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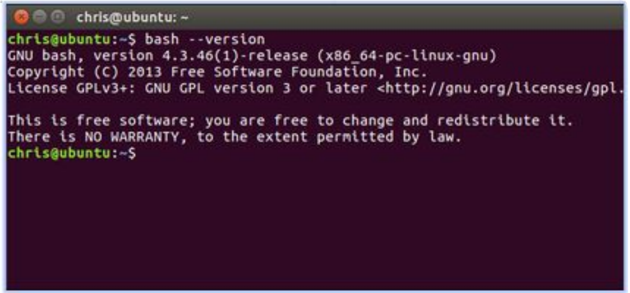
Linux

The Command Line Interface

In The Beginning...

- What is the command line?
- A way to enter textual commands and read textual output
- Sometimes called "terminals"



```
chris@ubuntu:~$ bash --version
GNU bash, version 4.3.46(1)-release (x86_64-pc-linux-gnu)
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There is NO WARRANTY, to the extent permitted by law.
chris@ubuntu:~$
```
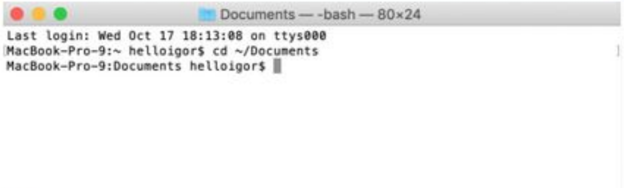
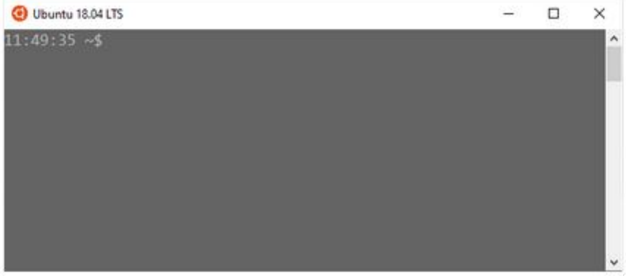



```
Last login: Wed Oct 17 18:13:08 on ttys000
MacBook-Pro-9:~ helloigor$ cd ~/Documents
MacBook-Pro-9:Documents helloigor$
```



```
11:49:35 ~$
```

In The Beginning...

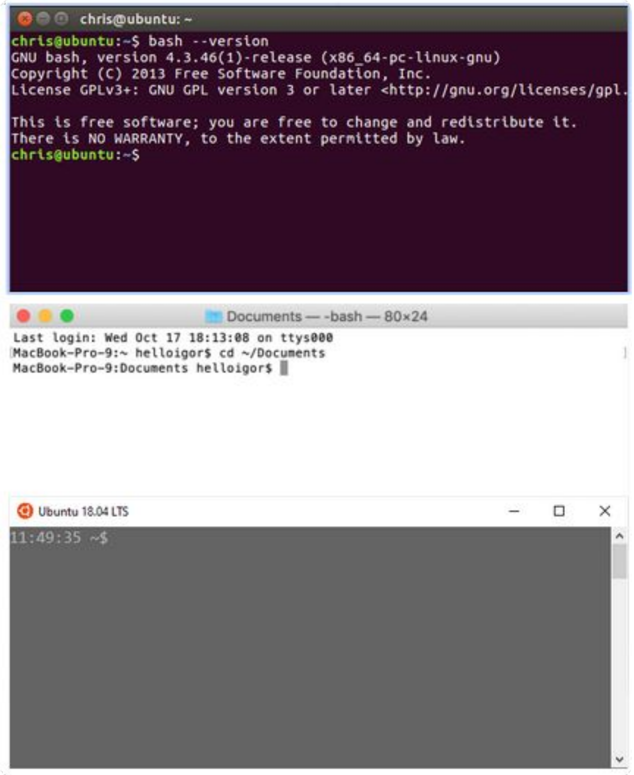
- That's not a terminal
- *This* is a terminal

In The Beginning...

- *That's* not a terminal
- *This* is a terminal
- Teletype Model 33 ASR
  - Literally prints characters out like a typewriter
  - ASCII was first used commercially on one of these things...

