Virtual Reality Widevision 2021

Due to the pandemic, a virtual version of Widevision has been proposed, and it will be based in Virtual Reality. VR will be based in SteamVR, which is free with Steam and can be used most VR headsets. This document will walk you through getting your Solidworks models and portfolio ready for VR, what your project will look like in the virtual space and a look into a custom area that you can design, build and have added to your projects display.

PLEASE NOTE: copy and paste does not work very well in pdf form. You need to open it in notepad and remove the "returns" from the copy paste. Sorry for the inconvenience. The following shows what works and what doesn't. Again sorry.

```
"C:\Program Files (x86)\Steam\steamapps\common\SteamVR\tools\steamvr_environments\game\bin
\win64\steamtours.exe" -addon widevision -tools -destinations_workshop

^ this works ^

becomes

"C:\Program Files
(x86)\Steam\steamapps\common\SteamVR\tools\steamvr_environments\game\bin\win64\ste
amtours.exe" -addon widevision -tools -destinations_workshop

^this does not ^
```

Sections

1. Preparing Solidworks Models for Virtual Reality
2. Exporting Folio to PNG
3. Custom Booth Design
4. Voiceover Presentation
5. Custom work in SteamVR Hammer
6. SteamVR workshop on Mac (advanced users only)

Sections 3, 4 and 5 are optional. You may complete some, all or none of them, in any order. Section 6 must be completed by Mac users before you start section 5.

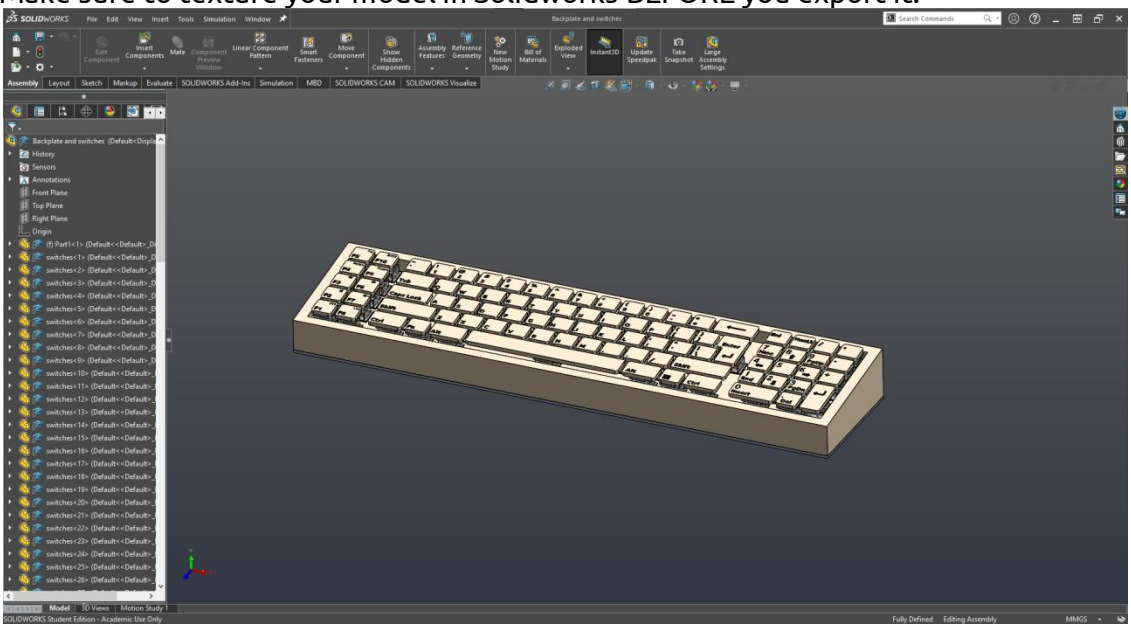
1 Preparing your Solidworks Models for Virtual Reality

Solidworks itself can't export to a file format that includes textures, and that SteamVR can use. Though I found a script that exports Solidworks assemblies to .obj files that can be imported into SteamVR fairly easily. This guide will use a wood keyboard as an example piece, taking it from Solidworks to VR ready.

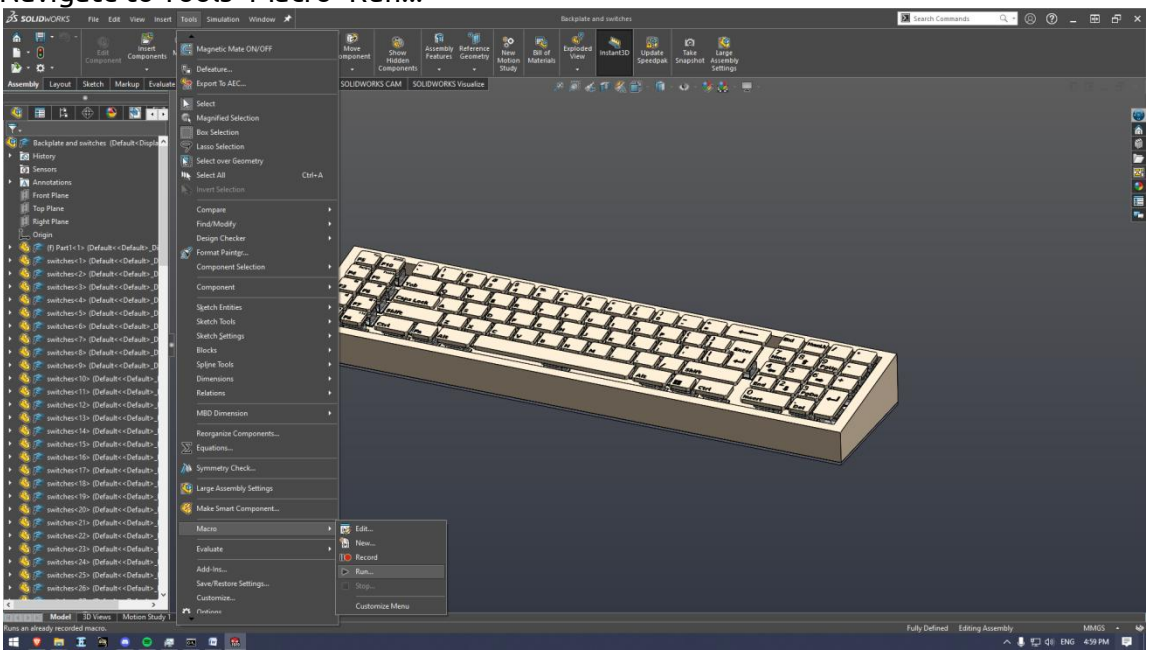
Firstly, create a folder called "`StudentNo_Firstname_LastName`". This is where you will save everything throughout this guide.

Secondly, you'll need to download the macro used to create the .obj file. You can find it HERE.

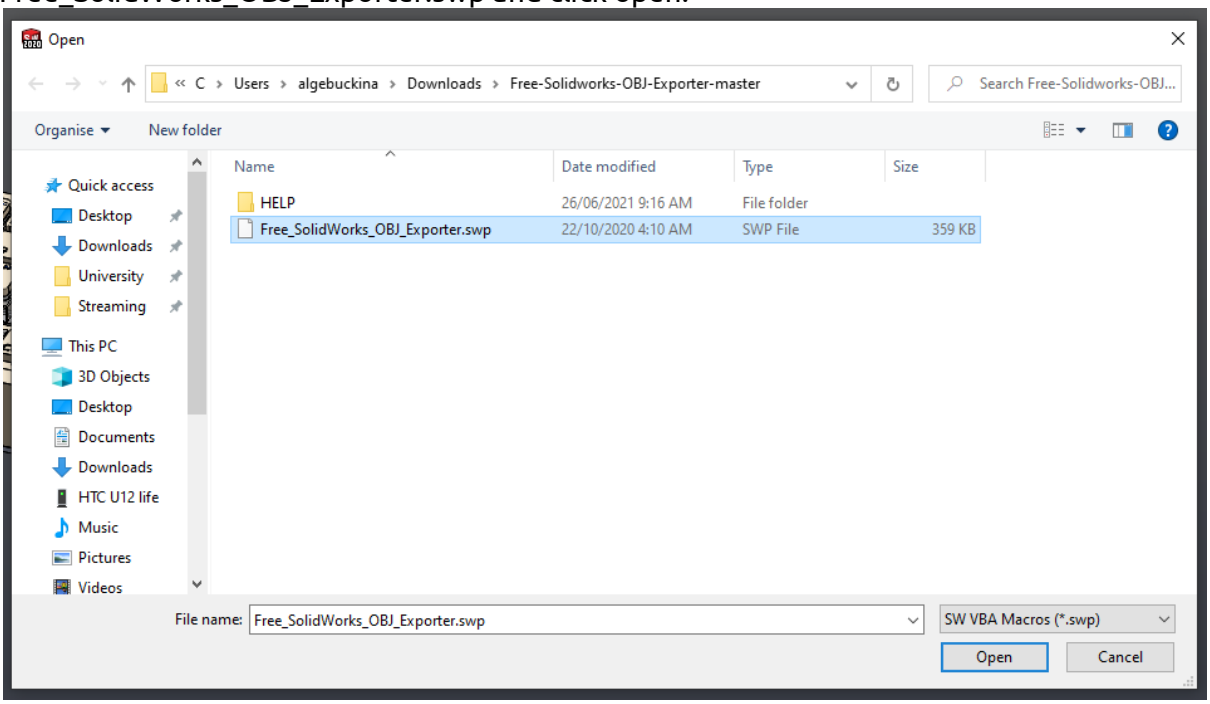
Once you've downloaded and extracted the script, open your assembly in Solidworks. Make sure to texture your model in Solidworks BEFORE you export it.



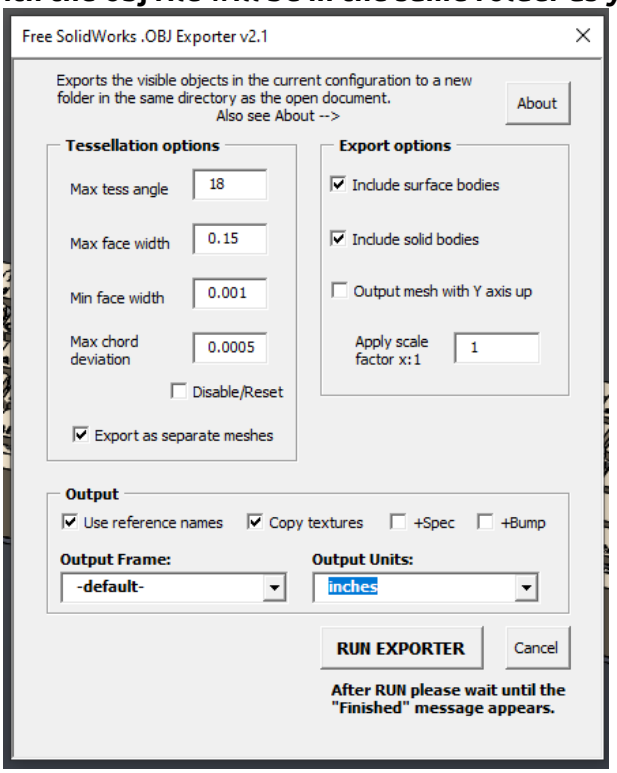
Navigate to Tools>Macro>Run...



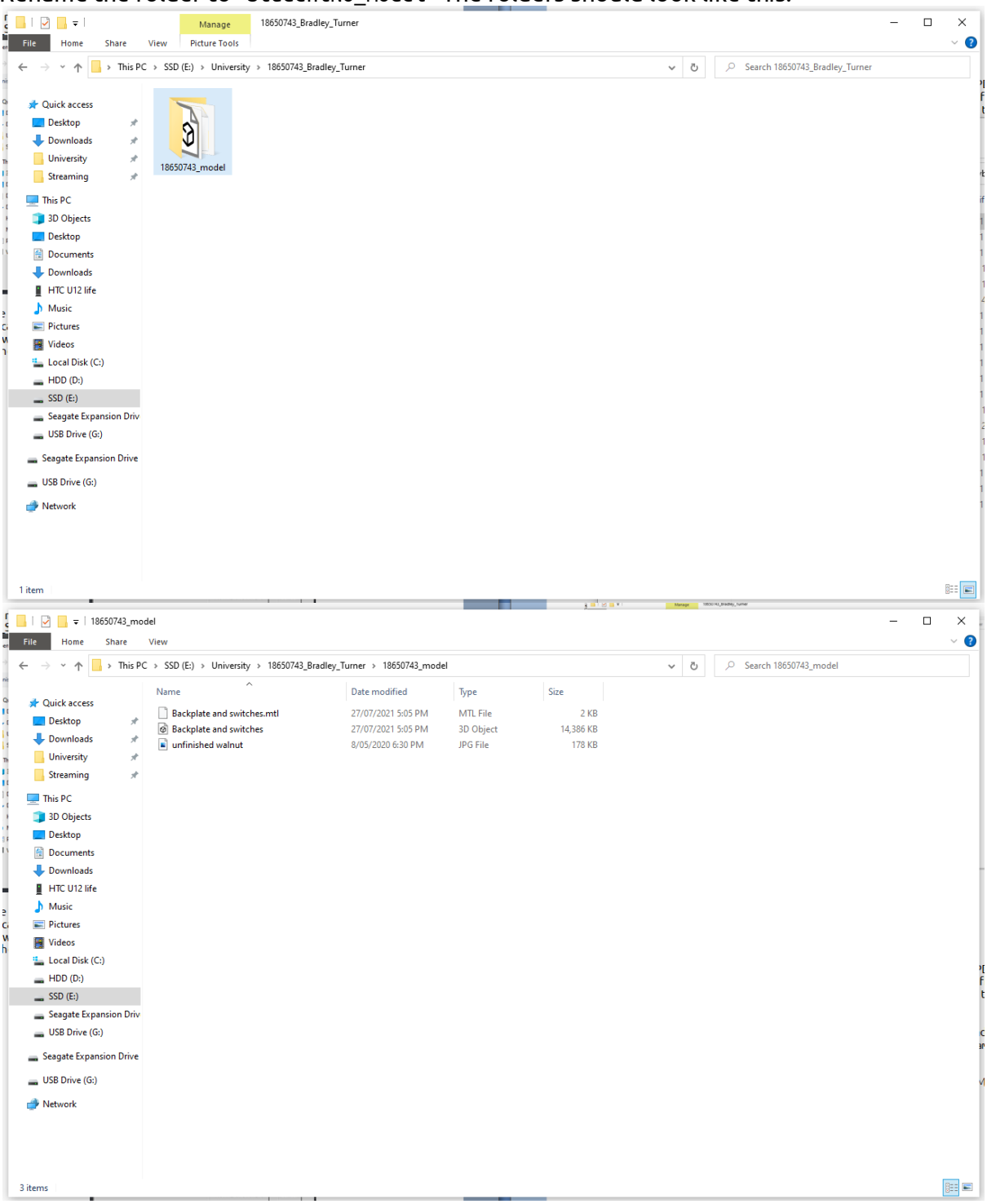
Then navigate to the folder that you extracted the script file to, and select Free_SolidWorks_OBJ_Exporter.swp and click open.



