Lab #1

Recommendations for a successful lab

BINF 2111, Fall 2023

Introductions

- Madeline (Madeline or Maddy)
- RAW Lab for 2 years
- Ph.D. in Bioinformatics and Computational Biology
  - M.S. in Bioinformatics (UNC Charlotte, 2022)
  - B.S. in Computer Science (UNC Charlotte, 2021)
  - B.A. in Anthropology (UNC Charlotte, 2021)
- Office: BINF 360
  - Office hours: T, R, F by appointment in person, M-F by appointment virtually

What is your name?
(I promise I will learn them all)

Recommendation #1 - Terminology

Know your terminology and commands, as this will be used in tests/quizzes.

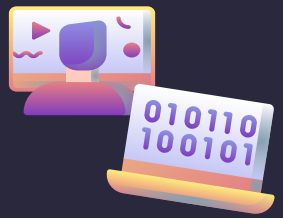
- **Terminal**: a command line interface (CLI), where you can type commands, manipulate files, execute programs, and open documents
- **Directory**: folder or path to a folder/file
- **UNIX/bash**: language used in terminal
- **Print**: display information
- **Command**: a specific word or phrase that tells the computer what to do
- **Run**: execute a command or program
- **Options/flags**: an addition to a command that slightly changes the command in a specified manner

Command	Meaning	Usage
ls	lists everything in a directory	ls [options] [folder]
echo	prints text to a location	echo [phrase]
mkdir	create new directory	mkdir [folder name]
cd	change directory	cd [directory]
touch	make new file without any content	touch [file name]
more	view file one screen at a time	more [file]
cat	print full contents of file	cat [file]
mv	move file to a different location, rename file/folder	mv [file] [new location] mv [old name] [new name]
pwd	print current location (working directory)	pwd
wc	count the number of lines/words/bytes in a file	wc [options] [file]

- Command
- Options
- Input (like a file or folder)

Recommendation #1 - Commands

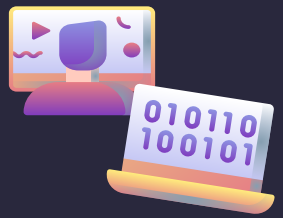
- **ls**: lists everything in a directory
  - Useful options:
    - -a show all files (including ones that start with .)
    - -l use long listing format (file sizes, dates, permissions, etc)
    - -h use human readable format (1G, 27K, 736M)
    - -t sort by time with newest first
    - -o similar to -l, but without group permissions
    - -r reverse the order while sorting
  - Usage:
    - `ls -thor`
    - `ls -alh Desktop/`



Recommendation #1 - Commands

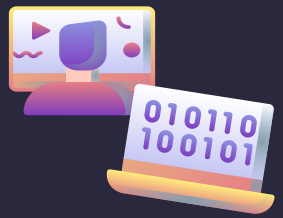
- **wc**: count the number of lines/words/bytes/characters in a file
  - Default (no options) prints out:

    line count word count byte count
  - Useful options:
    - -c print the byte count
    - -l print the line count
    - -m print the character count
    - -w print the word count
  - Usage:
    - `wc file.txt`
    - `wc -l file.txt`



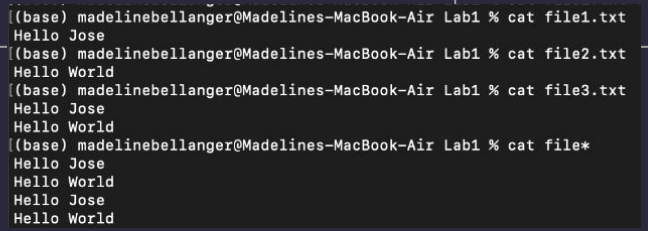
Recommendation #1 - Commands

- **echo**: prints text to a location
  - Important notes:
    - Using **> file** after the command will put the text in the file
    - Using **>> file** after the command will append the text to the end of the file.
  - Usage:
    - `echo “hello”`
    - `echo “hello world” > file.txt`
    - `echo “hello student” >> file.txt`

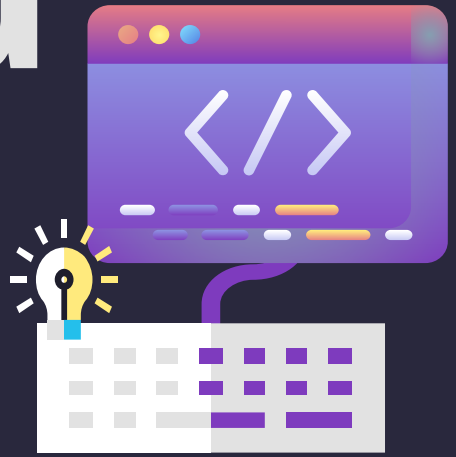


Recommendation #1 - Operators

Operator	Meaning	Usage
|	Pipe, used as “and” or used to use the output of the first command as the input of the second command.	echo “hello” | echo “world” ls | wc -l
>	Output, put the output of the command into a file	echo “hello” > file.txt
>>	Append, add the output of a command to the end of a file	echo “hello” >> file.txt
*	Wildcard, used as a placeholder for any character for zero or more times	cat file*

