Lab 0 Objectives

- Intro to Labs
- Intro to Operating Systems
- Start Lab #0
  - UNIX/Linux intro
  - Use jEdit (Text Editor)
  - Register for Interactive Textbook
  - Canvas (Forum for “Broader Issues”)

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Intro to Labs

- Student Assistants
  - Grace MacDonald ‘23
  - Elyssa McMaster ’22
- Tech Support Tom Marcais
  - Linux/CS account issues
  - tmarcais@wlu.edu

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Intro to Labs

- ~2 hours to get started on labs
  - ~1st hour is review (which is meant to help you get started on lab too)
  - Help from me and the student assistants
- Often, will need to finish lab after lab period
  - Lab assignments are the majority of your homework
- Use this lab (P405), preferably, or P413
  - Or, work remotely

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What Today Is and Is Not

- Not ready for programming
- Set up for the rest of semester
- Develop skills
  - Communicating with computer
    - When we talk to computer, we need to be ***precise***
  - **Identifying problems** and **solving those problems**
- Start to learn Linux

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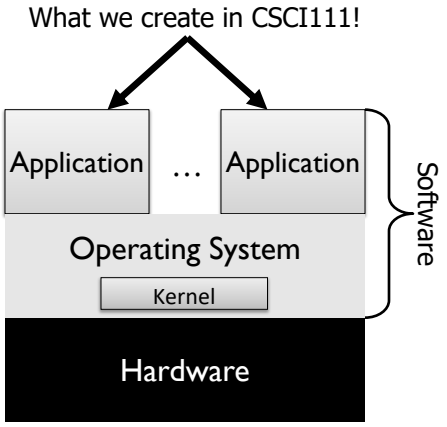
Basic Computer Architecture

Solve problems
MSOffice Applications (Excel, Word), Solitaire, Firefox, Internet Explorer

Manages hardware resources
Windows, OSX, UNIX, Android, **Linux**

The machine, made up of CPU, memory, hard drive, keyboard, etc.
Dell, Apple, **HP**, IBM, Toshiba, …



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Parmly 405 Machines

- Run Linux, distribution: Ubuntu
- Parmly 413 is the "advanced lab" down the hall
  - Can use those machines when the lab is in use
- Use your W&L username and password to login
  - But, the **files** you have access to on the Linux machines is not the same as the files you have access to on other W&L lab machines

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Operating Systems

- Manage hardware resources
- Three popular desktop operating system variations:

Mac	Windows	UNIX

- Learn Linux (a UNIX variation) in this class
  - Macs are built on UNIX → can use UNIX commands

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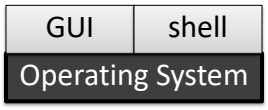
Intro to UNIX



- Execute operations by typing commands in shell or using GUIs (Graphical User Interfaces)
- Command-line tools
  - Pros and cons
    - Faster to use keyboard than mouse
    - Easier to automate
    - Can be intimidating
- We will use both GUIs and command-line tools

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OVERVIEW OF LAB

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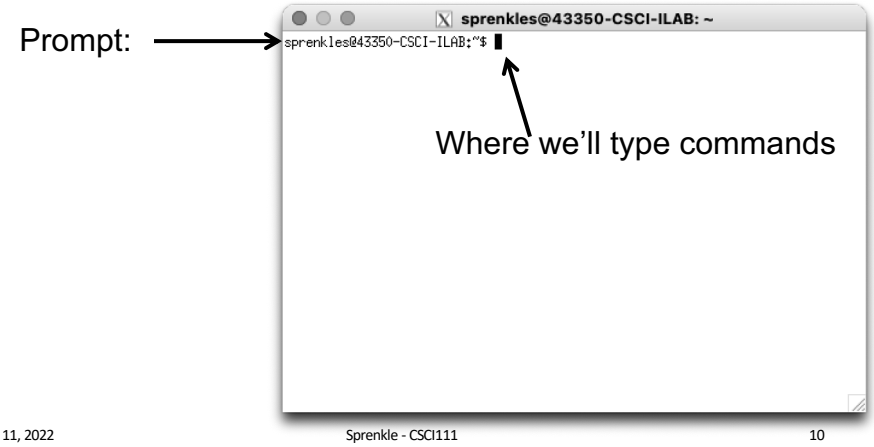
Terminal

