

Two vertical bars, one dark green and one yellow, are positioned on the left side of the slide.

OS/Shell Introduction

Getting Started

Computer Accounts

- Each student in the School of Engineering and Computer Science should have an ECS account.
 - Go the site: <http://www.ecs.csus.edu/>
 - Scroll to below the picture.
 - Click on **ECS Quick Links**
 - Choose the option **Get an ECS Account**
 - Follow the directions. You must present a OneCard when you pick up the information.
 - Can also go to RVR-2011

Process needed to deal with a program (1 of 2):

- Log onto **athena** computer
 - Windows machines: Use PuTTY
 - MAC machines: Open up a terminal/console window (ssh)
- Open an editor. (C programmers use **vim**.)
- Write code, compile, save, etc.
- Get the code to a place where you can open your browser and upload it to Canvas (replacement for SacCT)

Process needed to deal with a program (2 of 2):

- Get the code to a place where you can open your browser and upload it to Canvas (replacement for SacCT)
 - Use file transfer software to move the code from **athena** to your own computer. (WinSCP, FileZilla, CyberDuck)
 - Email the file from athena to yourself. (pine)
 - Log onto an ECS computer, click on “My Files On **gaia**” to open your file, open a browser, upload it.
 - Mac: Use scp to transfer the file.
 - Use **hydra**



Software for moving files
between laptop/home and athena



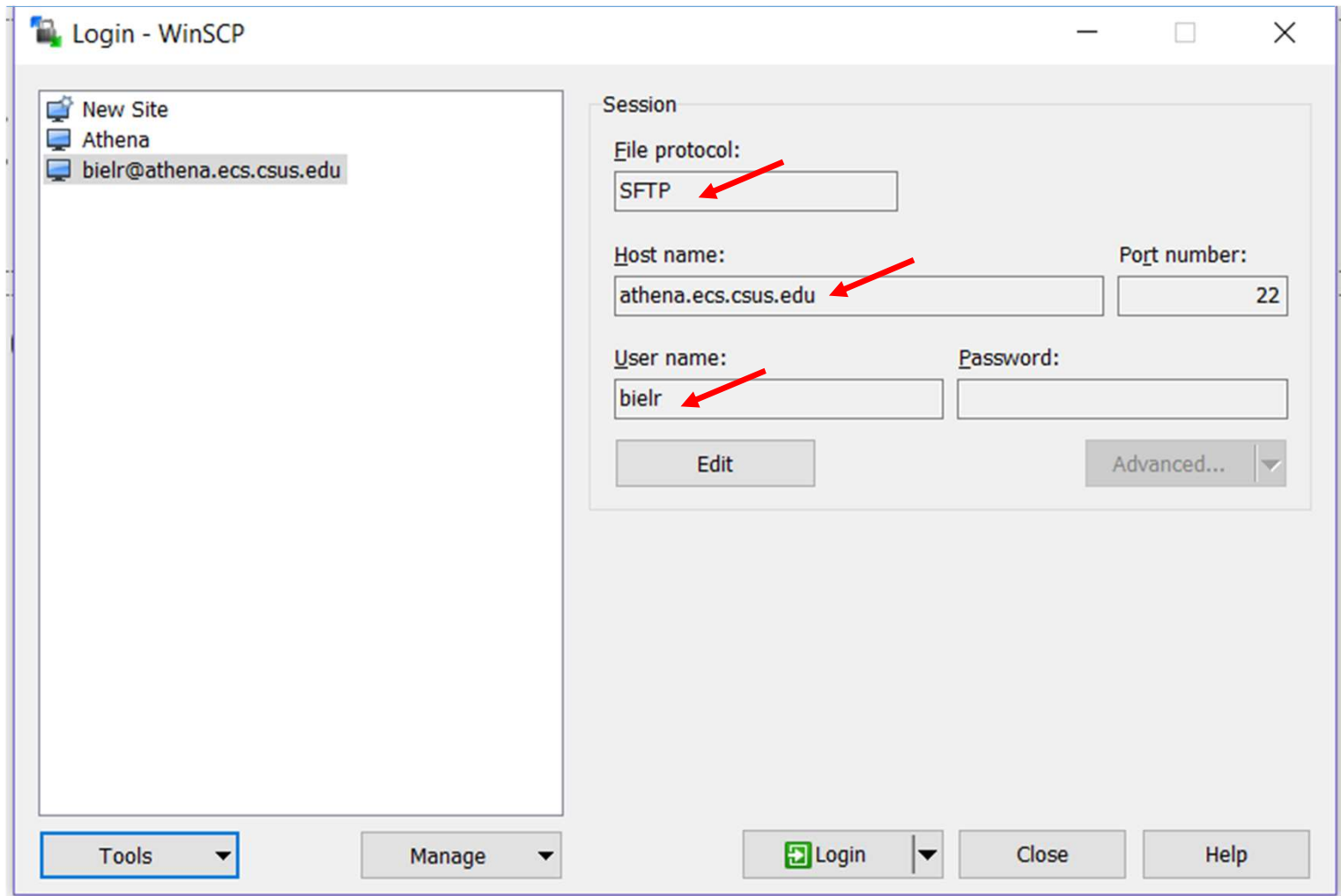
Transfer Software for home:

