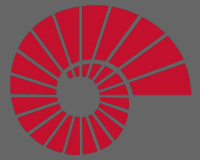
Introduction to
Linux Shell



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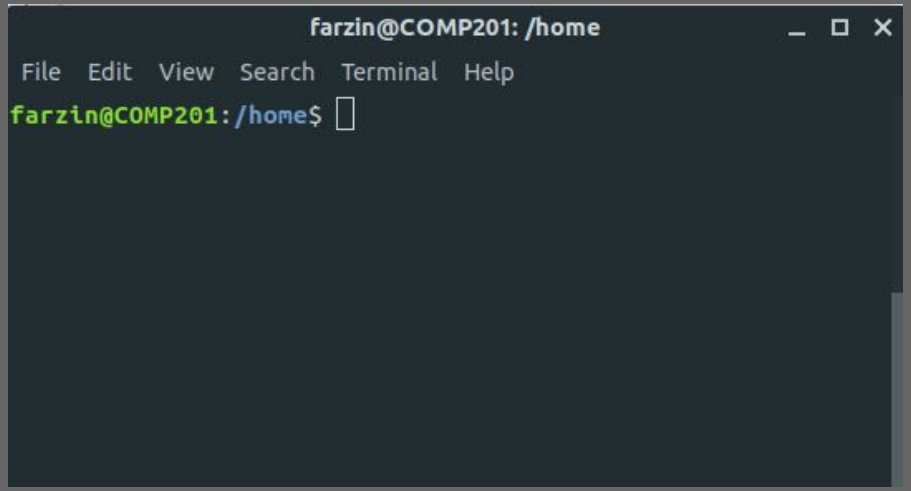
COMP201 Lab Session
Fall 2022

What is shell?



- The Linux shell is the interface between you and operating system that controls the hardware.
- The most commonly used shell is called BASH – Bourne Again Shell
- username@hostname:curr_dir$
  - username: farzin
  - hostname: COMP201
  - curr_dir: /home

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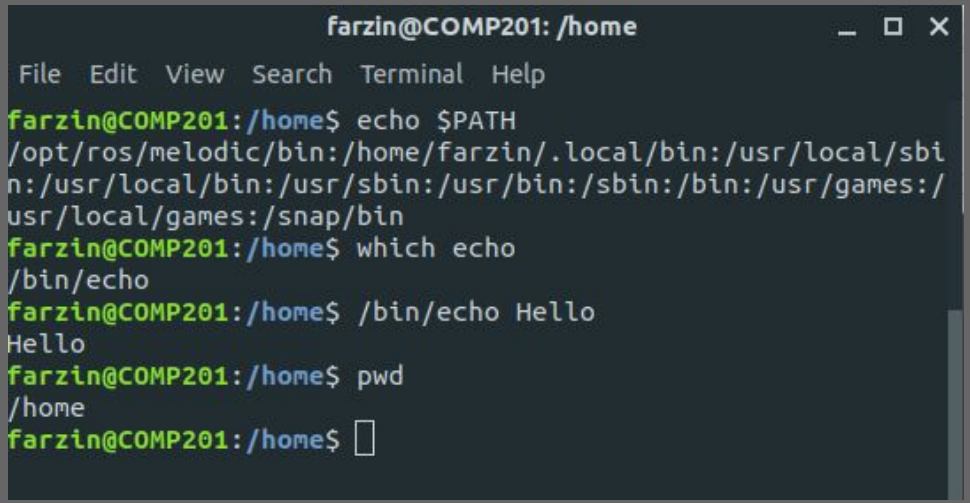
Executing system programs

- Execute programs
- $date
  - This program prints current date and time
- $echo
  - This program prints the input argument

Path and $PATH



- $PATH
  - A variable that contains addresses where system look for programs to execute
- $which
  - Prints which file is being executed given an input program name
- $pwd
  - This program prints current working directory
  - Stands for “print working directory”

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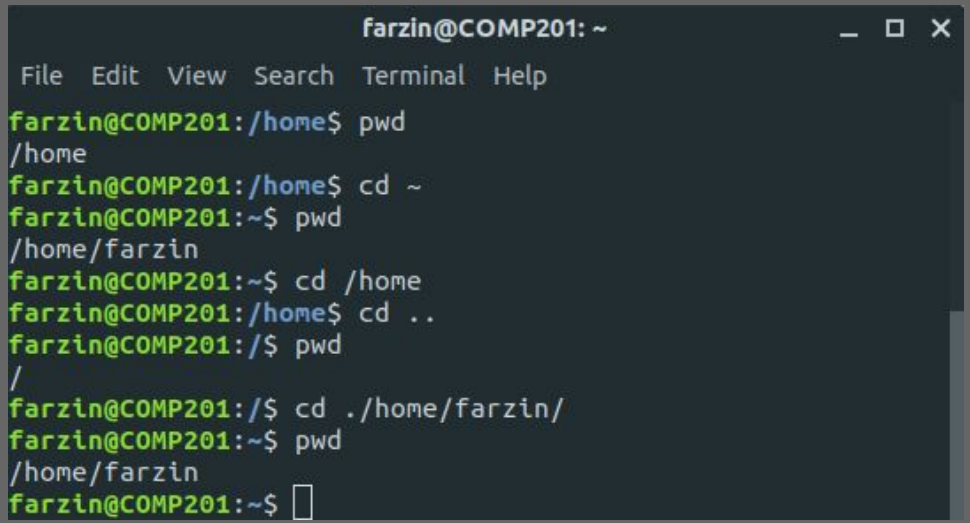
Path



