Objectives

- Reviewing lab
- Introduction to
  - Problem solving
  - Algorithms
  - Programming languages

1

Typical Class Period Organization

1. Pearls of wisdom from Professor Sprenkle
2. Review in rows
   - Consult your notes, handouts, slides from recent classes (see course web site)
3. Review as a class
4. New stuff!
   - Some think-pair-share work

2

Course Logistics

- Handouts
  - Slide number won't always line up with slides
  - Won't always get to all
  - Don't look ahead
- Office Hours
  - Zoom, Wed and Thurs, 2-4 p.m.
  - If you're in the advanced lab, let me know (Zoom can't be used on lab computers)
- Working from off campus?
  - Can use the VPN – email me for more information

3

Review: Lab

- Learned some UNIX commands
- Created a Web page
- Lessons learned:
  - Problems are fixable (often just typos!)
  - No "sorry" → you're learning
  - Learn from, adapt examples
  - Find a good solution
  - Honing your mental model

4

Review: UNIX

- UNIX is a bad parent
  - Doesn't tell you when you've done something right
  - Only tells you when you've done something wrong

Terminal:
```
sprenkle@spartacus Desktop$ cp lab00.ppt.pdf lab00.pdf
sprenkle@spartacus Desktop$
```

Did it work? Maybe.
While you're learning, need to check/confirm it!

Review: Linux

- What is the command to
  - List the files in a directory?
  - Change your current directory?
  - Make a directory?
  - Find out the current directory?
  - Make a copy of a file?
- What is the shortcut for …
  - The current directory?
  - The parent directory?
  - Your home directory?
- What does the / at the beginning of a directory mean?
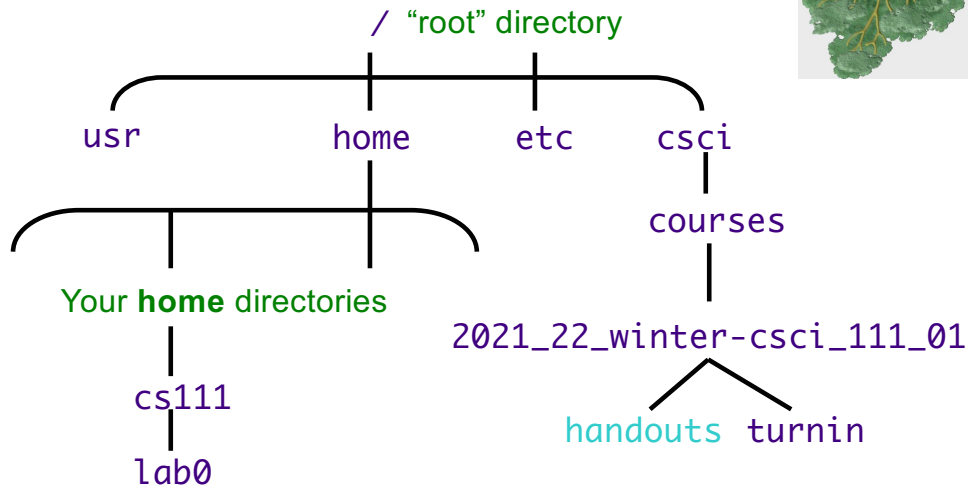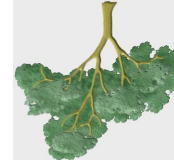- What is the *absolute path* to your home directory?

(Partial) Linux File Structure

Paths through tree

/ "root" directory

usr   home   etc   csci

Your **home** directories

courses

cs111

2021_22_winter-csci_111_01

lab0

handouts turnin

> What is the *absolute* path to the handouts directory?

7

Review: Linux File System

Your HOME directory (**~**)

/   home   yourusername@ad.wlu.edu

...   ...

cs111

lab0   lab1
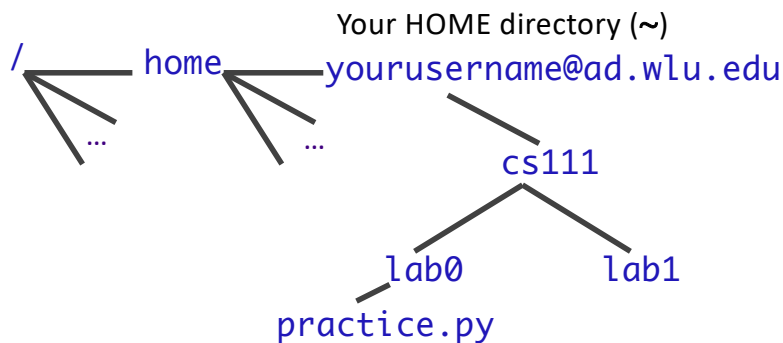
practice.py

~ is a shortname for your home directory, i.e., short for /home/yourusername@ad.wlu.edu

