Installing Quartus

Credit for the organization and much of the contents of this document goes to Kevin Bishop and the course ECE 272 from Oregon State University.

Introduction

The Quartus design software is available for **Windows** (and Linux, but it is much trickier to set up and is therefore not officially supported for this class).

> ⓘ   If you are installing on a Windows machine, then you ONLY need to read and perform Step 5 of the Instructions.

This rest of this document contains instructions describing how to install Quartus on macOS using the VMware Fusion virtual machine tool, which is one of two main methods for macOS users:

1) Use a **virtual machine** (described here). A virtual machine runs Windows as an application within macOS. The advantage of this is that you will not have to partition (section off part of) your hard drive for use by Windows, meaning that your entire disk space is still accessible to macOS should you need it. This method is suggested if you do not have a lot of extra space on your hard drive or if you do not plan on using the Windows virtual machine extensively.

2) **Dual-boot** your laptop using `Boot Camp`. This method splits your hard drive into two parts: one for macOS and one for Windows. The division cannot be changed without fully deleting the Windows side, so you will need reserve all the space you could potentially need when your set it up. This also generally requires much more space to be set aside for the Windows boot (30-60 GB) than is needed for a virtual machine. This method will run faster than a virtual machine and is suggested if you will be using Windows extensively and have ample space on your hard drive. For assistance with Boot Camp, please contact the CSE support staff (support@cs.washington.edu, CSE 207).

Note that Mac computers using Apple silicon (the "M1 chip") cannot run Windows through VMware Fusion nor Boot Camp. Other virtualization options exist (e.g., Parallels Desktop, VirtualBox), but are not officially supported for this class. You will also have the option of using the computers in the lab (ECE 365), which have Quartus installed.

Instructions

[1] Download & Install VMware Fusion

a) Visit the VMware Academic Program site at http://vmware.cs.washington.edu and log in with your UWNetID.

b) Click the latest VMware Fusion from the list of products (do *not* select VMware Workstation) and then click "Add to Cart" and "Checkout."

c) Copy down the serial number given – you will need this in the next step.

d) Download the program and run the installer. When prompted, enter the serial number where you are asked for "license key."

[2] Download Microsoft Windows

a) Visit the Microsoft Azure Education Hub at
https://portal.azure.com/#blade/Microsoft_Azure_Education/EducationMenuBlade/software and
log in with your UW NetID.

b) Search for **Windows 10 Education Edition** and choose "Add to Cart." There will be a download
button and a view key button.

c) Copy down the product key given and then click on the "Get Started" button (*Figure 1*).
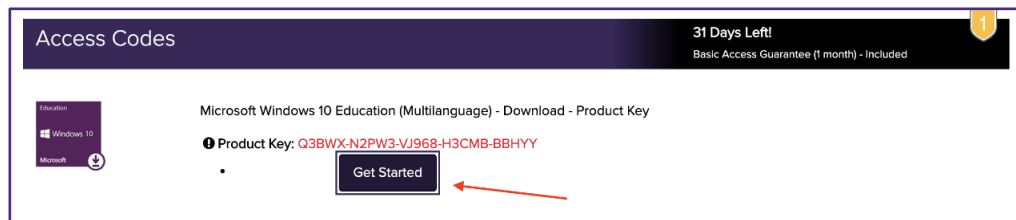

Figure 1: *Checkout view for Windows 10 Education from the Microsoft Software for the UW site.*

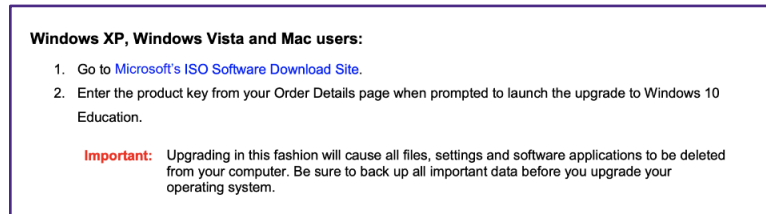d) From the Quick Start Guide, click on the link to take you to Microsoft's ISO page (*Figure 2*).

