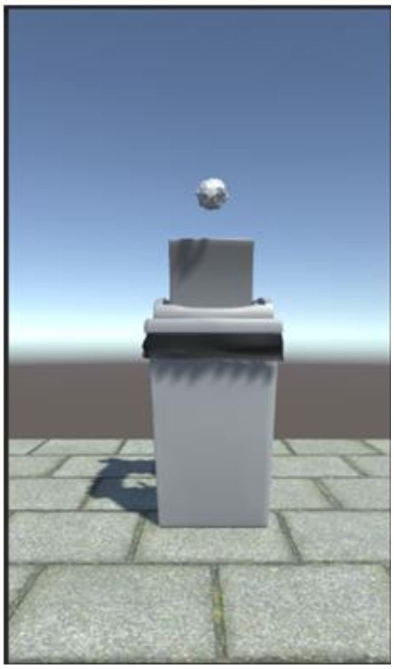
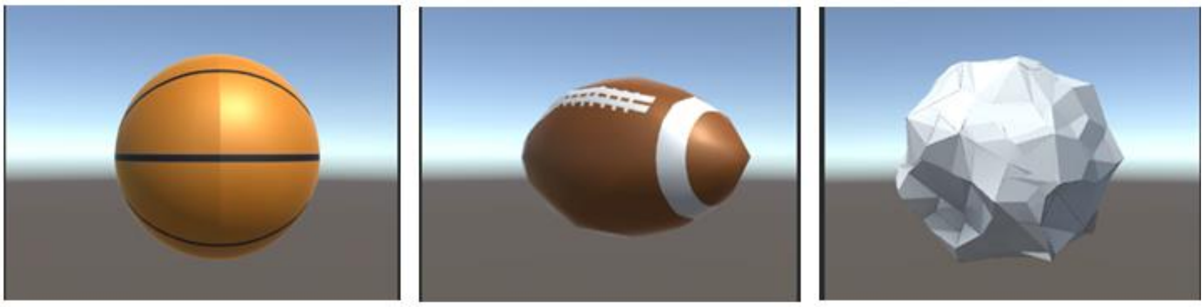
	X	Y	Z
Position	0	0	0
Rotation	0	0	0
Scale	1	1	1

App State Manager (Script)

Script	AppStateManager
Reconstruction Behaviour	SmartTerrain_ImageTarget (ReconstructionBehav
Surface Behaviour	Primary Surface (SurfaceBehaviour)
Image Target	ImageTarget (ImageTrackableEventHandler)
Instruction Holder	InstructionPanel
Instructions Text	InstructionText (Text)
Done Button	CompleteButton (Button)
Reset Button	RestartButton (Button)

On Start Game ()

List is Empty

Point Device Text	Find Target
Pull Back Text	Pull back the device slowly