

Installing and Using the ECS Virtual Machine 2021/22

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1 Overview

To make it easy to install all the programs that you need in Computation I in one go, we provide a *virtual machine*. With a virtual machine your computer can be used run a different operating system with different programs. For example, if your laptop runs the Windows operating system, then with a virtual machine it can run the Linux operating system and applications. The virtual machine uses the Ubuntu Linux operating system and applications.

In the Computation I and II and ECS courses, and Vehicle Networking each student will use their own PYNQ hardware board connected to their laptop. The virtual machine also makes it easier to connect the PYNQ board to your laptop.

This document is quite long and detailed. Make sure you that you perform all the required steps. A separate document describes how to connect the PYNQ board to your computer and how to use it with the virtual machine.

Note that Apple computers with ARM M1 processor are not capable of running the Virtual Machine.

If you already VirtualBox installed, update it to the latest version (currently 6.1.26) first.

2 Installing VirtualBox

To use the ECS Virtual Machine you need the *VirtualBox* application for your operating system as well as the *VirtualBox 6.1.26 Oracle VM VirtualBox Extension Pack*. You can download them from this address: <https://www.virtualbox.org/wiki/Downloads>

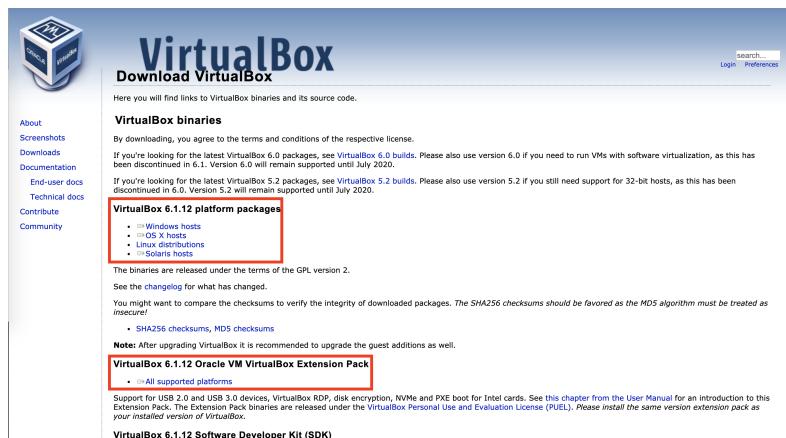


Figure 1

- *Installing VirtualBox on Windows Laptops*

Download and install VirtualBox 6.1 for Windows hosts.

- *Installing VirtualBox on Mac OS X*

Download and install VirtualBox 6.1 for OS X hosts.

- *Installing VirtualBox on Linux*

Even if you already run Ubuntu or another Linux, then you must install VirtualBox because then you don't have to install many (more complicated) applications. Select the right version from this page: https://www.virtualbox.org/wiki/Linux_Downloads

