

CS3040 Virtual Machine (VM) Setup

Objective:

Your first assignment is to prepare a laptop that can be used during lecture and the lab sessions. This is a two-step process:

1. Install VMware
2. Import and configure the lab virtual machine (VM).

The remainder of this document describes how to do the above steps.

Requirements:

A laptop with the following:

1. At least 10GB of free disk space and
2. At least 512MB of free RAM
3. A network connection

If you do not have a laptop, or your laptop cannot handle the execution of a VM (such as a lack of memory), then you can try to borrow one for the quarter from the CS Department by communicating with Loren Peitso (lepeitso@nps.edu).

1 Install VMware

You may already have VMware installed from another class. If so, you can skip to Section 2. If VMware is not already installed, email **helpdesk@nps.edu** with a request to be added to the VMware Academic Program (VMAP). You will eventually receive an email with a URL and an initial password to the system. Once you log into the system you can download (for free) the following software, depending on the OS you are using:

- **Microsoft Windows:** VMware Workstation (the latest version)
- **MacOS:** VMware Fusion (the latest version)

After downloading the appropriate software, install it. At some point you will need to enter a product key, which you should have seen during the software checkout process. If you did not see it, then you'll need to log back into the VMAP site to obtain it.

2 Import and Configure the CS3040 VM

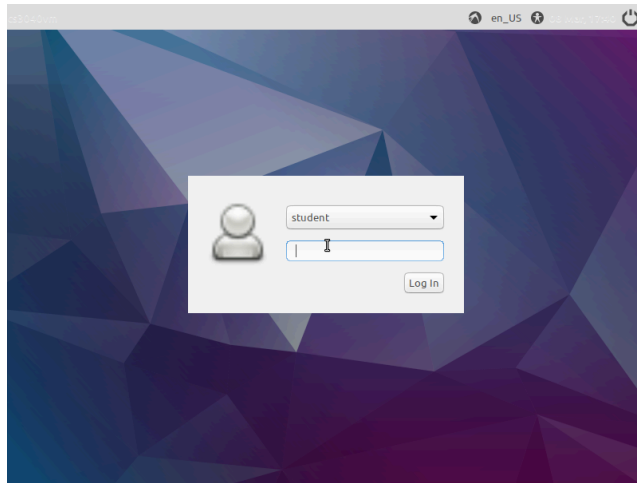
The following instructions have you download, import and configure a VMware virtual machine (VM) that has been created for this class. The VM runs a minimal distribution of Ubuntu, which is a Linux-based environment. We are using a 32-bit VM to maximize its portability across all laptops.

The steps below may not cover the latest version of VMware, so be flexible.

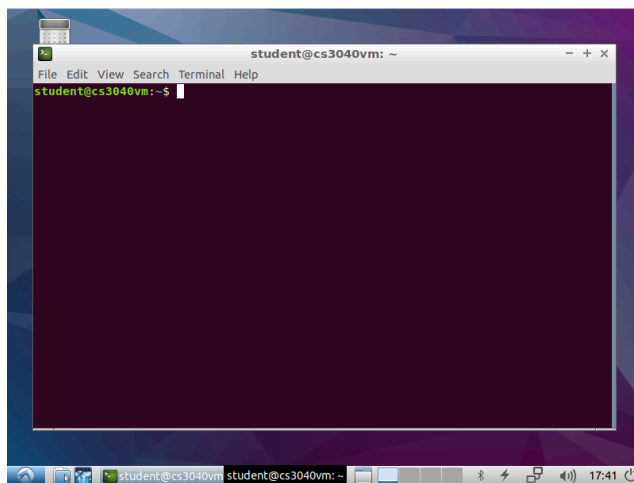
1. Create a folder for your VM files.

