



## Lecture Participation Poll #2

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# Lecture 2: Meet the Linux Shell

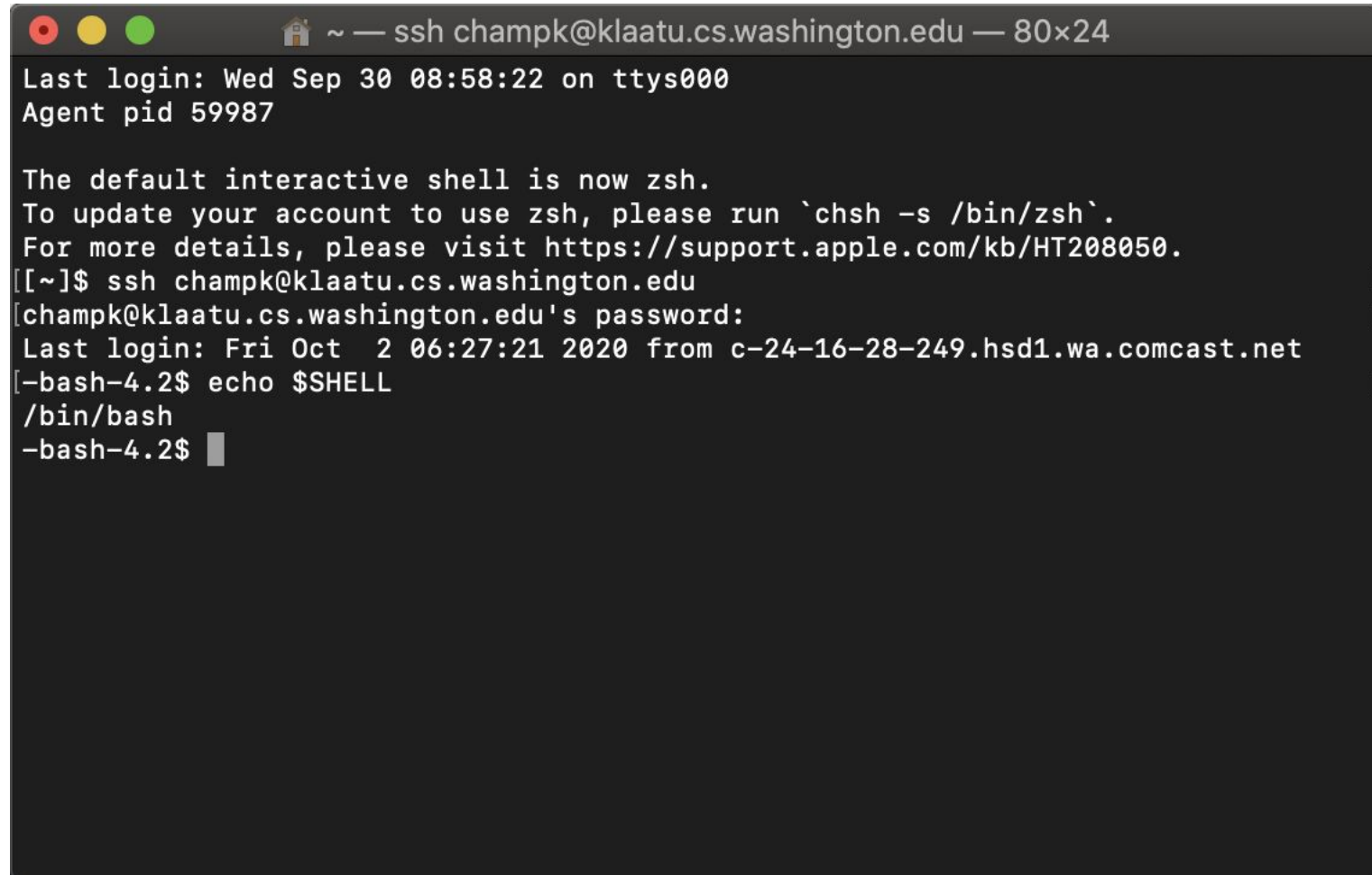
CSE 374: Intermediate  
Programming Concepts and  
Tools

# Administrivia

- Exercise 0 will release today
- Class webpage now live
- Class discussion board available
- Linux accounts will be available later this afternoon
  - Username = uwnetid
  - Password = tempPassword
- Linux account issues? Fill out form: <https://forms.gle/SDNkjSfmB7GLsFrT6>
- Fill out student survey: <https://forms.gle/2nqB8HnAHhXeLWCD7>

# Meet the Linux Shell

- Text based interface for Linux operating system
- We will be using the “Bash” shell
  - There are different versions, but for this course we will only be using bash
- Use `echo $SHELL` to check which shell you are using
- Bash is a unix shell and command language that is the default login shell for most Linux and MacOS
- Interpreted, not compiled
  - You’re on your own when things go wrong