The Modern CLI

- Computer systems became more advanced
- Added GUIs
- Terminal emulators allowed for textual interaction with the underlying system



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Copyright (C) 2013 Free Software Foundation, Inc.
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chris@ubuntu:~$
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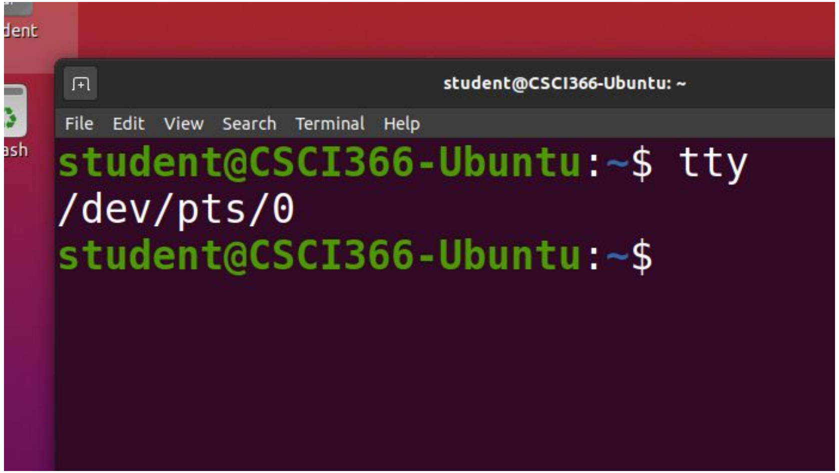
11:49:35 ~$
```

Echos Of The Past

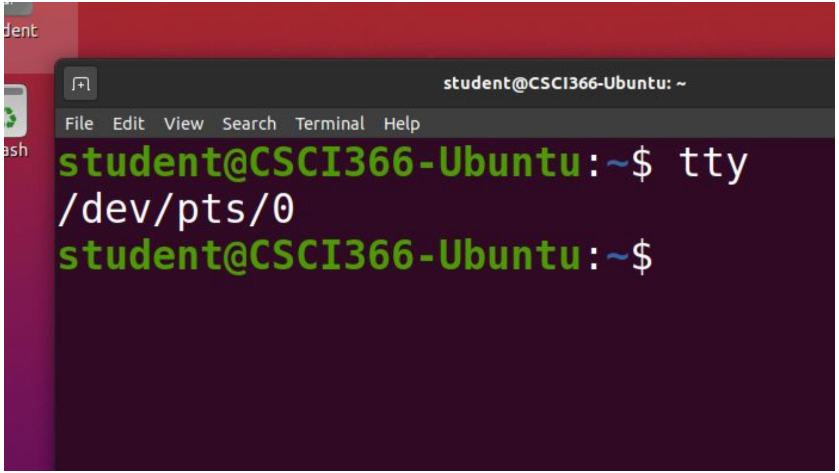
- Open up a terminal in linux
- Run the command “tty”
- What does /dev/pts?
- *pseudo*teletype!



```
student@CSCI366-Ubuntu:~$ tty
/dev/pts/0
student@CSCI366-Ubuntu:~$
```

Echos Of The Past

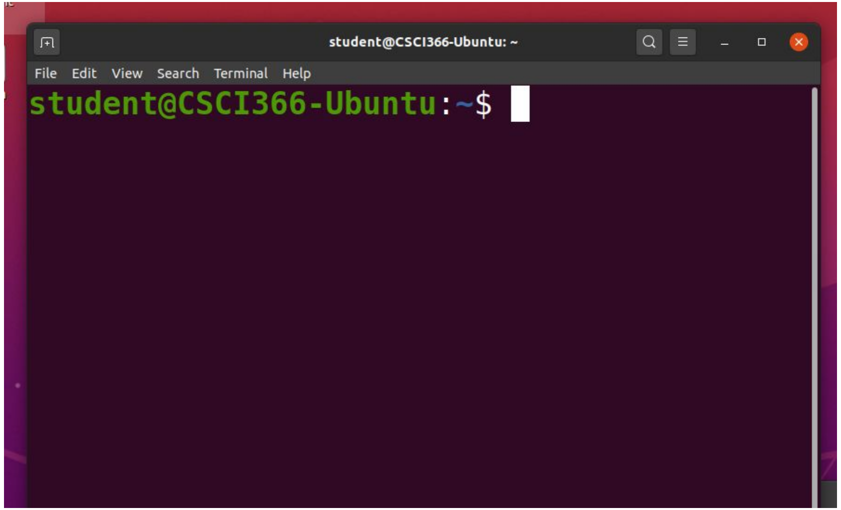
- Using the terminal gives us an efficient way to interact with
  - Text files
  - Large numbers of files
  - Low level features of the computer
- Worth knowing as a developer!