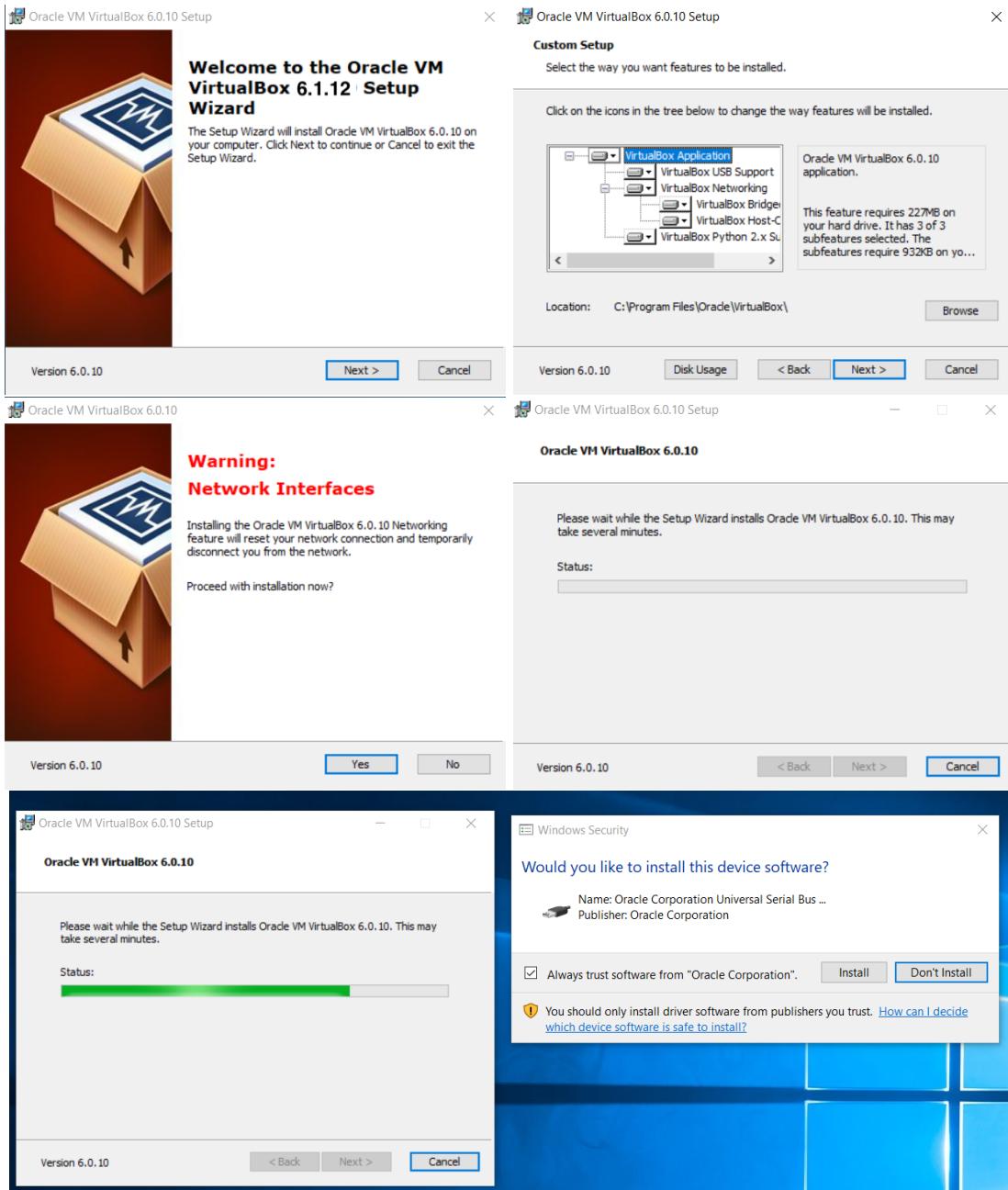


Figure 2: Note: some images show VM VirtualBox 6.0.10 but you should install the latest version (currently 6.1.26).

3 Importing the VirtualBox Extension Pack

Download the *VirtualBox 6.1.26 Oracle VM VirtualBox Extension Pack* from the VirtualBox website. There is one version for all platforms. Start the VirtualBox application and open the preferences. Install the *VirtualBox 6.1.26 Oracle VM VirtualBox Extension Pack* by clicking on the Extensions button and selecting the file you downloaded earlier.

