Prototyping Augmented Reality: Image Targets with Vuforia

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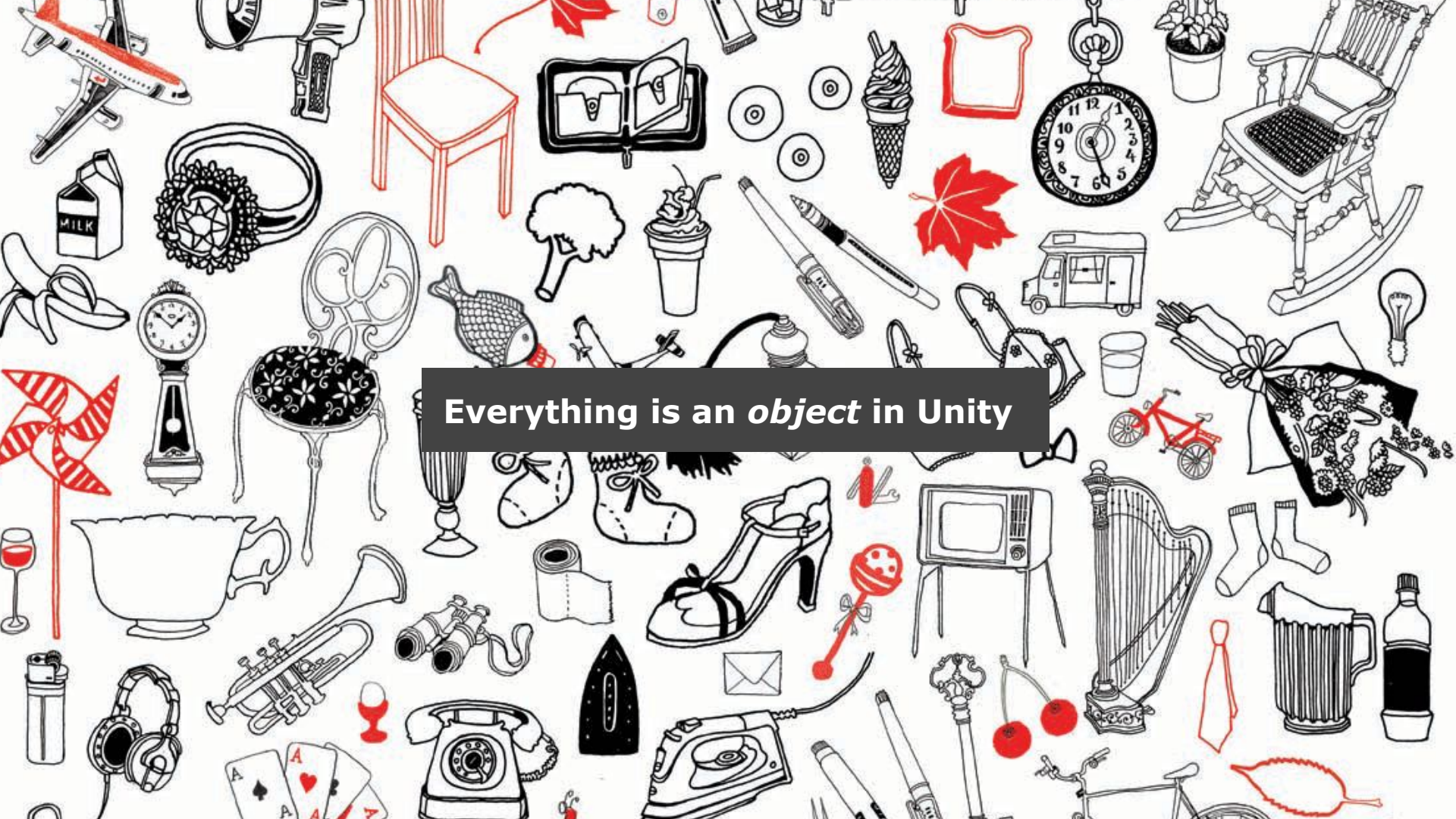
ITP Spring 2018


Everything is an *object* in Unity

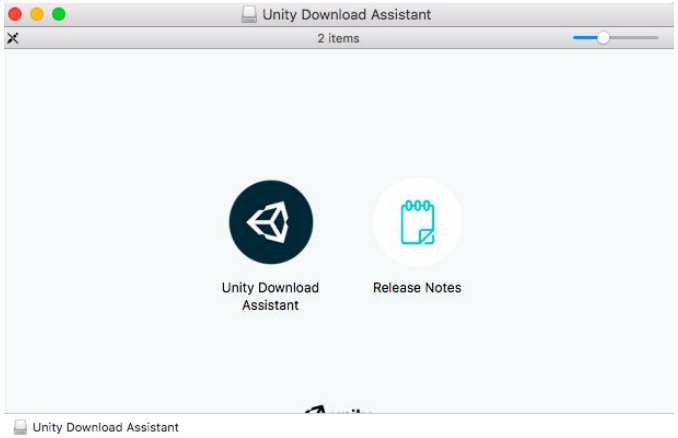

Objects are just code

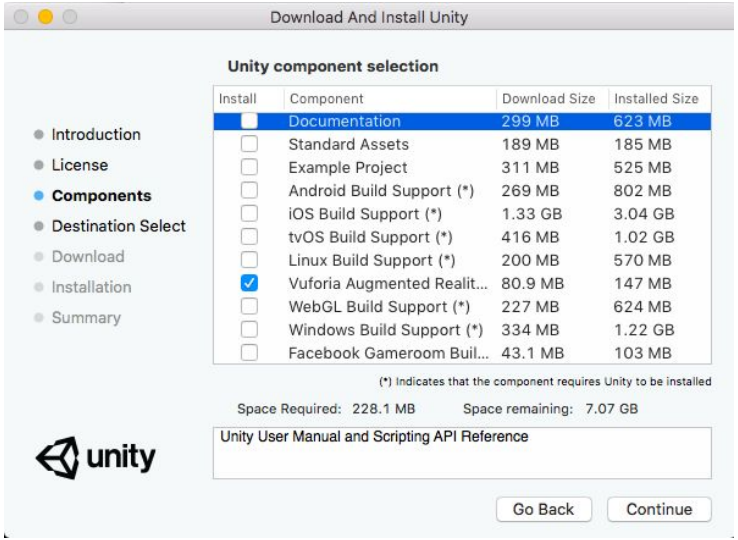

You need lighting (or shaders)
to make things look good

Install Vuforia for Unity

Getting the Vuforia Component

- Download the Unity Assistant Downloader again and launch it as if you were installing Unity again
- In the Components section deselect everything except the “Vuforia Augmented Reality Support” component. Proceed with the installation