2. Download the VM files from the Sakai website (named `vm1.zip` and `vm2.zip`) into the folder created in step 1. **These are very large files that will not download immediately. Therefore, do not continue to the next step until the downloads have finished.**
3. Unzip both zip files:
Windows: Right-click a file and then select **Extract All...**
MacOS: Right-click a file and then select **Open With > Archive Utility**
4. The unzipping could have left some files in a subfolder, **but all the files need to be together in the same folder (as created in step 1 above)**, so move anything that has been separated from the other files. When you are done, you should have the following files in **one folder**:
 - CS3040-x86-v3.nvram
 - CS3040-x86-v3.plist
 - CS3040-x86-v3.vmsd
 - CS3040-x86-v3.vmx
 - CS3040-x86-v3.vmx
 - CS3040-x86-v3.vmx
 - Virtual Disk-s001.vmdk
 - Virtual Disk-s002.vmdk
 - Virtual Disk-s003.vmdk
 - Virtual Disk-s004.vmdk
 - Virtual Disk-s005.vmdk
 - Virtual Disk-s006.vmdk
 - Virtual Disk.vmdk
 - quicklook-cache.png
 - startMenu.plist
 - vmware-0.log
 - vmware.log
5. You may now delete `vm1.zip` and `vm2.zip`.
6. Start VMware.
7. From the VMware menu select **File > Open**. Browse to the location where the files were extracted and **double-click** "`CS3040-x86-v3.vmx`".
8. It *may* claim that it is already being used, but you can ignore that by selecting "Take Ownership".
9. Boot the VM:
Windows: Select **Power on this virtual machine** in the new tab.
MacOS: Select the big *play* icon in the new window to boot the VM.
 1. If you get a question asking whether you should upgrade the VM, feel free to upgrade it. Either answer (Yes or no) should work.
 2. When you get a question about copy or move, select **I copied it**.
 3. If you get a question about connecting non-existent devices, select **No**.

10. The VM should start to boot within its window. You should end up with a login window that looks like the following figure:



11. Log in as “student” with a password of **password123**. (You may need to click your mouse in the window before keystrokes will register there).
12. You should end up with a window that looks like the following figure:



13. Adjust the screen resolution for your environment
On a laptop, it may be easier to maximize the window than to set the resolution manually: from the VMware menu, select **View > Full Screen**.
If, however, you wish to set the resolution manually (or the full screen did not behave as expected), do the following:
- Select: **Bottom-left-icon > Preferences > Monitor Settings**
 - Pick a resolution to your liking (**bigger than the default**)
 - Apply
 - OK
 - Save

14. Install upgrades and additional software by entering the following commands in the open terminal.

```
sudo su                                (enter the password when prompted)
apt-get -y update
apt-get -y upgrade                    (this will take 5-10 minutes)
apt-get -y install gdb
apt-get -y install valgrind
apt-get -y install build-essential
apt-get -y install manpages-posix-dev
```

You will not see anything displayed on the screen as you type the password

15. Select (or create) a folder on your host machine (Windows or Mac) that you will share between your host machine and the VM, as a way of passing files back-and-forth between the two operating systems. Do not use the same folder that stores the VM files.

16. Configure a shared directory

From the VMware menu select: **Virtual Machine (or VM) > Settings**. (If you have gone into full-screen mode, just hover at the top of the screen to force the menu to appear).

Windows:

- Select the **Options** tab
- Select **Shared Folders**
- Select **Always enabled**
- Select **Add**
- Browse to the folder you selected/created in step 1 above.
- Select **Next**.
- Click through the remainder of the wizard, accepting the defaults.
- Press **OK** to leave the settings window.

MacOS:

- Select **Sharing**
- Select **Enable Shared Folders**.
- Select '+'.
- Browse to the folder you selected/created in step 15 above.
- Select **Add**.
- Exit the sharing configuration window.

17. To test the configuration of your shared folder, enter the following in the terminal:

```
ls /mnt/hgfs
```

The name of the shared folder should have been displayed in the terminal.

18. To create a shortcut to this shared directory, enter the following in the terminal (replacing "foldername" with the name of your shared folder):

```
exit
cd
ln -s /mnt/hgfs/foldername shared
```

For example, if the name of the folder was "temp", you would enter the following:

```
cd
ln -s /mnt/hgfs/temp shared
```

19. You are now done with the configuration of VMware. To power off the VM:
bottom-right icon > Shutdown.
20. You can now Exit VMware.

3 Reinstalling the VMware Tools

The “VMware Tools” provides for an easier environment for sharing files and manipulating the screen resolution. These tools were already installed, but if file sharing and full screen resolution is difficult to get working correctly, the tools may need to be reinstalled.

To reinstall the tools, do the following:

1. From the VMware menu select: **Virtual Machine (or VM) > Install VMware Tools.**
2. Select **Install** in the pop-up window.
3. In a few moments, you should see another pop-up asking if you want the File Manager. Select **Cancel.**
4. Start a terminal if one is not already open.
5. Enter the following commands in the terminal:

```
sudo su
cd /tmp
tar -xvzf /media/student/*/*.gz
cd vmware-tools-distrib
./vmware-install.pl -d default
exit
```
6. Logout
7. Log back in. You should now be able to easily go to full screen mode via **View > Full Screen.**