

Linux/Unix Tutorial: Introduction

The purpose of this tutorial is to give you a short introduction to the Unix and Linux operating systems.

Unix is an operating system developed in the early 1970s that is widely used by programmers. Linux is an open-source version of the Unix OS developed in the 1990s. Many computers run this operating system and a lot of programming code has been developed to run on Unix-like systems, so it is good for Bioinformaticians to be familiar with this OS.

More information

Unix: <http://en.wikipedia.org/wiki/Unix>

Linux: http://en.wikipedia.org/wiki/History_of_Linux

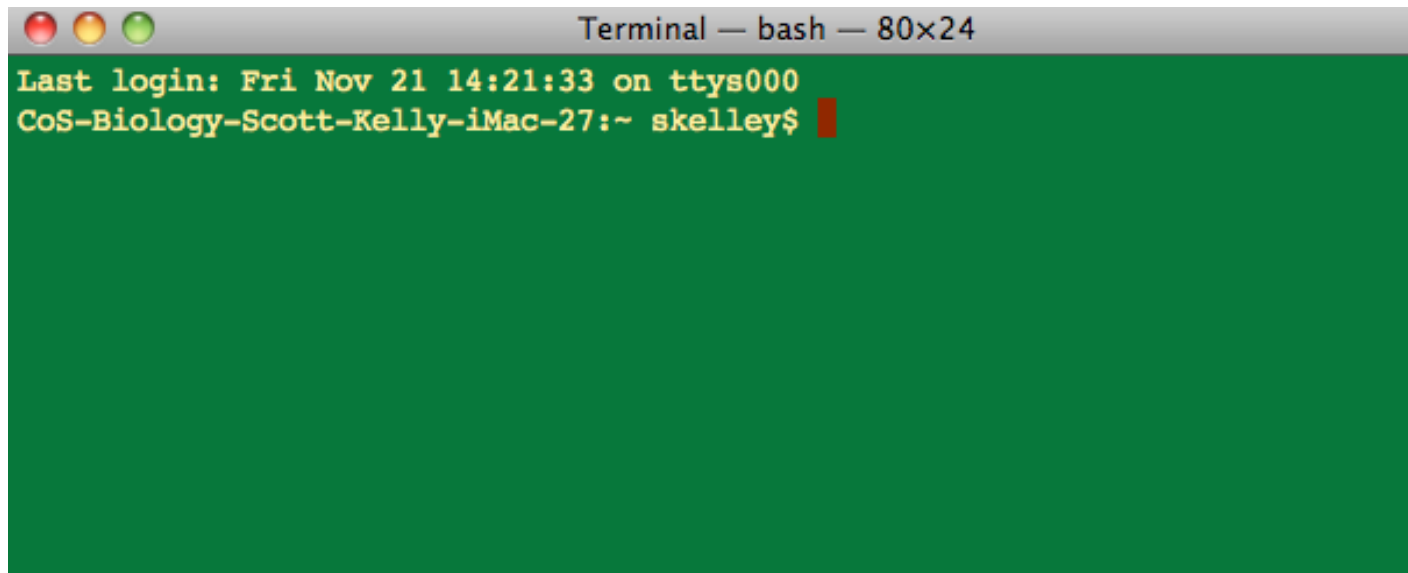
Macs come with terminals, but if you want to play around on Windows, you need to download and install a Unix-like emulator on your PC.

Linux/Unix Tutorial: Opening a terminal window

Unix-like systems can always be accessed by opening a Terminal window and typing on the command line. The MacOS is built upon a “flavor” of the Unix operating system.

Unix-like systems have a clear hierarchical directory system and everything is accessible from the command line as long as you know the file path to what you want.