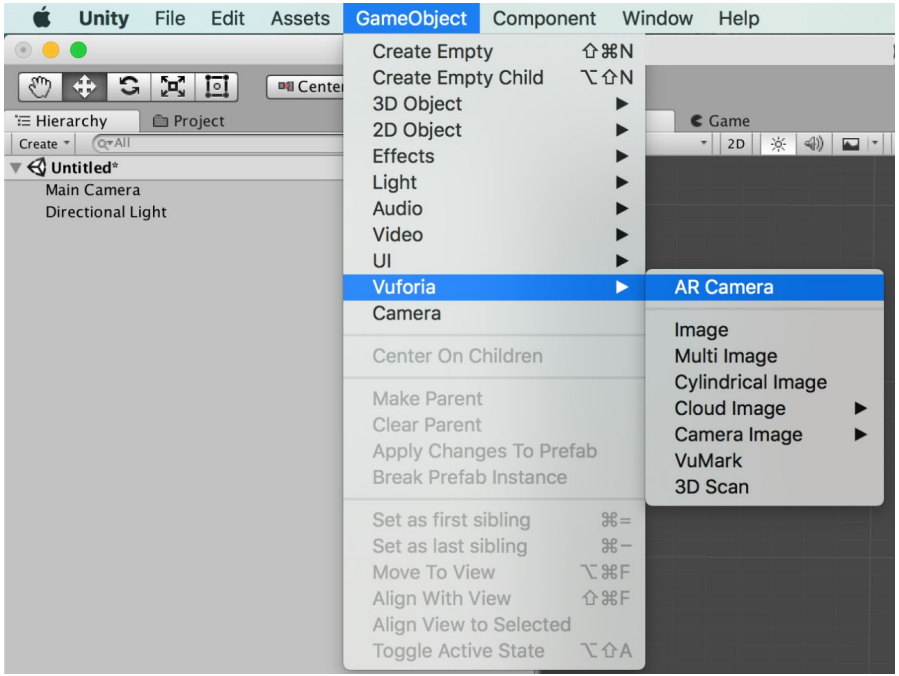




Creating our first scene

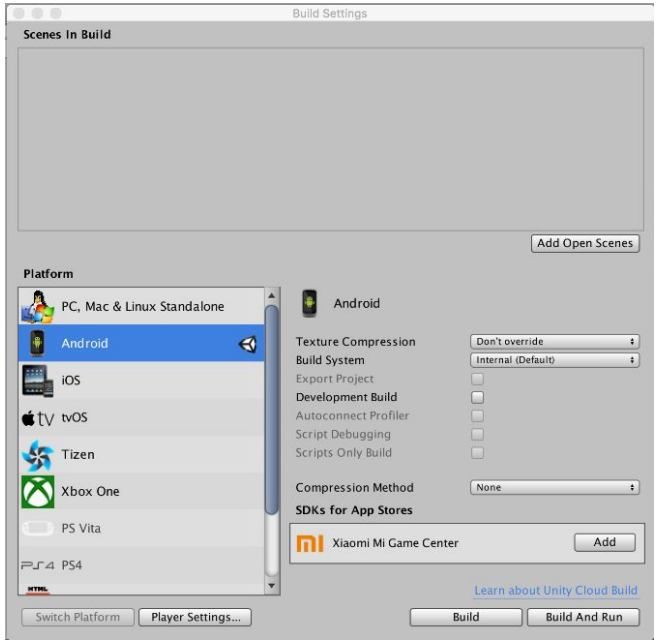
Create a 3D project in Unity

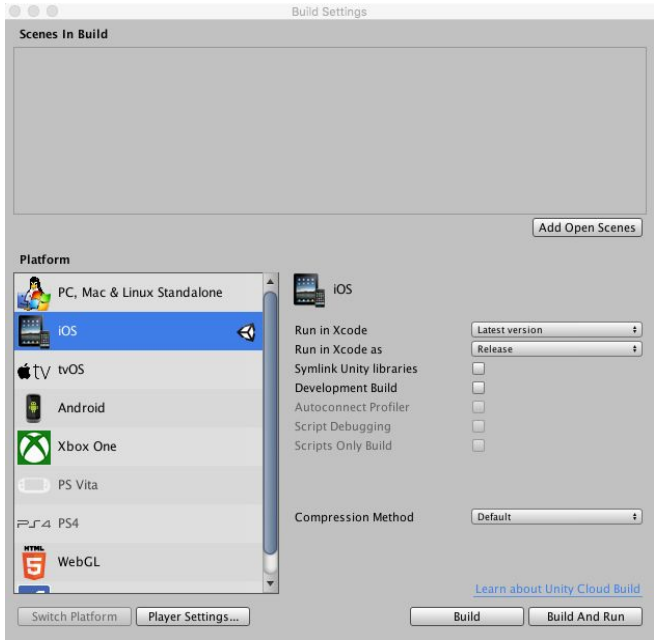
- Create a project with any name making sure to select it as a “3D” project.
- Go to the GameObject menu > Vuforia > AR Camera
- Select “import” if you get a dialog box popup



Switch to Android or iOS

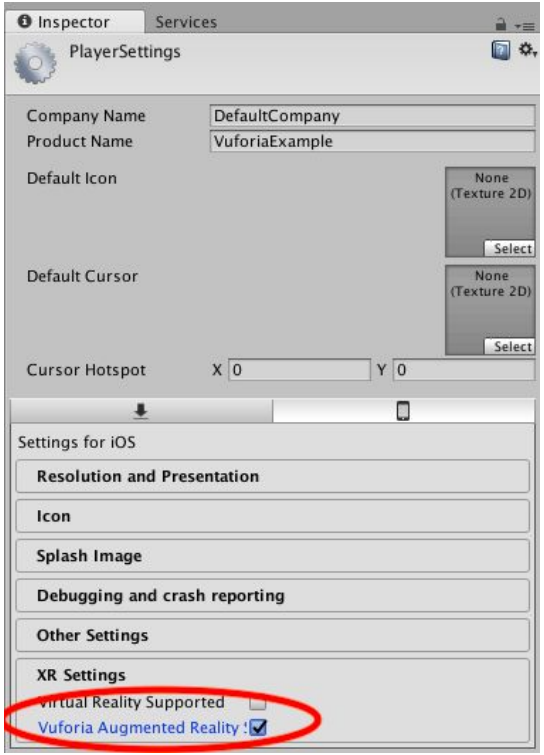
- Go to File > Build Settings and switch to either iOS or Android platform
- Download the mobile module if you have to





Activate Vuforia in Player Settings

- Go to Edit > Project Settings > Player to open the player settings in the Inspector
- Download the mobile module if you have to
- In the Inspector view open the “XR Settings” tab and check the box that says “Vuforia Augmented Reality” (you might have to click Accept on the software license)