```
student@CSCI366-Ubuntu:~$ tty
/dev/pts/0
student@CSCI366-Ubuntu:~$
```

Commands - Files

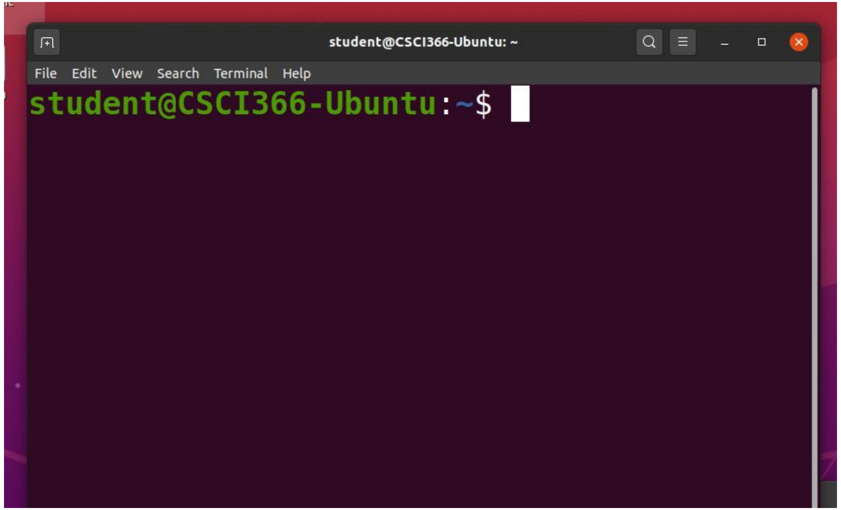
- ls - list directory
- cd - change directory
- mkdir - make a directory
- touch - create a file
- *tab key* - completes paths
- mv - move (rename) file
- cp - copy file
- rm - remove file
- pwd - show path



```
student@CSCI366-Ubuntu:~$
```

Commands - Programs

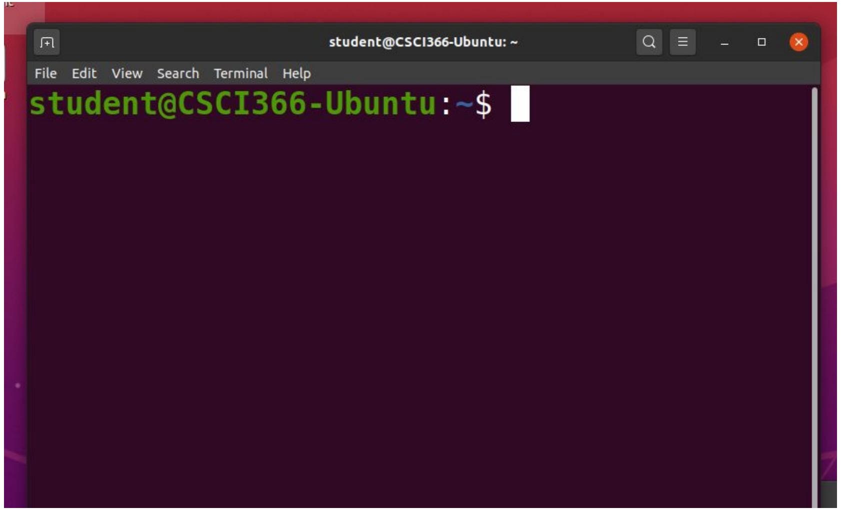
- cat - show file contents
- less - screen reader
- tar - file compression
- wget, curl - web download
- locate, find - find files
- diff - compare files
- grep - search through content of files


student@CSCI366-Ubuntu: ~
File Edit View Search Terminal Help

```
student@CSCI366-Ubuntu:~$ 
```

Input / Output

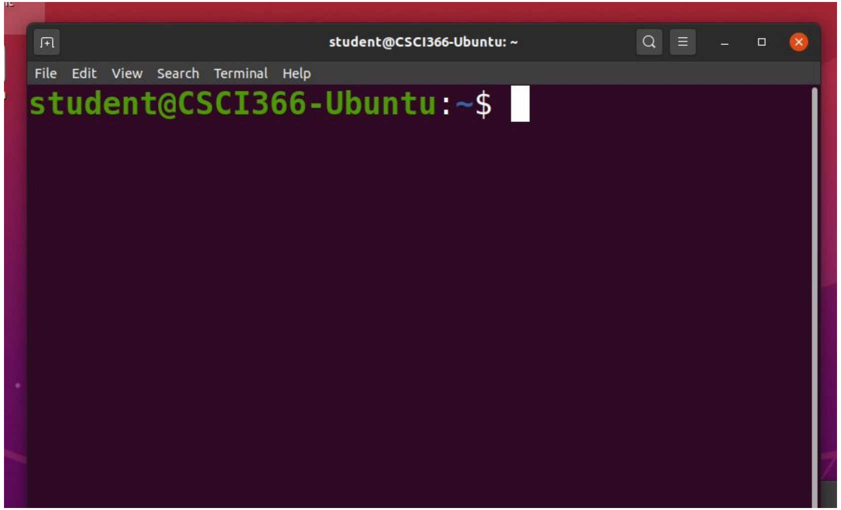
- STDIN, STDOUT, and STDERR
- | - Pipe output between programs
- > - create file with output
- >> - append to file
- 2> - Redirect STDERR only
- <- use file as input
- /dev/null - black hole



