

# Princeton University

## COS 217: Introduction to Programming Systems

### An X Window System COS 217 Computing Environment

The handout from the first precept entitled *A Minimal COS 217 Computing Environment* describes how to create and use a computing environment that is sufficient for COS 217. If you're satisfied with that environment, then you can ignore the rest of this document.

The minimal computing environment has some disadvantages. Probably the biggest is that it can't handle input from pointing devices (mice, touchpads, and so forth). In particular, you might find it difficult to get comfortable with Emacs editing in the absence of a pointing device.

A reasonable alternative to the minimal environment is the *X Window System* environment. Essentially, the X Window System integrates the local computer's windowing system with a remote Linux system. The web page [http://en.wikipedia.org/wiki/X\\_Window\\_System](http://en.wikipedia.org/wiki/X_Window_System) provides details.

The biggest advantage of the X Window System environment is that it allows you to use a pointing device when editing with Emacs. Its biggest disadvantages are that (1) setup is more difficult, and (2) it doesn't work well off campus, that is, with a lower-bandwidth network.

The instructions given below describe how to connect your computer to CourseLab using the X Window System environment. When thus connected to CourseLab:

Issuing a command of the form `emacs filename` displays a new window for Emacs. You can use a pointing device to manipulate that window. The shell hangs until you terminate your Emacs session.

Issuing a command of the form `emacs filename &` (note the trailing ampersand) displays a new window for Emacs. Emacs itself is running as a *background* process. Thus the shell doesn't hang, and is available to do additional work while Emacs is running. You probably will find that form more convenient.

Issuing a command of the form `emacs -nw filename` (the `-nw` option stands for "no window") launches Emacs in the existing terminal window, as in the minimal environment.

#### **If your computer runs Microsoft Windows:**

To use the X Window System, you must have an X Window System Server installed on your computer. A program named *Xming* is a free X Window System Server for Microsoft Windows.

Follow these instructions to download Xming. Using a web browser:

1. Visit the web page <http://sourceforge.net/projects/xming/files/>. Click on the *Xming* link, and then the *6.9.0.31* link to reveal the *Xming-6-9-0-31-setup.exe* link. Click on that link to download the file to your local computer.
2. Again visit the web page <http://sourceforge.net/projects/xming/files/>. Click on the *Xming-fonts* link, and then the *7.7.0.10* link to reveal the *Xming-fonts-7-7-0-10-setup.exe* link. Click on that link to download the file to your local computer.

Follow these instructions to install Xming:

1. Execute the *Xming-7-7-0-10-setup.exe* program on your local computer to install Xming. Use the default install settings.
2. Execute the *Xming-fonts-7-7-0-10-setup.exe* program on your local computer to install Xming fonts. Use the default install settings.

Follow these instructions to use Xming:

1. From your computer's Start menu, choose *All Programs | Xming | Xming* to launch Xming.
2. Launch PuTTY.
3. Change PuTTY settings as usual (*Window | Colours | Use system colours*). Then change one more setting: make sure the *Connection | SSH | X11 | X11 Forwarding | Enable X11 forwarding* check box is checked.
4. Use PuTTY to log into `courselab.cs.princeton.edu` as usual.

### **If your computer runs Mac OS X:**

To use the X Window System, you must have an X Window System Server installed on your computer. A program named *XQuartz* is a free X Window System Server for Mac OS X. Follow these instructions to install XQuartz:

1. Browse to <http://xquartz.macosforge.org/landing/>
2. Click on the *XQuartz-2.7.11.dmg* link.
3. After the download completes, in the Finder double click on the *XQuartz-2.7.11.dmg* file to perform the installation.

If you are using a version of Mac OS X that is older than 10.6, then you cannot use XQuartz. Instead you must use the X Window System Server that is provided on your Mac OS X install DVD. The precise instructions for installing from the DVD vary among versions of OS X. Generally, these are the steps:

1. Insert your Mac OS X install DVD into your computer's DVD drive.
2. Choose *Optional Installs*.
3. Choose *Applications*.
4. Choose *X11*.
5. Continue the installation to completion.

After installing an X Window System Server, use the Terminal application to login to CourseLab as usual. However, specify the `-Y` option to `ssh`:

```
ssh -Y YOURNETID@courselab.cs.princeton.edu
```

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