Leave all the settings as standard, and make sure Output Units: says inches, because that's the scale that SteamVR uses. Clicking "RUN EXPORTER" will run the exporter. This will lock Solidworks up, but it is working. When it is finished, a popup will appear that just says Finished. **The folder with the obj file will be in the same folder as your assembly.**



Rename the folder to "`StudentNo_model`" The folders should look like this.



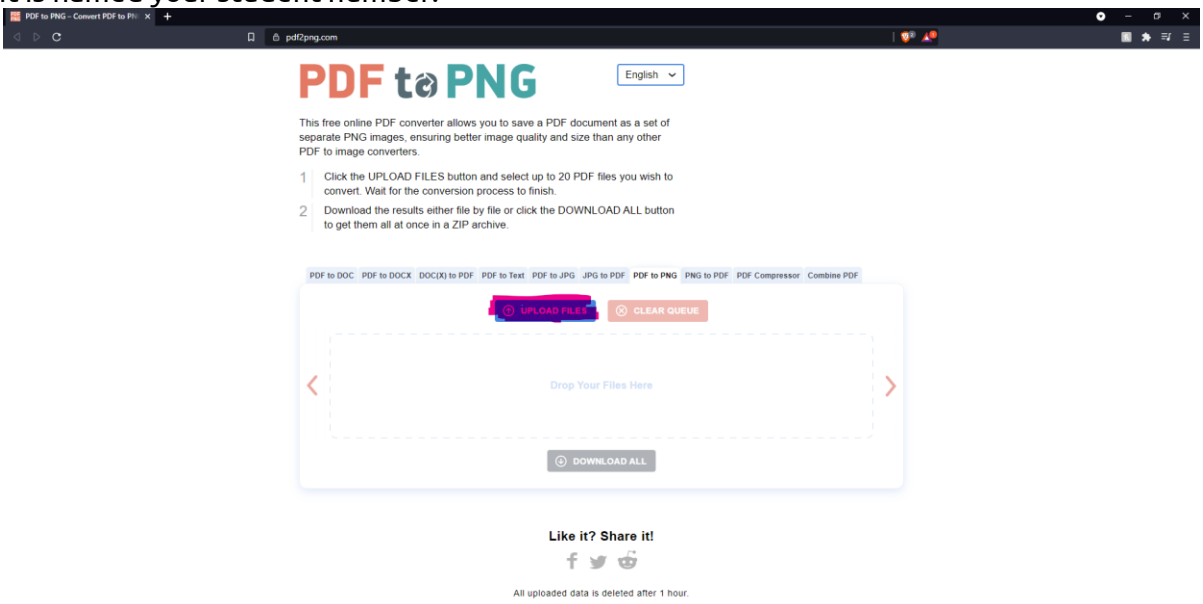
If there are any issues, Bradley will contact you and explain how fix them.

2 Exporting your Folio to PNG files

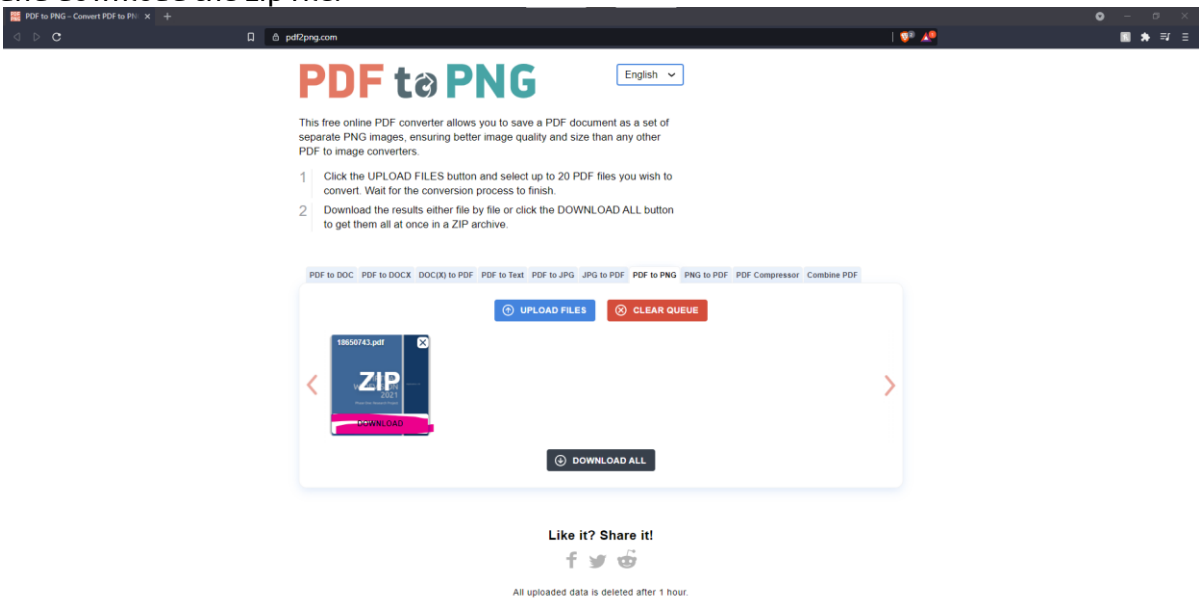
The UI used in SteamVR is html based, so it works the same as a webpage. So a PDF does not display natively. Because of this, your folio will need to be exported as PNG files to natively display in the UI. Every page must be titled as "`StudentNo-xx`" where x is the page number starting at 01.

An easy way to achieve this is `https://pdf2png.com/` which will take your PDF and export it as a .zip file. Unzip that and place the folder in your "`StudentNo_Firstname_LastName`" folder. We will be using my Phase One Research Project from Semester 1.

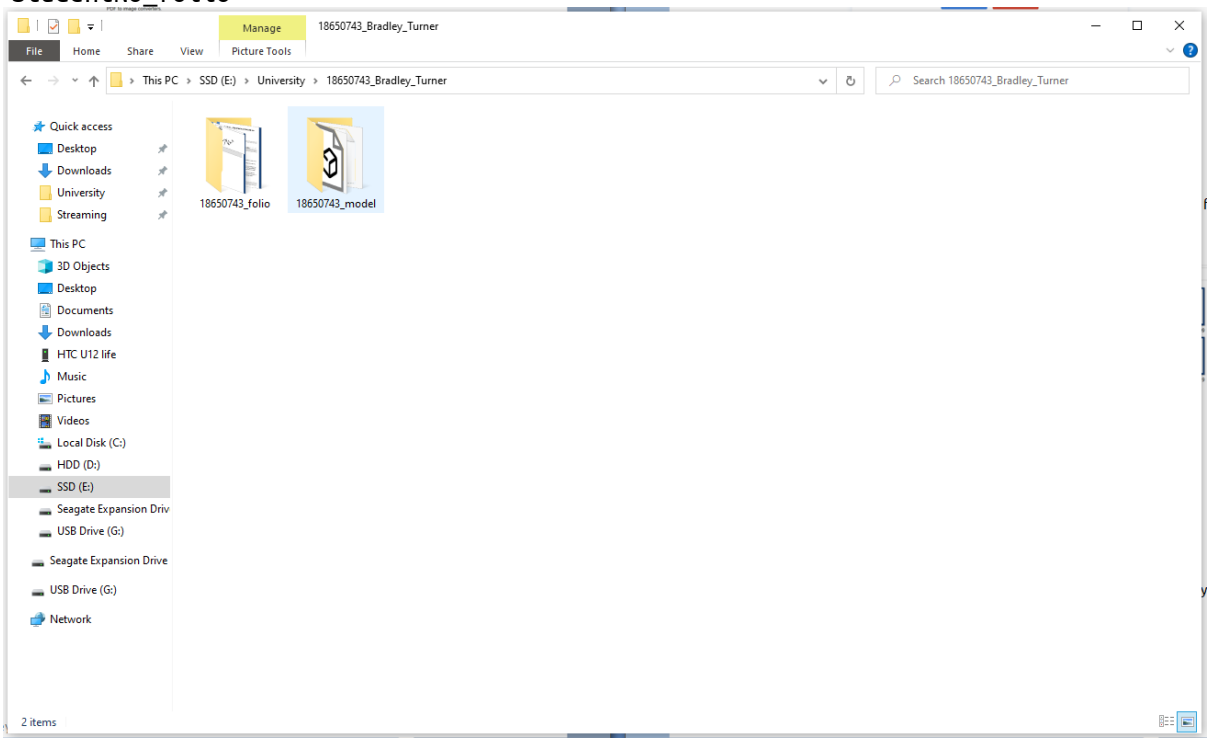
Firstly, navigate to the website, click on upload files, and navigate to your PDF. Make sure it is named your student number.

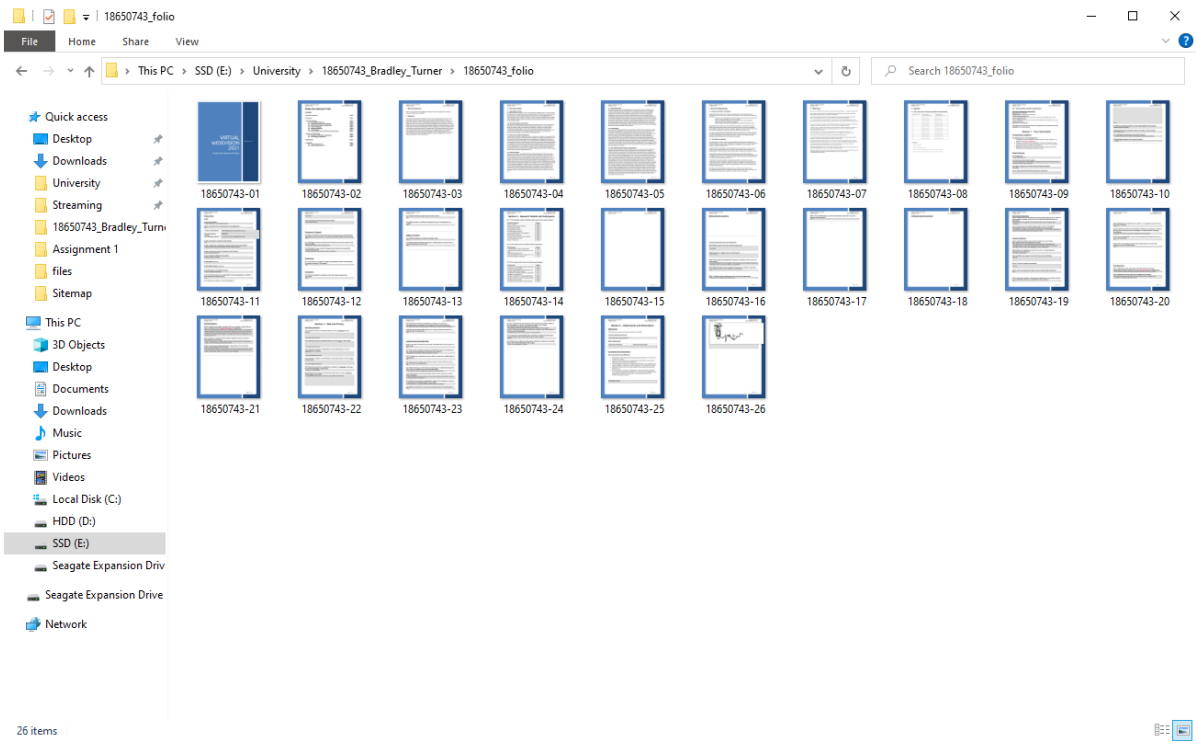


Wait for the PDF to upload (this may take some time). After this is done, click download and download the zip file.