> - What is the *syntax* for the copy command?
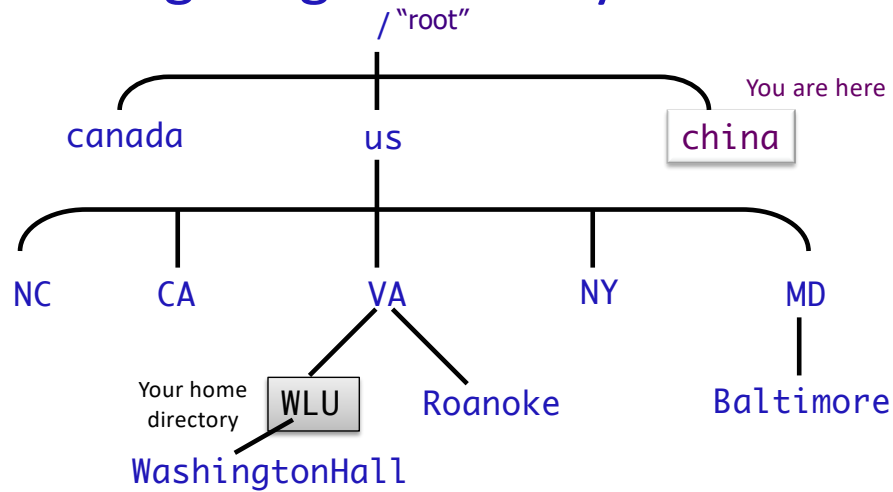> - How would you copy practice.py to your lab1 directory if you were in lab0? If you were in lab1?

8

4

Review: Navigating the File System

/ "root"

You are here

canada   us   china

NC   CA   VA   NY   MD

Your home directory   WLU   Roanoke   Baltimore

WashingtonHall

Given that you're in /china,
how would you go to canada? WLU? Washington Hall?

9

Linux: Helpful Trick

- If you ran a command that isn't working
  - Example: the prompt doesn't come back, and it looks like the terminal is hanging without response
  - Example: your command isn't correct
- Use Control-C to stop the command
  - You should get the prompt back, perhaps with a message (that probably won't make sense to you)

10

Post-Analysis of Labs

- "That's it?"
  - Often, students get overwhelmed by the directions, but then the work isn't that difficult
  - It's *problem solving*
    - Here's what I need to do. Here's what I know.
    - How do I bridge the gap between them?
- Worth 35% of your grade
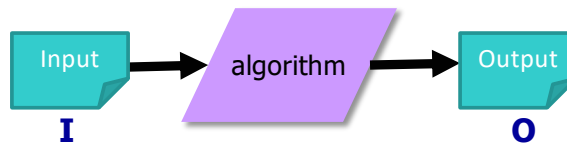 - Should get in B+/A- range easily with help from student assistants and me

11

Review: Computational Problem Solving 101

- **Algorithm**: a well-defined recipe for solving a problem
  - Has a finite number of steps
  - Completes in a finite amount of time
- Program
  - An algorithm written in a programming language
  - Also called code
  - Large programs, solving many problems together → application

12

Algorithms: Input and Output

- Algorithms often have a defined **input** and **output**
- Correct algorithms give the intended output for a set of input
- Example: Multiply by 10
  - I/O for a correct algorithm:
- More examples
  - averaging numbers, recipes

Input	Output
5	50
.32	
x	

13

Algorithms: Input and Output

- Algorithms often have a defined **input** and **output**
- Correct algorithms give the intended output for a set of input
- Example: Multiply by 10
  - I/O for a correct algorithm:
- More examples
  - averaging numbers, recipes

Input	Output
5	50
.32	3.2
x	10x

14

Making a Peanut Butter & Jelly Sandwich

- How do you make a peanut butter and jelly sandwich?
- Write down the steps so that someone else can follow your instructions
  - Make no assumptions about the person's knowledge of PB&J sandwiches
  - The person has the following materials:
    - Loaf of bread, Jar of PB, Jar of Jelly
    - 2 knives, 2 spoons, a paper plate, napkins
- Algorithm: What is the input? What is the output?

15

Discussion of PB&J

- The computer: a blessing and a curse
  - Recognize and meet the challenge!
- Be unambiguous, descriptive
  - Must be clear for the computer to understand
  - "Do what I **meant**! Not what I said!"
    - Motivates programming languages
- Creating/Implementing an algorithm
  - Break down pieces
  - Try it out
  - Revise

16

Discussion of PB&J

- Steps need to be done in a particular order
- Be prepared for special cases
  - ➢ Any other special cases we didn't discuss?
- Aren't necessarily spares in real life
  - ➢ Need to write correct algorithms!
- Reusing similar techniques
  - ➢ Do the same thing with a little twist
- Looping
  - ➢ For repeating the same action

17

Looking Ahead

- Broader Issue write up due Thursday at 11:59 p.m.
- Lab 0 due before class on Friday

18