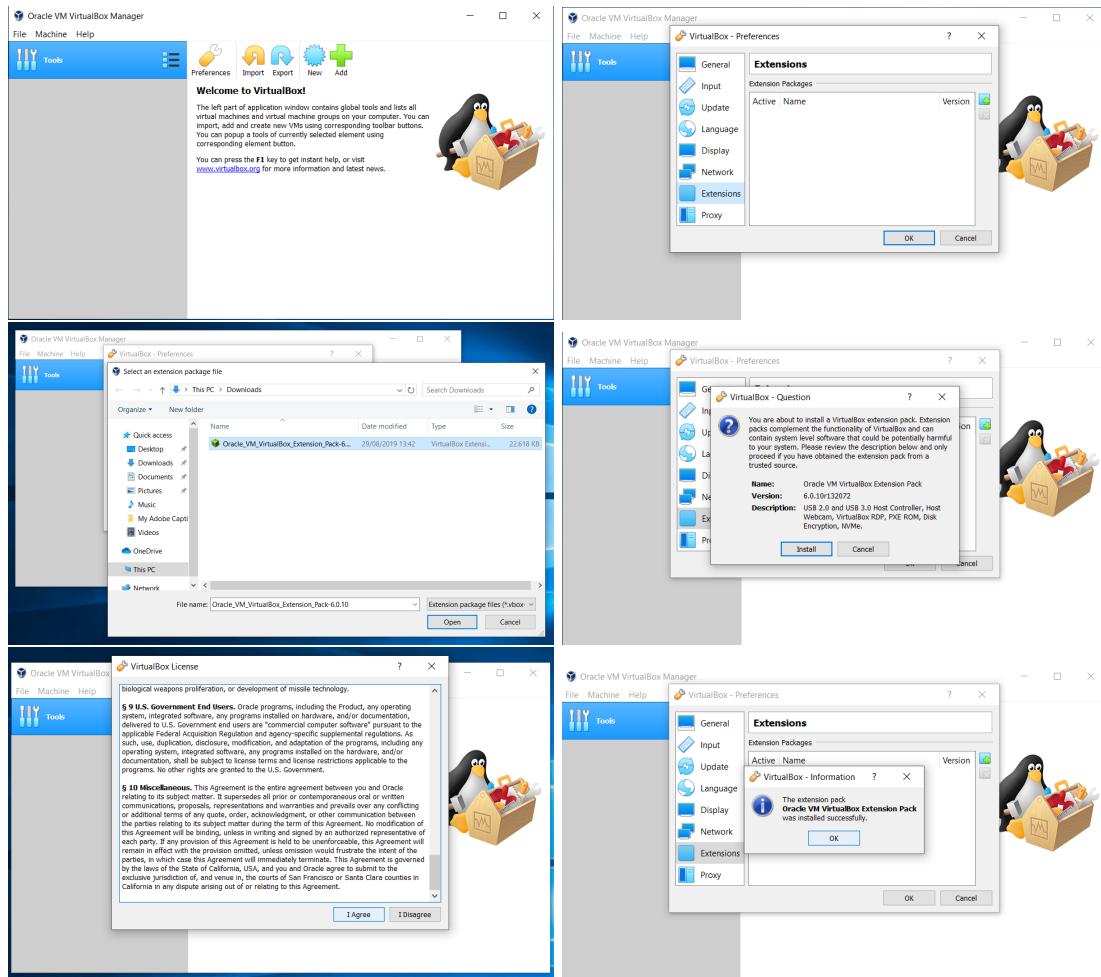


Figure 3: Note: some images show VM VirtualBox 6.0.10 but you should install the latest version (currently 6.1.26).

4 Downloading the ECS Virtual Machine

You can download the ECS virtual machine from this address:

<https://virtualmachine.compsoc.eu/>

Electronic Systems - Embedded Control Systems (5LIJ0)

Virtual Machine - Version 2021-2022

[Download Now !\[\]\(74d4806277d7e73349d8e8c0897931e9_img.jpg\)](#)

SHA256: 3e7fc01a91a407e6358f13451cc1eca553ecbfcd8fb85f134cd573c78db2d7a4

Figure 4

You need to be on the TUE-WPA2 network (directly or on VPN). The TUE guest network does not work. If for some reason you have problems with the virtual machine during the course, then you can just download and reimport it again.

5 Importing the ECS Virtual Machine

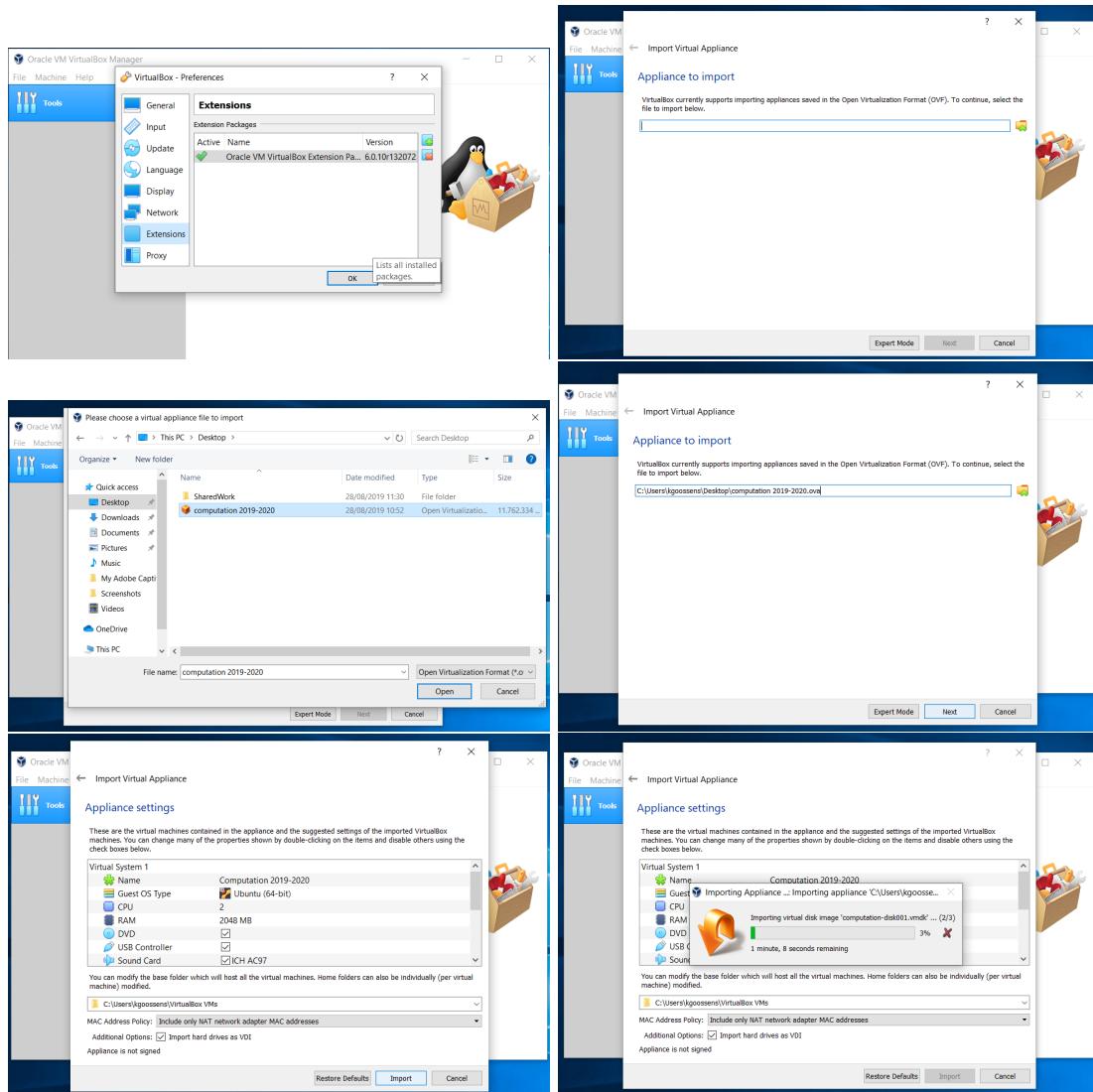


Figure 5: Note: some images show the 2019/20 Computation Virtual Machine but you should use the 2021/22 ECS Virtual Machine.