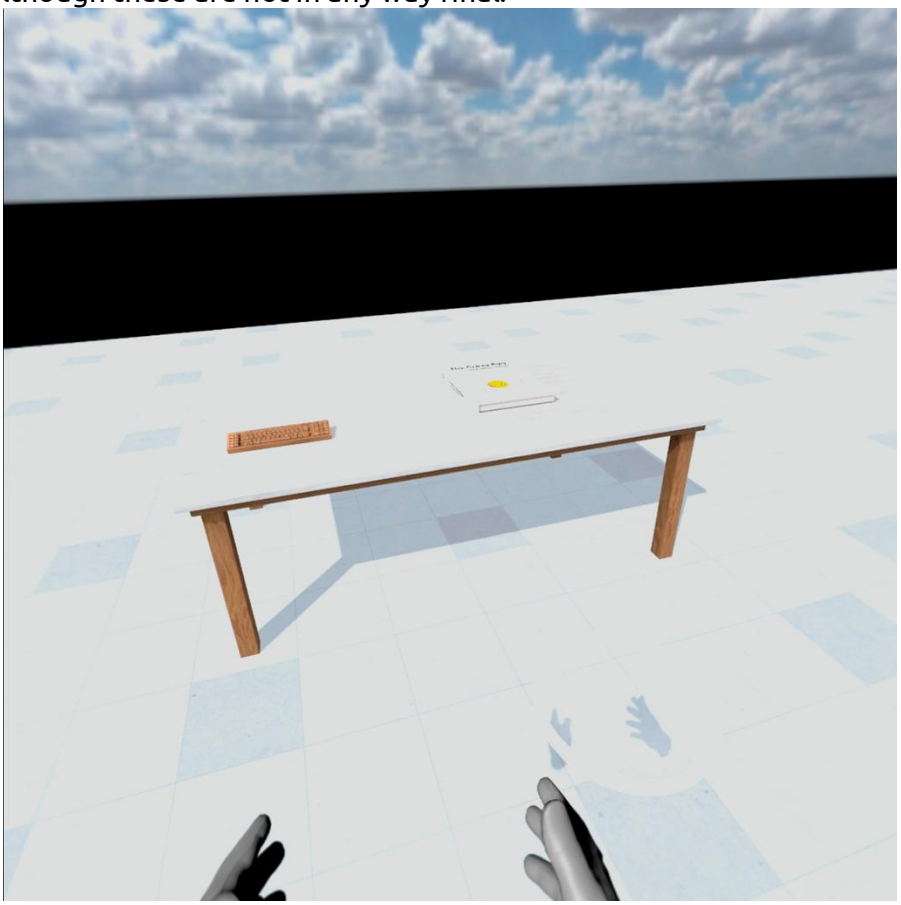
Extract the zip file into you "`StudentNo_Firstname_LastName`" folder, and call the folder "`StudentNo_folio`"





Check over all the images to make sure they exported properly. If they didn't, try another PDF to PNG service.

The following are screenshot is a demonstration on how the assets from Section 1 and 2 will be used in the new Hassel Street Building VR space IF this is all the work you wish to complete, although these are not in any way final.



Well done! You have now finished the bare minimum requirements for porting your major work into VR! Although many other options lie ahead like providing a voice over, customising your artefact booth and creating your own space to showcase your project in its chosen Environments.

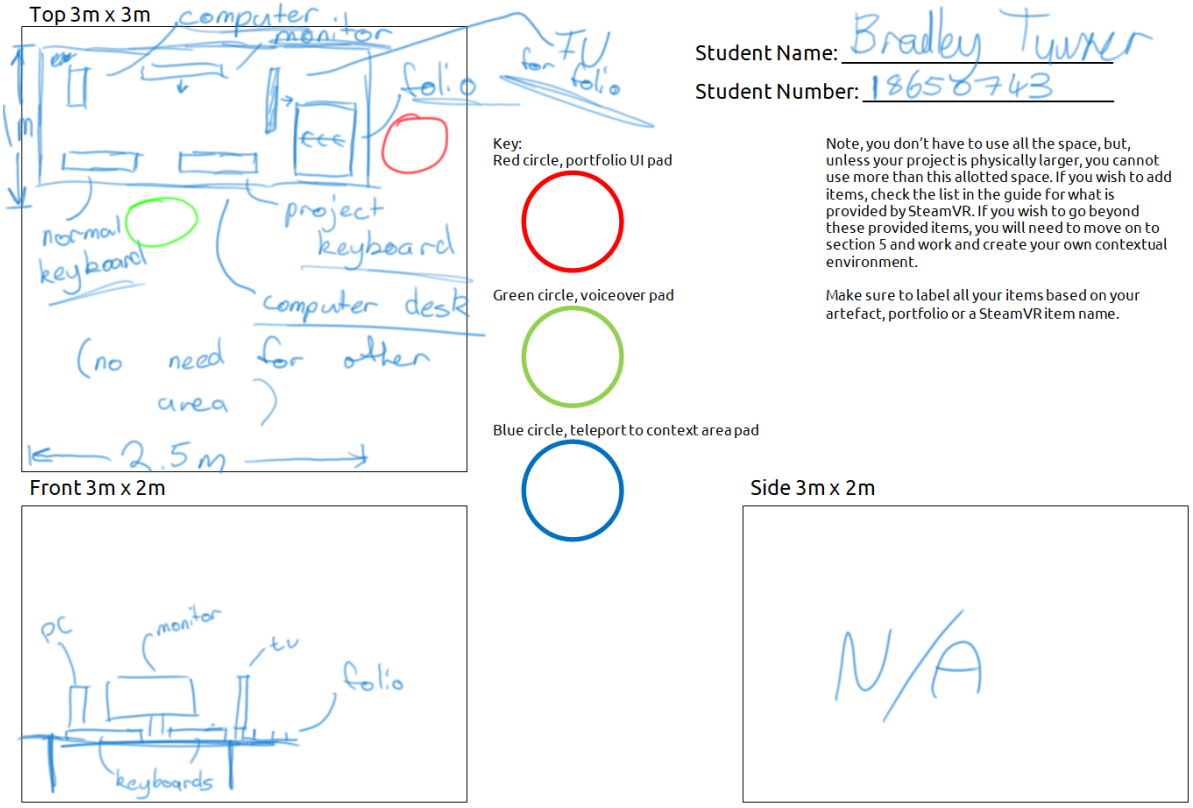
Make sure to send a zipped version of your "`StudentNo_Firstname_LastName`" folder and upload it and send a download link to Bradley at 18650743@student.westernsydney.edu.au by week 7 to leave time for revisions (date subject to change) unless you are working further than this point. If this is not submitted in time, your project will not be included in 2021 Widevision VR.

3 Custom Booth Design

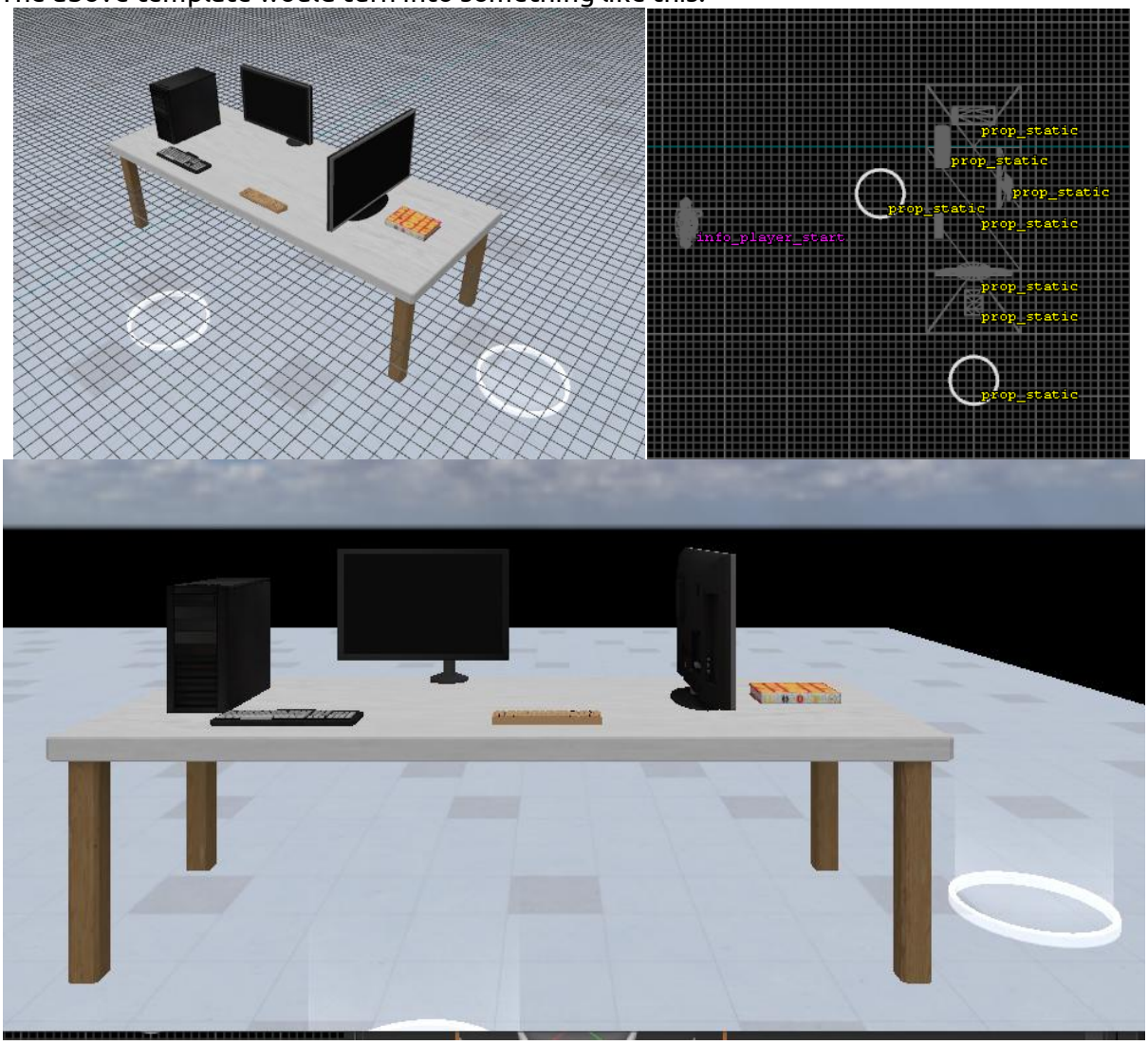
If you wish to personalise your table/booth area to better suit and contextualise your design, SteamVR has many inbuilt items and systems that are very easy to implement as long as it is easily laid out. Each student has 3 meters by 3 meters to display their artefact and any other items that are included in SteamVR. A list of items can be found HERE.

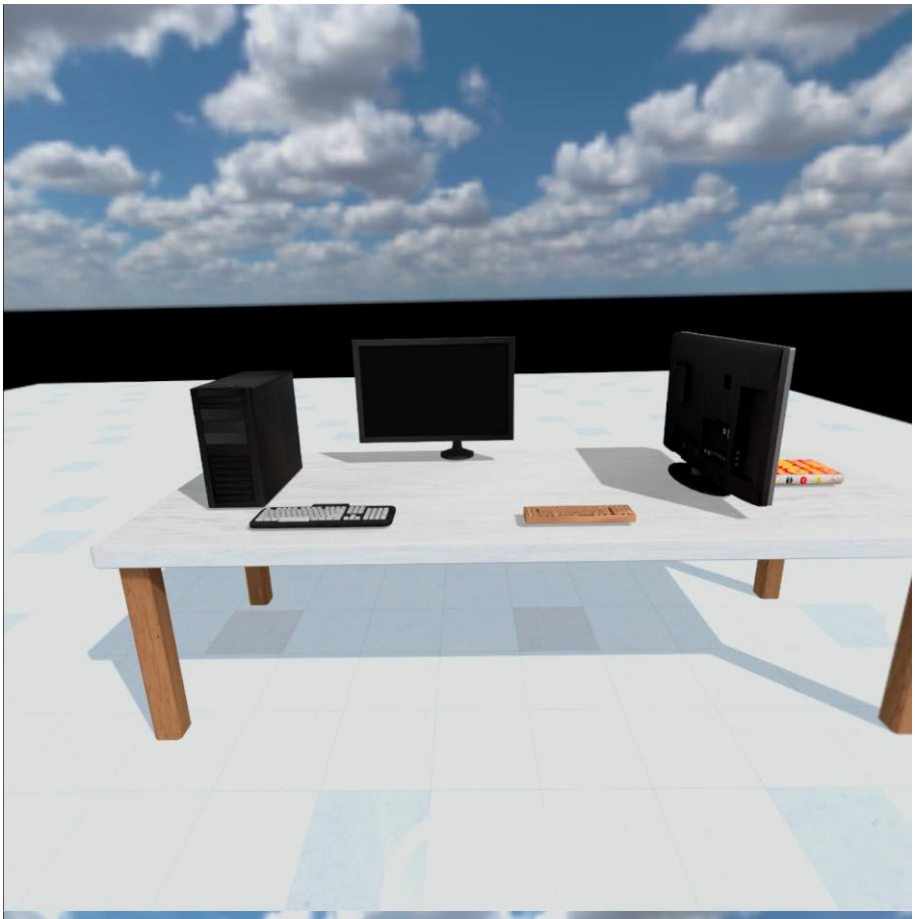
The file found HERE is an image guide to be used to create what you want as your artefact display area in VR Widevision. These areas will all be created by Bradley to make sure they all fit into the exhibit. This png must be used to sketch the layout of your display area that will be created in VR. Using the keyboard from earlier, the following is an example of how to use this guide to create your display area, and then what it will become in VR.

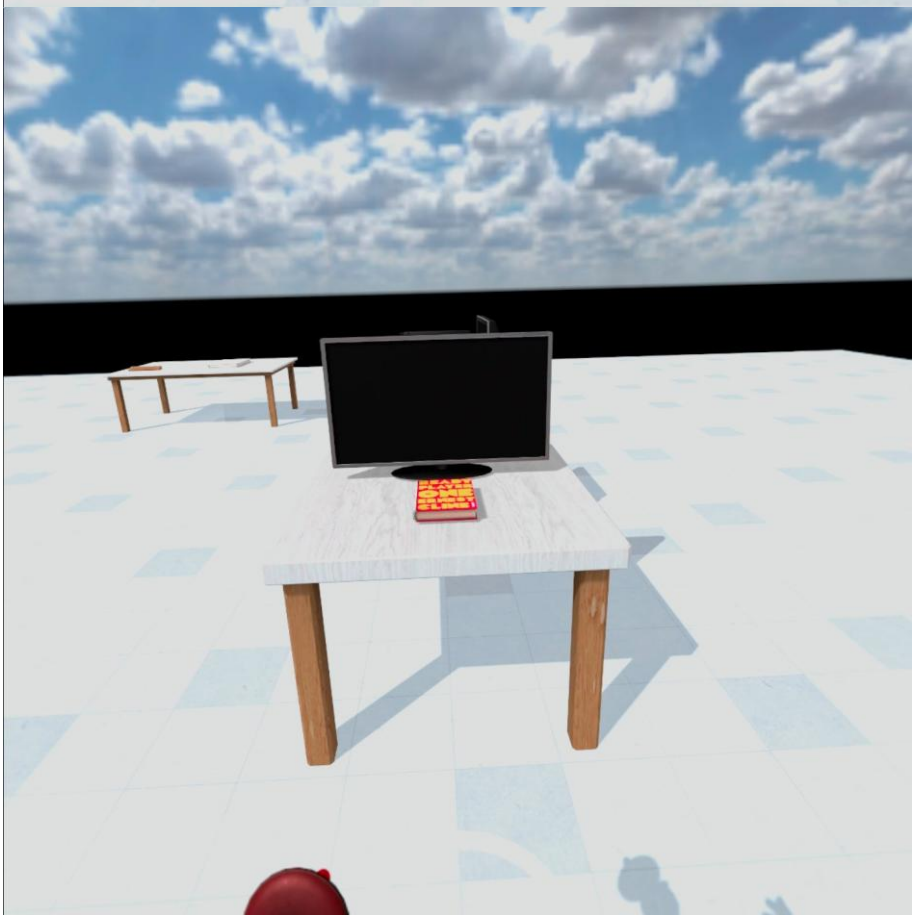
Make sure to save it as "`StudentNo_booth.png`"



The above template would turn into something like this.