```
student@CSCI366-Ubuntu:~$ 
```

Commands - Administration

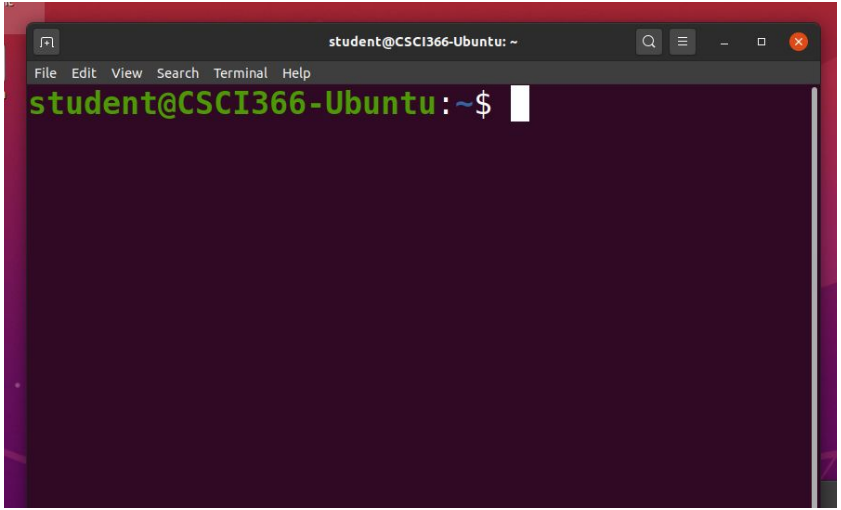
- apt - install programs
- env - environment
- echo - prints strings and system variables
- export/unset - set/unset variable
- sudo - run command as super user (admin)



```
student@CSCI366-Ubuntu:~$ 
```

Directory Layout

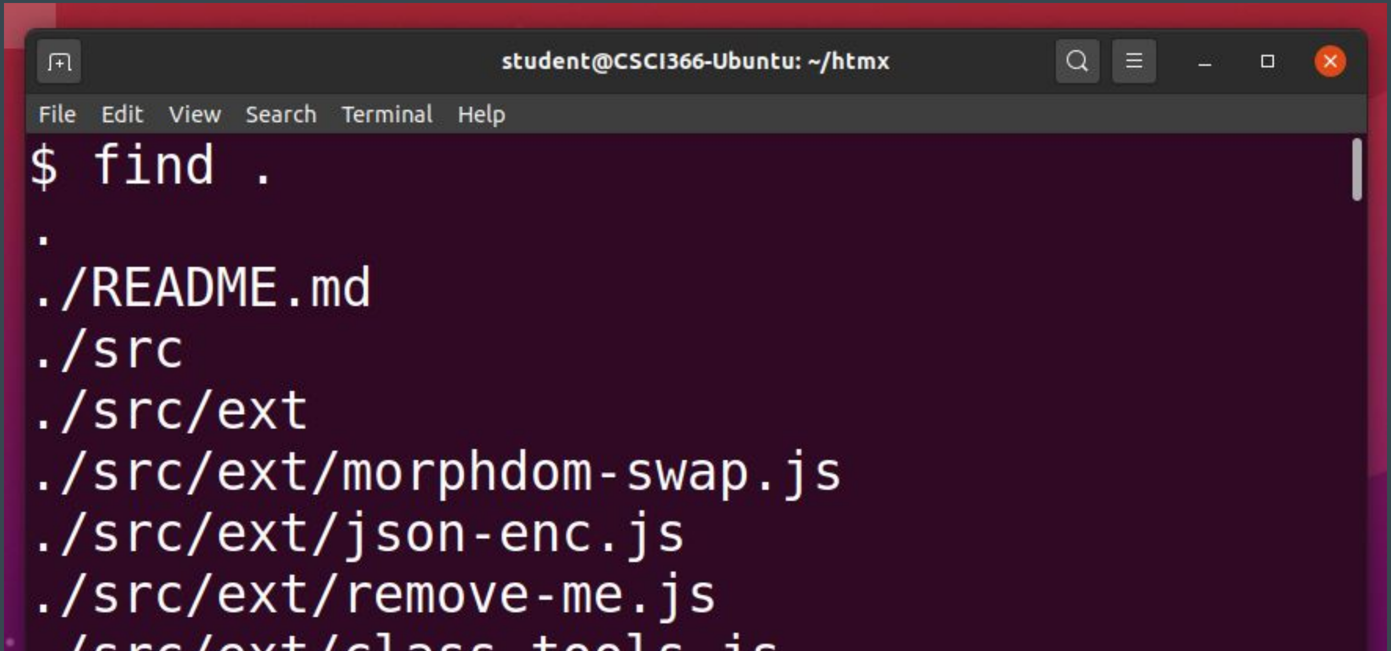
- / - root
- /home - user directories
- /usr/local - directory for global programs
- /tmp - contains temporary files
- /var/log - log files
- ~ - your home directory


student@CSCI366-Ubuntu: ~
File Edit View Search Terminal Help