- **Why** – We will be working on a Linux machine to create our code and run it. When you are finished with the assignment, the files are on that Linux machine named “athena”.
- If you are in our lab or another ECS computer, it is easy to check out of Linux and back to Windows, open a browser and upload your files to Canvas.
- But how to do this at home? We use free file transfer software to move the file from athena to your home computer.

Transfer software for home - Windows:

- **WinSCP** – free software that allows one to move files from one site to another, from athena to home, and the reverse.
- At the site: <http://winscp.net/>
- Next slide shows startup menu with entries for instructor
- The same information will be needed whether you use WinSCP or another product.

WinSCP Log-in Screen with settings



WinSCP Sample screen: *left* side is a folder on home computer, *right* side is folder on gaia

class_files - bielr@athena.ecs.csus.edu - WinSCP

Local Mark Files Commands Session Options Remote Help

Synchronize Queue Transfer Settings Default

bielr@athena.ecs.csus.edu New Session

My documents class_files Find Files

Upload Edit Properties Download Edit Properties

C:\Users\Ruthann\Documents\CSUS Classes\csc 25\Fall 2015\Labs\Lab4 /gaia/home/faculty/bielr/class_files

| Name | Size | Type | Changed | Name | Size | Changed | Rights | Owner |
|-----------------|-------|----------------------|------------------------|-----------------|------|------------------------|------------|-------|
| .. | | Parent directory | 10/14/2015 11:12:14 AM | .. | | 1/21/2016 1:43:26 PM | rw-x--x--x | bielr |
| Lab4 solution.c | 2 KB | C File | 9/20/2015 3:34:27 PM | a.out | 6 KB | 11/4/2015 11:18:32 AM | rw-r--r-- | bielr |
| lab4.c | 2 KB | C File | 9/21/2015 4:12:06 PM | lab2a.c | 1 KB | 9/14/2015 11:02:50 AM | rw-r--r-- | bielr |
| Lab4_test.c | 2 KB | C File | 9/20/2015 3:33:42 PM | lab2b.c | 2 KB | 9/14/2015 11:03:05 AM | rw-r--r-- | bielr |
| Lab4.docx | 18 KB | Microsoft Word Do... | 9/23/2015 5:14:49 PM | lab3.c | 3 KB | 9/16/2015 11:19:26 AM | rw-r--r-- | bielr |
| | | | | lab4.c | 2 KB | 9/21/2015 4:12:06 PM | rw-r--r-- | bielr |
| | | | | lab5.c | 1 KB | 9/21/2015 1:06:31 PM | rw-r--r-- | bielr |
| | | | | lab6a.c | 2 KB | 9/28/2015 4:57:31 PM | rw-r--r-- | bielr |
| | | | | lab6b.c | 2 KB | 9/30/2015 8:56:11 PM | rw-r--r-- | bielr |
| | | | | lab7a.c | 2 KB | 10/5/2015 2:48:12 PM | rw-r--r-- | bielr |
| | | | | lab7b.c | 2 KB | 10/5/2015 2:50:45 PM | rw-r--r-- | bielr |
| | | | | lab7c.c | 2 KB | 10/5/2015 2:52:27 PM | rw-r--r-- | bielr |
| | | | | lab8.c | 1 KB | 10/14/2015 3:21:25 PM | rw-r--r-- | bielr |
| | | | | lab11.c | 5 KB | 10/28/2015 10:22:24 AM | rw-r--r-- | bielr |
| | | | | lab12.c | 1 KB | 11/1/2015 1:20:21 PM | rw-r--r-- | bielr |
| | | | | lab12sample.dat | 1 KB | 3/20/2006 3:38:38 PM | rw-r--r-- | bielr |
| | | | | lab13.c | 2 KB | 11/4/2015 11:18:24 AM | rw-r--r-- | bielr |
| | | | | lab14.c | 3 KB | 11/11/2015 3:54:01 PM | rw-r--r-- | bielr |
| | | | | lab14.dat | 1 KB | 11/11/2015 1:42:09 PM | rw-r--r-- | bielr |
| | | | | lab15.c | 3 KB | 11/15/2015 12:50:32 PM | rw-r--r-- | bielr |
| | | | | lab15.dat | 1 KB | 3/21/2004 9:08:22 PM | rw-r--r-- | bielr |
| | | | | lab16.c | 4 KB | 12/8/2015 12:20:17 PM | rw-r--r-- | bielr |
| | | | | lab16a.dat | 1 KB | 10/31/2005 1:09:48 PM | rw-r--r-- | bielr |
| | | | | lab16b.dat | 1 KB | 10/31/2005 1:11:22 PM | rw-r--r-- | bielr |

