CS Linux Development Environment

[**Option A**](#_yg0syya4e1kv)**:** Run a Linux [**V**irtual **M**achine](https://www.youtube.com/watch?v=6ftLGkkKhLY). (**Strongly Recommended**)

[**Option B**](#_cdvtsblux5vh): Dual boot Windows/Linux (A bit riskier)

[**Option C**](https://docs.google.com/document/d/1Omwb2Od_QM5RZM5Q_bn5fYb5o3BIFyC85FugiaVF-AU/edit#heading=h.w2un5n5vgsc3): Use one of our VMs (If you don’t have at least 8GB of RAM)

The instructions in this document are meant to get you started. You may still want to watch a video or read installation documentation or post on Piazza if you have questions.

# **Option A: Run a Linux Virtual Machine**

This is the recommended setup if you have a laptop with enough memory. It will work on machines with less than 8GB of RAM, but it may be a bit slow. You will need a virtual machine installed for CS453 (Operating Systems), so it is worthwhile to get it setup now. Many software companies use VMs for testing and development, so understanding what they are and how to set one up are good tools to have in your toolbox.

If you choose to install a VM, it may be easiest to develop all your programs on the same Linux distribution installed on onyx (Fedora Linux or CentOS), but you can choose to install whichever “flavor” of Linux you want. Some people find it easier to install Ubuntu, but I have never had an issue with Fedora.

## **Step 1: Install VMware Player or VirtualBox**

First, you will need to install Virtual Machine Software on your *host system* (aka the operating system currently installed on your laptop). There are several options available depending on the operating system of your host.

### **Windows**

You can install either [VMWare Player](https://my.vmware.com/web/vmware/free#desktop_end_user_computing/vmware_workstation_player/12_0%7CPLAYER-1210%7Cproduct_downloads) or [VirtualBox](https://www.virtualbox.org/wiki/Downloads). Both have good reviews. We use VMWare Player extensively in the department.

### **Mac OS X**

VMWare Player isn’t available for Mac OS X, but you can get [VMWare Fusion](http://e5.onthehub.com/d.ashx?s=kw3jtuc8h6) for free using your DreamSpark account information. Sign in with your DreamSpark account information here:

<http://e5.onthehub.com/d.ashx?s=kw3jtuc8h6>

If you don’t remember your login information, try searching your email inbox for

# *“An account has been created for you”* or *“Boise State University - ITS, College of Engineering”*.

You can also use [VirtualBox](https://www.virtualbox.org/wiki/Downloads) on Mac OSX.

## **Step 2: Download OS Image**

Now that you have your VM software installed and ready to go, you will want to download a [Fedora 24 KDE Plasma desktop spin](https://spins.fedoraproject.org/kde/download) image (this will be closest to the Linux in the CS labs). You will use this image to install Fedora on your Virtual Machine.

Note that when it boots it is booting a live image, it isn't actually installed yet. A live image is good to play with it before an actual install. However, it is read only and cannot be modified until we actually install it! Normally there is an icon on the desktop that says "install to hard drive" or something similar. Click on it to actually install it on the hard drive. Or if you don't see that on your desktop make sure you select install to hard drive when the machine is booting up instead of running a live image.

## **Step 3: Install image on your VM and Customize it**

*Step 3.1: Create and install the Fedora Linux image on a VM*

Here’s a video that may help: [VMWare Player | Fedora 24 Installation - step by step guide](https://drive.google.com/file/d/0B-GB2wkZsTOwRV9BRnhtc2wwV00/view?usp=sharing).

It’s for Fedora 24 and VMWare player.

There are several tutorials available for installing a new guest operating system on your virtual machine.

* [VMWare - Guest OS Install Guide: Fedora 22 Desktop Edition](http://partnerweb.vmware.com/GOSIG/Fedora_22.html)

Note: If you get an error when you try to start your VM, you may need to enable virtualization in your BIOS. If you google something like “enable virtualization in bios windows 10” there are several videos/tutorials showing you how to do this.

Note: If your VM is running slow, you may want play around with the memory for the VM. On a laptop with 8GB of RAM, we recommend setting the VM memory to 4GB. The option is available by clicking on the “Customize Hardware” button. Also, use at least 40GB (60GB would be even better) for the disk size so you have room to grow in subsequent courses. We also recommend using manual partitioning and putting all the available disk space into the / partition instead of separate / and /home partitions. The video above shows how to do that.