Before you start using the virtual machine, you need to create a shared folder, as described next.

6 Out-of-Date VirtualBox

If you use a VirtualBox version that is older than is required by the ECS Virtual Machine, then you will get something like the following error:

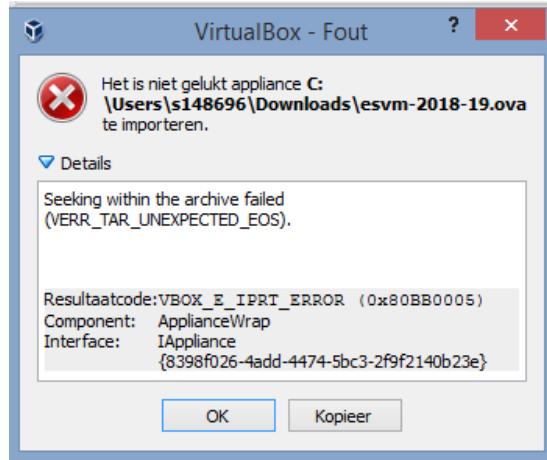
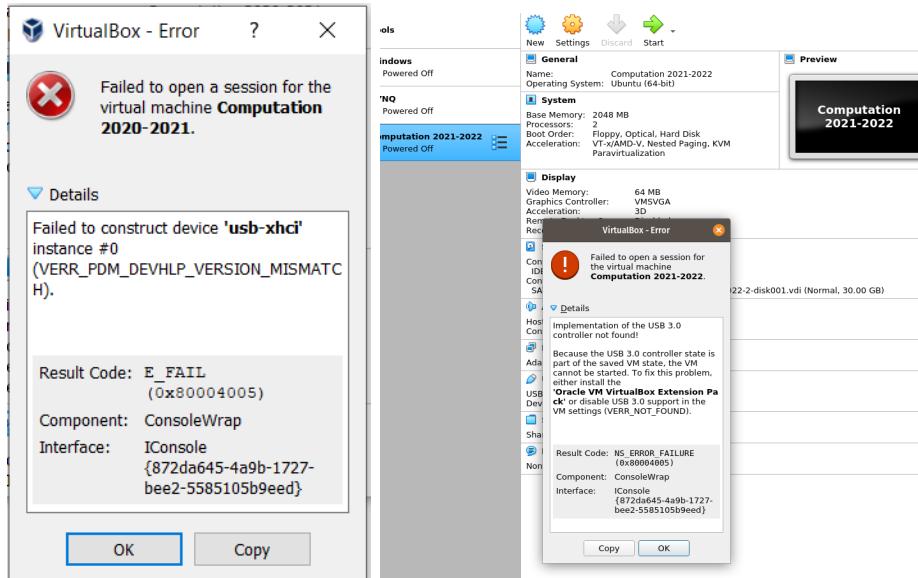


Figure 6

Update VirtualBox to the latest version, and restart VirtualBox before importing the virtual machine. If the VirtualBox update process takes a long time then it's probably hanging because lost its network connection. Just stop the program and restart it, and start the update again.

7 Incompatible VirtualBox and Extension Pack

If you get the following error message then the Extension Pack has not been installed correctly, or the versions of the Extension Pack and VirtualBox are not compatible. Upgrade to or install the latest version of VirtualBox and Extension Packs.



8 Keeping your Work Safe using Shared Folders

You can store all your work, i.e. your files and projects, on the file system of your computer (Windows, Mac, Linux, etc.), or on the file system of the virtual machine. Your computer file system is the one you normally use and make backups of (you do make backups, right?). The files in the file system of the virtual machine can only be accessed from within the virtual machine.

We strongly recommend that when you work in the virtual machine, i.e. use programs in the virtual machine, that the files you use are stored on your computer's file system. You do this with a *shared folder*.

When you work in the virtual machine all your work (files) must be in a shared folder.

That is, the files are in the file system of your computer, rather than in the file system of the virtual machine. In this way, your files will always be safe on your computer (even if for some reason you have problems with your virtual machine).

This figure shows what we're going to achieve: a shared folder that resides on your computer but is accessible from within the virtual machine:



Figure 7

The virtual machine already has a shared folder (`/home/student/SharedWork`), which you need to change to a location that's convenient for you, such as your Desktop on your computer.