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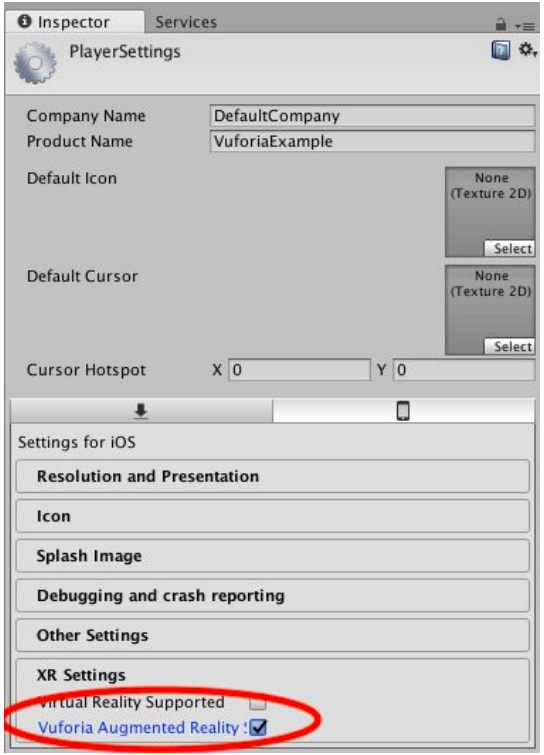
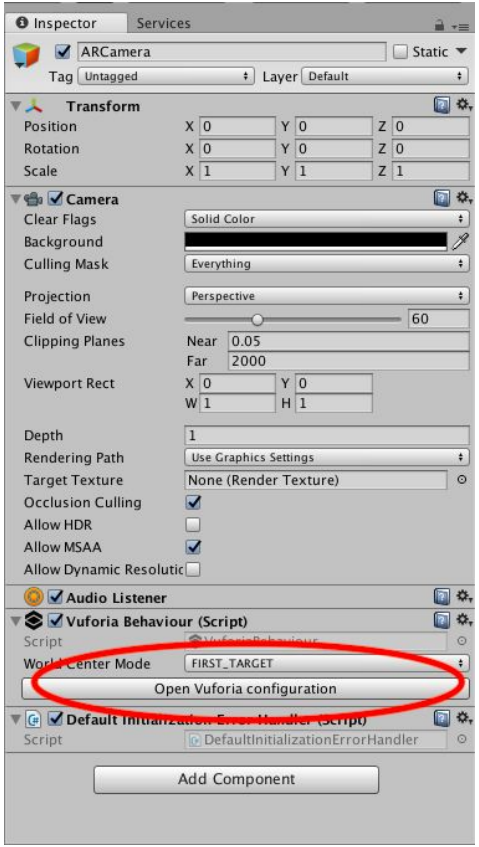


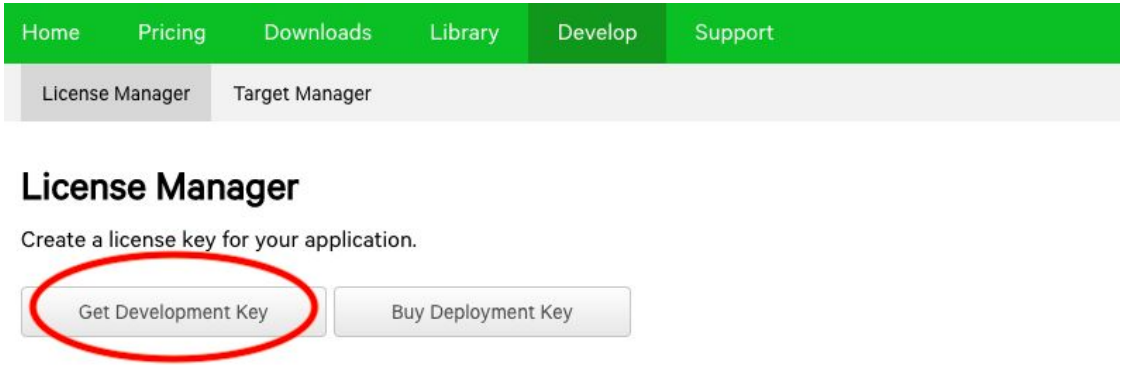
Configure Vuforia

- Click on the “AR Camera” object and then find the button that says “Open Vuforia Configuration”



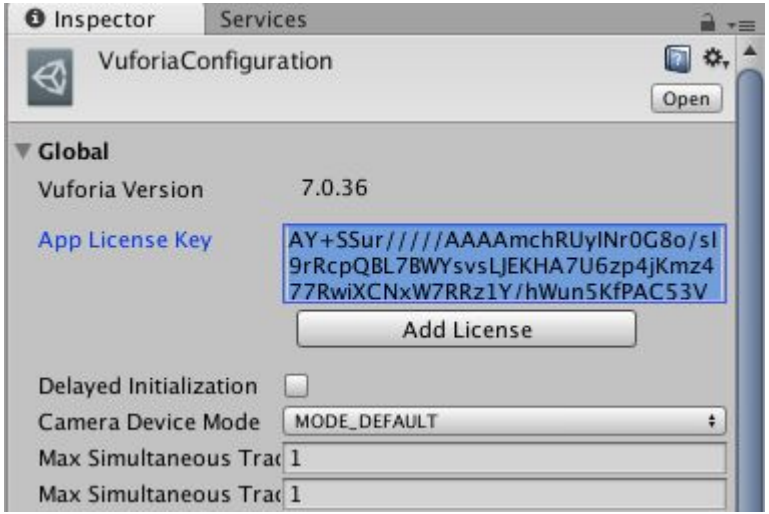
Getting a license key

- Next we're going to create a Vuforia account. Vuforia is a software provider that makes creating visual AR markers a breeze. Go to the following website and register a new account: https://developer.vuforia.com/user/register
- Now we're going to create a license key for our application. Go to the Develop Tab > License Manager section or go to: https://developer.vuforia.com/targetmanager/licenseManager/licenseListing
- Click on the button "Get Development Key"



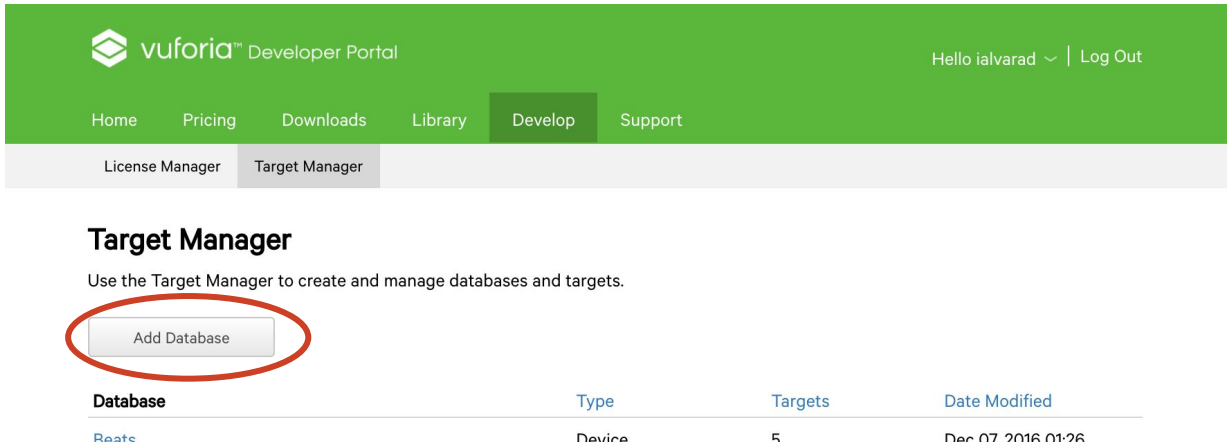
Copy development key back to Unity

- Click again on the project you just make and find the development key (a long list of random letters)
- Copy the key and open up Unity
- You'll need to paste the key where it says "App License Key" in the Vuforia Configuration window