```
student@CSCI366-Ubuntu:~$
```

Demo - Count The Lines of Code In A Project

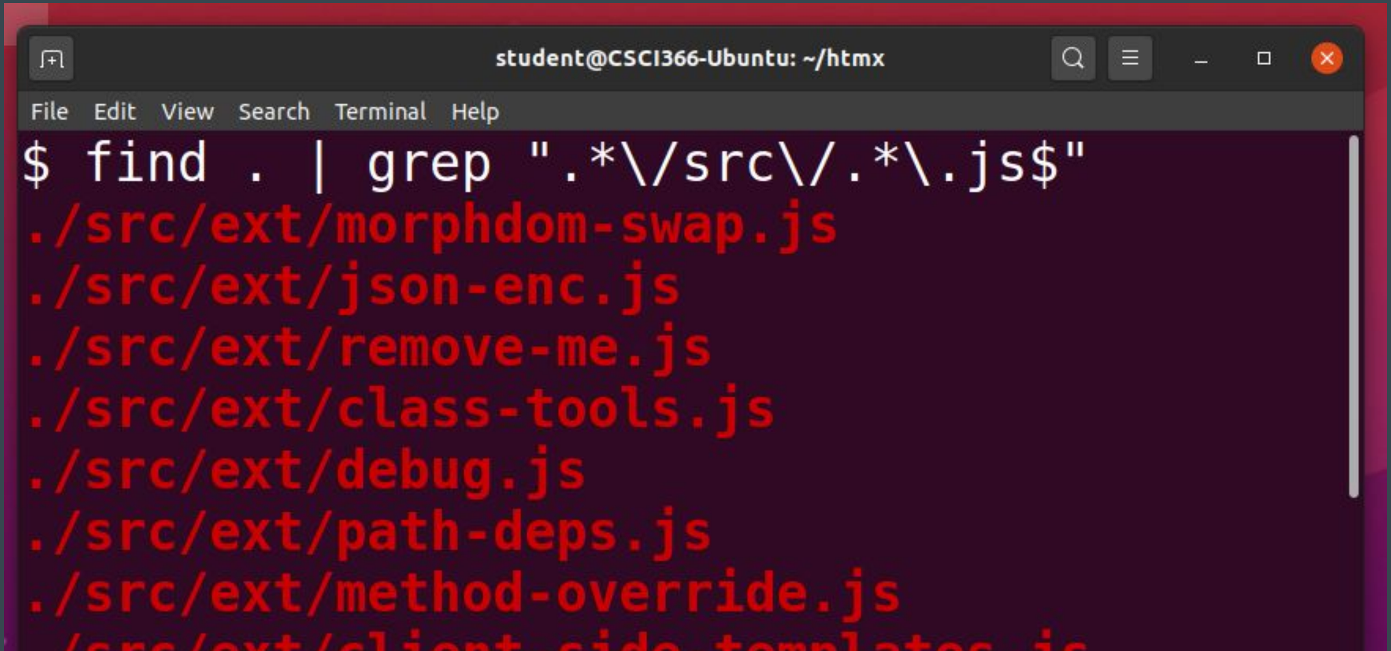
- Step 1 - find all files in directory with a find command