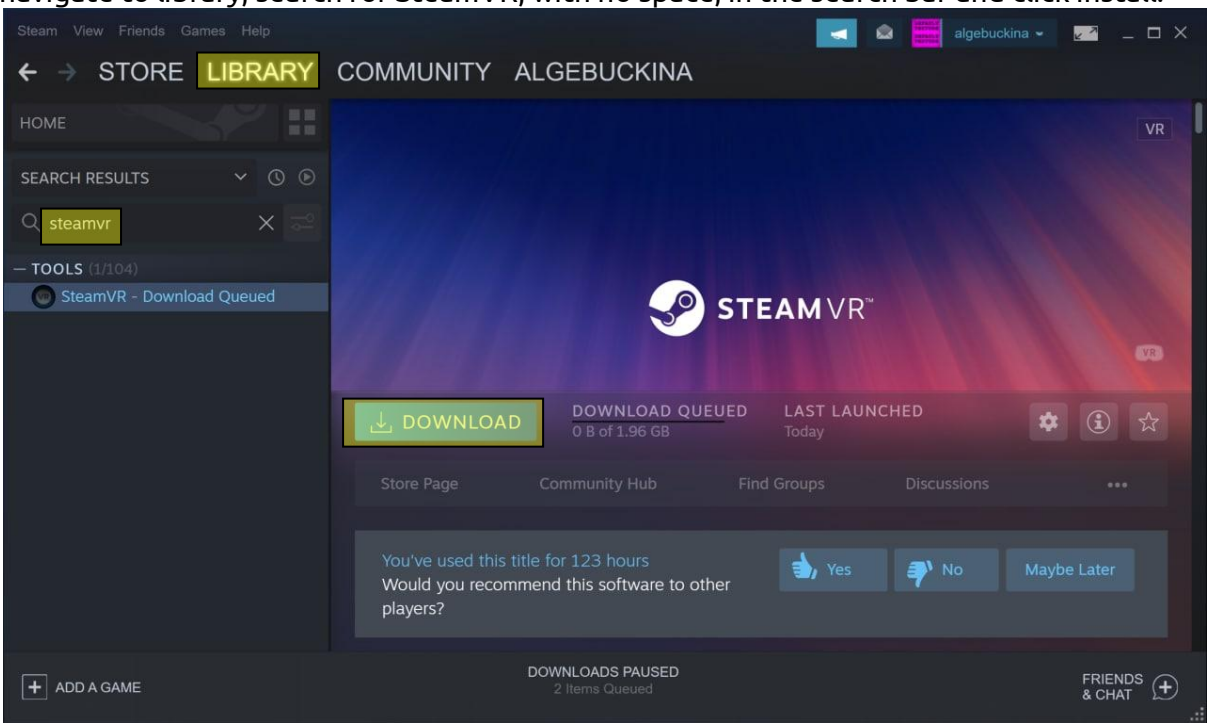


4 Voiceover

You will have the ability to record a small voice presentation when users navigate to your projects area. These audio clips need to be short and to the point, noting the problem statements, and how your model addresses these problem statements. These files should be recorded in and submitted as "`StudentNo_presentation_audio.mp3 (or .wav)`". **YOUR LAPTOP MIC IS NOT GOOD ENOUGH.** It is recommended to use your phone to record the audio though Bradley will be the judge of if the recording quality is high enough. If you cannot find a high quality audio recording device, and if restrictions allow, a day and time will be organised to meet on campus to record your voice lines with the University's audio equipment (more information to come).

5 Creating a contextual VR space (Windows)

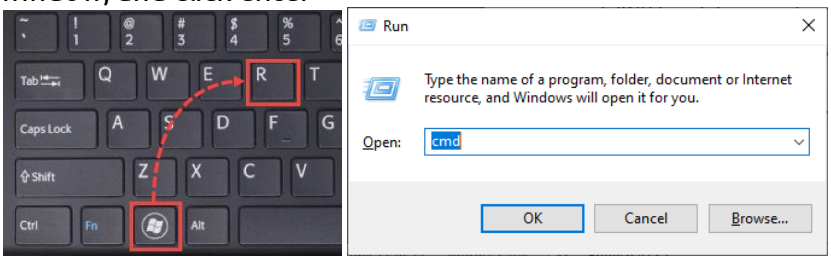
For SteamVR home, you will need to download and install Steam from their website HERE. Once steam is installed, open it and create an account. Once your account is created, navigate to library, search for SteamVR, with no space, in the search bar and click install.



Once SteamVR is downloaded, launch it and wait for some small updates to take place. When that is done, close SteamVR. Open file manager and navigate to "`C:\Program Files (x86)\Steam\steamapps\common\SteamVR\tools\steamvr_environments\game\bin\win64`" and open `steamtourscfg.exe`. This will take you to the SteamVR Workshop Tools. Create an empty addon and call it widevision. Then close the program.


SteamVR Workshop Tools
STEAMVR™
WORKSHOP TOOLS
Custom Environments
Addon Name
steamvr_home
widevision (*** Default ***)
widevision_test_one
Create Empty Addon
Create New Addon From Selected
Create Desktop Shortcut
Set As Default
Launch Tools
Show Launch Command Line
View Wiki
Edit Dependencies

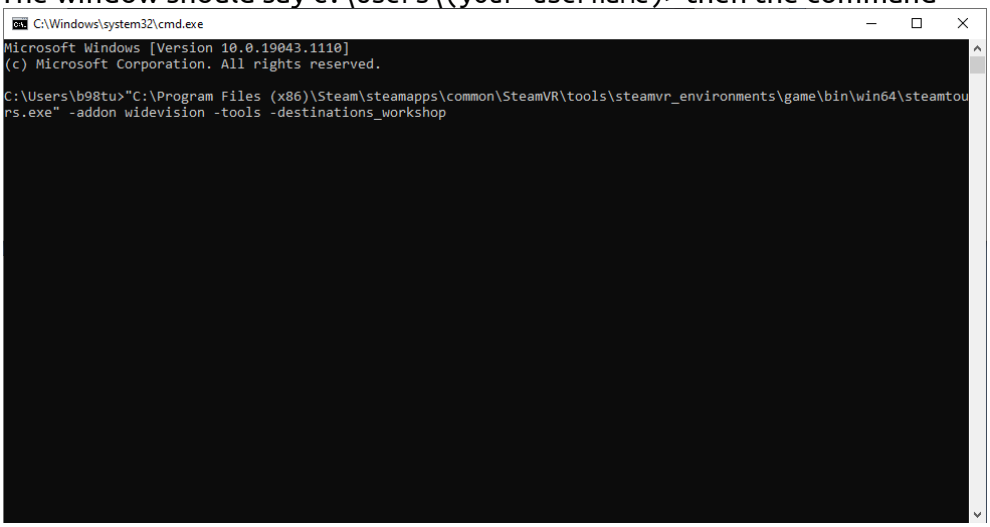
After closing the program, use the “Windows Key + R” and type in cmd into the run window, and click enter



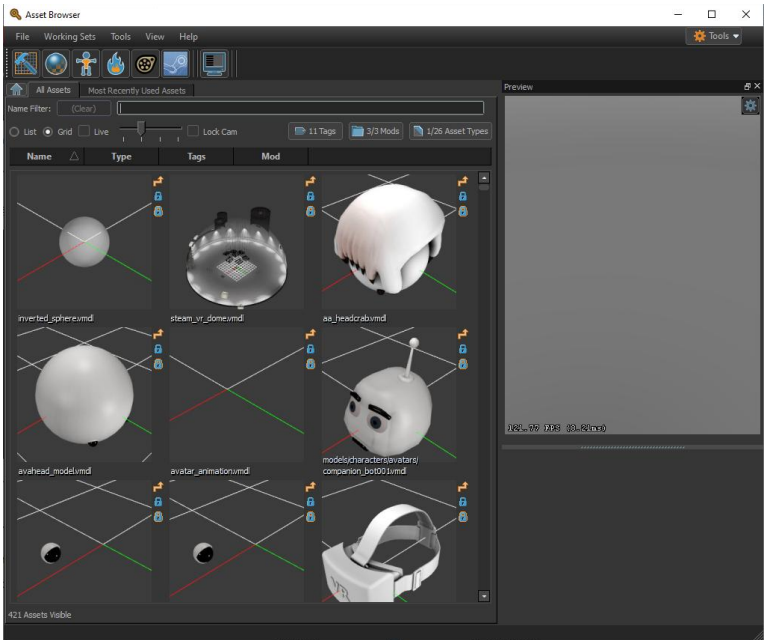
Copy the following line, and paste it in by right clicking in the command prompt window:

```
"C:\Program Files (x86)\Steam\steamapps\common\SteamVR\tools\steamvr_environments\game\bin\win64\steamtours.exe" -addon widevision -tools -destinations_workshop
```

The window should say `C:\Users\(your username)>` then the command

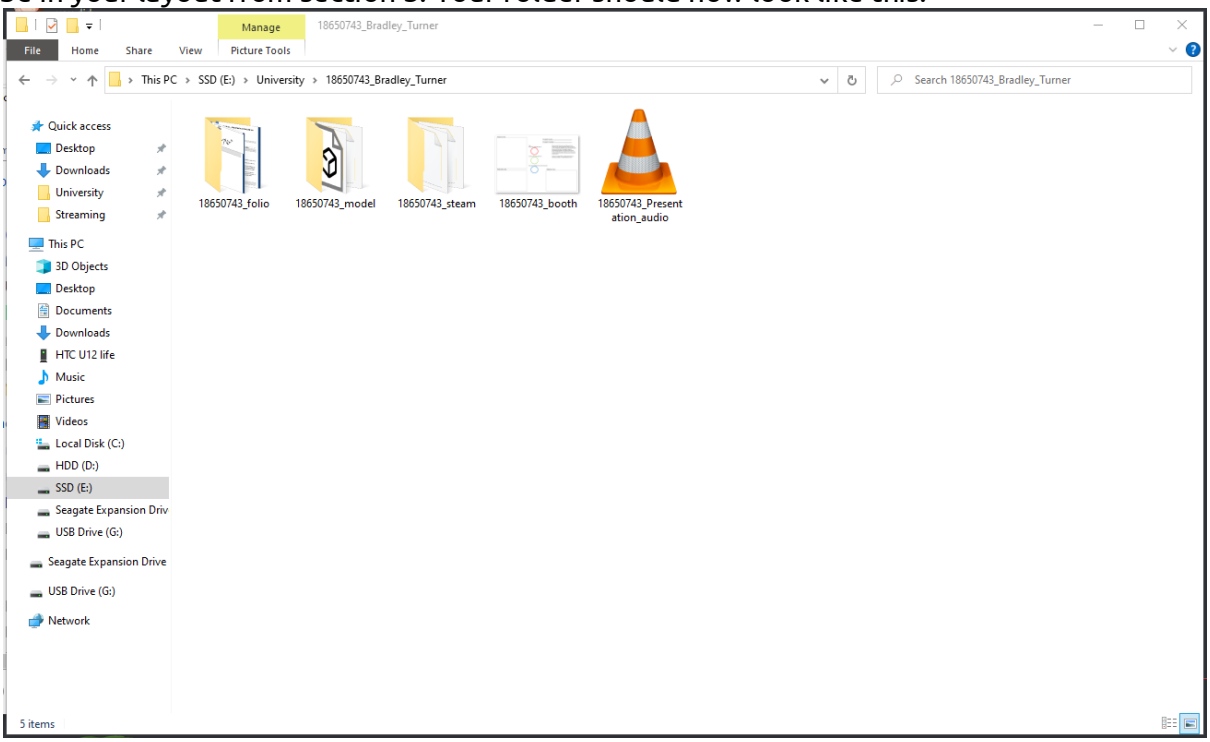


Hitting enter will now boot you into SteamVR’s workshop tools. All your work will be done in the “Asset Browser” Which should look like this:



After this, follow the tutorials HERE to get an idea of how to use the software. Then use this knowledge to create a small room that showcases your project in any way you see fit.

After you have finished creating your custom space, navigate to `C:\Program Files (x86)\Steam\steamapps\common\SteamVR\tools\steamvr_environments\content\steamtours_addons\` and copy the "Widevision" folder. And add it to your folder to hand in, and call it "`studentno_steam`". Bradley will create a prefab from this project and drop it into the main Widevision project, then create a teleport pad to and from the area. The one that should be in your layout from section 3. Your folder should now look like this:



Well done, you're done! Make sure to send a zipped version of your "`StudentNo_Firstname_LastName`" file and upload it (I suggest dropbox or mega.nz) and send a download link to Bradley at 18650743@student.westernsydney.edu.au by week 10 (date subject to change). Make sure to keep in communication with Bradley on how things are progressing as well as any general questions.