*Make sure to add yourself as an admin user when asked.*

After you install the OS, you are almost ready to go! Fedora 24 will have most of the tools you will need for development, but we will customize so that it will be useful to you in several courses beyond CS 253.

*Step 3.2 Customize the Fedora 24 KDE Plasma Desktop workstation*.

After Fedora 24 installation is complete and the VM has rebooted.

1. Right click on the desktop and start a terminal (konsole). You can increase the font size with keystroke combo: Ctrl + You can also customize the look and feel of the konsole from the *Settings* menu in its menu bar.
2. Setup download from fastest mirrors. The dnf program is a package manager for Fedora Linux systems.  
    sudo dnf -y install yum-plugin-fastestmirror
3. Do a full update  
    sudo dnf -y update
4. Install VIM and related tools  
    sudo dnf -y install vim-enhanced vim-X11 vim-vimoutliner
5. Disable SElinux by editing /etc/selinux/config using vim and changing the enforcing in the following line to disabled. Then reboot the system.  
      
    sudo vim /etc/sysconfig/selinux  
    change this line -->SELINUX=enforcing  
    sudo reboot
6. Install additional software. To list groups, type:  
    sudo dnf group list
7. We recommend installing the following groups and packages that would be useful for 253 and beyond.  
    sudo dnf -y group install "Editors" "Educational Software"  
    sudo dnf -y group install "C Development Tools and Libraries"   
    sudo dnf -y group install "System Tools" "Development Tools"   
    sudo dnf -y group install "Web Server"  
    sudo dnf -y install kernel-devel   
    sudo dnf -y install qt-devel xz-libs openssl-devel elfutils-libelf-devel
8. Remove the Calligra office suite (default for KDE) as we want to use LibreOffice instead.  
    sudo dnf -y remove calligra-core  
    sudo dnf -y group install "LibreOffice"
9. Add the RPM Fusion repo for extra software that Fedora doesn’t include.  
   sudo rpm -ivh <http://download1.rpmfusion.org/free/fedora/rpmfusion-free-release-24.noarch.rpm>  
     
   sudo rpm -ivh <http://download1.rpmfusion.org/nonfree/fedora/rpmfusion-nonfree-release-24.noarch.rpm>
10. Setup Google Chrome repo (may not be needed) and install Google Chrome. First, check the folder /etc/yum.repos.d for either the file google.repo (or google-chrome.repo). If the file exists, skip the following step:  
     sudo vim /etc/yum.repos.d/google.repo  
     And then insert:  
     [google-chrome]  
     name=google-chrome - 64-bit  
     baseurl=http://dl.google.com/linux/chrome/rpm/stable/x86\_64  
     enabled=1  
     gpgcheck=1  
     gpgkey=https://dl-ssl.google.com/linux/linux\_signing\_key.pub  
      
    Now, install Google Chrome as follows:  
     sudo dnf -y install google-chrome-stable
11. Install some more useful packages and fonts:  
     sudo dnf -y install java-\*-openjdk-devel kile gnuplot geeqie   
     sudo dnf -y install freetype-freeworld google-droid-sans-fonts  
     sudo dnf -y install sj\*fonts\* larabie\*fonts\* \*gentium\*font\*   
     dustin\*fonts\* gnu\*fonts\* google\*fonts\*
12. Reboot and enjoy!

# **Option B: Dual Boot Windows/Linux**

We are not providing support for this, but here’s some information from a student who did it.

*For those interested, I tried several different virtual machines on Windows 10 and found them to run very slow and had trouble with screen resolution etc. I decided to set up my PC as a dual boot system similar to the ones in the ECE lab where it will ask you whether to boot Windows or Linux at startup. I only had to partition about 15GB of my hard drive for the Fedora install (~4 for the OS and ~10 for storage space) and it is running very fast. You will need a 4GB USB drive and I like to use Rufus for creating bootable drives.*

*This article has a very easy step by step on the process (Takes about 20 minutes):*

*http://www.howtogeek.com/214571/how-to-dual-boot-linux-on-your-pc/*

# **Option C: Use one of our VMs**

We do have a few VMs available that you can access from any web browser, but I recommend installing your own VM if you have the hardware to do so. You will only be able to access the VM if you have access to internet and the connection may be slow depending on your internet provider/speed.

However, this is a good option if you don’t have your own laptop or desktop with at least 8GB of memory.