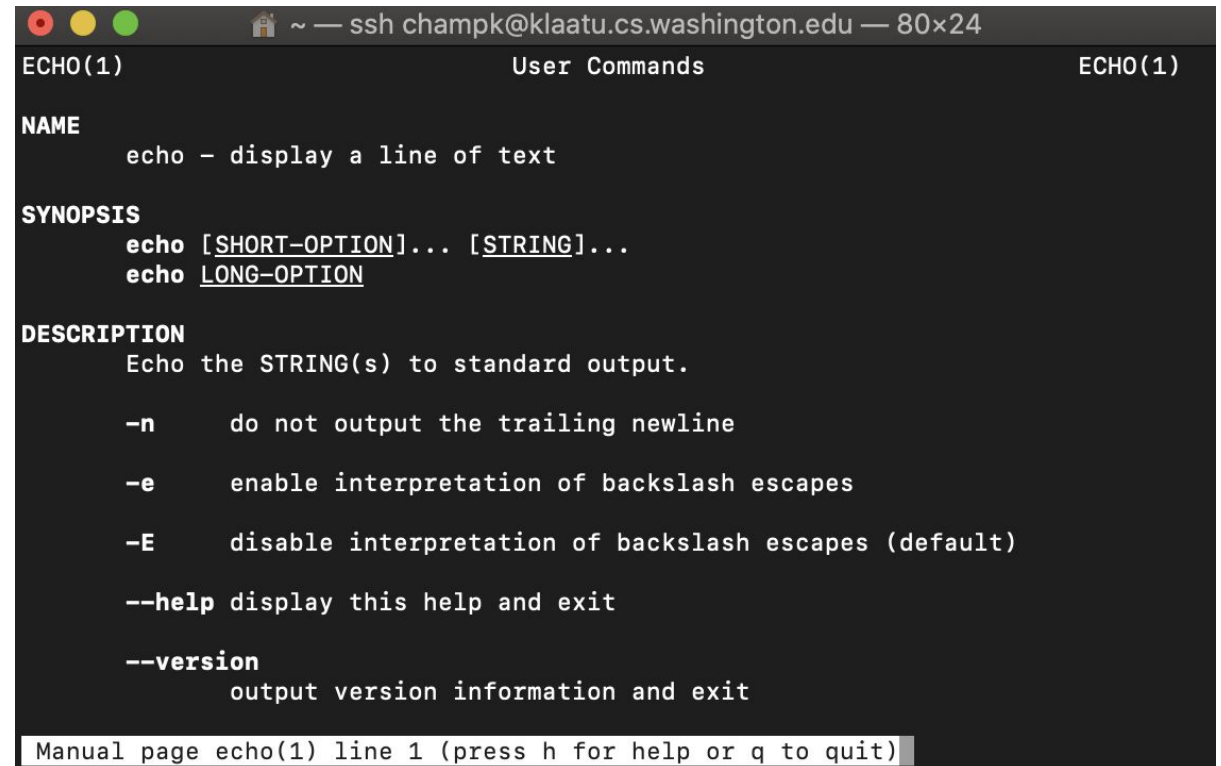
```
~ — ssh champk@klaatu.cs.washington.edu — 80x24
Last login: Wed Sep 30 08:58:22 on ttys000
Agent pid 59987

The default interactive shell is now zsh.
To update your account to use zsh, please run `chsh -s /bin/zsh`.
For more details, please visit https://support.apple.com/kb/HT208050.
[[~]$ ssh champk@klaatu.cs.washington.edu
[champk@klaatu.cs.washington.edu's password:
Last login: Fri Oct  2 06:27:21 2020 from c-24-16-28-249.hsd1.wa.comcast.net
[-bash-4.2$ echo $SHELL
/bin/bash
-bash-4.2$
```

Local MacOS terminal connecting to remote Linux machine

# Commands in the Shell

- The shell is a text-based interface that takes commands instead of clicks
- Commands are pre-existing programs
  - <command name> <options> <input || output>
- To learn about an individual command use “man”
  - <command name> man
  - Short for “manual page”
  - Can also use the --help option



```
ECHO(1) User Commands ECHO(1)
NAME
    echo - display a line of text
SYNOPSIS
    echo [SHORT-OPTION]... [STRING]...
    echo LONG-OPTION
DESCRIPTION
    Echo the STRING(s) to standard output.
    -n      do not output the trailing newline
    -e      enable interpretation of backslash escapes
    -E      disable interpretation of backslash escapes (default)
    --help  display this help and exit
    --version
            output version information and exit
Manual page echo(1) line 1 (press h for help or q to quit)
```

echo man page

# Shell Interaction Basics

1. Open the terminal application on your local computer
2. Connect to Klaatu Linux server with
3. `ssh <username>@klaatu.cs.washington.edu`
4. Enter in your password, you will not see characters as you type