6 navigating and opening SteamVR workshop on Mac

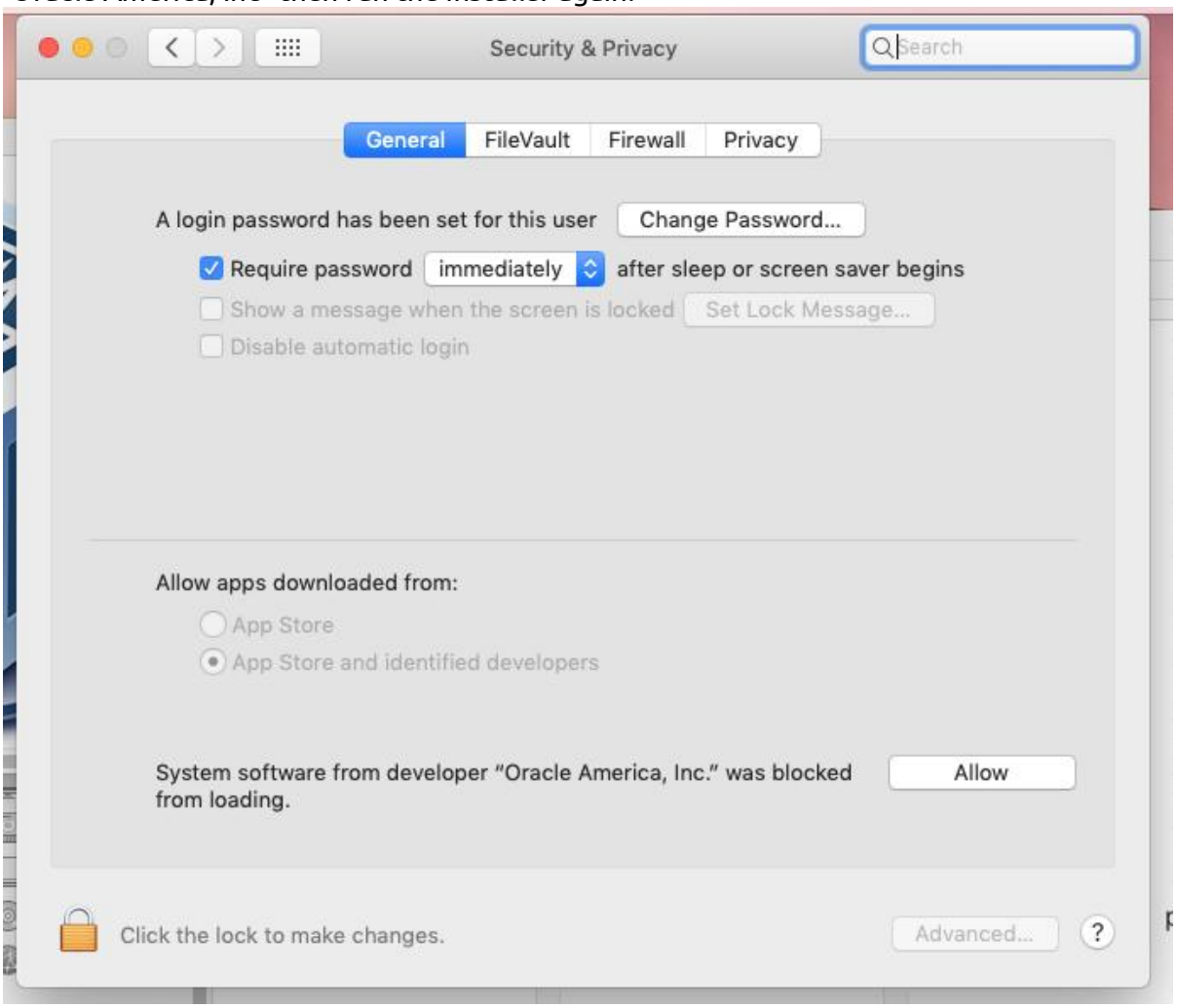
We will be using, after much testing, Virtualbox to emulate a Windows 10 OS in Mac OS. You will need to have MacOS X 10.6 to 10.15 (tested on 10.14). Note, it will not work on M1 or PowerPC chipsets. And there are reported issues on using 10.16, but I am unable to test them at this time.

A Windows 10 ISO can be acquired for free if you choose not to activate it. It removes some visual and advanced functions that aren't needed for running SteamVR workshop tools, so navigate HERE. Choose Windows 10, English and 64-bit Download, save it to a new folder called VMs in your home folder, we will save everything for the virtual machine here so it is easy to remove when you are done.

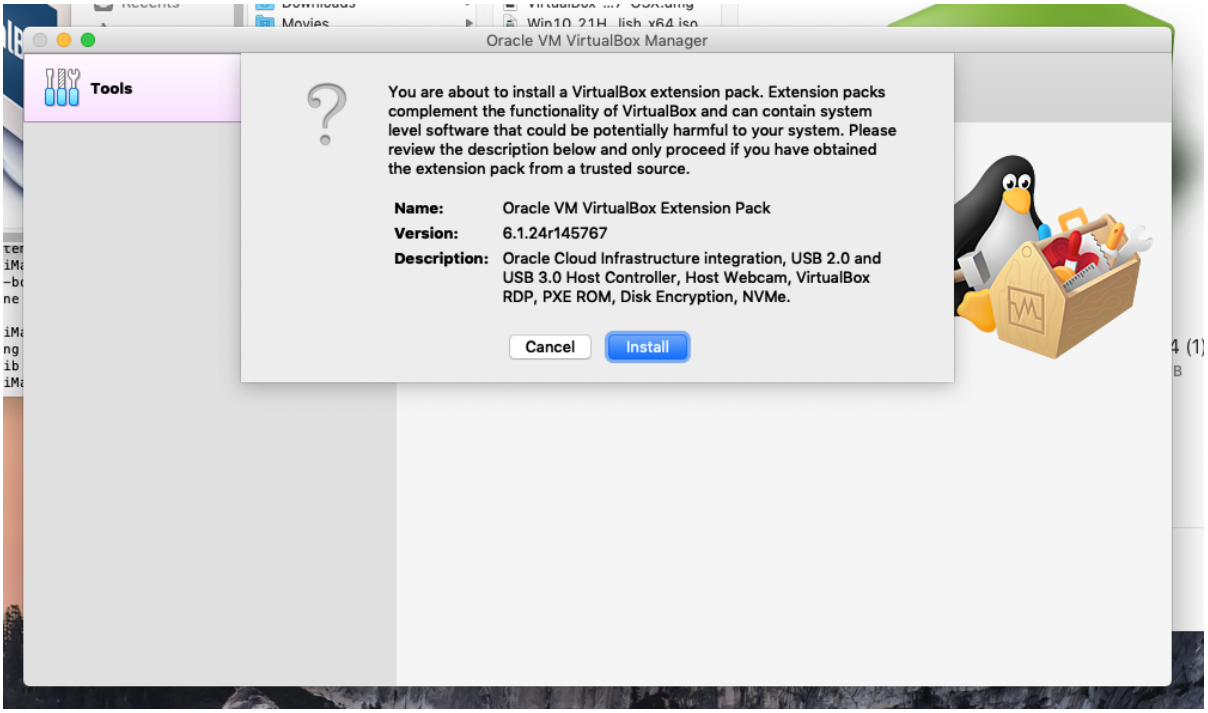
After that download is finished, you'll need to download Virtualbox from HERE and the Virtualbox extensions pack from HERE and save them in the VMs folder created earlier.

Open the Virtualbox DMG and open the .pkg file, following the installer till it installs.

IF the installer fails, go the System Preferences, Security & Privacy and click “Allow” for “Oracle America, Inc” then run the installer again.

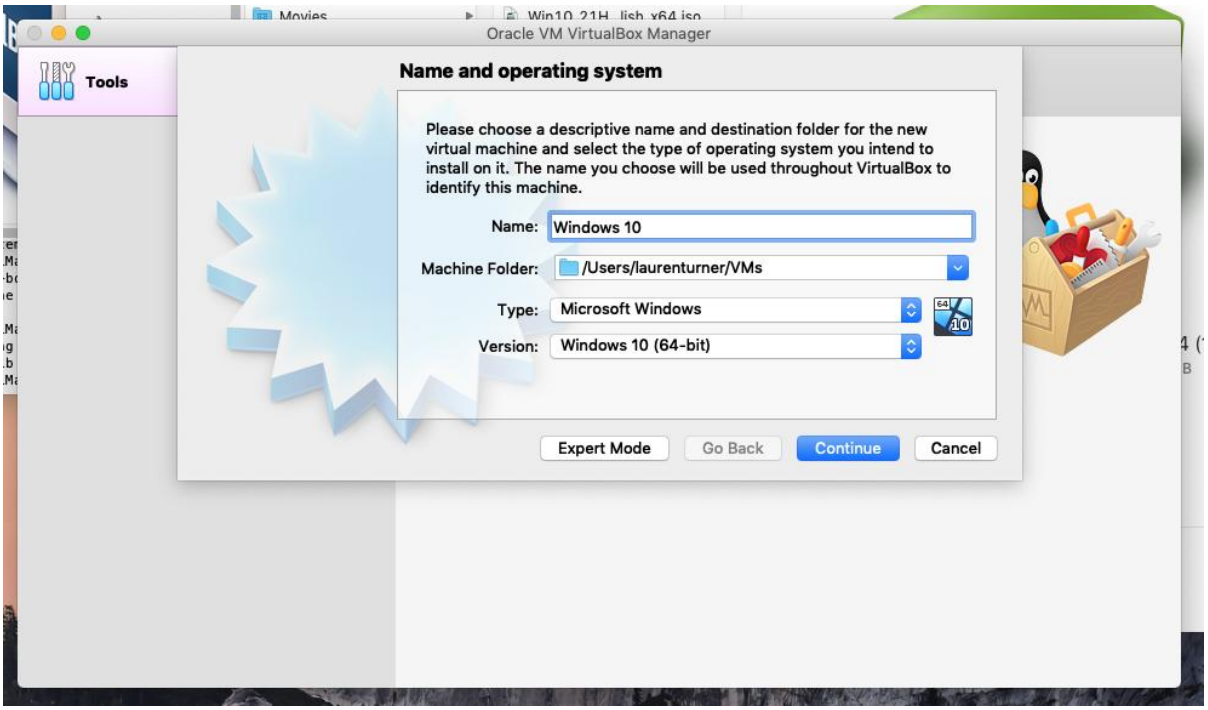


Once it installs, run Virtualbox, then navigate to the “Extensions Pack” downloaded earlier in Finder. Open it and it should install with a few prompts.

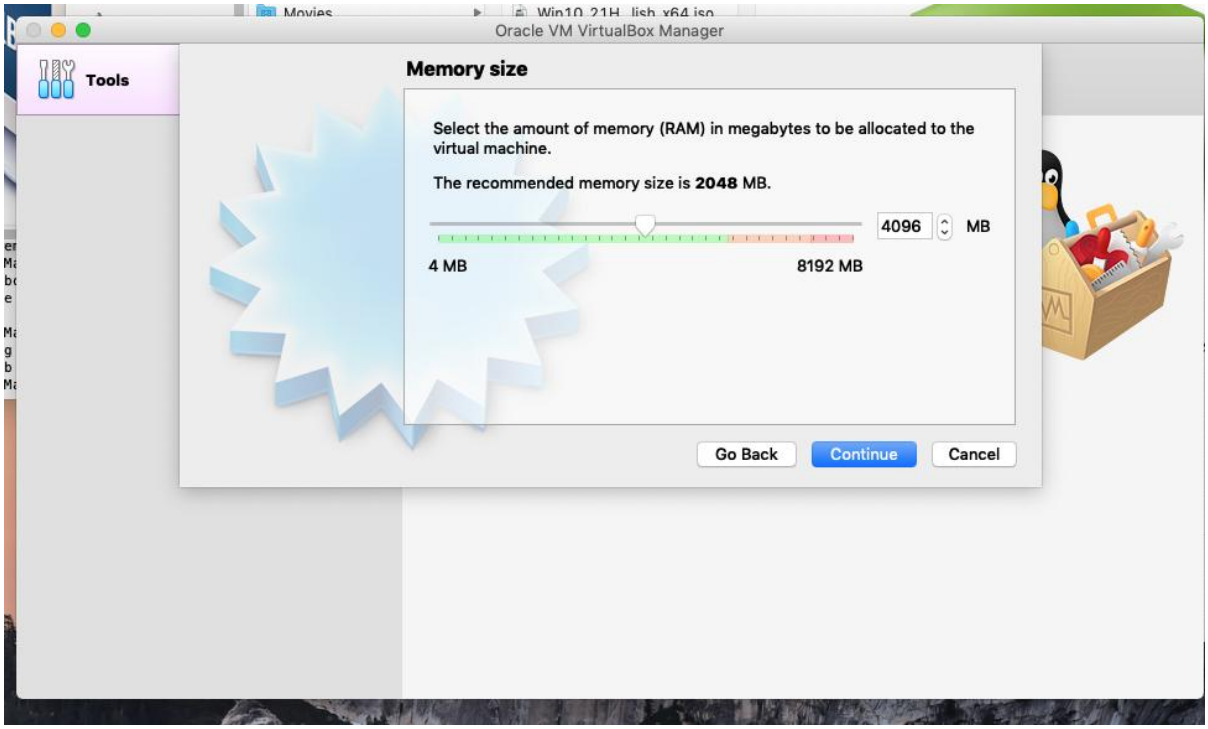


Now to make a new Virtual Machine. Click New in the Virtualbox window and follow the installer, making sure to ser the settings as seen in the following screenshots.