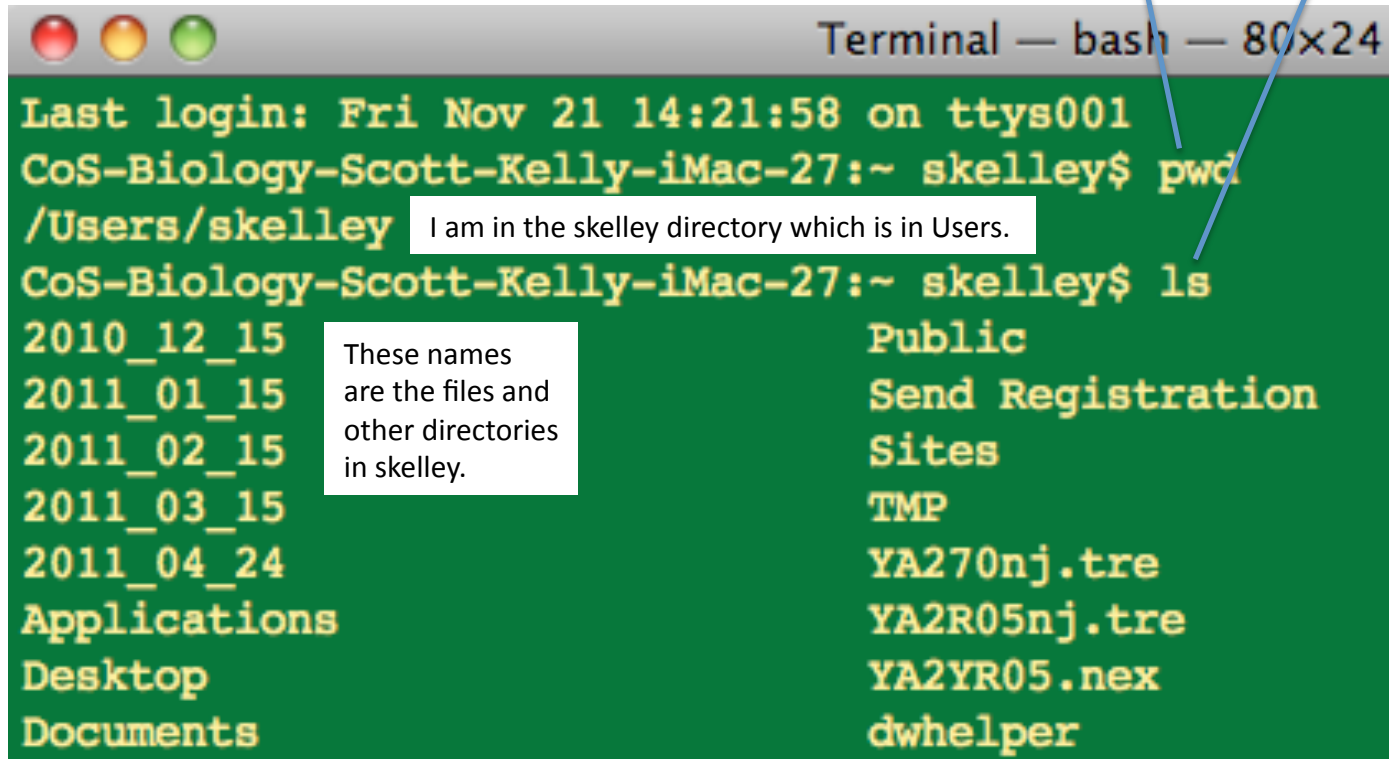
To start playing around in Unix, open a Terminal window like this:



```
Terminal — bash — 80x24
Last login: Fri Nov 21 14:21:33 on ttys000
CoS-Biology-Scott-Kelly-iMac-27:~ skelley$
```

Linux/Unix Tutorial: Entering commands

In the Terminal window, you type in commands and hit “Enter” and things happen! Here I’ve typed in some commands “pwd” and then “ls”. The “pwd” command stands for “print working directory” and tells me the directory path of my current directory. The “ls” command lists all the files and directories in the current directory.



```
Terminal — bash — 80x24
Last login: Fri Nov 21 14:21:58 on ttys001
CoS-Biology-Scott-Kelly-iMac-27:~ skelley$ pwd
/Users/skelley
CoS-Biology-Scott-Kelly-iMac-27:~ skelley$ ls
2010_12_15      Public
2011_01_15      Send Registration
2011_02_15      Sites
2011_03_15      TMP
2011_04_24      YA270nj.tre
Applications    YA2R05nj.tre
Desktop          YA2YR05.nex
Documents        dwhelper
```

I am in the skelley directory which is in Users.

These names are the files and other directories in skelley.

Linux/Unix Tutorial: More commands

There are lots of commands you can use to navigate the operating system. Around 30 of them are used all the time. Unix is tedious at first, but it is so much faster than clicking through a lot of folders and windows.