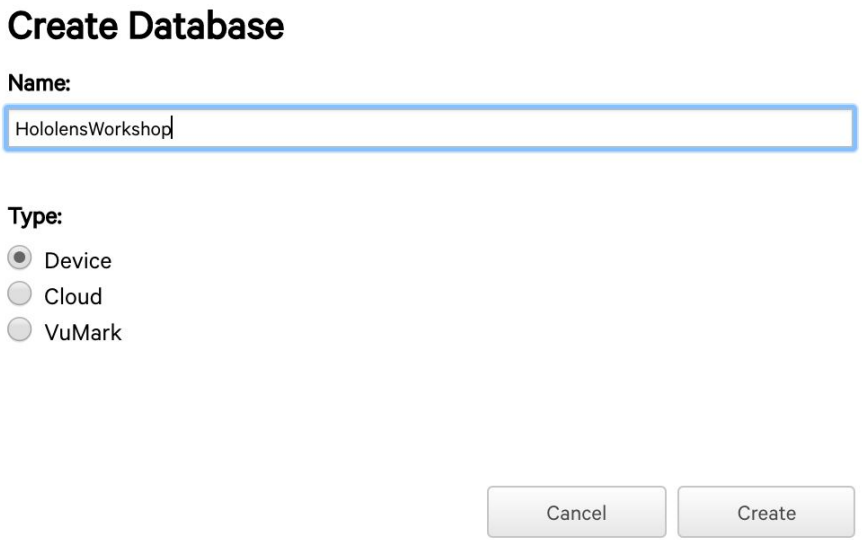
Adding a target database

- Next we'll go to the "Target Manager" section on the Vuforia website and create a target. Try this link to go directly to the Target Manager: https://developer.vuforia.com/targetmanager/project/checkDeviceProjectsCreated?dataRequestedForUserId=
- Go to Develop > Target Manager and then click on the "Add Database" button



Adding a target database

- Create a “Device” database and name it whatever you’d like
- Then click on the database name from the resulting table list



Adding a target

- Now we’re going to choose and configure an image to act as our AR marker. What does this mean? Anytime this image is displayed, we want our AR hologram to appear.
- Download both the target PDF: https://drive.google.com/open?id=1G50D104ULASsd8JceBkO_n6Sca2m46Uw
- And our target image: https://drive.google.com/open?id=10w5mvU_Apcegh7nAfGoKLM6rPdkpIskF
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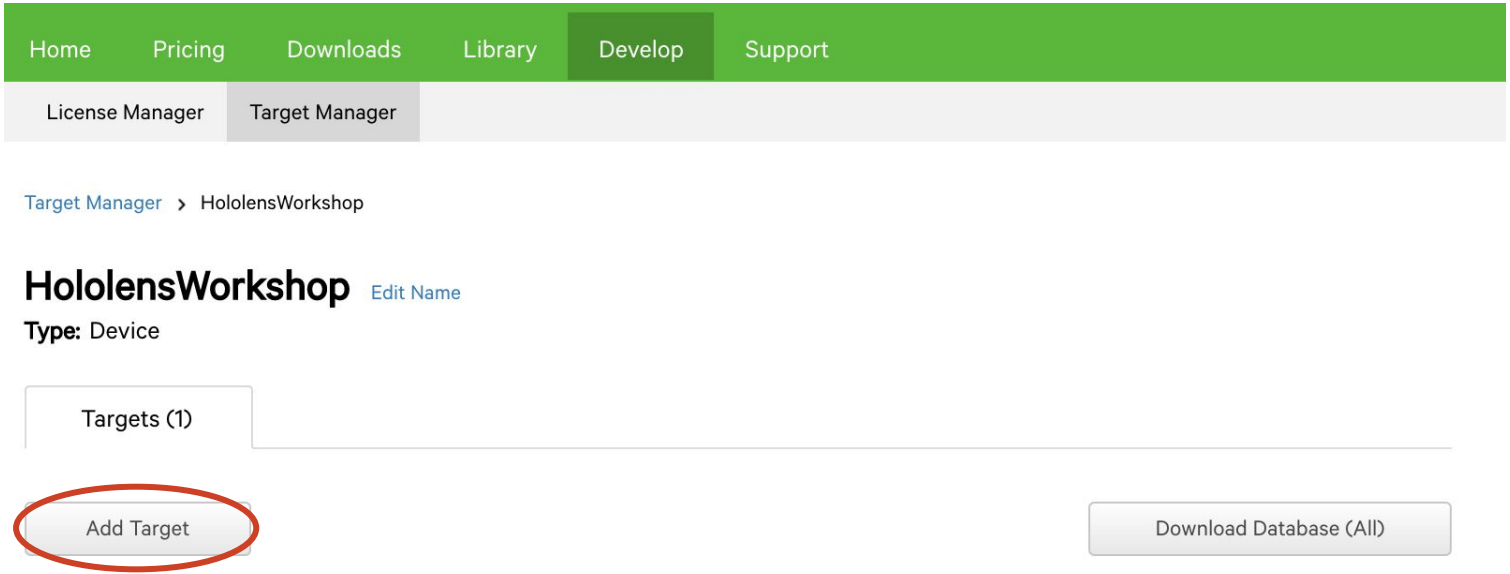
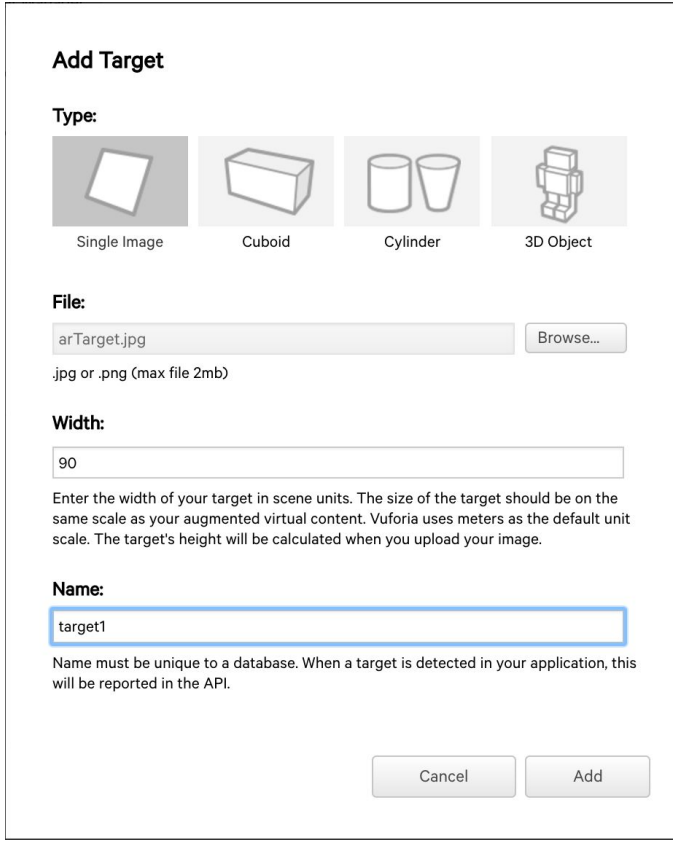
Adding a target