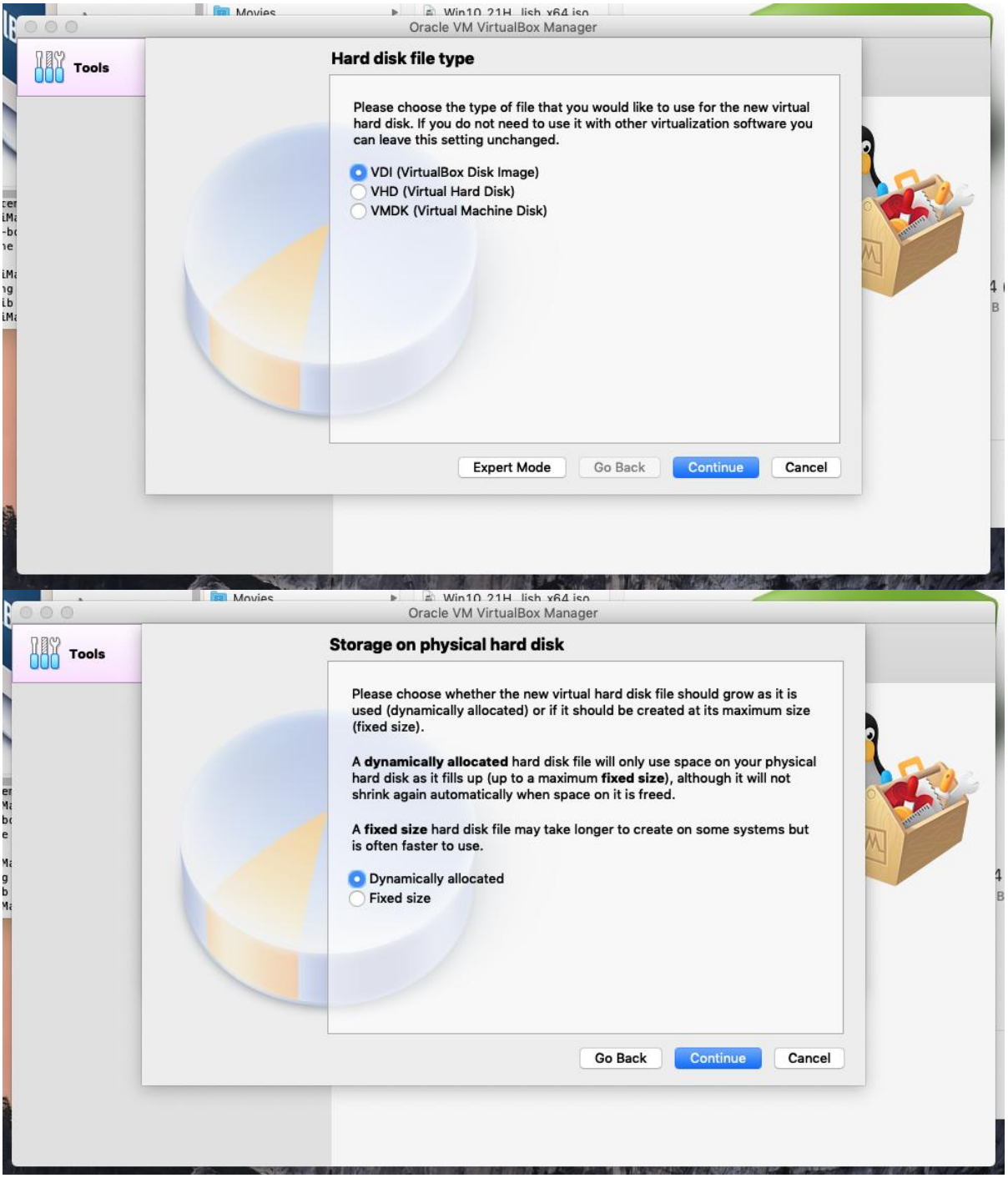
When prompted for the machine folder, choose the VMs folder created earlier as the machine folder.

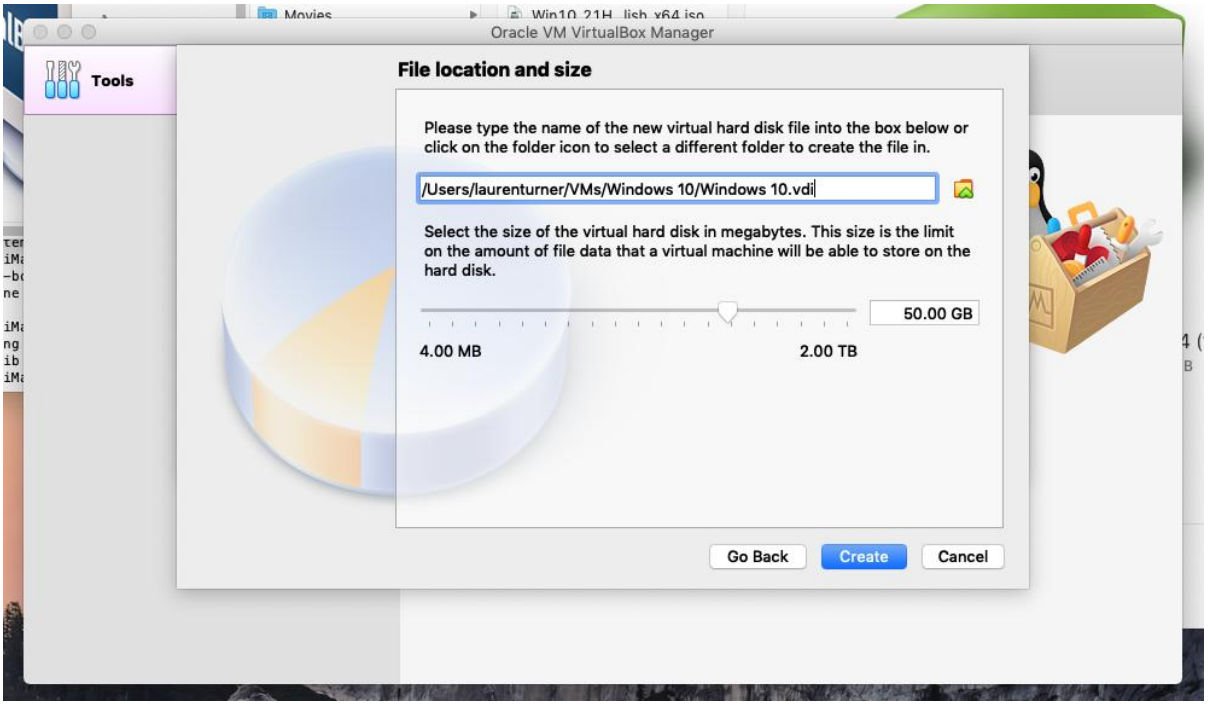


Memory should be set to about half of the max ram your computer has, because it needs to run both MacOS and windows at the same time.

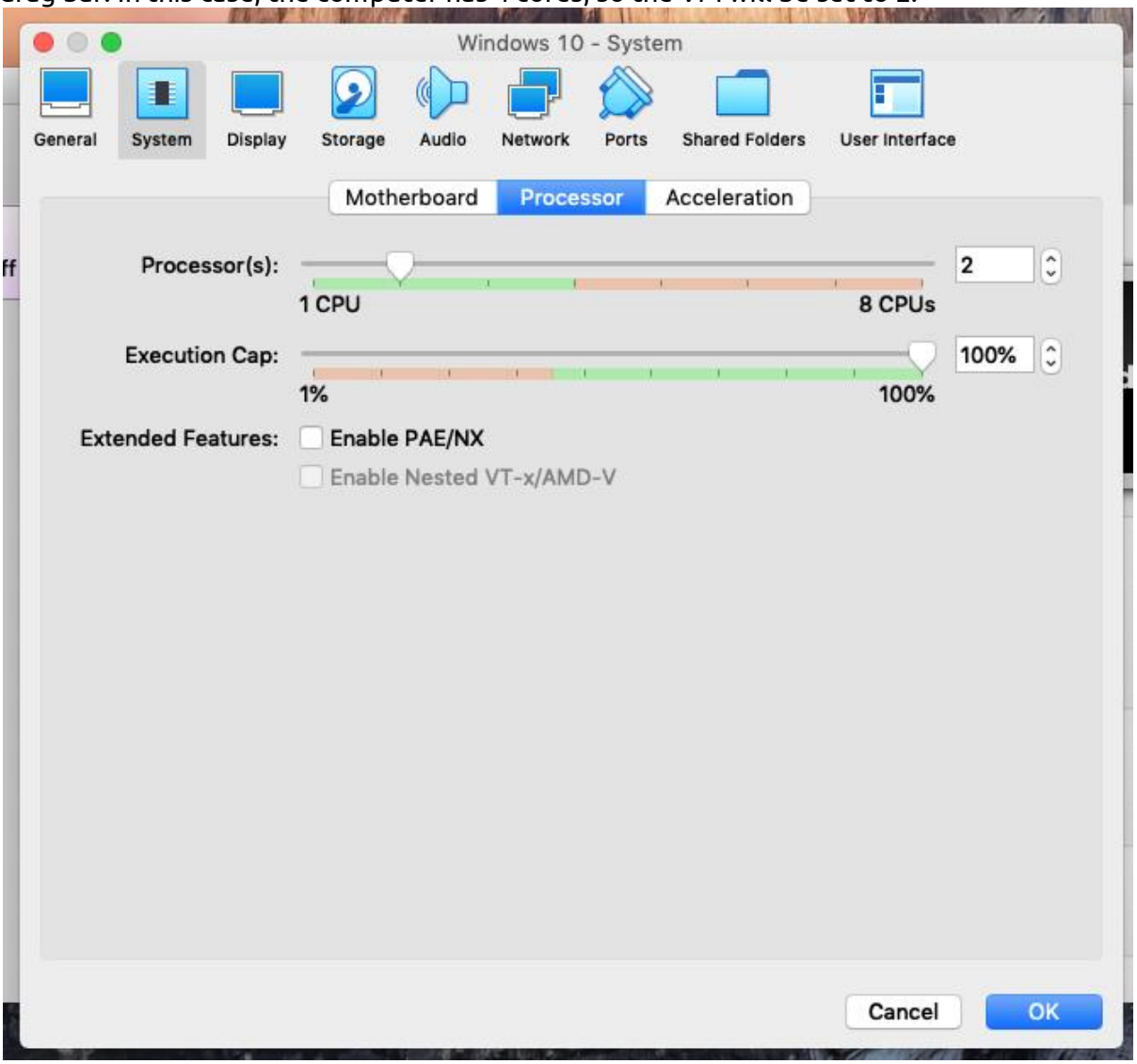


Creating a virtual HDD is a very easy process

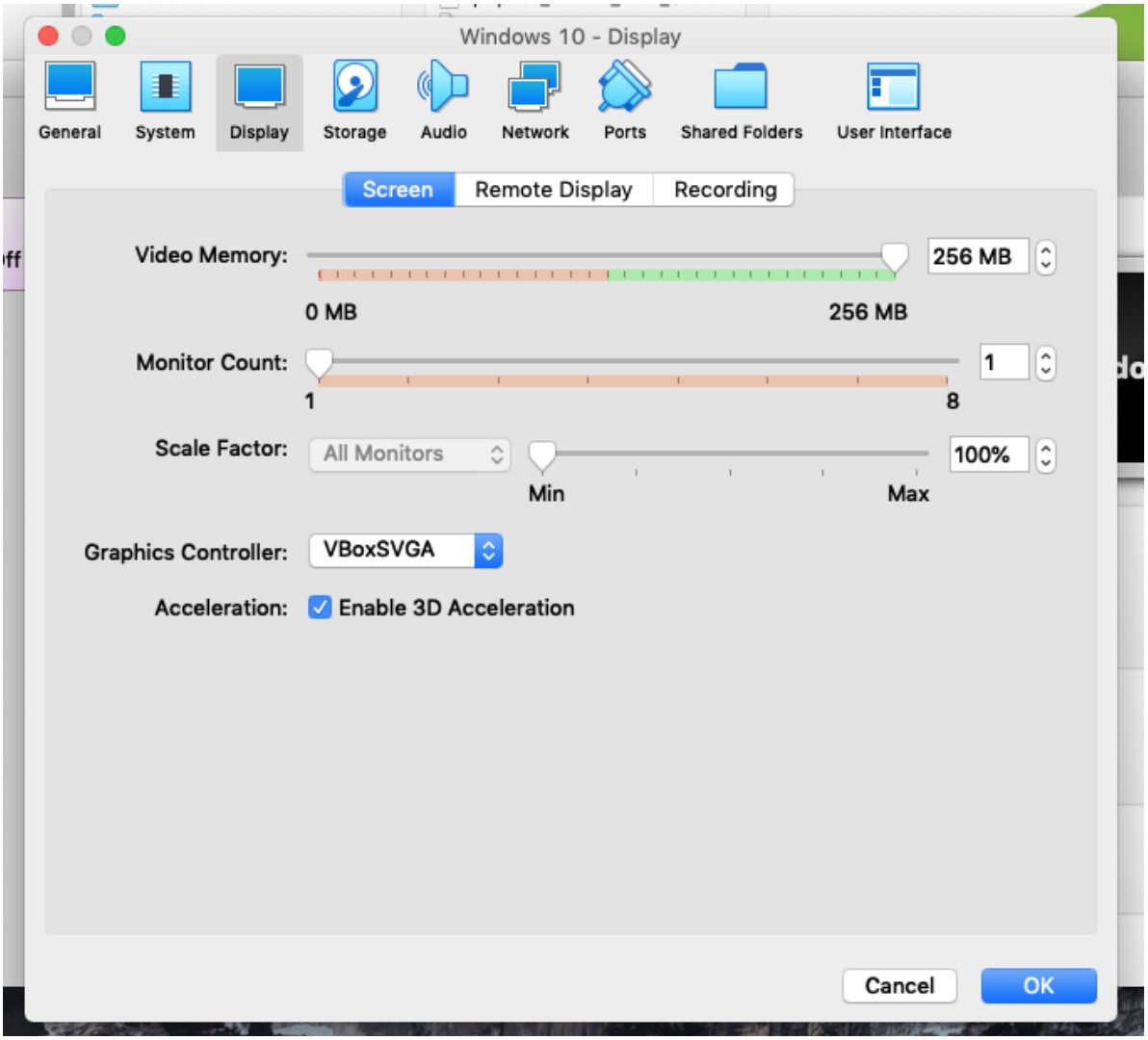

Oracle VM VirtualBox Manager
Tools
Hard disk file type
Please choose the type of file that you would like to use for the new virtual hard disk. If you do not need to use it with other virtualization software you can leave this setting unchanged.
VDI (VirtualBox Disk Image)
VHD (Virtual Hard Disk)
VMDK (Virtual Machine Disk)
Expert Mode
Go Back
Continue
Cancel
Oracle VM VirtualBox Manager
Tools
Storage on physical hard disk
Please choose whether the new virtual hard disk file should grow as it is used (dynamically allocated) or if it should be created at its maximum size (fixed size).
A dynamically allocated hard disk file will only use space on your physical hard disk as it fills up (up to a maximum fixed size), although it will not shrink again automatically when space on it is freed.
A fixed size hard disk file may take longer to create on some systems but is often faster to use.
Dynamically allocated
Fixed size
Go Back
Continue
Cancel