- Command-line interface to operating system
- Open a terminal



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Terminal

- Command-line interface to operating system
- Open a terminal

Prompt: `[username@machinename directoryIAmIn]$`

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UNIX Shortcuts: ~

- ~ represents your home directory
  - *Not *the* home directory*
  - Always with respect to the user
- When you open a new terminal, you're in your home directory

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GUI to Get Help

- At the prompt, run the command
  - `labhelp`

Opening a Text Editor

- Text editor: an application to write/edit text files
  - Text files: program source code, HTML code
  - Like NotePad++ or TextEdit
- To run one text editor:
  - `emacs &`
  - `&` means "run in the background" so you can keep using the terminal

Challenge: UNIX is a Bad Parent

- Doesn't tell you when you've done something right
- Only tells you when you've done something wrong

```
sprenkle@spartacus Desktop$ mv lab00.pptx.pdf lab00.pdf
sprenkle@spartacus Desktop$
```

Renames file from `lab00.pptx.pdf` to `lab00.pdf`

Since you didn't get an error message, it did something!
(May not be what you wanted/expected.)

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Intro to UNIX: Essential Commands

- Manipulating Files

Command	What it does
`ls`	**l**i**s**t the files, directories in a directory
`mkdir dname`	**m**a**k**e a **dir**ectory with the name "dname"
`cp src dest`	**c**o**p**y a `src` to a `dest` `src` and `dest` can be a file, set of files, or a directory
`rm file`	re**m**ove (delete) a file/directory

- Navigating Directories

pwd	**p**rint **w**orking **d**irectory
cd name	**c**hange to **d**irectory name

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Useful Trick: Up Arrow

- Hit the up arrow. What happened?
- Hit the up arrow again? What happened?

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Intro to UNIX: File Structure

- Organize our files
- Hierarchy of *directories* or "folders"

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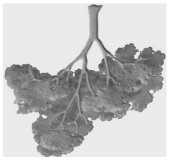
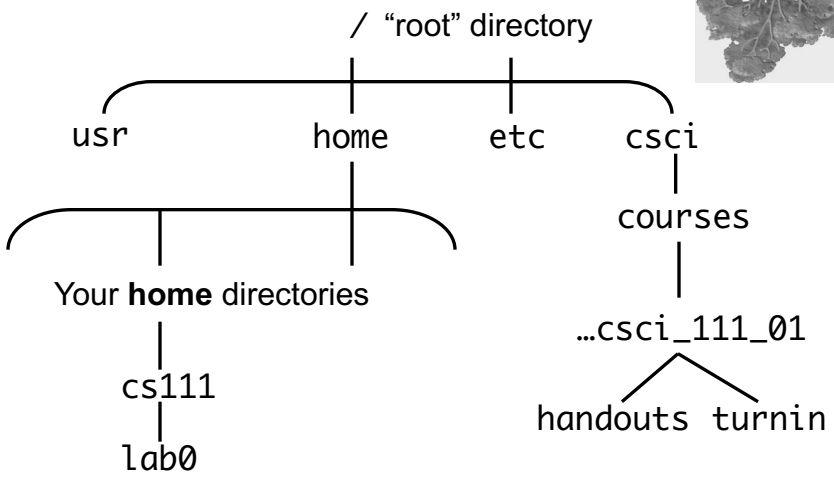
Paths through tree



(Partial) Linux File Structure



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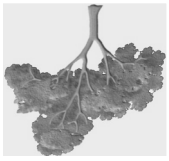
Paths through tree



(Partial) Linux File Structure

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What is the Unix command to do the following?

In your rows, come up with these commands

1. Find out what directory you're in
2. View the contents of the directory
3. Create a directory called cs111
4. View the contents of your directory (again)
5. Go into the cs111 directory
6. View the contents of cs111 directory

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What is the Unix command to do the following?

Now, execute those commands!