Figure 2: *Quick Start Guide page that will take you to Microsoft's ISO Software Download Site.*

e) Download the 64-bit version and save the `.iso` file.

[3] Install Microsoft Windows

a) Open VMware Fusion and drag the Windows `.iso` file you downloaded to the "install from disc or
image" area. Enter the Windows product key when prompted and select Windows 10 Education
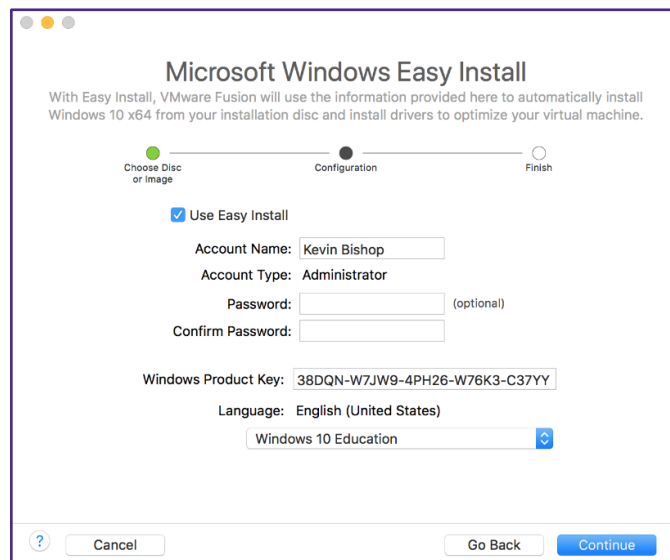(*Figure 3*). Click Continue.

Figure 3: *Entering your Windows 10 Education product key.*

b) Select "more isolated" and save the setup to "virtual machines" (the default option).

c) The virtual machine should open and install Windows. This will take some time and the virtual machine may restart itself several times. You may also get an alert during installation if you do not have enough space on your hard drive – if so then delete some files (or transfer them to an external drive) and click continue. Finally, the VMware Fusion window may go black if an alert pauses the installation and you leave it for too long. This is fine – it is just the virtual machine going to sleep. Click in the VMware Fusion window to wake it up and continue the installation.

d) Once the installation is fully completed you may delete the `.iso` file.

[4] Set Permanent MAC Address

a) Fully shut down the virtual machine (select the virtual machine window, "Virtual Machine" → Shutdown).

b) From the VMware Fusion menu bar, select Window → "Virtual Machine Library".

c) Select the virtual machine and click the settings button (the wrench in the upper right corner).

d) Under "Removable Devices" in the settings window, select "Network Adaptor" and click Advanced options.

e) Click the Generate button next to the listed MAC address; the address in the text box should change. Use this newly generated address when you request a license in the next step. You can now close the settings window.

[5] Install Quartus II on your Windows 10 VM

We will use the **Quartus II web edition release 17.0**.

a) **Download** the files from either of the URLs below (they should be the identical files) from a browser within your VM. You'll need the Quartus and ModelSim install files and the CycloneV `.qdz` file. Save all of these to the same directory.

- Google Drive: https://drive.google.com/drive/folders/1oRtPT_X6EGs8vwtG670MwmHe4LAD0BA1
- CSE Web: http://courses.cs.washington.edu/courses/cse369/software/

b) **Run the `QuartusLiteSetup` executable** (this is slow to start up). When it asks for components to install, select all of the following: "Quartus Prime," "Devices→Cyclone V," and "ModelSim – Intel FPGA Starter Edition." When the software is done installing, make sure to select "**Launch USB Blaster II driver installation**."

c) **Start the Quartus software**. When it asks about licensing, select "Run the Quartus Prime software" (the free version doesn't require a license). You will likely have to start it twice to get it to run the first time.