- Back to Vuforia website: Make sure you click on the database we just created
- Within the database page, click on “Add a target”



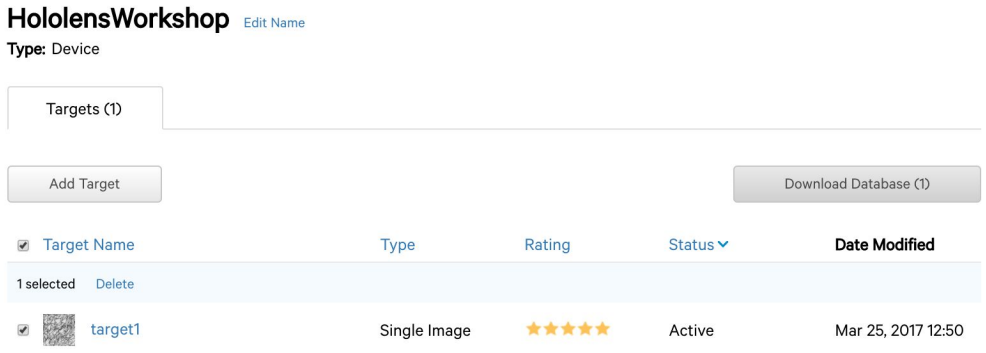
Adding a target

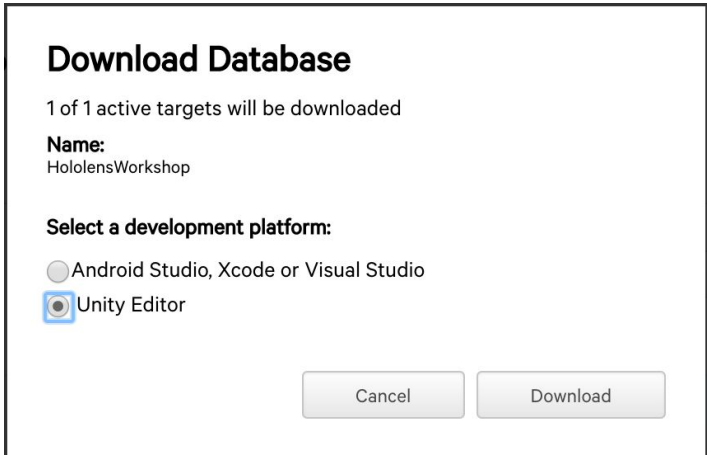
- Target options:
  - Type: single image
  - File: click the jpg file
  - Width: The target on the printed PDF is 9cm. We will use millimeters as our unit, so enter 90 as our width
  - Name: name your target “target1”
- Note: The target size does not necessarily have to match the real (physical) size of the physical target, for example, the printed size of a paperboard, sheet, or other physical support. However, in most cases it is convenient (and easier) to choose a unit of measure (for example, millimeters) ahead of time and then define the target size that is consistent with that choice.



Download database

- Now select the target from the list and select “Download database”
- Make sure you download it for Unity Editor



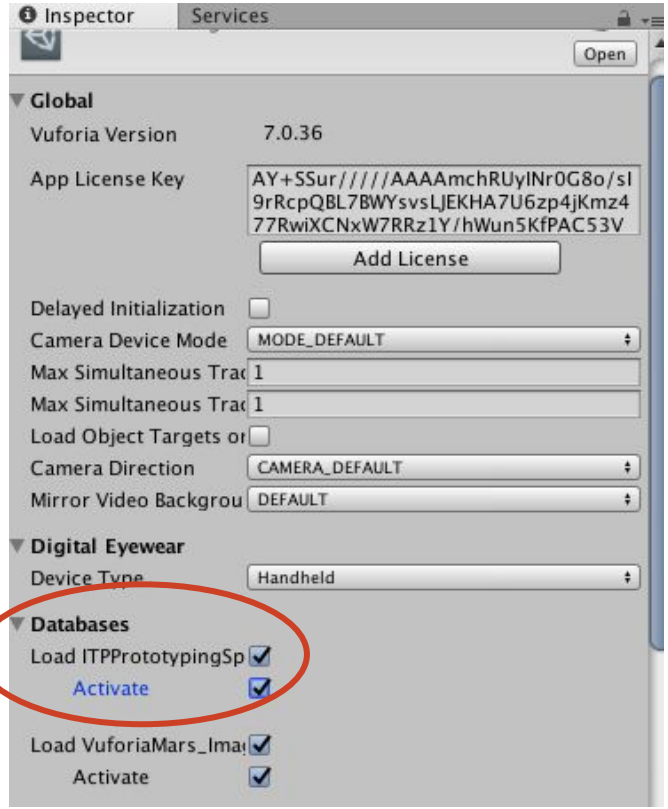


Import database

- Go back into Unity and let's import the *package* we just downloaded from Vuforia
- From the menu bar go to Assets > Import Package > Custom Package and select the package we just downloaded from Vuforia, in my case it's called "HololensWorkshop.unitypackage"
- Again, click "import" when you see the detailed list of files within the package to import

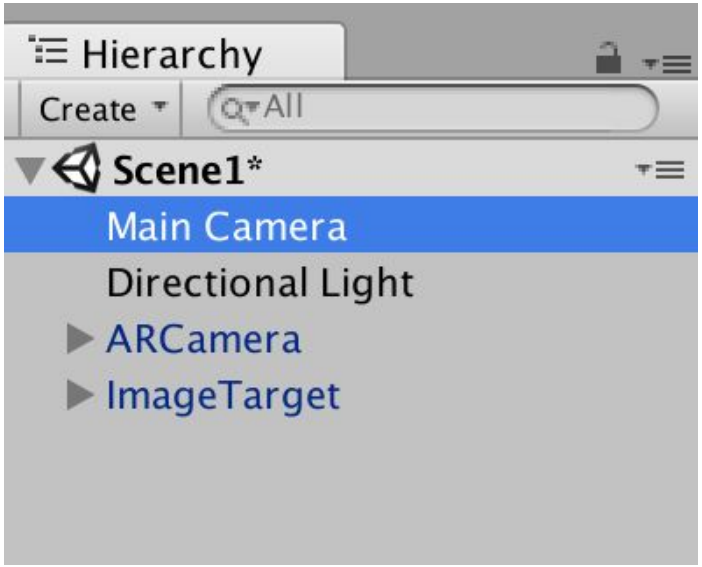
Activate database

- Click on the AR camera object again and look at what shows up in the Inspector
- Click on “open Vuforia configuration”.
- Now scroll to the “Database” portion and check the box for the database you just imported as well as “Activate”



