

CSCI 136 - Mac and Unix Hints

This set of notes assumes that you have never used Unix before. It does assume, however, that you are comfortable using computers with a graphical user interface, such as the Macintosh operating system or Microsoft Windows. You should sit down at a Mac in the lab and go through this tutorial trying things out as they are explained. Upon completion, you should be able to understand the basics of entering a [command line](#), move around in the [file system](#) and view existing files, do [basic manipulations of windows](#), do [basic editing with the XEmacs text editor](#), and know where to find [help](#). To gain experience with these topics, try things out as you read.

Logging In

To start, you must log in to one of the Macintosh computers in our lab. Begin by entering the user name and password for your computer science account in the login window and click "Log in". Your user name for this account will be the same as that used for computer accounts provided by the Office of Information Technology (typically something like 06ewr), but the initial password will be different. You must obtain this password from your instructor. Once you log in, the screen should display a window containing icons for some of the files you can access on the machine.

Changing Your Password

Before proceeding, you should change the password we assigned to your account to something that only you will know and that will be easier for you to remember. Don't, of course, make your new password too easy to guess. In particular, at least use something that is a mix of letters and numbers. If you forget your password, the system administrator can give you a new password. To change your password you should:

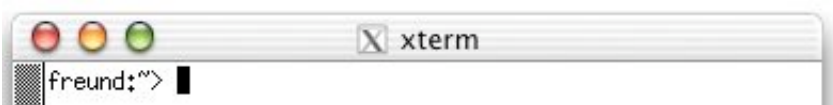
- Point the mouse at the blue Apple icon in the upper left corner of the screen. Depress and hold down the mouse button to open a menu.
- Select "System Preferences" from this menu.
- Click once on the "My Account" icon in the window that appears. This is near the right end of the second row of icons.
- Click on "Change" next to the "My Password" label.
- Enter your current password in the "Current Password" field. Then enter your new password in the "New Password" and "Verify" fields.
- Click "OK".

Now, log out and log in again with your new password. To log out select the last item in the menu that appears when you depress the mouse on the little apple image that appears in the upper left corner of your screen. Then click the "Log out" button that appears in the dialog box. The files you create for our course laboratory projects will not actually be stored in the computer on which you are working. Instead, they will be stored on our department's Macintosh file server, cortland. By entering the account information for your account, you have instructed the computer you are using to access your files on cortland. You can access your files on cortland from any computer in our lab by simply logging in to that computer.

Using the Mac Interface

Some of you may be new to Macintoshes, and the section highlights the most important elements of interface. The files on the hard drive can be viewed by clicking on the "Macintosh HD" icon in the top right-hand corner of the screen. To go to your home directory, click on the house icon in the Finder window.

All Mac Windows look like the following window:





Here are some basic window management operations:

- To change the size of the window, click the mouse in the lower, right corner and drag the mouse with the button held down.
- To close a window, click on the red circle in the title bar.
- To iconify a window, click on the yellow circle in the title bar. The window should appear as an icon at the bottom of the display in the tool bar. Clicking on the icon in the tool bar will restore the window.
- To maximize the size of a window, click on the green circle in the title bar. Clicking again will restore a window to its previous size.

You can start to get the feel for the environment by clicking on the Safari icon to start a web browser. The safari icon is in the tool bar and looks like the following:



Go to the class web page at <http://www.cs.williams.edu/~freund/cs136> and find the electronic version of this page. Bookmark this page- you will be referring to it often during lab.

Using Unix Commands

In order to use the Unix interface on the Macintosh, you must first start the X Server Program, which you can do by clicking on the following icon in the tool bar:



The X Server will open a shell window in which will type Unix commands. For example, type the command "ls" in the shell window and press return. This command will list the files in your directory. A command consists of the name of a program, zero or more options preceded by '-', and zero or more arguments, which are themselves words. The command line is terminated with a carriage return.

If you make mistakes in typing on the command line, use the Delete or Backspace key to erase the previous character.

Here are other useful commands related to files:

ls	List the files in the current directory
cp file1 file2	Copy the file named file1 to a new file named file2
	Rename the file named file1 to have the name

mv file1 file2	file2. (mv is actually short for move, but it doesn't necessarily move anything!)
rm file1	Remove the file named file1
more file1	Display the contents of a file
lpr file1	Print the file named file1

One thing you will notice with Unix is that "no news is good news". Often if a Unix command is successful, it will produce no output! If it fails, you will receive an error message. Of the list of commands above, only ls and more produce output when they succeed.

The "more" command deserves some more comment because it is an interactive command. It displays your file one screenful at a time. After each screenful, it displays a prompt either consisting of the name of the file being displayed in reverse video (for the first screenful), (END) in reverse video (for the last screenful), or : (for all other screenfuls). The prompt appears at the bottom of the screen. At this prompt, you have several options, the most useful being:

space	Display the next screenful
b	Display the previous screenful
q	Quit more, returning to a shell prompt.