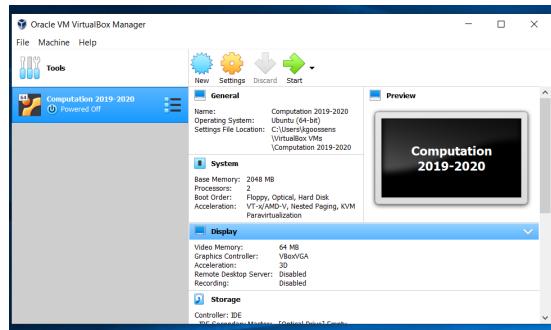
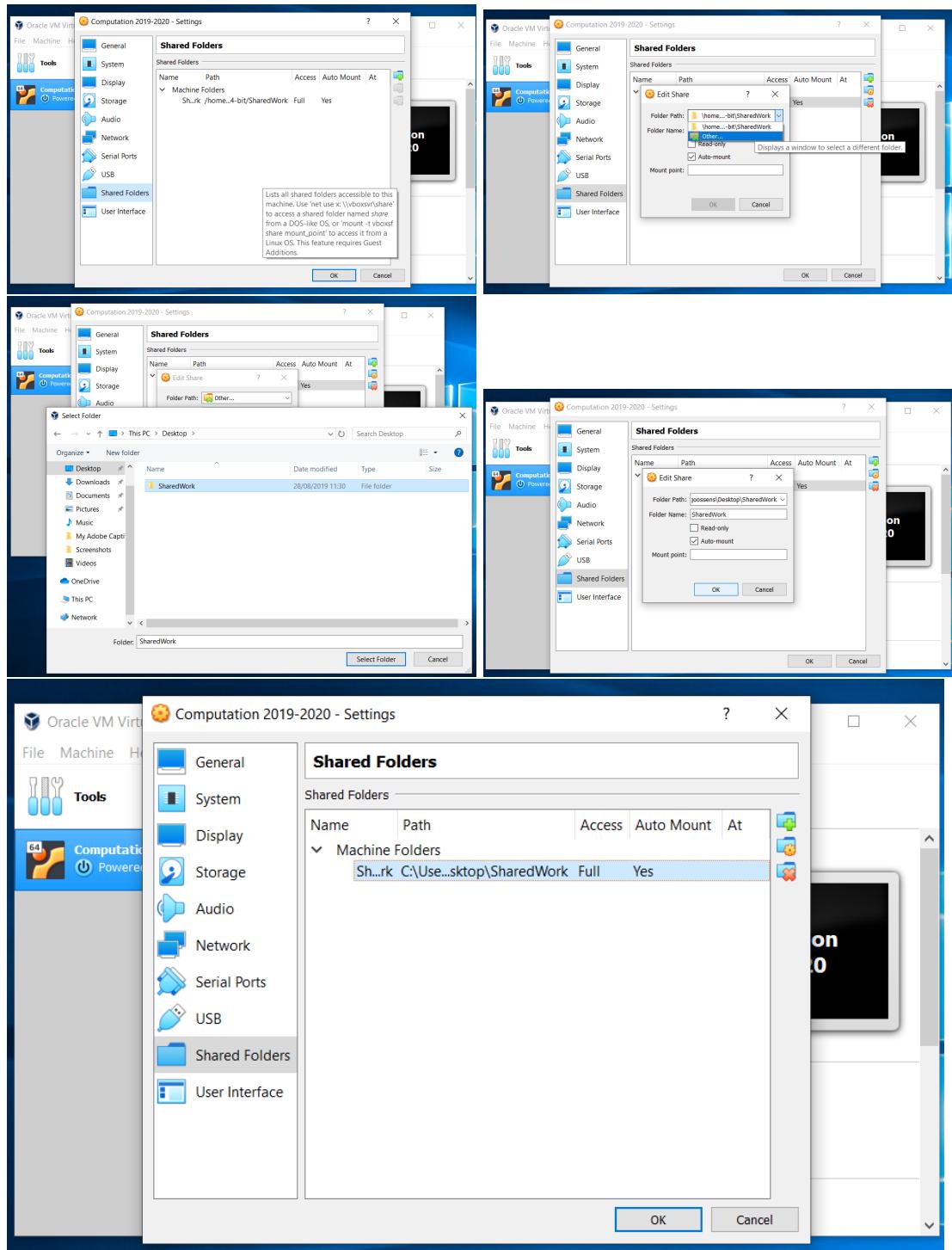


Figure 8

Click on Shared Folders and double-click on /home/student/. . . . Create a folder on your computer called **SharedWork** (with the capital 'S' and 'W' and without spaces); you can place it wherever you want (Desktop, Documents, etc.). (Take care that you change the /home/student/. . . shared folder, and not just add a new shared folder.)