Delete main camera

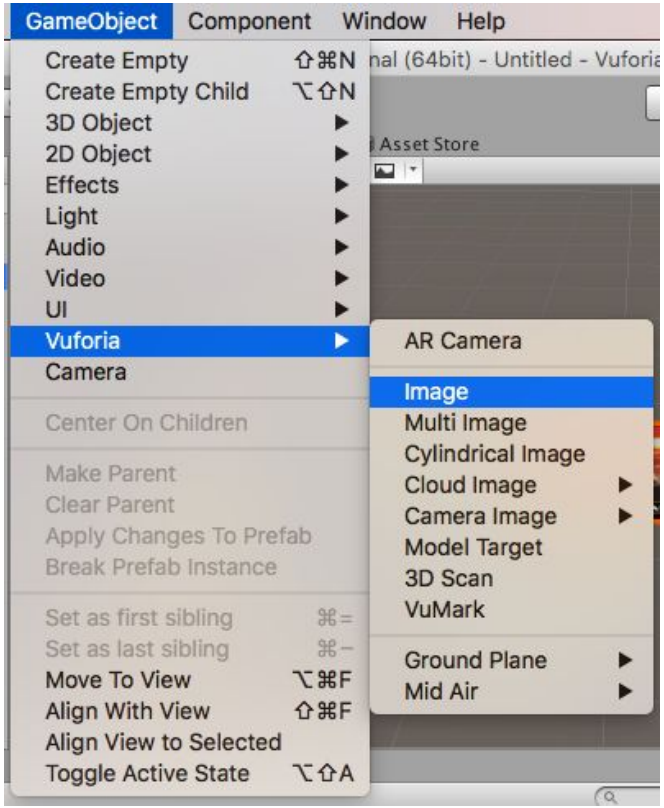
- We’ve got two cameras in the scene.
- Let’s delete the “Main Camera” object within the Hierarchy view that came with our standard project when we created it (right click and delete)



Setting up a 3D model and Image Target

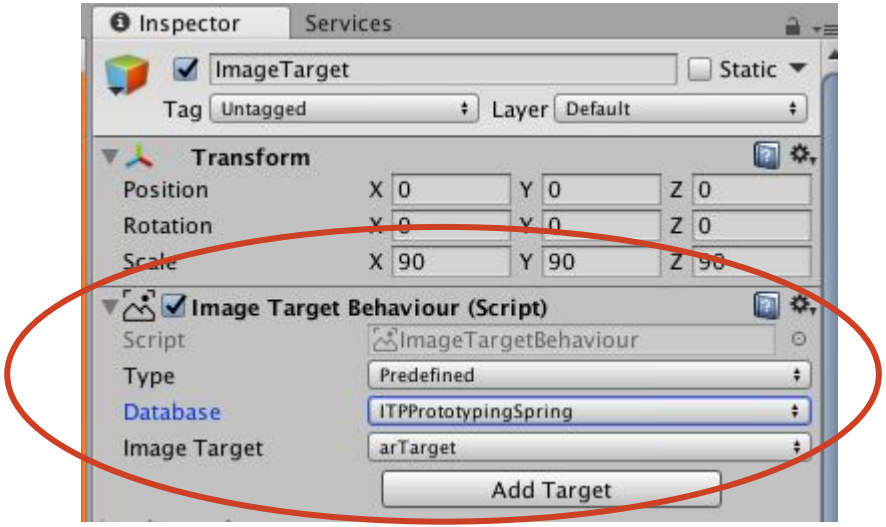
Add a target to the scene

- Go to Game Object menu > Vuforia > Image
- This will add a default Image target to your scene



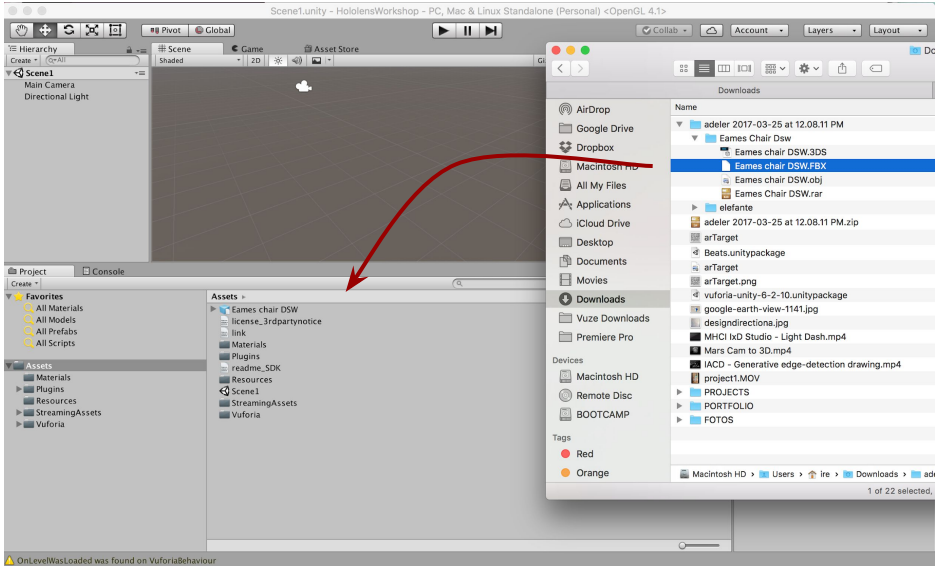
Add a target to the scene

- Now click on the actual image target object and check out the options in the Inspector
- Select the Database that we just downloaded in the “Image Target Behavior” section and you should see our pre-selected image target appear
- Notice that the scale changes along with it



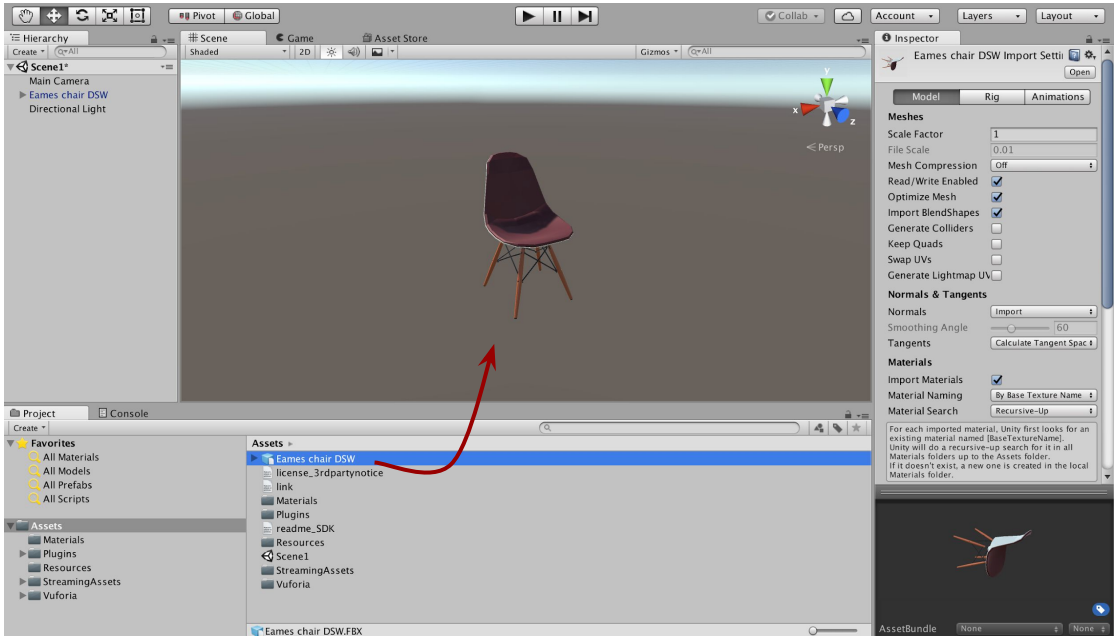
Import a model to the scene

- Now, we're going to download this eames chair 3D model: https://drive.google.com/open?id=1RsHx64DgEyc-amZ4LE_-EksPZRQ6cGBS
- Drag and drop the model from your Finder into the Assets folder within Unity. You can simply drag and drop while having Unity open