You can try out "more" by typing "more /Network/Servers/cortland.cs.williams.edu/Volumes/Courses/cs136/alice.txt". This will show you a file containing the first chapter of Alice in Wonderland. (One useful tidbit: hitting the tab key will autocomplete directory and file names. Try typing "/Network/Ser" and then hitting the tab key.)

When you use ls to list your files, a directory will appear with / at the end of its name. At all times you have a current directory. Your commands are interpreted with respect to your current directory by default. So, for example, ls lists the files in your current directory if you give it no arguments. Here are some useful commands to manipulate directories:

mkdir dir1	Create a new directory named dir1.
rmdir dir1	Remove the directory named dir1. You can only do this if the directory is empty.
cd dir1	Make dir1 be the current directory
pwd	Display the name of the current working directory

Filenames should consist only of letters, numbers, and '!'. A filename is typically divided into a descriptive name and an extension, separated by '!'. Extensions are purely by convention but typically indicate the type of file. For example, "myfile.txt" would be a text file, while "myfile.java" would contain a Java program. Extensions are generally optional although some programs, such as the Java compiler, expect them to be there.

Filenames can be given as names that are relative to the current working directory or as absolute names from the special root directory. Thus far, we have assumed relative names that refer simply to files in the current directory. We can also use relative names to identify files in subdirectories. For example, "mydir/myfile" is the file named "myfile" in the directory named "mydir", where "mydir" is located in the current working directory.

Each user also has a home directory This is the directory that is the current directory when you start a new shell window. (You have already found your home directory through the standard Mac interface). No matter what the absolute pathname is to your home directory, you can always refer to it with the special relative pathname '~'. For example, no matter what your current directory is, if you type "ls ~", you will see a listing of the files in your home directory.

An absolute pathname always begins with / while a relative pathname never does. To find out the pathname that corresponds to your current directory, type `pwd`. Use `pwd` to find the absolute path for your home directory. One last useful feature of the command line: Pressing the up arrow will give the last command you executed. Pressing return will run that command again. Try this. You can access older commands in your history by hitting the up arrow multiple times. To practice these commands, copy the `alice.txt` file to your home directory with the command

```
cp /Network/Servers/cortland.cs.williams.edu/Volumes/Courses/cs136/alice.txt ~/alice.txt
```

Rename the file, move it into a newly created subdirectory, and practice the other basic Unix commands as well.