0 B of 22,065 B in 0 of 4 0 B of 43,799 B in 0 of 29

SFTP-3 0:01:39

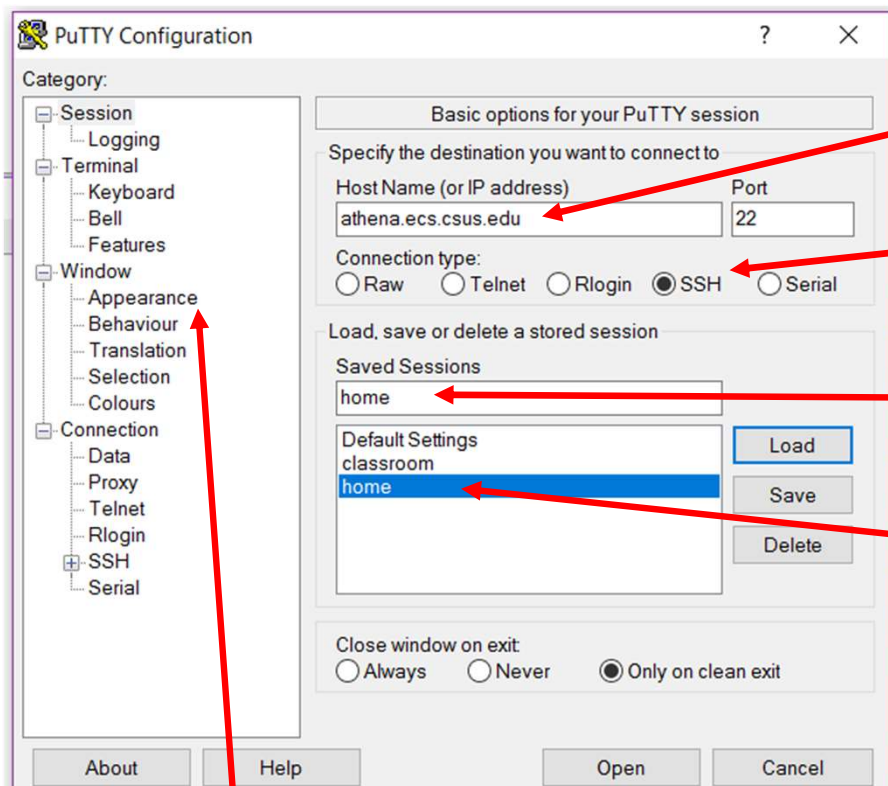
Optional software for home (MAC & Windows):

- Free software that allows one to move files from one site to another, from athena to home, and the reverse.
 - **Filezilla** – <https://filezilla-project.org/>
 - **Cyberduck** - <https://cyberduck.io/?l=en>
- Both software packages work on Windows or Mac.
- A search on “cyberduck vs filezilla” will bring up a couple of comparison articles.