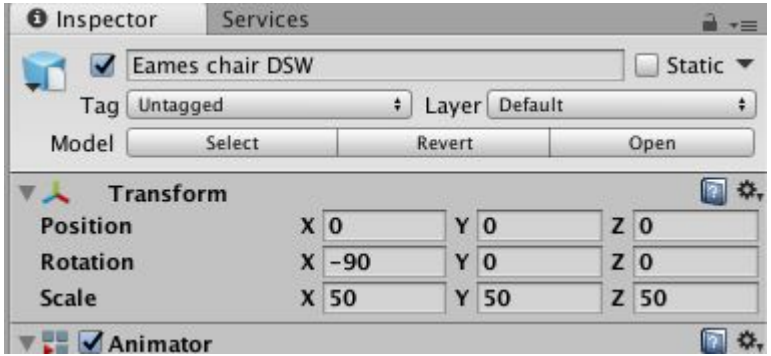
Import a model to the scene

- Next within unity: drag and drop the “Eames Chair DSW” file into the Unity Scene.
- You should see the chair appear within your Unity scene



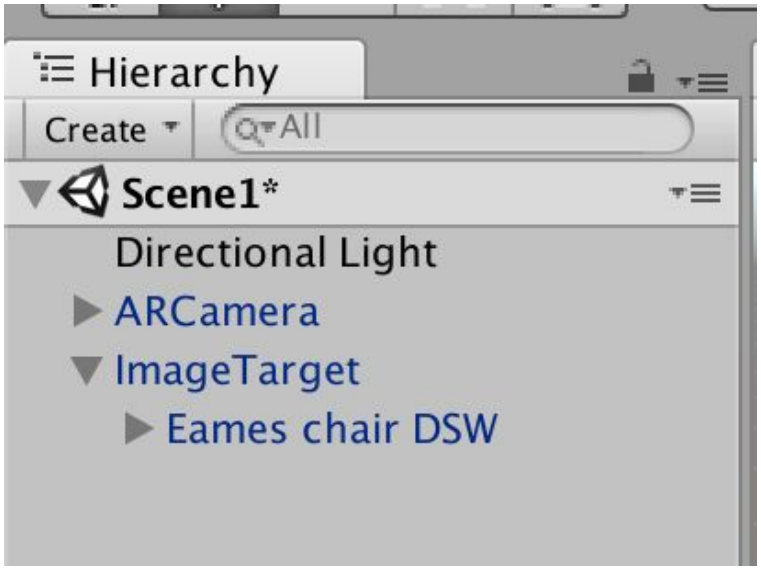
If your chair is rotated or at a strange scale...

- Try to set these values manually in the chair object inspector settings
- Changing the position will possibly take the chair out of view in the Scene.
- A trick for getting an object into view is to click on it within the Hierarchy + *place your mouse within the Scene* + and then click f.



Adjust parent/child relationship

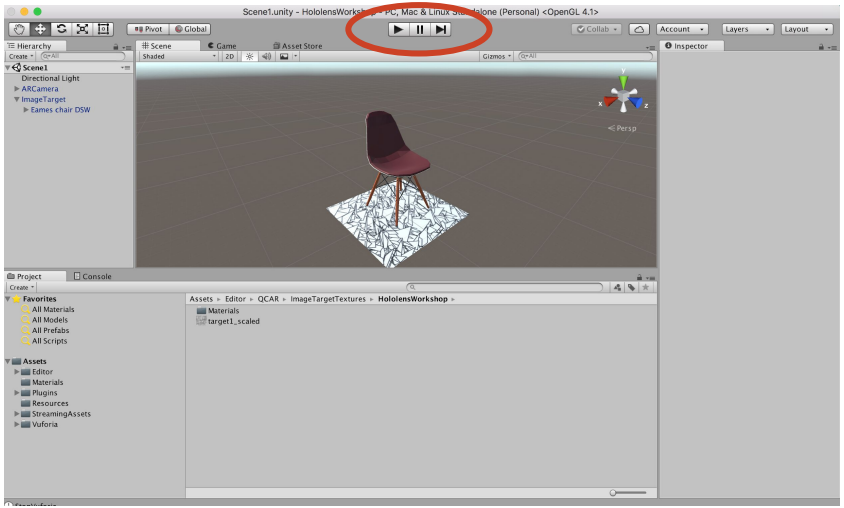
- Now let’s adjust the object parent-child hierarchy.
- Drag and drop the Eames Chair object *within* the Image Target object so the Hierarchy looks like so:



And finally… AR!

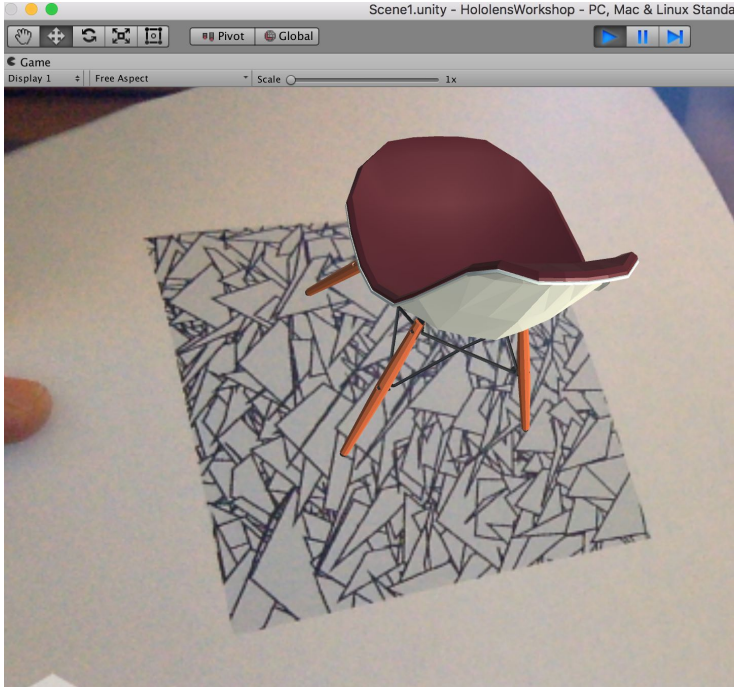
Testing the AR experience

- Print out the PDF you had downloaded before: https://drive.google.com/open?id=1G50D104ULASsd8JceBkO_n6Sca2m46Uw
- Save your scene
- Hit the play button within Unity to play the scene. I'll assume you're using a laptop with a built-in camera.