1. Find out what directory you're in
   - `pwd` You should be in your home directory
2. View the contents of the directory
   - `ls` What files are in your home directory?
3. Create a directory called cs111
   - `mkdir cs111`
   - View the contents of your directory again
4. Go into the cs111 directory
   - `cd cs111`
5. View the contents of cs111 directory
   - `ls`

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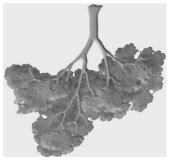
Paths through tree

Absolute vs Relative Paths

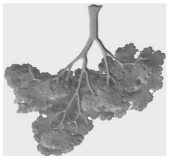


Absolute paths start from the root directory, work no matter where you are

→ What you see when you type `pwd`

Paths through tree

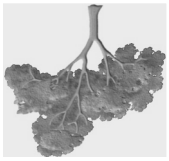
Absolute vs Relative Paths

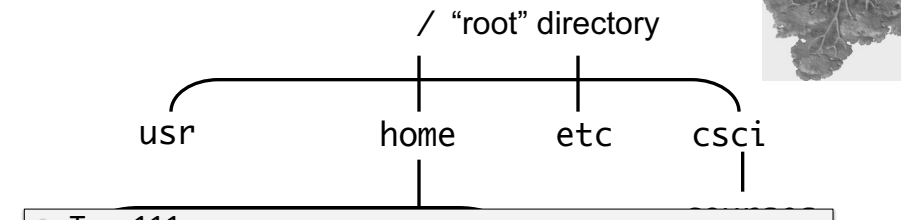


- Provide the absolute path and the relative path
- Given that you're in *your* `cs111` directory, how would you get to `lab0`? To your home directory? To the `handouts` directory?

Absolute vs Relative Paths

Paths through tree





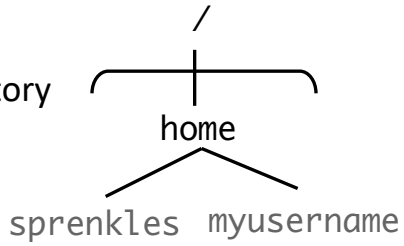
- To cs111
  - cd /home/username/cs111/lab0
  - cd lab0
- To home
  - cd /home/username
  - cd ..
  - cd
  - cd ~
- To handouts
  - cd /csci/courses/2021_22_winter-csci_111_01/handouts
  - cd ../../../../csdept/courses/cs111/handouts

Intro to UNIX: Shortcuts

Shortcut	Meaning
.	Current Directory
..	Parent Directory

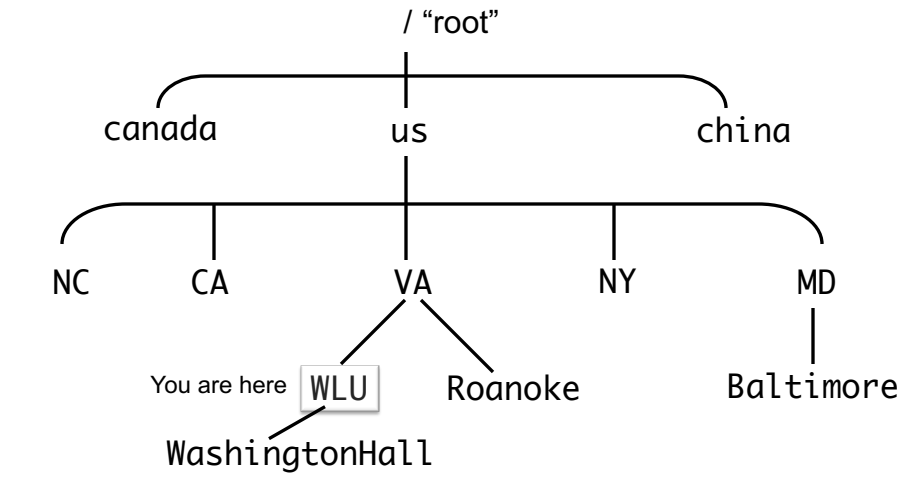
- Often used with **cp**, **mv**, **cd** commands

- **cd** or **cd ~**
  - Change to *your* HOME directory



Example: /home is the parent directory of /home/sprenkles

Relative Paths vs Absolute Paths



- Given that you're at **WLU**, how would you get to Washington Hall? To Roanoke? To Baltimore?