Oracle VM VirtualBox Manager
Tools
File location and size
Please type the name of the new virtual hard disk file into the box below or click on the folder icon to select a different folder to create the file in.
/Users/laurenturner/VMs/Windows 10/Windows 10.vdi
Select the size of the virtual hard disk in megabytes. This size is the limit on the amount of file data that a virtual machine will be able to store on the hard disk.
50.00 GB
4.00 MB
2.00 TB
Go Back
Create
Cancel

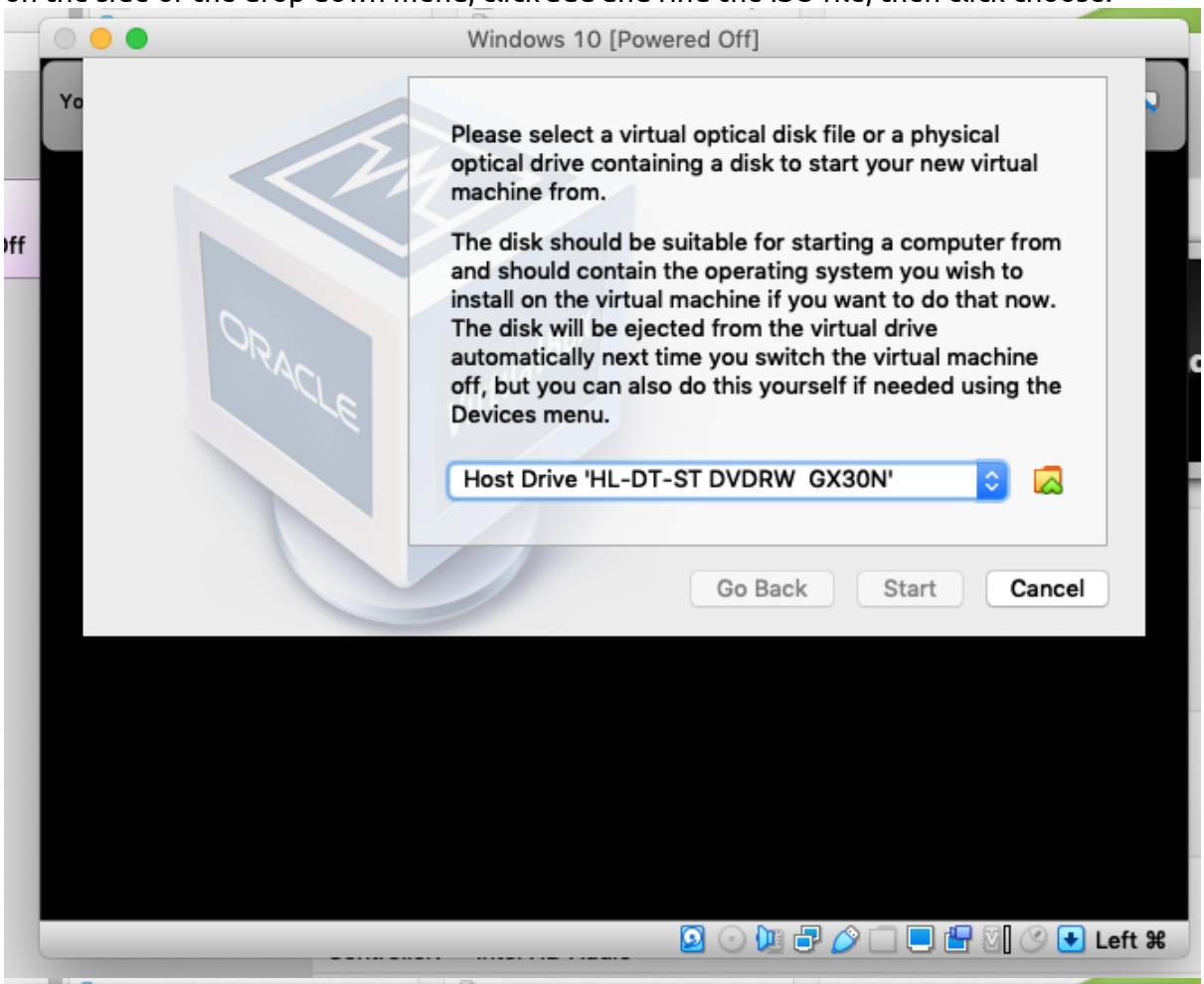
Now your VM is ready, but we want to make a few changes before you boot it on for the 1st time. Navigate to settings in the Virtualbox window, System then processor, and change the processor cores to half the maximum cores shown in the green area of the drag bar. In this case, the computer has 4 cores, so the VM will be set to 2.

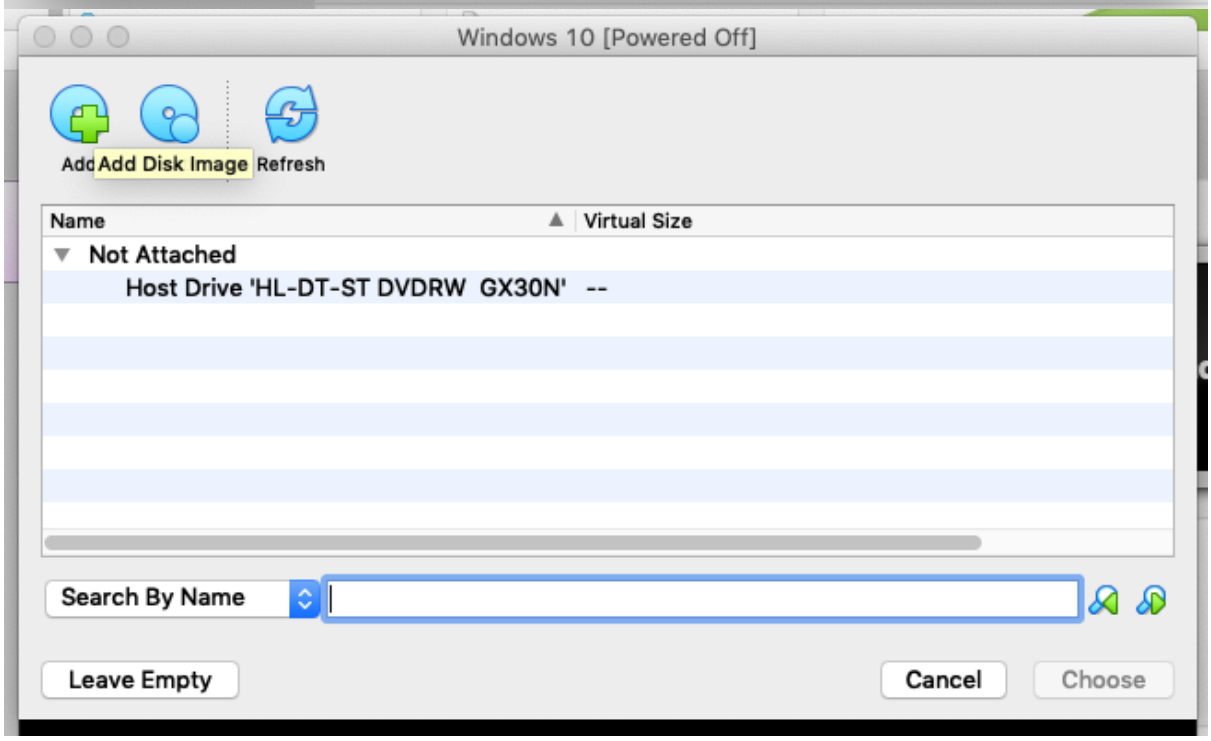


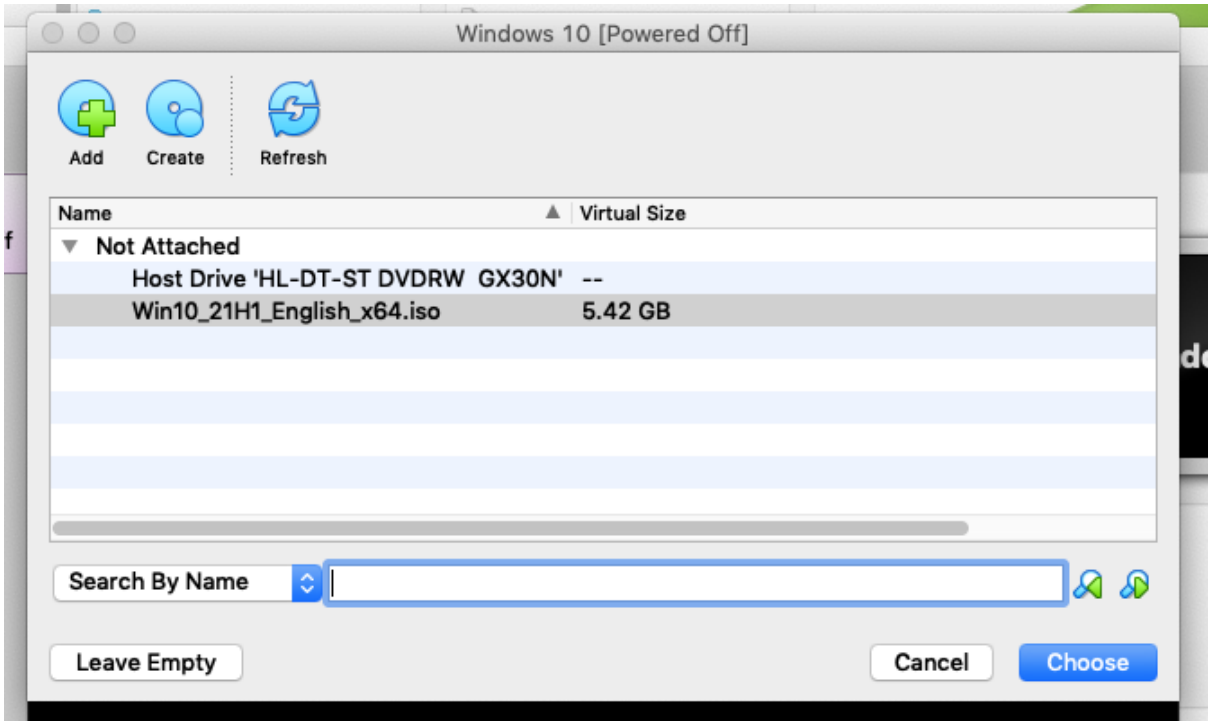
Now navigate to display, tick “Enable 3D Acceleration” and max out the video memory. Then click OK.



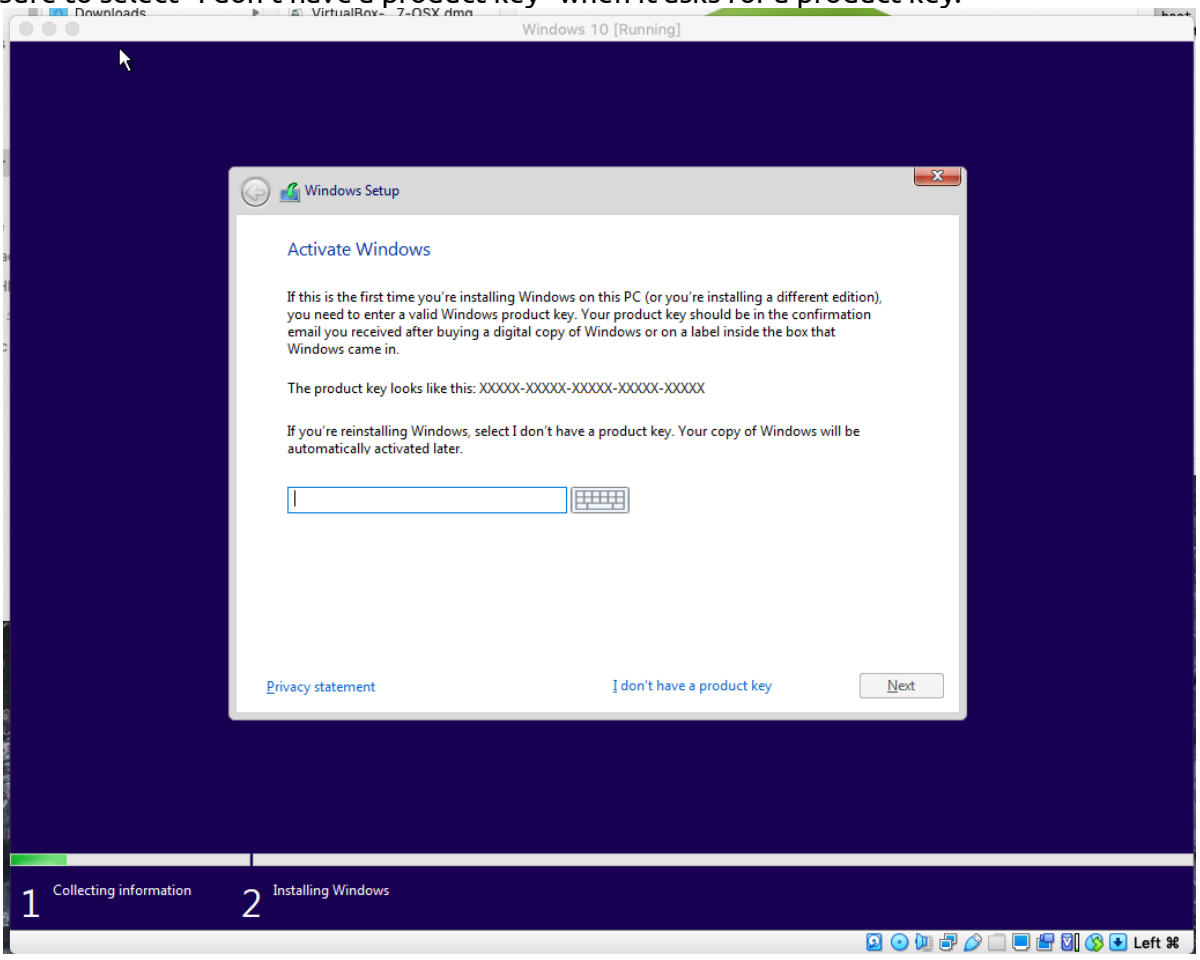
Now start the VM. If a prompt asks for accessibility rights, go to system preferences and grant them. When the VM loads, a screen will pop up and ask for a boot disk. This is where you will choose the Windows 10 ISO from the beginning of the guide. Click the little folder on the side of the drop down menu, click add and find the ISO file, then click choose.