```
$ find .
.
./README.md
./src
./src/ext
./src/ext/morphdom-swap.js
./src/ext/json-enc.js
./src/ext/remove-me.js
./src/ext/class-tools.js
```

Demo - Count The Lines of Code In A Project

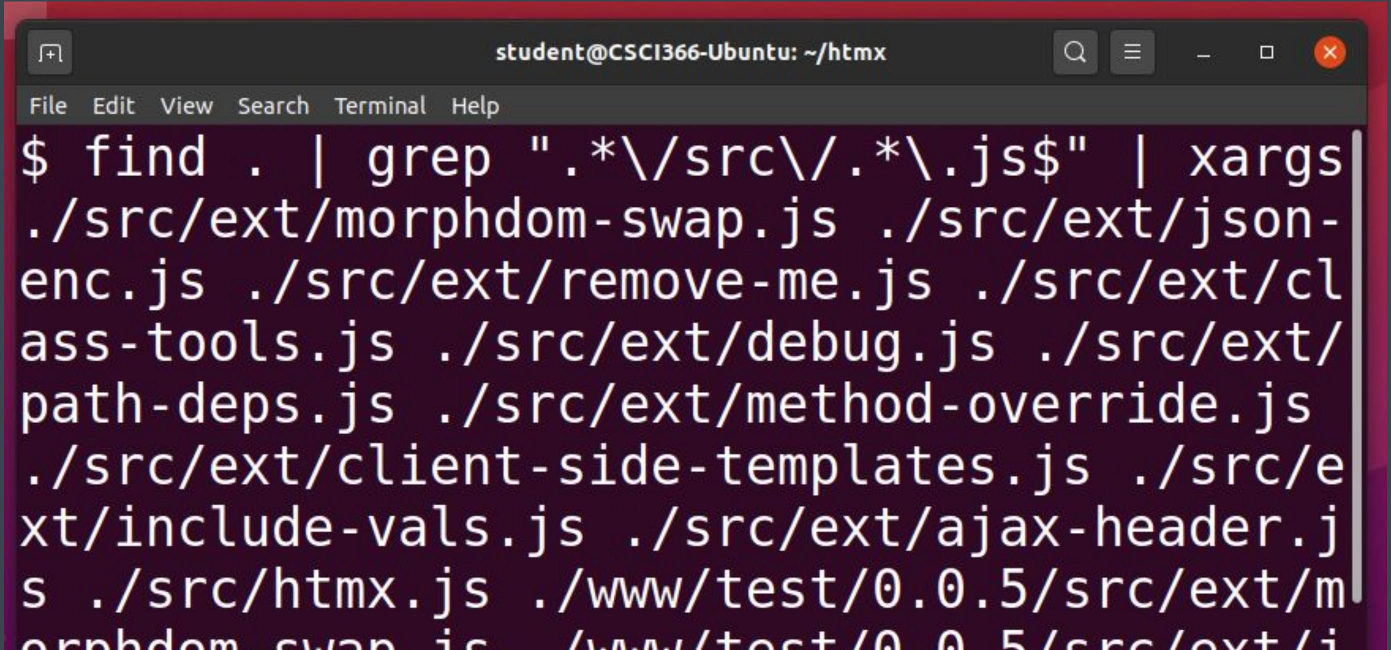
- Step 2 - use grep to filter non-javascript files