Here are some examples.

```
CoS-Biology-Scott-Kelly-iMac-27:~ skelley$ cd TMP/  
CoS-Biology-Scott-Kelly-iMac-27:TMP skelley$ ls  
SCOTT_RULES      tmp.txt  
CoS-Biology-Scott-Kelly-iMac-27:TMP skelley$ ls -al  
total 32  
drwxr-xr-x   4 skelley  staff   136 Dec  6  2013 .  
drwxr-xr-x+ 61 skelley  staff  2074 Oct 29 12:29 ..  
drwxr-xr-x   2 skelley  staff   68 Dec  6  2013 SCOTT_RULES  
-rw-r--r--   1 skelley  staff 12663 Dec  6  2013 tmp.txt  
CoS-Biology-Scott-Kelly-iMac-27:TMP skelley$
```

“cd” means “change directory. Here I have moved in the TMP directory.

Adding some options to the ls command “-al” and I can see more details about my folders and files.

“.” Means the current directory.
“..” Means the directory one-step above (in this case “skelley”).

The “d” tells me that SCOTT_RULES is a directory.

This is the file size.

Linux/Unix Tutorial: And more commands

```
CoS-Biology-Scott-Kelly-iMac-27:TMP skelley$ head tmp.txt
>200334 1231 bp TEXT 9-MAY-2012, 1231 bases,
GAGTTTGATCCTGGCTCAGGATGAACGCTGACAGAATGCTTAACACATGC
AAGTCGACTCGAGTCTTCGGACTTGGGTGGCGCACGGGTGAGTAACGCGT
AAAGAACTTGCCTCTTAGACCGGGACAACATCTGGAAACGGATGCTAATA
CCGGATATATGGTTTTTCGCATGGAGAATCATGAAAGCTAGATGCGCTAA
GAGAGAGCTTTGCGTCCCATTAGCTNGTTGGTGAGGTAACGGCCCACCAA
GGCAATGATGGGTAGCCGGCCTGAGAGGTTGAACGGCCACAAGGGGACTG
AGACACGGCCCTTACTCCTACGGGAGGCAGCAGTGGGGAATATTGGACAA
TGGACACAAGTCTGATCCAGCAATTCTGTGTGCACGATGACGTTTTTCGG
AATGTAAGTGCTTTCAGTCGGAAGAAGTCAGTGACGGTACCAGACAGAA
CoS-Biology-Scott-Kelly-iMac-27:TMP skelley$ cd ..
CoS-Biology-Scott-Kelly-iMac-27:~ skelley$ pwd
/Users/skelley
CoS-Biology-Scott-Kelly-iMac-27:~ skelley$ cd TMP/
CoS-Biology-Scott-Kelly-iMac-27:TMP skelley$ ls
SCOTT_RULES tmp.txt
CoS-Biology-Scott-Kelly-iMac-27:TMP skelley$ cp tmp.txt tmp2.txt
CoS-Biology-Scott-Kelly-iMac-27:TMP skelley$ ls
SCOTT_RULES tmp.txt tmp2.txt
CoS-Biology-Scott-Kelly-iMac-27:TMP skelley$ rm tmp2.txt
CoS-Biology-Scott-Kelly-iMac-27:TMP skelley$ ls
SCOTT_RULES tmp.txt
CoS-Biology-Scott-Kelly-iMac-27:TMP skelley$ cd ..
CoS-Biology-Scott-Kelly-iMac-27:~ skelley$ mkdir TMP2
CoS-Biology-Scott-Kelly-iMac-27:~ skelley$ less temp.sh

#!/bin/sh

# temp.sh
#
#
# Created by Scott Kelley on 6/11/12.
# Copyright 2012 __MyCompanyName__. All rights reserved.

echo "Demultiplexing"
rm -rf split_library_output ; split_libraries.py -m nicu_office_m
-q nicu_Example.qual -o split_library_output
```

head – show first 10 lines of a file.

cd .. – move up one directory.

cp – make a copy of a file. Here we copy the contents of tmp.txt to tmp2.txt

rm - stands for “remove” and it deletes files.

mkdir - makes a new (empty) directory

The “less” command lets you scroll through the contents of a file one page at a time.