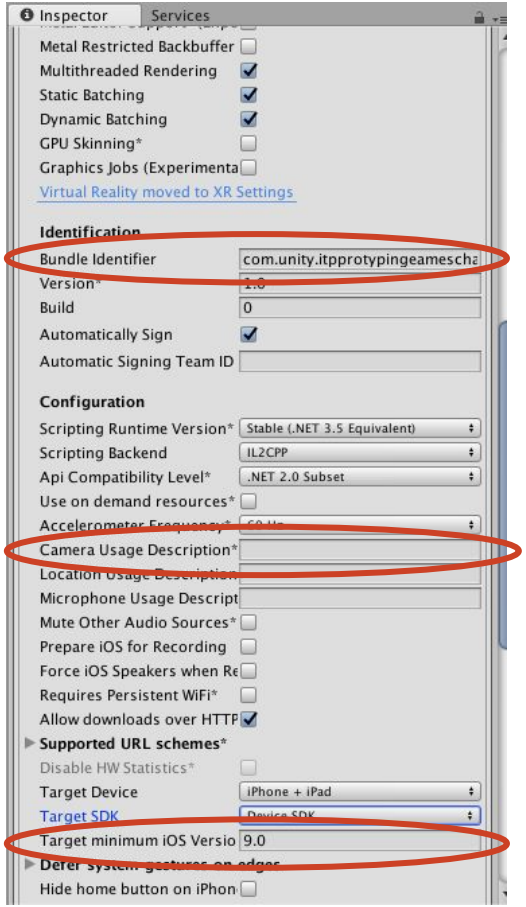
Testing the AR experience

- Hold the PDF with the marker up to the camera and... surprise!



Now let’s deploy on device

- Open Player settings by going to Edit > Project Settings > Player
- Under Other settings > Identification > Bundle Identifier: assign a unique name such as “com.unity.ITPPrototypingVuforiaChairIrene”
- Under Other Settings > Configuration > Target Minimum iOS Version: write in 9.0
- Under Other Settings > Configuration > Camera Usage Description: write something like: “Camera access required for image target”

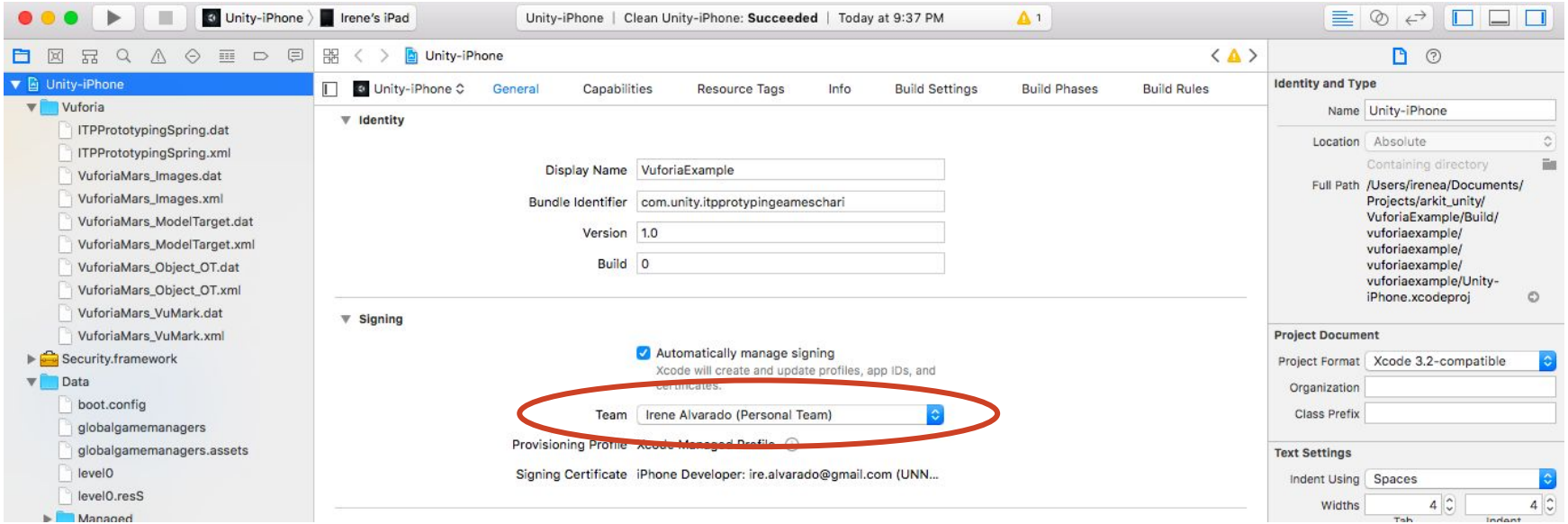


Build the project

- File > Build Settings > iOS platform. Select the Development checkbox and click on “Build”
- This should open up the project in XCode

Deploy the project

- Make sure you add a your own account unter “Team” in the “Signing” section of the general project settings
- Click on the Play button to deploy your project to your iOS device



Unity resources and tutorials

Official unity tutorials: https://unity3d.com/learn/tutorials

Creative coding with Unity: https://channel9.msdn.com/Series/UnityCreativeCoding

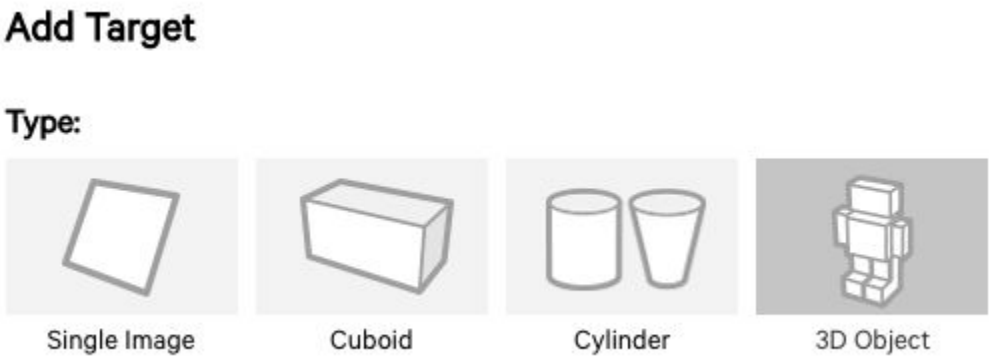
Lighting
Official unity tutorial:
https://unity3d.com/learn/tutorials/topics/graphics/introduction-lighting-and-rendering

Other targets & resources

Using other types of targets

Cuboid and Cylinder: Target Manager

3D Objects: Vuforia Object Scanner



Resources

More on image targets

Image target generator

Exporting to Android