## Basic Interactions:

- You can use copy and paste with with your usual short cuts
- You can navigate through your executed commands by using the up and down arrows
  - Convenient way to rerun commands or to fix small errors in previous command
- The history command will print the commands you've used this session to the terminal



# Linux Demo

Recorded Demo from 374 Sp 20 Instructor Megan Hazen

# Running Programs










- You can run a program by typing its path into the terminal
- Some folders are globally visible, so you only need the program's name
  - /bin/ is globally visible because it is in the PATH shell variable
- To run a program in the current directory you need to give the path
  - ./local\_program
  - Running local\_program by itself will not work because it's not globally visible
- All commands are bash files that are executed when you hit "enter" on a terminal line
  - You can write and execute your own! More on that later

# Files

- A collection of data used for long term storage
  - Stored on a hard drive
  - Hard drive is the physical portion of a computer that stores large amounts of data sits outside the CPU

- Files have...

- Name
  - Unique string within the folder
- Type
  - Indicated by the extension at the end of the name
- Content
  - Data contained within the file
- Location
  - Folder trail from drive to name
  - “breadcrumb”

Name	Date Modified	Size	Kind
 Lecture1-Intro.pptx	10/7/20	4.9 MB	PowerP...(.pptx)
 Lecture2-Shell.pptx	11:49 PM	1.5 MB	PowerP...(.pptx)
 Lecture3-Shell2.pptx	10/7/20	2.4 MB	PowerP...(.pptx)
 Lecture4-grep.pptx	10/7/20	989 KB	PowerP...(.pptx)
 Lecture5-...pting.pptx	Yesterday	959 KB	PowerP...(.pptx)
 Lecture6-Regex.pptx	Yesterday	954 KB	PowerP...(.pptx)
 Lecture7-l...oToC.pptx	11:13 PM	1.9 MB	PowerP...(.pptx)
 Lecture8-...nters.pptx	11:15 PM	2.5 MB	PowerP...(.pptx)
 Lecture9-malloc.pptx	11:17 PM	858 KB	PowerP...(.pptx)

## Finder GUI view of folder

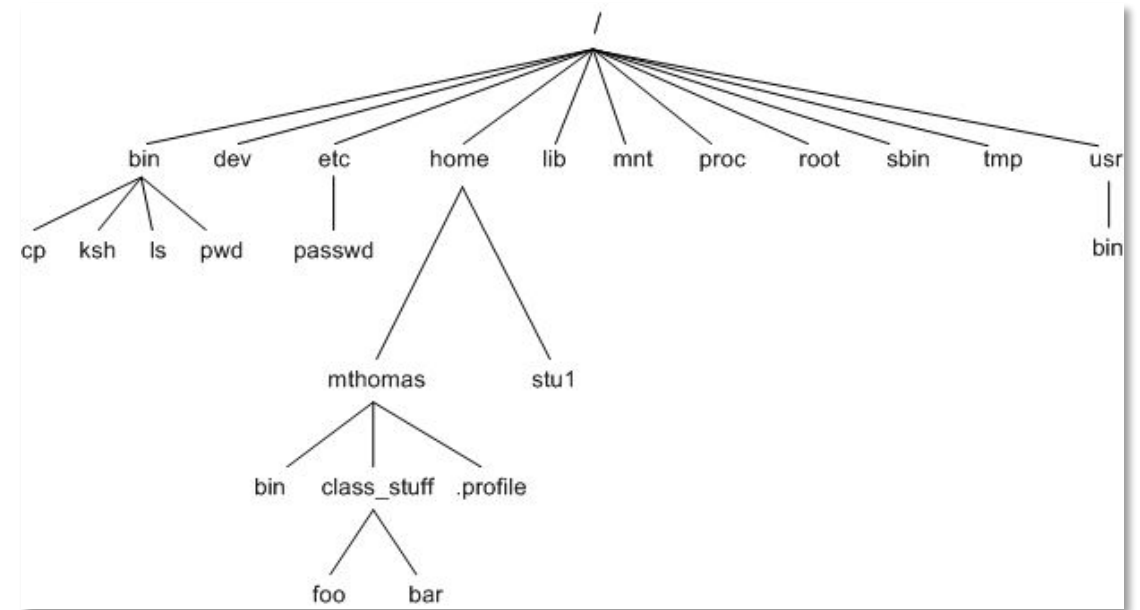
```
[[Lecture Slides]$ ls -l
total 33128
-rw-r--r--@ 1 Kasey  staff  4893375 Oct  7 07:57 Lecture1-Intro.pptx
-rw-r--r--@ 1 Kasey  staff  1488041 Oct 13 23:49 Lecture2-Shell.pptx
-rw-r--r--@ 1 Kasey  staff  2425734 Oct  7 07:57 Lecture3-Shell2.pptx
-rw-r--r--@ 1 Kasey  staff   988501 Oct  7 10:45 Lecture4-grep.pptx
-rw-r--r--@ 1 Kasey  staff   958522 Oct 12 08:57 Lecture5-Scripting.pptx
-rw-r--r--@ 1 Kasey  staff   954220 Oct 12 09:28 Lecture6-Regex.pptx
-rw-r--r--@ 1 Kasey  staff  1869399 Oct 13 23:13 Lecture7-IntroToC.pptx
-rw-r--r--@ 1 Kasey  staff  2498379 Oct 13 23:15 Lecture8-Cpointers.pptx
-rw-r--r--@ 1 Kasey  staff   857760 Oct 13 23:17 Lecture9-malloc.pptx
-rw-r--r--@ 1 Kasey  staff     165 Oct 13 23:21 ~$Lecture2-Shell.pptx
-rw-r--r--@ 1 Kasey  staff     165 Oct 13 21:15 ~$Lecture7-IntroToC.pptx
```