```
$ find . | grep ".*\/src\/.*\.js$"
./src/ext/morphdom-swap.js
./src/ext/json-enc.js
./src/ext/remove-me.js
./src/ext/class-tools.js
./src/ext/debug.js
./src/ext/path-deps.js
./src/ext/method-override.js
./src/ext/client-side-templates.js
```

Demo - Count The Lines of Code In A Project

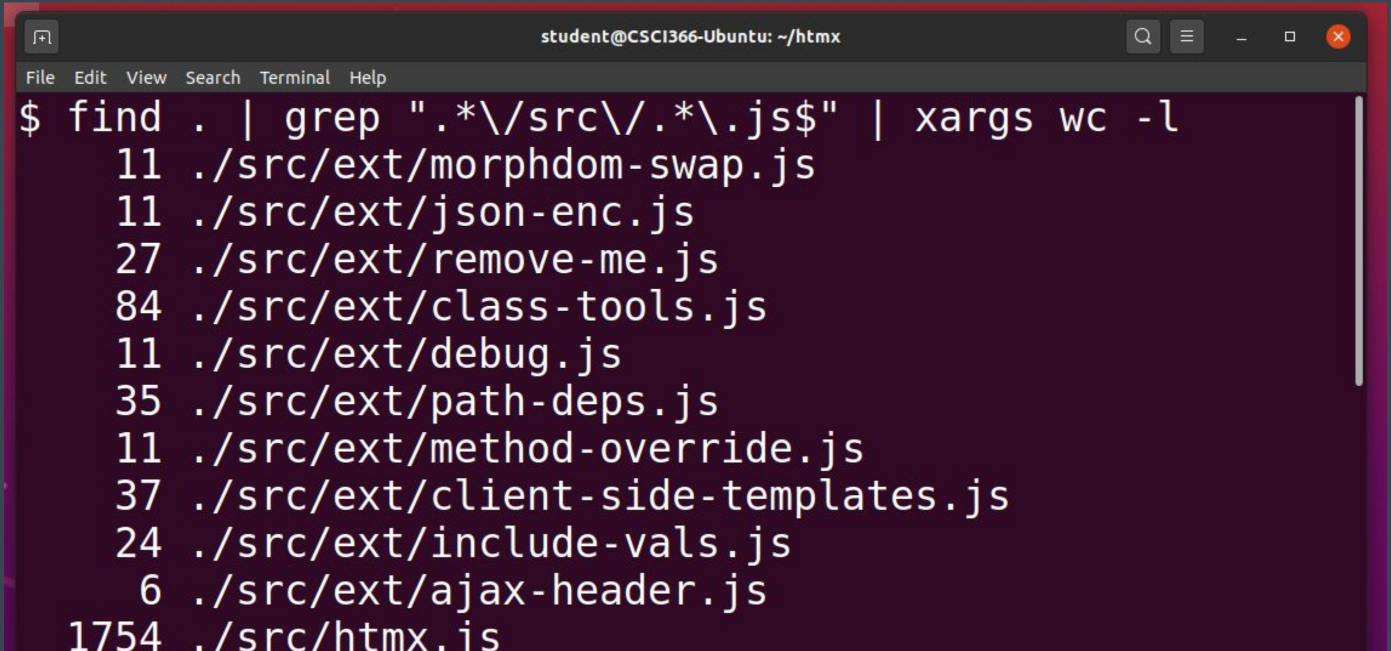
- Step 3 - use xargs convert into command arguments



```
$ find . | grep ".*\/src\/.*\.js$" | xargs
./src/ext/morphdom-swap.js ./src/ext/json-
enc.js ./src/ext/remove-me.js ./src/ext/cl
ass-tools.js ./src/ext/debug.js ./src/ext/
path-deps.js ./src/ext/method-override.js
./src/ext/client-side-templates.js ./src/e
xt/include-vals.js ./src/ext/ajax-header.j
s ./src/htmx.js ./www/test/0.0.5/src/ext/m
orphdom-swap.js ./www/test/0.0.5/src/ext/j
```

Demo - Count The Lines of Code In A Project

- Step 4 - use wc -l (word count) to count the lines

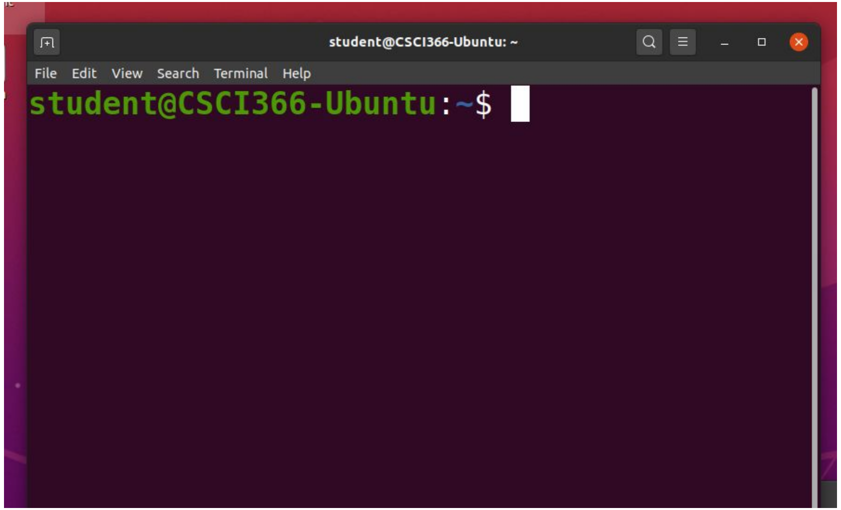


student@CSCI366-Ubuntu: ~/htmx
File Edit View Search Terminal Help