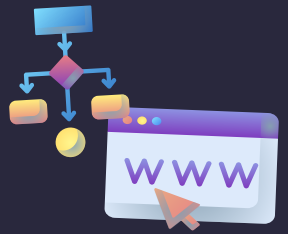


EVERYTHING IS TYPED



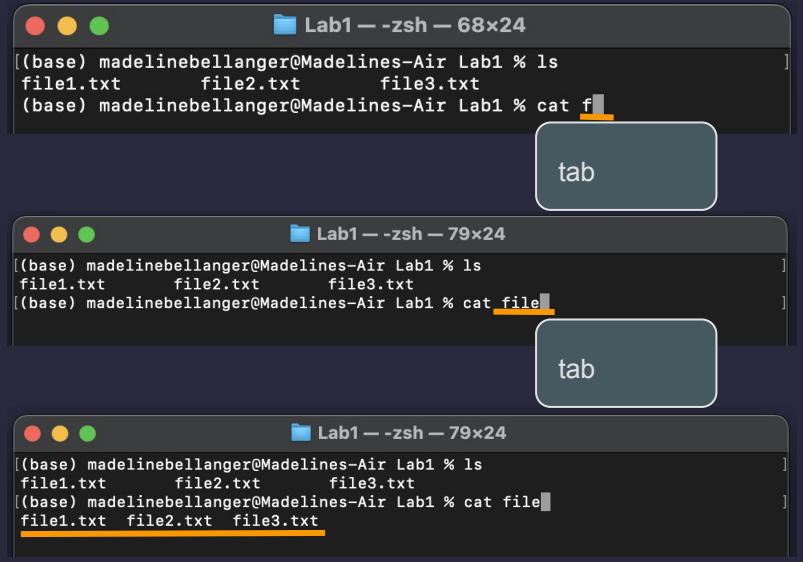
Recommendation #2

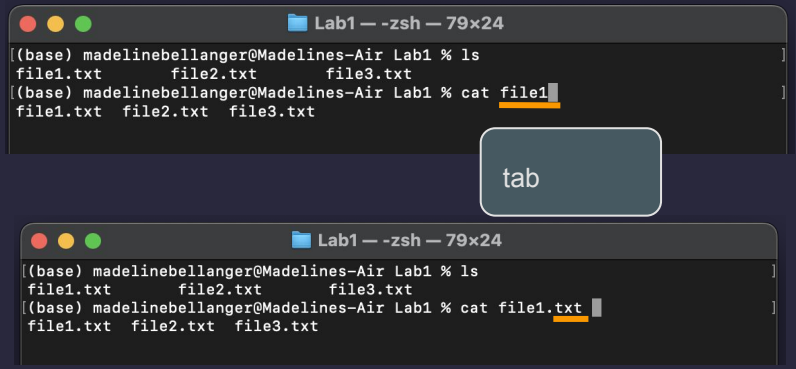
- Use your resources:
  - Lectures
  - Me, Dr. White, Andra, and your peers
  - Websites: GeeksForGeeks, Explainshell, Bash scripting cheatsheet
  - AI: ChatGPT, DALL-E, DeepMind, etc.
  - Your terminal
    - Test commands out!
  - **man** command
    - Pulls up the manuals for each command
    - Press Q to exit



Recommendation #3

- Use your tab button to autofill file/folder names.





Recommendation #4

Tip: Do not use spaces in your file and folder names!

Make a directory specifically for this class.

```
(base) madelinebellanger@Madelines-Air ~ % cd Desktop  Move to my Desktop
(base) madelinebellanger@Madelines-Air Desktop % ls  List everything on my Desktop
Flow Data                               NFixDB
GLK_assembly_HQ_large-only.fasta        PhD
GLO_best.fasta                          RYT200
GLO_plasmid_best.fasta                  Screenshot 2023-08-10 at 1.45.30 PM.png
MicroscopyImages                        cyclops-main
(base) madelinebellanger@Madelines-Air Desktop % mkdir BINF2111  Create a new directory for this class called BINF2111
(base) madelinebellanger@Madelines-Air Desktop % ls  List everything on my Desktop again to confirm the new directory was
BINF2111                                NFixDB       created
Flow Data                               PhD
GLK_assembly_HQ_large-only.fasta        RYT200
GLO_best.fasta                          Screenshot 2023-08-10 at 1.45.30 PM.png
GLO_plasmid_best.fasta                  cyclops-main
MicroscopyImages
```

Make a subdirectory for each lab.

```
(base) madelinebellanger@Madelines-Air Desktop % cd BINF2111 Move to the BINF2111 folder
(base) madelinebellanger@Madelines-Air BINF2111 % mkdir F23 Create a new directory for Fall 2023 (not necessary)
(base) madelinebellanger@Madelines-Air BINF2111 % cd F23  Move to the F23 folder
(base) madelinebellanger@Madelines-Air F23 % mkdir Lab1  Create a new directory for Lab 1 called Lab1
(base) madelinebellanger@Madelines-Air F23 % ls  List everything in F23 to confirm the new directory was created
Lab1
```

Helpful Hints

- Copy and paste does not always work :(
  - When in doubt, type it out!
- Press the up and down arrows to cycle through previous commands.
- Use the **history** command to see a list of your past commands.

```
(base) madelinebellanger@Madelines-MacBook-Air Lab1 % history -9
  702  cd Desktop/BINF2111/F23/Lab1
  703  echo "Hello Jose" > file1.txt
  704  echo "Hello World" >> file2.txt
  705  cat file1.txt file2.txt > file3.txt
  706  cat file1.txt
  707  cat file2.txt
  708  cat file3.txt
  709  cat file*
  710  history
```

Lab Notes

- Question 10:

  echo "Hello Jose" > file1.txt | echo "Hello World" >> file2.txt

  - Underlined portion will **not** work for **Mac** users
  - Run the following for the last command (cat…) to work:
    - echo "Hello Jose" > file1.txt
    - echo "Hello World" >> file2.txt
  - You still need to know what the command does!
    - You can run it on Replit to see it working.