Logging onto a UNIX machine

- Sit at a UNIX machine and log in.
- As you enter your password, nothing will show on the screen.
- Do a remote login using SSH
 - Most of us use PuTTY software to accomplish this.
 - The ECS computers all have PuTTY
 - To get PuTTY at home, download it from:
<http://www.chiark.greenend.org.uk/~sgtatham/putty/>

PuTTY Screen



Address of "athena"

Choose the option - SSH

I saved the session, named it "home"

Once the session is saved,
we can just double click on the session name,
and the log-in window will appear

Contains options to change font and font size



MAC Users

- Open up a terminal/console window and type the following:

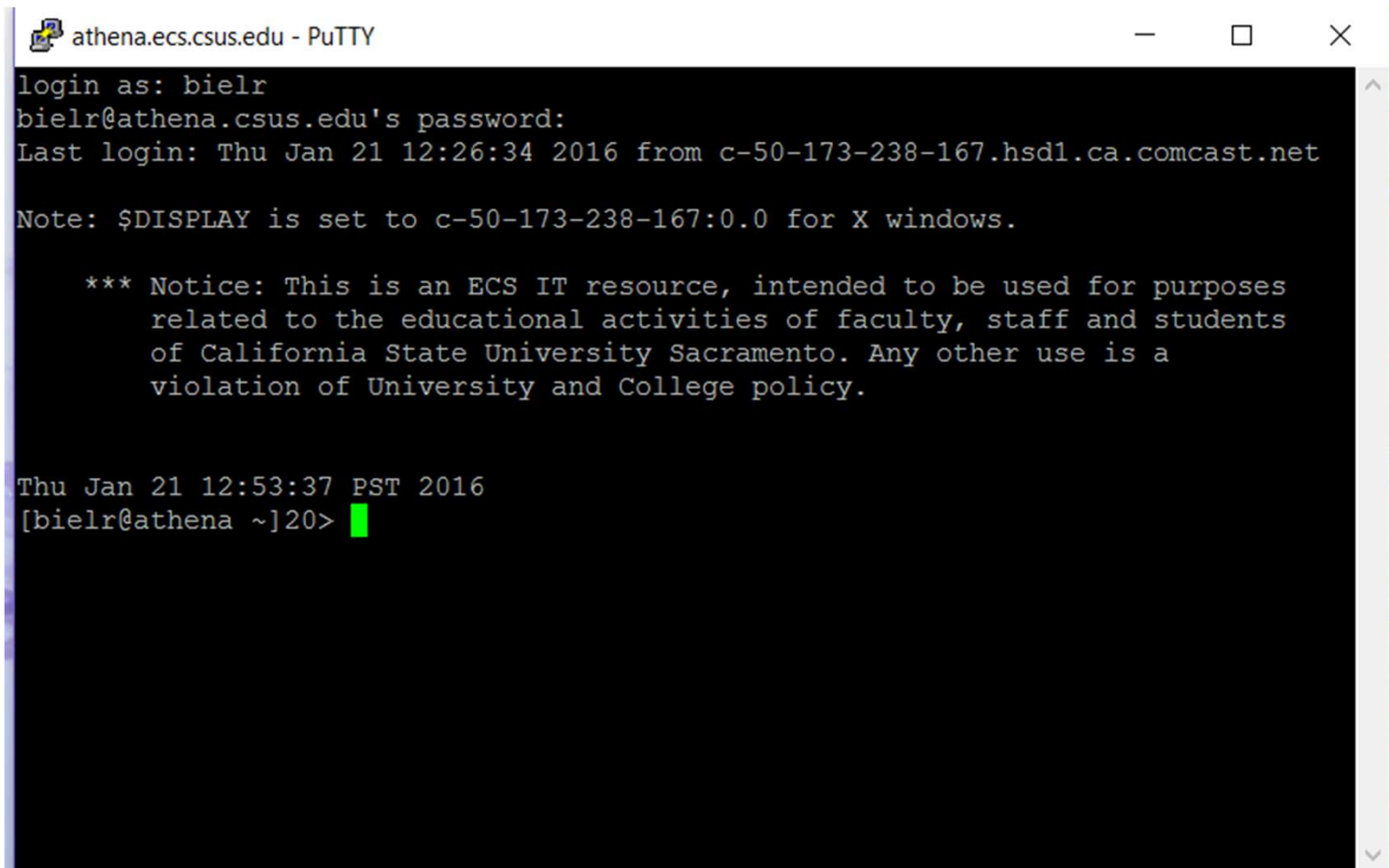
ssh yourECSname@athena.ecs.csus.edu

Press Enter.

When prompted, type “yes” to accept the server’s key.

Then enter your password.