8.1 Changing the Shared Folder after You Started the Virtual Machine Anyway

If you did not change the shared folder before starting the virtual machine or (re)moved the shared folder on your computer you will get an error message similar to this one:

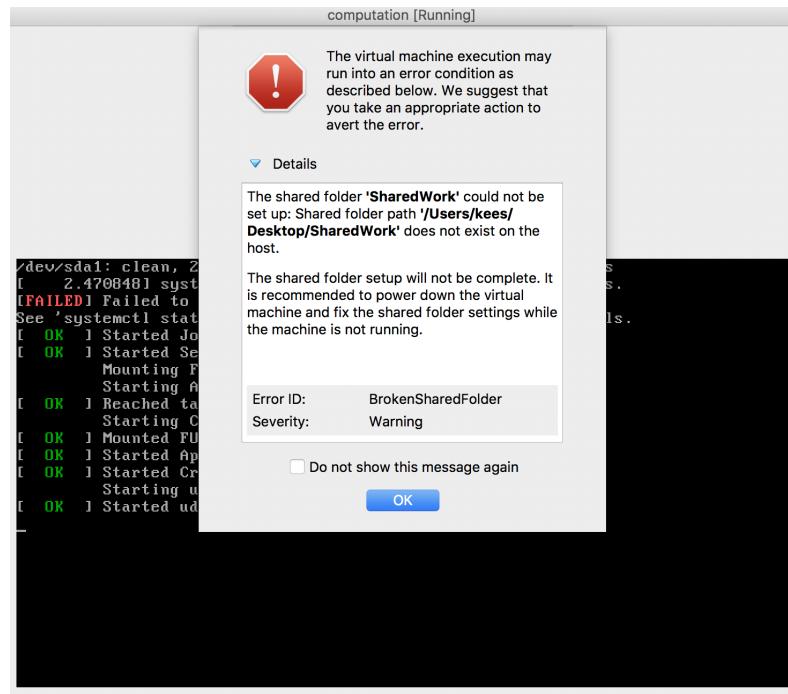


Figure 9

You need then to do essentially the same thing as outlined above.

9 Using the ECS Virtual Machine

First, remember:

**when running programs in the virtual machine,
you always save your work in the shared folder.**

You are now ready to use the ECS Virtual Machine. The password for the user computation is computation.

9.1 Using the Shared Folder

Double-click the “SharedWork” icon on the desktop, to open the shared folder from the virtual machine.

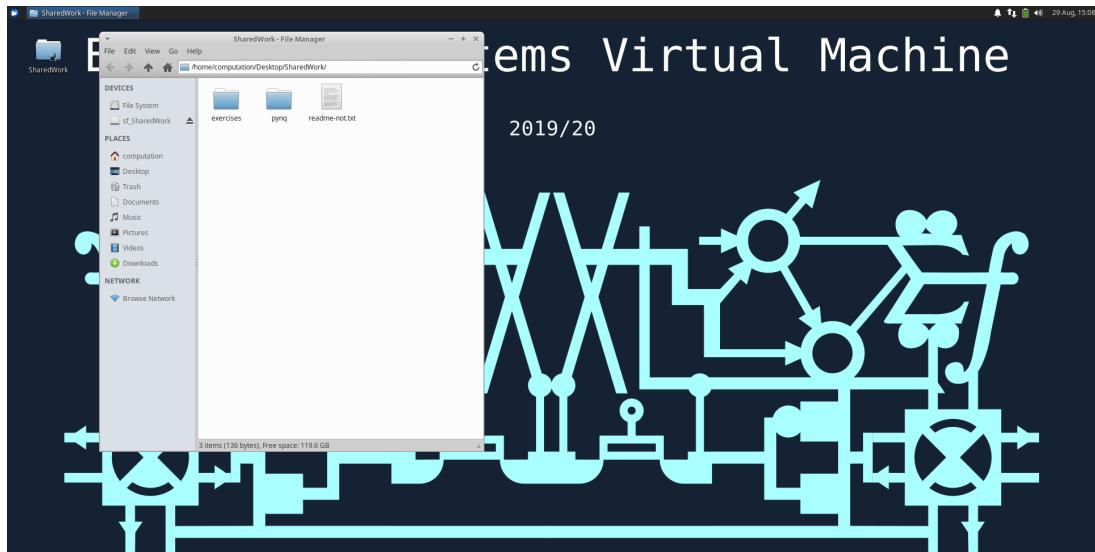


Figure 10

Alternatively, you can open the file manager by clicking on the top-left blue circle and access the shared folder from the side bar as “sf_SharedWork” as shown below:

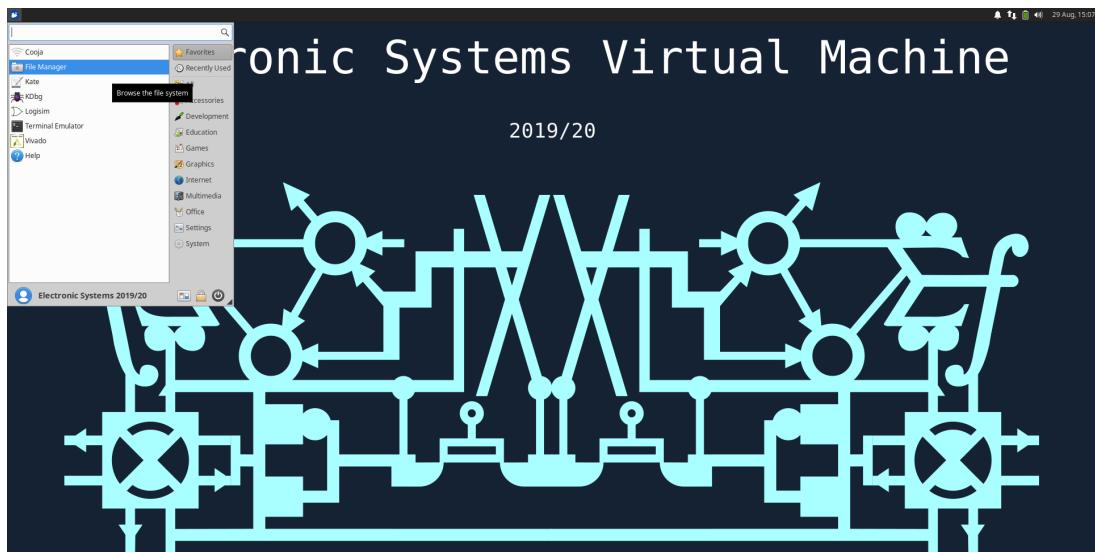


Figure 11

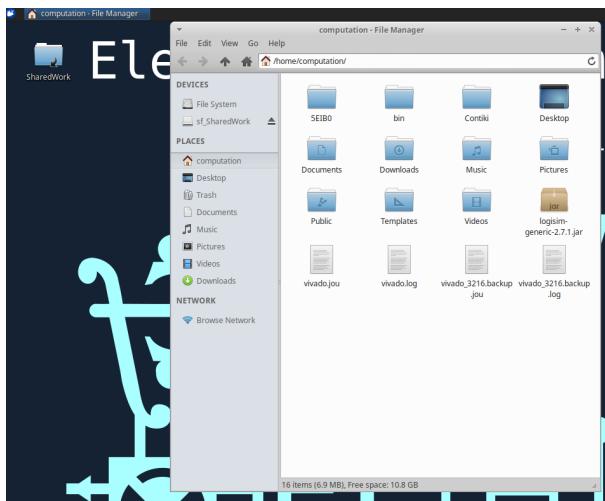


Figure 12

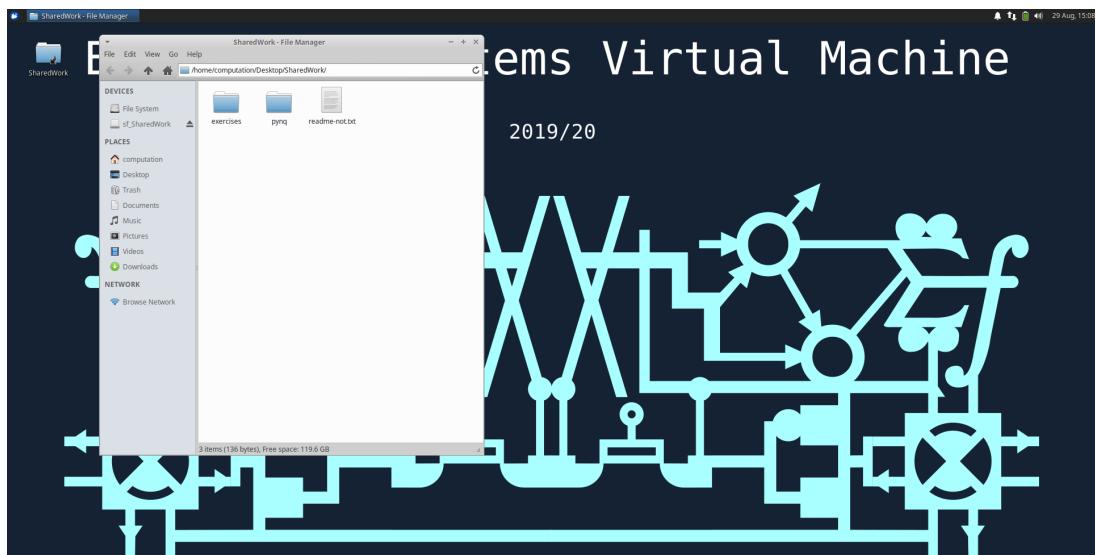


Figure 13

The last way to access the shared folder is to use the Terminal application and navigate to /Media/sf_SharedWork.