[6] Connect Your DE1-SoC to Your VM

With the virtual machine running, plug your DE1-SoC board into your computer using the USB cable provided. You should see a window like the one in *Figure 4*. Select "Connect to Windows."
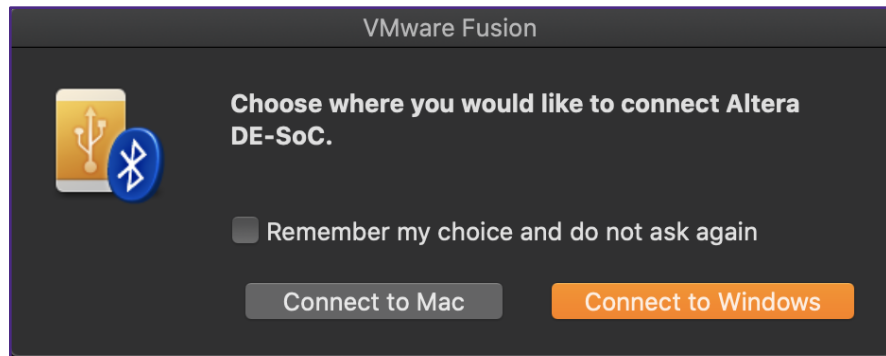
Figure 4: *Prompt upon connecting your DE1-SoC board (with power on) to your computer. Select "Connect to Windows" to connect it to your VM.*

ⓘ If you do not see a popup, from the VMware Fusion menu bar, select "Virtual Machine" → "USB & Bluetooth" → "USB & Bluetooth Settings..." In the window that opens, find the FPGA and in the "Plug In Action" column, select "Connect to Windows" from the dropdown menu (*Figure 5*).
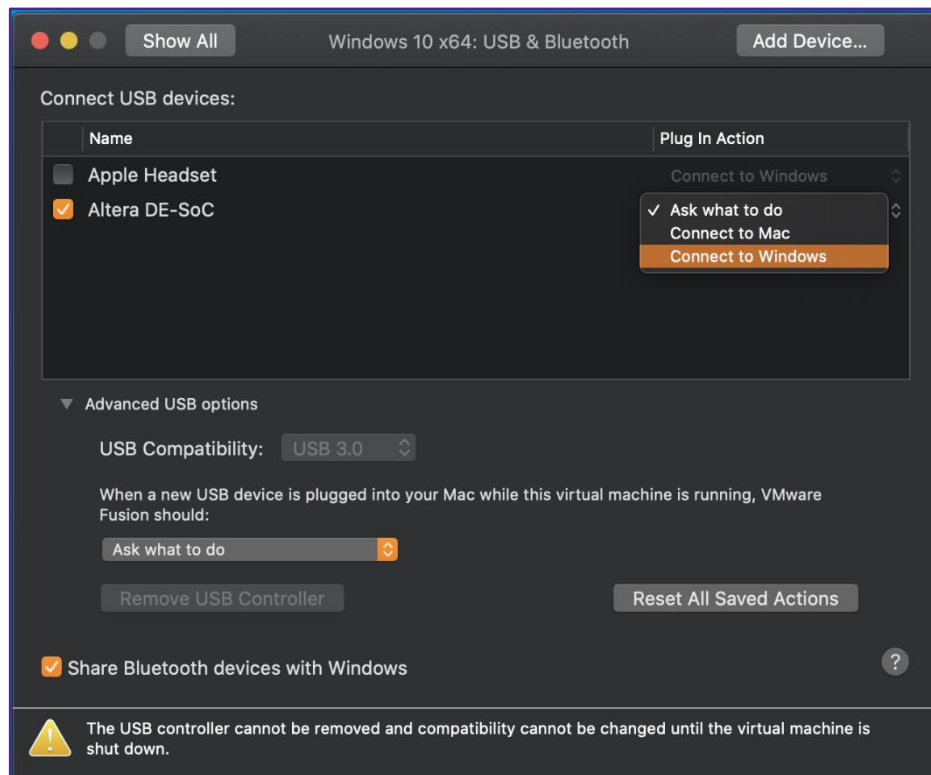

Figure 5: *Manually setting your DE1-SoC to connect to the VM if the expected prompt (Figure 4) did not appear.*

You Should Be Good to Go!

Feel free to proceed to start with Lab 1 or you can try to rerun a lab from EE 271 or CSE 369 if you'd like to double-check that everything is in working order.