Login Screen



The image shows a PuTTY terminal window titled "athena.ecs.csus.edu - PuTTY". The terminal output is as follows:

```
login as: bielr
bielr@athena.csus.edu's password:
Last login: Thu Jan 21 12:26:34 2016 from c-50-173-238-167.hsd1.ca.comcast.net

Note: $DISPLAY is set to c-50-173-238-167:0.0 for X windows.

*** Notice: This is an ECS IT resource, intended to be used for purposes
    related to the educational activities of faculty, staff and students
    of California State University Sacramento. Any other use is a
    violation of University and College policy.

Thu Jan 21 12:53:37 PST 2016
[bielr@athena ~]20>
```

The terminal window has a standard PuTTY interface with a title bar, window controls (minimize, maximize, close), and a vertical scrollbar on the right side.




Shells:

A shell is an interface between you and the kernel of UNIX/Linux.

Kernel. The center, the core.

Shell. A way to communicate with the Kernel.

The default on our system is **cs****h**, read aloud as 'C-shell'.



By doing “**cat /etc/shells**”, I found that athena has:

- sh (Bourne Shell)
- bash (superset, Born Again Shell. LOL)
- nologin
- tcsh
- **cs**h (spoken as C-shell) (**Default** on athena)
- dash
- ksh

It is possible to change the default shell, using the command “**chsh**”.

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Shell Verification

To see what Shell you are in, type:

> echo \$SHELL

Getting help:

“Look at the “man” page.” You will hear this.

This means looking at the on-line manual which is extensive.

\$ **man** *command*

| | |
|------------------|-----------------------------------|
| Examples: | /* will show you... */ |
| \$ man ls | /* all the options for listing */ |
| \$ man gcc | /* options for the compiler */ |

Maneuvering through a *man* page:

Hit **space bar** to advance thru page.

Hit **Enter** to advance the screen one line.

Hit **“q”** to quit.

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Various Commands in UNIX/Linux

Command: ls

Purpose: List files in directory.

Format: `ls [options] [file-list]`

Some Options:

- a List all files, including hidden ones.
- d List directory names only, not ordinary files.
- g Show group information with listing.
- l Show long listing with extended information.
- r List in reverse order.
- s List in order of increasing size.
- t List in order of time, most recent first.

Example: `ls` `ls -ra`
 `ls -l` `ls -ls`



Copying and Renaming Files:

Command: `cp`

Purpose: Copy a file.

Format: `cp source-file target-file`

Example: `cp my.file file2`

Result: There are now two identical files with different names.



Moving or renaming files:

Command: `mv`

Purpose: Move or rename a file.

Format: `mv source-file target-file`

Example: `mv my.file file2`

Result: One file with the target name exists.



Removing files:

Command: rm

Purpose: Remove a file.

Format: rm [*option*] *file(s)*

Option: -i Ask before deleting.
 Often the default.

Example: rm file2

Result: The file is no longer listed or available.

The *cat* command:

Command: cat

Purpose: Display or create files.

Format: cat [*source-file*] [symbol] [target-file]

Examples:

1. cat this.month
2. cat lab1.c

Result: File displayed on screen, lines echoed on screen

The *pwd* command:

Command: `pwd`

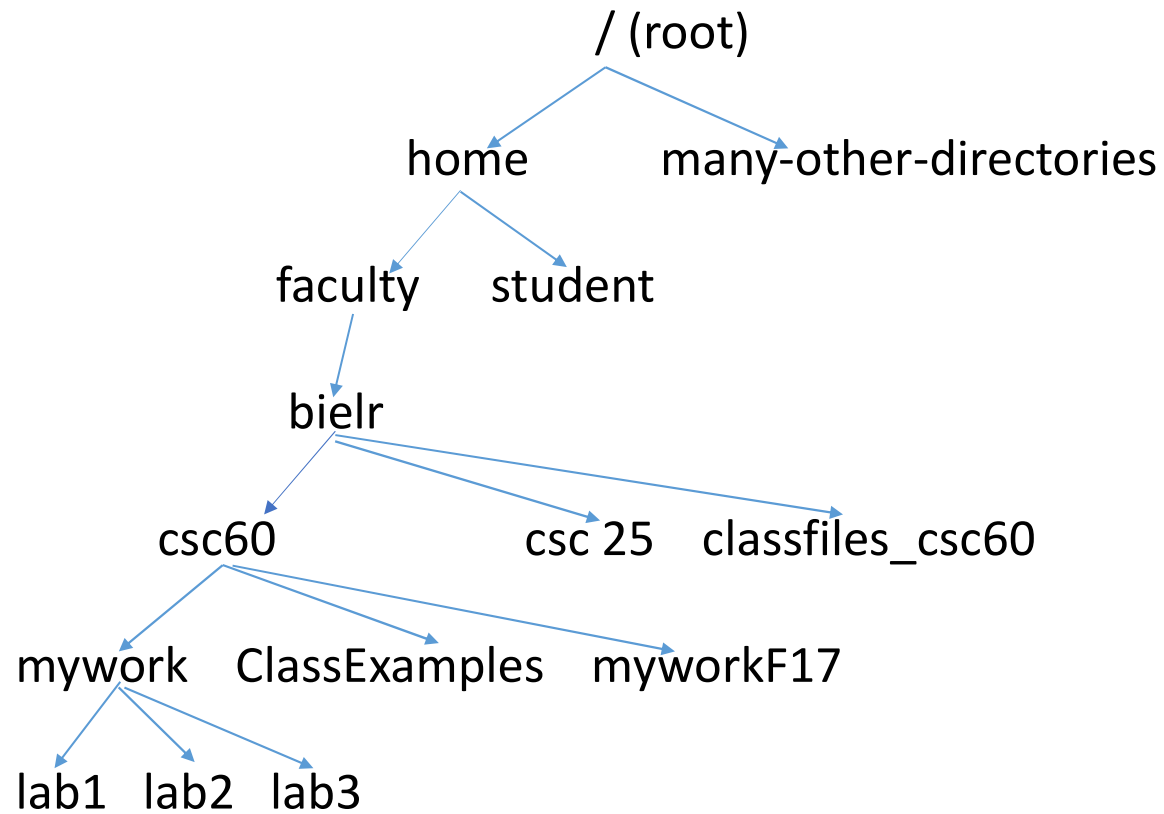
Purpose: print name of current/working directory.

Format: `pwd`

Example & Result:

```
[bielr@athena csc60]> pwd  
/gaia/home/faculty/bielr/csc60  
[bielr@athena csc60]>
```

Starting Directory Structure on Linux



The *cd* command:

Command: `cd`

Purpose: Change directory.

Examples & Results:

1. `cd` Takes you to your home directory
2. `cd ..` Takes you up to the parent directory
3. `cd lab1` Takes you down to a lower directory
4. `cd mywork/lab1` Takes you down to a lower directory

The *mkdir* command:

Command: `mkdir`

Purpose: Make directories.

Examples & Results:

1. `mkdir csc60` Makes a sub-directory named `csc60`
2. `mkdir lab1` Makes a sub-directory named `lab1`

Directories can also be moved or renamed (`mv`), and copied (`cp -r`)

The *rmdir* command:

Command: `rmdir`

Purpose: remove empty directories.

Examples & Results:

1. `rmdir csc60` Makes a sub-directory named csc60
2. `rmdir lab1` Makes a sub-directory named lab1

Note:

To delete an empty directory, you must be in the directory above it or you need to type a full path name.



The *clear* command:

Command: `clear`

Purpose: clear the terminal screen

Example:

```
> clear
```

Other Assorted Commands

- **less, more** – paging utilities
 - Use the “man” pages to find more
- **od – octal dump.** For viewing raw data in octal, hex, control chars, etc.
 - Use the “man” pages to find more
- **ln** – create hard (inode) or soft (symbolic) links to a file

[On creating a file, UNIX allocates the file an inode number of 4 bytes, an index value for an array on the disk. So every file has a unique inode number.]

Change The Prompt On athena (csh)

Change the prompt to show the folder/directory that you are in.

You need to type a SPACE after “**set**” and after the “**m**”.

Type in the command: **set prompt='[%n%m %~]!>'**



The **%n** will show your name.

The **%m** will show your current folder.

The **%~** will give you the command number.

REDIRECTION:

(1 of 4)

`$ ls` /* lists all files in your directories */

`$ ls | more` /* pipes the output to the *more* program which gives you a screen-full at a time */

The pipe symbol “|” redirects the standard output of one command to the standard input of another command or process.



REDIRECTION:

(2 of 4)

Use `>` to redirect an output to a file.

So ***cal*** is the calendar command.

```
$ cal 2017 > my_calendar
```

REDIRECTION:

(3 of 4)

Use `>>` to append to a file.

ps means process status.

`$ ps >> my_file`

Whatever was in *my_file* will now have the listing from the *ps* command appended to it.



Just to make things clear on Redirection: (4 of 4)

Use of the pipe “|” sends output to a **process**.

Use of the redirection “>” sends output to a **file**.

NOTE: The details of Redirection vary from shell to shell.

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OS/Shell Introduction

Getting Started

The End