## ls -l view of folder



# File System

- Files contain other files, branching out from the root “/” forming a tree-like hierarchy
- Files are located with a path of folders separated by “/” this is called the “file path”
- Paths starting with “/” are called absolute paths
  - Start searching from the root of the file system
  - EX: /usr/documents/myFiles/myFile.txt
- Paths that do NOT start with “/” are called relative paths
  - Starts searching from current directory
  - EX: myFiles/myFile.txt
- pwd command will print the current directory



Tree diagram of file structure

# Navigating the File System

- cd – change directory
  - cd <file path>
- Terminal commands for paths
  - ~ your home directory
    - EX: cd ~ #change location to home directory
  - . current directory
  - .. parent directory
    - EX: ls .. #print contents of parent directory

## Beef up:

- **Change this slide to be about navigating the file system with bash**
- **Recursive traversal vs non**

# Useful Commands

Command	Operation	Example
<code>ls</code>	See folder contents	<code>ls -l</code>
<code>cd &lt;folderName&gt;</code>	Move into given folder	<code>cd Downloads</code>
<code>cp &lt;source&gt; &lt;destination&gt;</code>	Make a copy of given file in given destination	<code>cp file.txt myDir/</code>
<code>mv &lt;oldName&gt; &lt;newname&gt;</code>	Rename or move given existing file to given name/destination	<code>mv fil.txt file.txt</code>
<code>cat &lt;fileName&gt;</code>	Print file contents to terminal window	<code>cat file.txt</code>
<code>touch &lt;filename&gt;</code>	Create empty file with given name	<code>touch file.txt</code>
<code>echo &lt;string&gt;</code>	Print given string to terminal window	<code>echo "hello world"</code>
<code>pwd</code>	Print working directory	<code>pwd</code>
<code>mkdir &lt;directoryName&gt;</code>	Create an empty directory at location specified	<code>mkdir ~/newDir</code>
<code>exit</code>	Exit the shell	<code>exit</code>

# Other Useful Commands

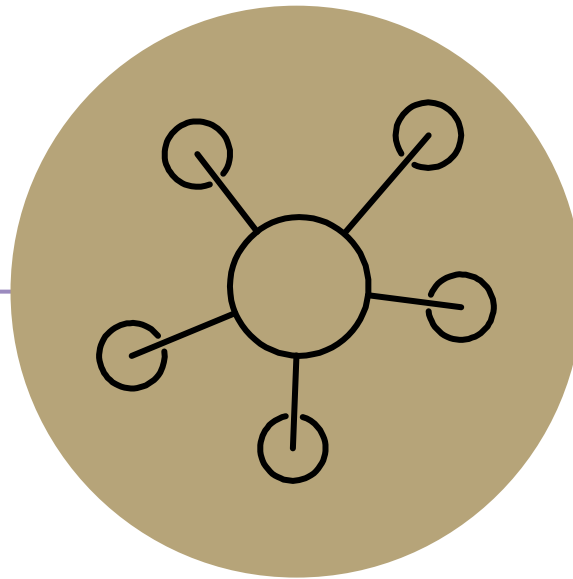
Command	Operation	Example
<code>pico &lt;fileName&gt;</code>	Create or edit files	<code>pico filename</code>
<code>echo &lt;text&gt;</code>	Print text	<code>echo hello world</code>
<code>pwd</code>	Print working directory's absolute path	<code>pwd</code>
<code>touch &lt;filename&gt;</code>	Create empty file	<code>touch filename</code>
<code>mkdir</code>	Create empty directory	<code>mkdir</code>
<code>find -name &lt;filename&gt;</code>	Search for file	
<code>exit</code>	Exit the shell	

**Moving files  
between machines**

- **Tar**
- **Wget**
- **Scp**
- **Filezilla**



# Demo: File Manipulation



# Questions?

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