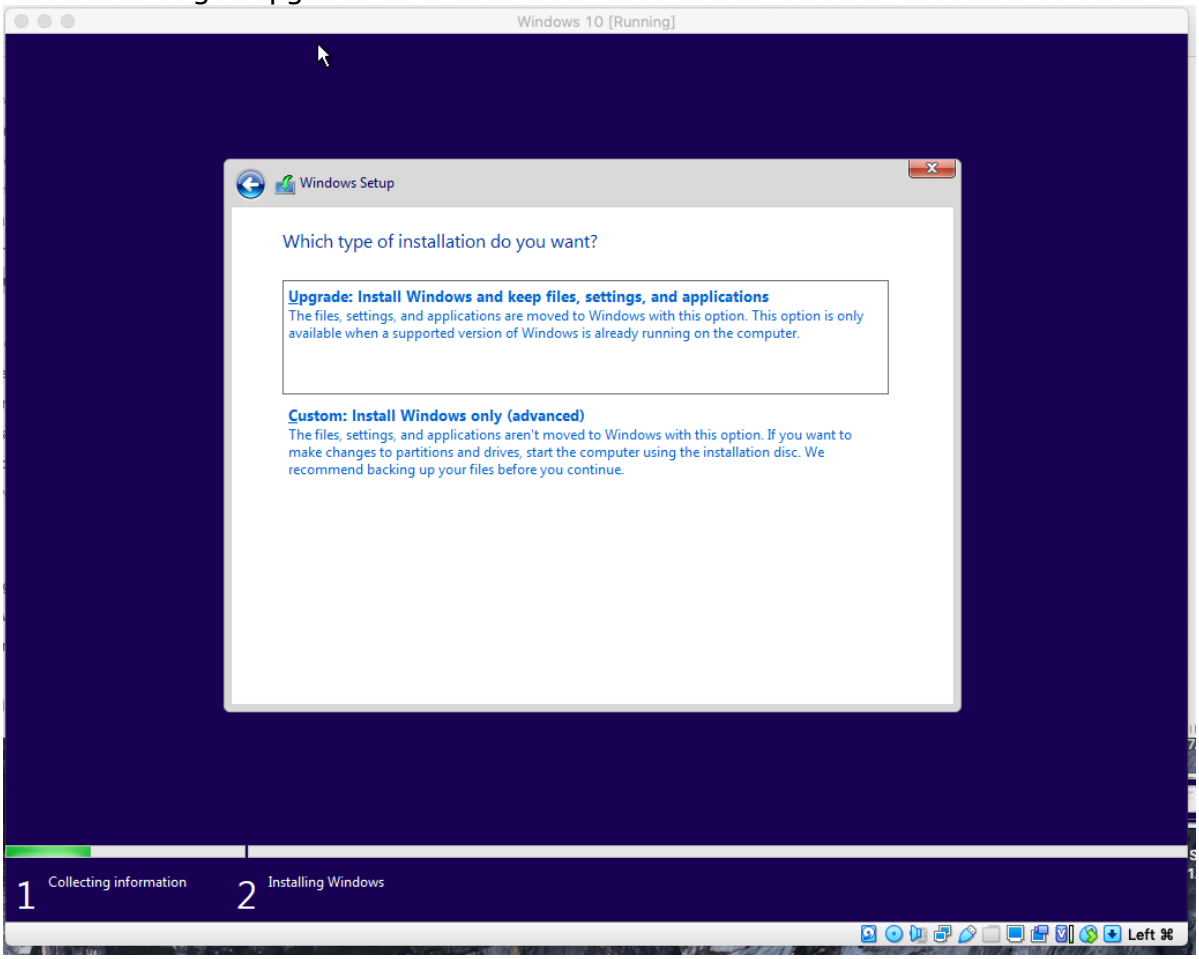




Windows 10 will now install. Install as you normally would an operating system, but make sure to select “I don’t have a product key” when it asks for a product key.



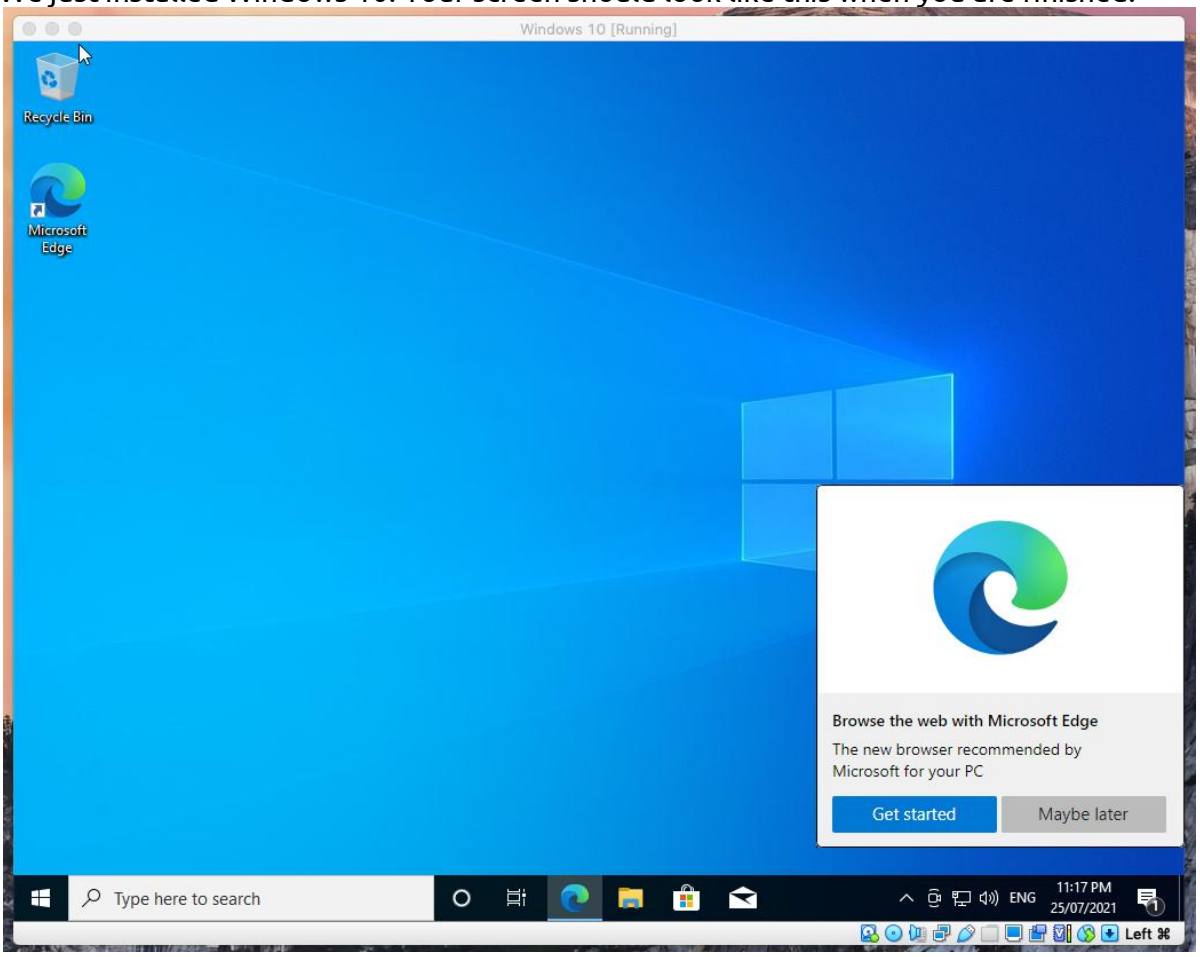
When prompted for Upgrade or Custom, choose custom because the disk is empty so there is nothing to upgrade.



When the system reboots for the 1st time, follow these options for the best user experience using the SteamVR workshop tools.

- Setup for personal use
- choose offline account
- choose limited experience
- name it whatever you want
- You don't need a password because it's already password protected in your computer, so just hit enter
- turn off everything under privacy settings
- choose "Not Now" for Cortana

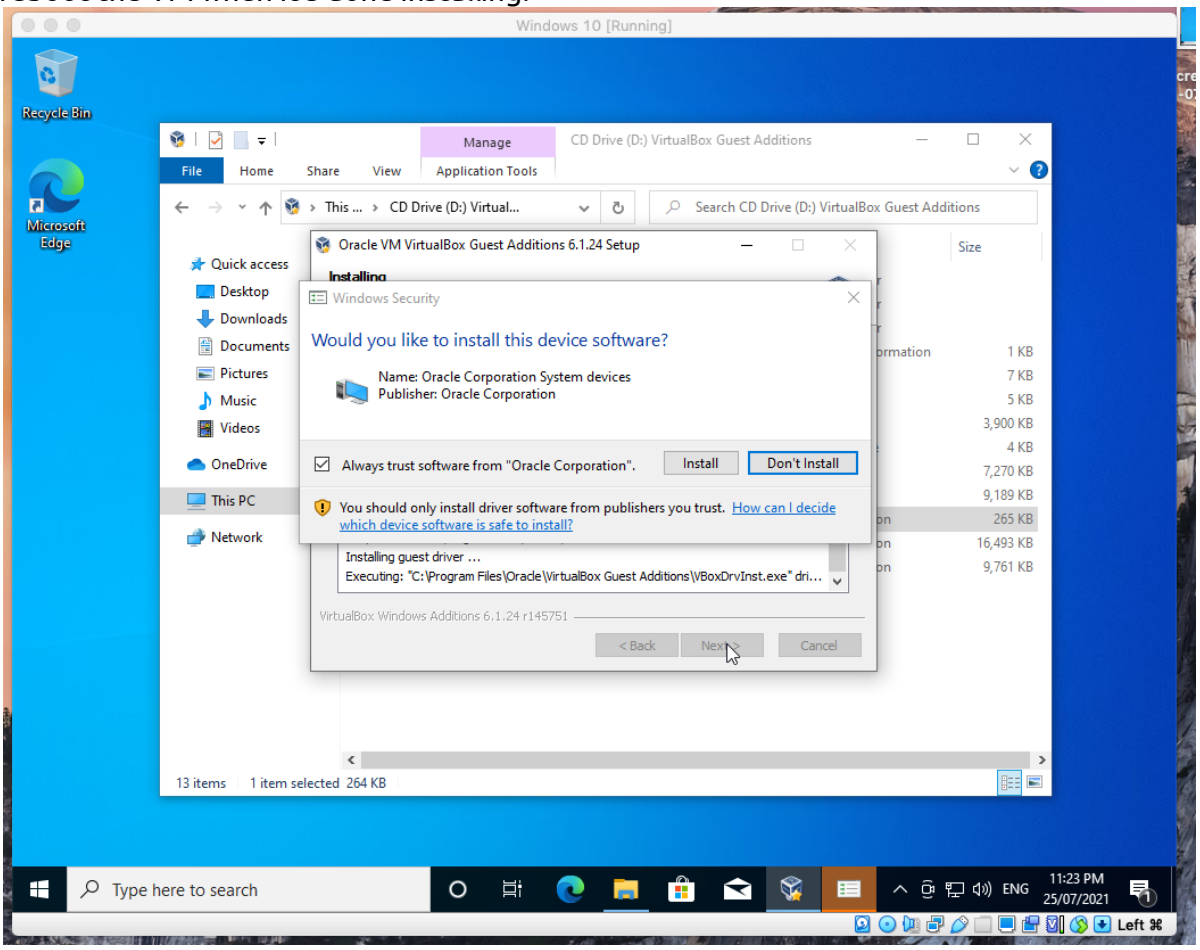
We just installed Windows 10! Your screen should look like this when you are finished.



Now, before we install steam, we need to install Virtualbox guest additions. To do this navigate out of the Virtualbox window to the MacOS menu bar and select Devices > Insert Guest Additions CD Image.

Now go back to Windows, navigate to This PC and open the CD and run the virtual box additions program.

Click through the installer. Make sure to click install on the Windows Security pop up. Then reboot the VM when it's done installing.



When it's rebooted, make sure to run all the windows updates available. You may also want to change the display size in windows so the Virtualbox window is larger on your screen. Now go back to section 5 and start the guide from there.

NOTE, windows will run quite slowly in Virtualbox, try to reduce multitasking and installing any other programs as much as possible. And there may be some graphical glitches, though they shouldn't affect the use of the SteamVR features. I did try and run Windows 10 in qemu, which is far lighter weight and runs better, but due to the lack of drivers, it didn't run SteamVR workshop tools at all, though the experience up to that point is much faster and smoother.