Practice, with Tab Completion

- Goal: go to the directory *This is an absolute path*
  `/csci/courses/2021_22_winter-csci_111_01`
  - You can use ***tab completion*** to help you complete commands
  - After typing the appropriate command, start to type `/cs` and then press tab.
    - What happens?
  - Now that you're in the `/csci` directory, press tab twice
    - What do you see?
  - Use tab completion to help you complete the rest of the path
- What are the contents of this directory?
- How can you get to the directory `/csci/courses`?
- How can you get back to *your* home directory? (3 ways)

emacs: A text editor

Check: are you are in your home directory? Now, go into your `cs111` directory.

- `emacs &`
  - Command to run
- Create a new file (under File → Visit New File), add some text to it
  - e.g., "this is my file"
- Save the file in *your* `cs111` directory, naming it `test.txt`
- Exit emacs from the menu
- What are the contents of the directory now?

More on the `cp` command

- `cp src dest`
  - `src`: what you want to copy
  - `dest`: to where you want to copy
    - If `dest` is a directory, copies `src` into that directory
    - If `dest` is a filename, makes a copy of `src` and names it `dest`
- Practice in the terminal: First, discuss the steps
  - Copy the file you just created and make a backup of it, e.g., named `test.txt.bkup`
  - Create a directory called `lab0`
  - Copy the file you just created into the `lab0` directory

Using the Wildcard: *

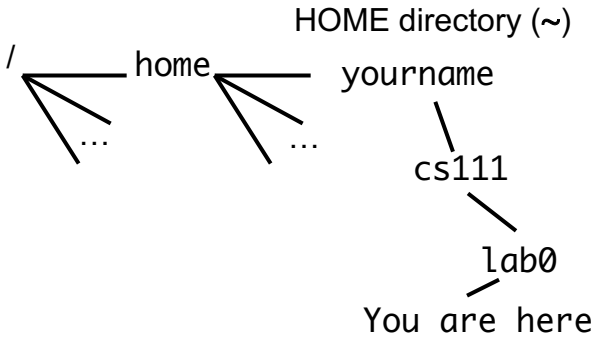
- Go into `/csci/courses/2021_22_winter-csci_111_01/handouts/lab0`
  - What are the contents of this directory?
- Try executing
  - `ls *.py`
  - `ls example.*`

What does the * do?

Wildcard: *

- Match 0 or more characters in filenames
- Used to operate on more than one file

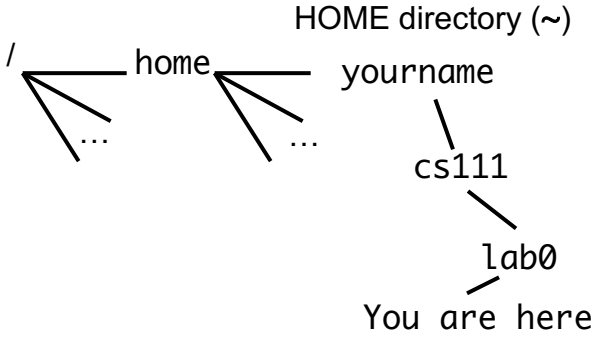
More on the cp command



- Confirm you are in your ~/cs111/lab0 directory
- Copy all of the files that end in .py from /csci/courses/2021_22_winter-csci_111_01/handouts/lab0 into your lab0 directory

Discuss the commands

More on the cp command



- Confirm you are in your ~/cs111/lab0 directory
- Copy all of the files that end in .py from /csci/courses/2021_22_winter-csci_111_01/handouts/lab0 into your lab0 directory

```
cp /csci/courses/2021_22_winter-csci_111_01/handouts/lab0/*.py .
```

Logging Out

- When you're done, you should log out
  - but not shutdown the machine

How do you log out?

Linux Quiz

- True or False: I should shut down the machine when I am done using it.
- True or False: My CS account is the same as my W&L account.
- True or False: I can give my password to my friend who needs to access my account.

Creating a Web Page

- Practical application of UNIX command skills
  - Practice commands you learned today
- Learning from following examples and adapting
- Learn what's "behind the curtain" of web pages

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Lab 0 Checklist

- Linux
- Go to Browser, Lab 0 Page
  - Remote access to the lab machines
  - Create your own web page
  - Canvas forum
  - Interactive textbook
- Separately: introductory survey is also due Friday

Due Friday before class

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