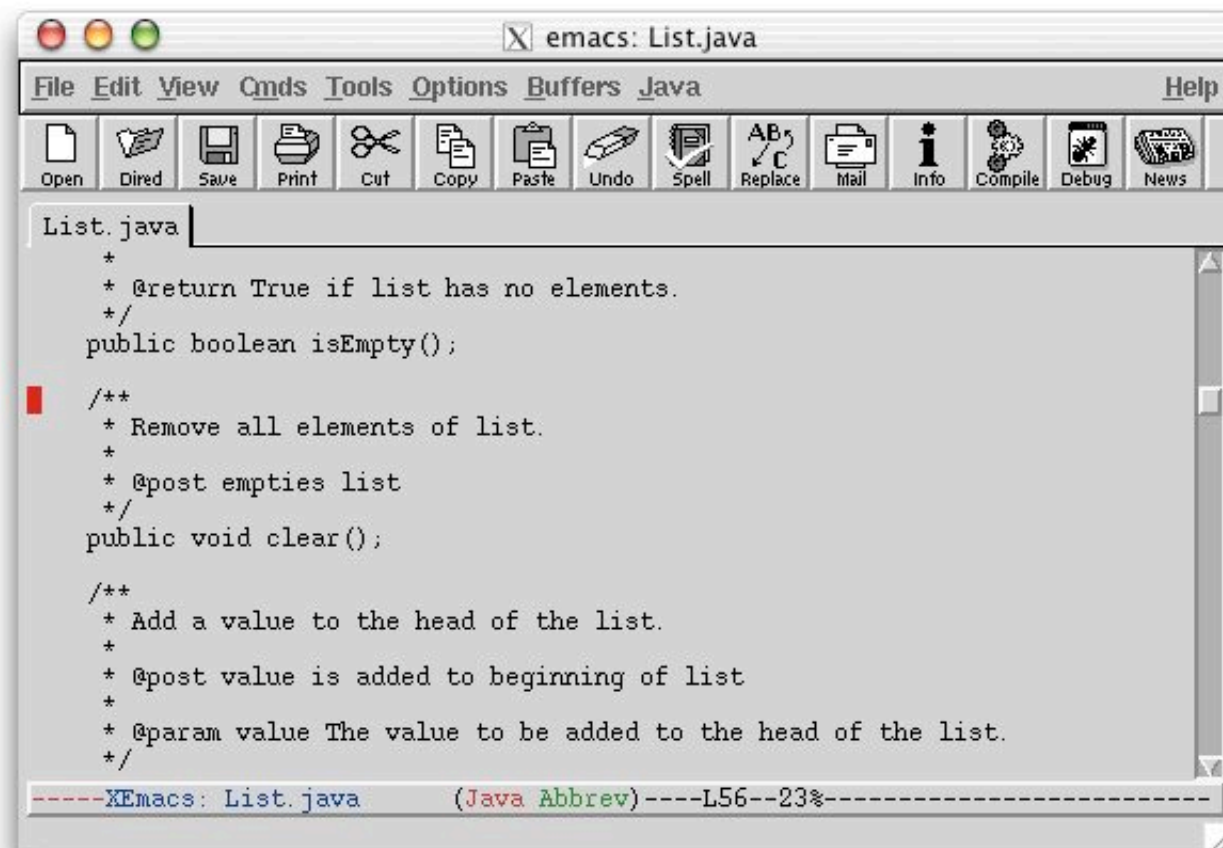
Additional Shell Windows

You can create additional shell windows to work in more than one directory or on different tasks at the same time. When any terminal window has the focus (by clicking in it), the menus across the top of the screen should be "X11", "Applications", and so on. Select "xterm" from the "Applications" menu. This will create a second terminal window which you can use just as the one already open.

Close a terminal either by clicking on the red circle in the title bar or by typing the "exit" command at the prompt.

Basic XEmacs

XEmacs is a widely used text editor for Unix. It relies heavily upon control-characters as a means of entering editing commands. Many commands are also available via pulldown menus, but experienced users tend to use control commands almost exclusively. To start XEmacs, select "XEmacs" from the "Applications" menu of the X Server. (To feel more like a Unix user, you could also launch XEmacs typing "xemacs &" in a shell window.) This will open a new window on your display. The window will look similar to that shown below:



The top row are the titles of pulldown menus that are available. Initially, we will work with a few of these menus and a few keyboard commands. Over the month, your repertoire of commands will grow and will move away from menus and toward keyboard commands. For now, let's create a new file. To do this, point at "File" and click the mouse button. Then select "Open...". At the bottom of the window, you will see "Find file: ~/ " with a small black box following it. The box indicates where characters will go when you type. Type in the name of the file that you want to create and hit carriage return.

The last line of the XEmacs window is where command prompts and messages appear. The reverse video line immediately preceding it is a status line. It shows you the name of the file you are editing. Before that you should see ----. This means that the file is up-to-date. If it says, ---**, it means the buffer has been changed since it was last saved. If it says ---%%, it means that you cannot modify the file. After the filename is the "mode" that you are editing in. This should say "(Fundamental)", or "(Java)" when editing a Java file. Next is the current line number (L1 indicates the first line). Following that is an indication of how far the current line is in the file in terms of percentage. "All" indicates that the entire file is showing. "Top" indicates that you are on the first screenful. "Bottom" indicates that you are on the last screenful.

The area between the menu titles and the status line is the buffer that displays the contents of the file. Most of your typing goes directly into this buffer. Type some text. Notice the status line changes. You can move the cursor around using the arrow keys. Use the scrollbar to move through the file. Use the "Save" command from the Files menu to save the buffer to a file. Use "Exit XEmacs" from the Files menu to exit XEmacs. Notice the characters that appear in parentheses at the ends of command names in the menus. These tell you the keyboard characters to type to execute the commands without using the commands. For example, saving the buffer can be executed by typing Control-x Control-s. In the menu control characters appear as C-. Type these by holding the control key down at the same time as typing the second character. Another common way to enter commands is using the Escape key. This is abbreviated M-. In this case the escape key and the following key are typed separately. For example M-x represents typing the Escape key followed by the "x" key. You can also press the "Apple" key and "x" at the same time to achieve the same effect. Here are the keyboard sequences for the most common XEmacs commands:

C-v	Next screenful
M-v	Previous screenful
C-d	Delete next character
Backspace	Delete previous character
C-x C-s	Save buffer to a file
C-x C-f	Open a file
C-x C-c	Exit XEmacs

You can find more XEmacs commands in the [Emacs Hints Page](#).

Using keyboard commands is generally faster than moving one's hands back and forth between the mouse and keyboard as one must do to use the menus and scrollbar. While it takes extra effort to learn, the payoff is worth it in the long run in terms of speed of using the editor.

Using Java

To execute a Java program, you perform two steps. First, you compile the Java source file. For example, to compile the file "Hello.java", type

```
javac Hello.java
```

Assuming the program is free of compilation errors, a class file "Hello.class" will be created. This file contains the compiled representation of the program. To execute the program, you run the Java virtual machine with the command

```
java Hello
```

The command line argument to `java` is the name of the class whose main method you would like to run. Copy the file `/Network/Servers/cortland.cs.williams.edu/Volumes/Courses/cs136/Hello.java` to your home directory, compile it, and run it.

Getting Help

The Unix command `man` provides information about all Unix commands and programs. For example, to learn about the `ls` command, type `man ls`. You can then page through the manual information as you did with `more`. To learn more about the manual, you can read the manual about the manual by entering `man man` at the command prompt.

Logging Out

As mentioned earlier, to logout you select "Log Out..." from the Apple menu in the top left-hand corner of the screen. Always close all XEmacs and shell windows prior to logging out to prevent you from losing any work.