```
$ find . | grep ".*\/src\/.*\.js$" | xargs wc -l
    11 ./src/ext/morphdom-swap.js
    11 ./src/ext/json-enc.js
    27 ./src/ext/remove-me.js
    84 ./src/ext/class-tools.js
    11 ./src/ext/debug.js
    35 ./src/ext/path-deps.js
    11 ./src/ext/method-override.js
    37 ./src/ext/client-side-templates.js
    24 ./src/ext/include-vals.js
     6 ./src/ext/ajax-header.js
  1754 ./src/htmx.js
```

The Unix Philosophy

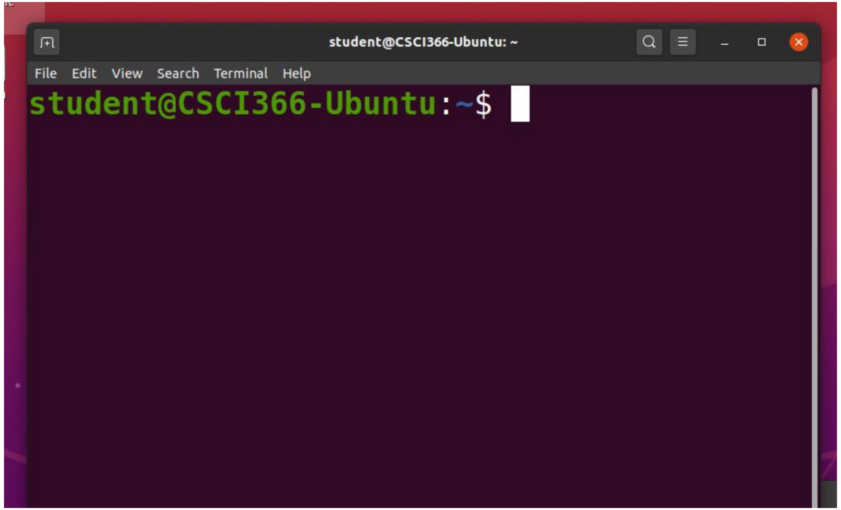
- https://en.wikipedia.org/wiki/Unix_philosophy
- Write programs that do one thing and do it well.
- Write programs to work together.
- Write programs to handle text streams, because that is a *universal* interface.


student@CSCI366-Ubuntu: ~
File Edit View Search Terminal Help

```
student@CSCI366-Ubuntu:~$ 
```

The Unix Philosophy

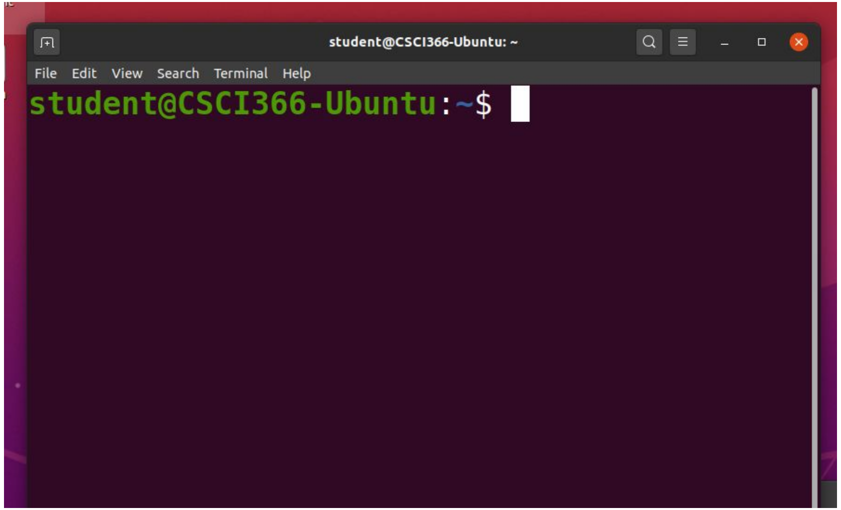
- Compare and contrast with other platforms
- The MS Windows philosophy
  - Everything through the GUI
  - Many complex tools
  - Many complex interaction mechanisms
- The Apple philosophy
  - A “Walled Garden”
  - We aren’t going to tell you, you aren’t cool enough


student@CSCI366-Ubuntu: ~
File Edit View Search Terminal Help

```
student@CSCI366-Ubuntu:~$
```

The Unix Philosophy

- Which is better?
- I prefer Unix/Linux
- But then I use Jetbrains tools
  - IDE with a kitchen sink philosophy...
- ¯_(ツ)_/¯



```
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