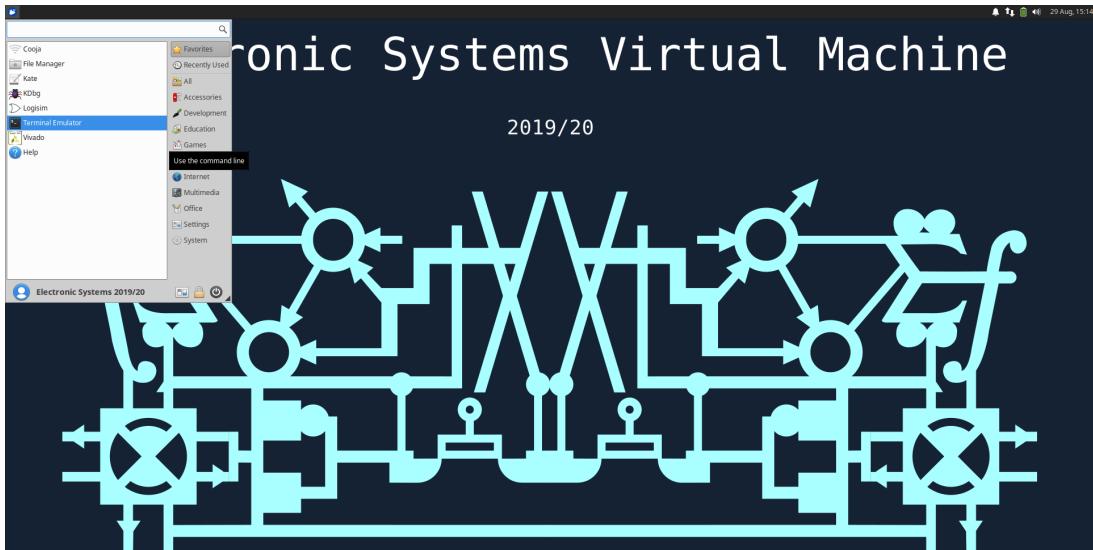


Figure 14

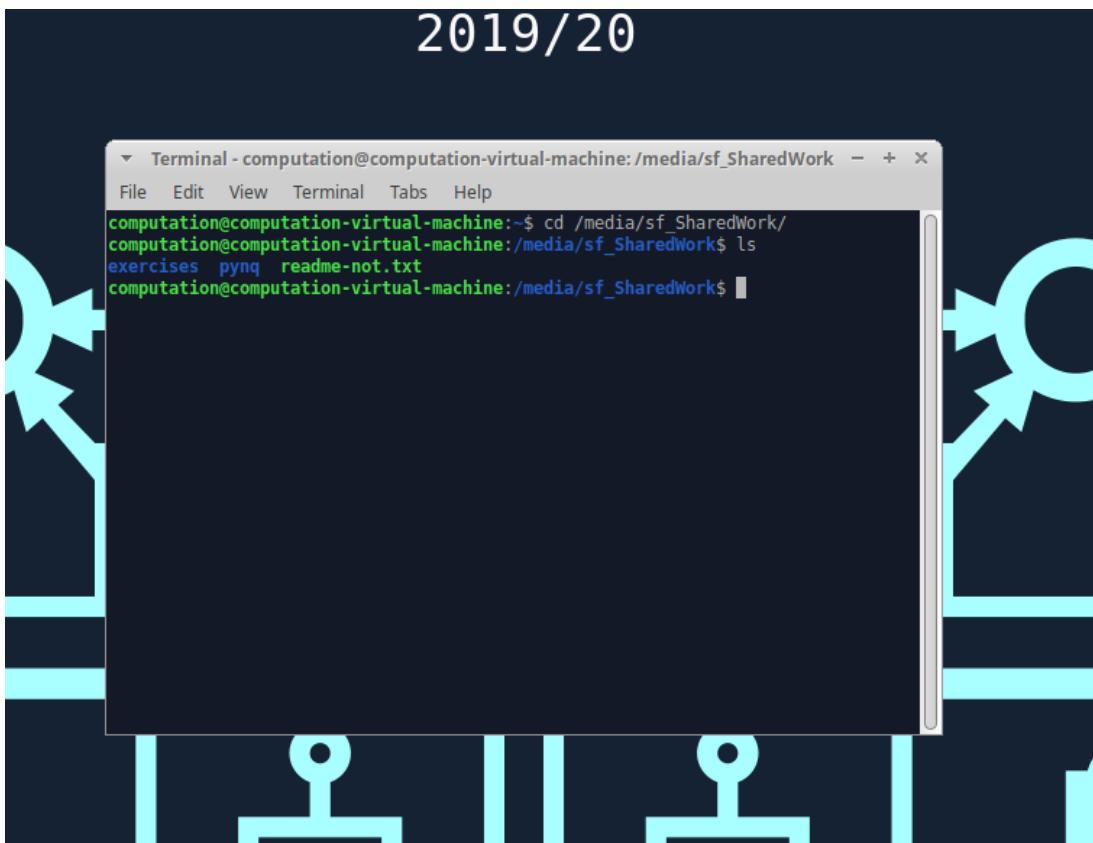


Figure 15

10 Keeping a copy of .ova File

Although you can remove the .ova file at this point, we strongly recommend that you keep it. If you have problems with your virtual machine, then you can just remove it (since all your work is in the shared folder, right?), and reinstall the virtual machine.

Version History

- **20/8 v3.0** Update for 2020/21.
- **31/8 v4.0** Update for 2021/22, moving all PYNQ info to the PYNQ tutorial.
- **3/9 v4.1** Updated name of shared folder.
- **5/9 v4.1** Added Apple M1 restriction. Added password.