- $cd
  - Changes the working directory
  - .. is the parent directory
  - . is the current directory
  - Tilda (~) is the /home/usr directory
- Absolute vs Relative path
  - Relative: ./home/farzin
  - Absolute: /home/farzin

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Listing files and directories

- $ ls
  - Prints files and directories under current working directory
  - You can use options with commands like “-l” which shows a long list containing more details of files and folders
  - You can also pass absolute or relative path to $ls command
  - Use --help for more info about arguments
  - Check -a and -F options

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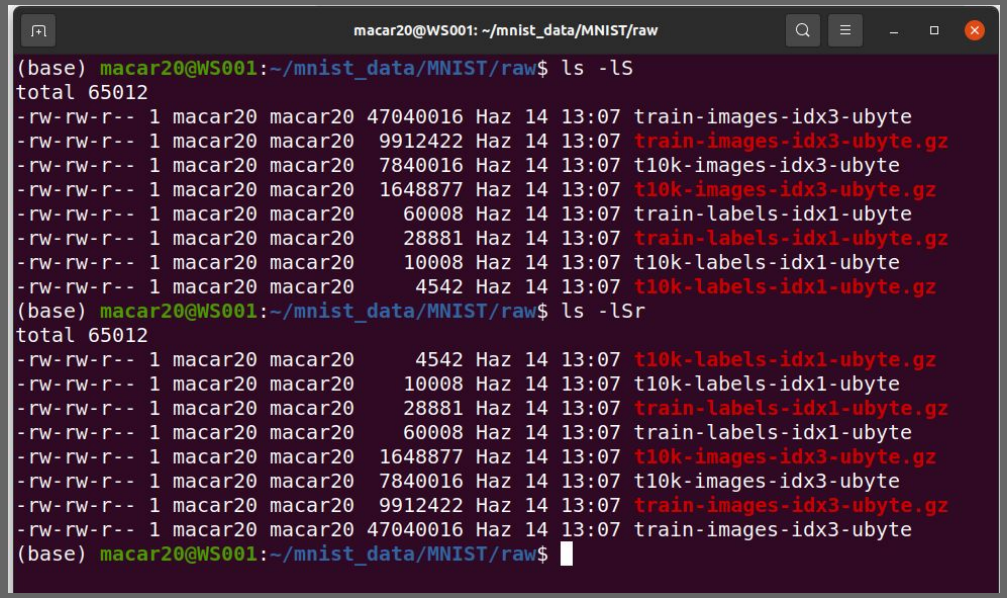
Listing files and directories



- You can use “-S” option to display files sorted by their sizes, and “-r” option for reverse sorting.

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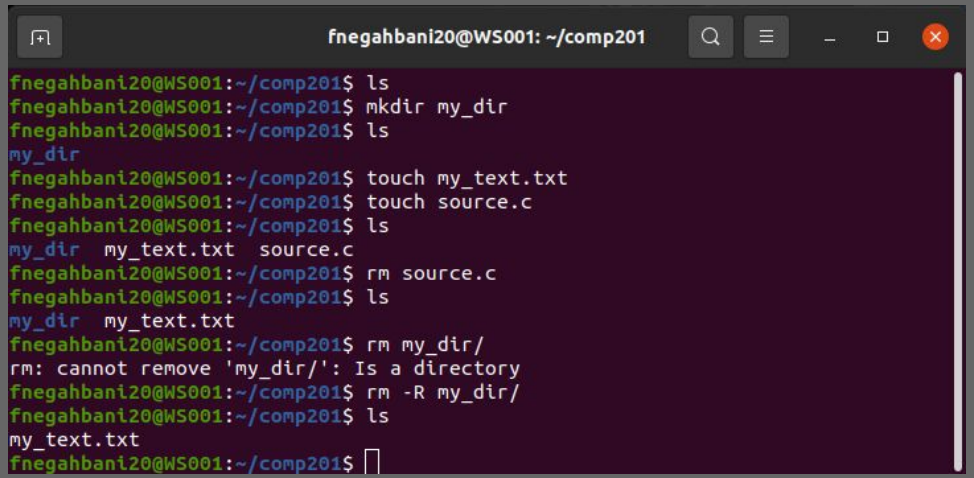
Making directories, files, and removing them



- $ mkdir <folder_name>
  - Makes a new directory in the given working directory with the given “folder_name”.
- $ touch
  - Creates a file with desired extension and name
- $ rm
  - Removes a file or folder.
  - For removing folders you need to use -R option

File Permission in Linux

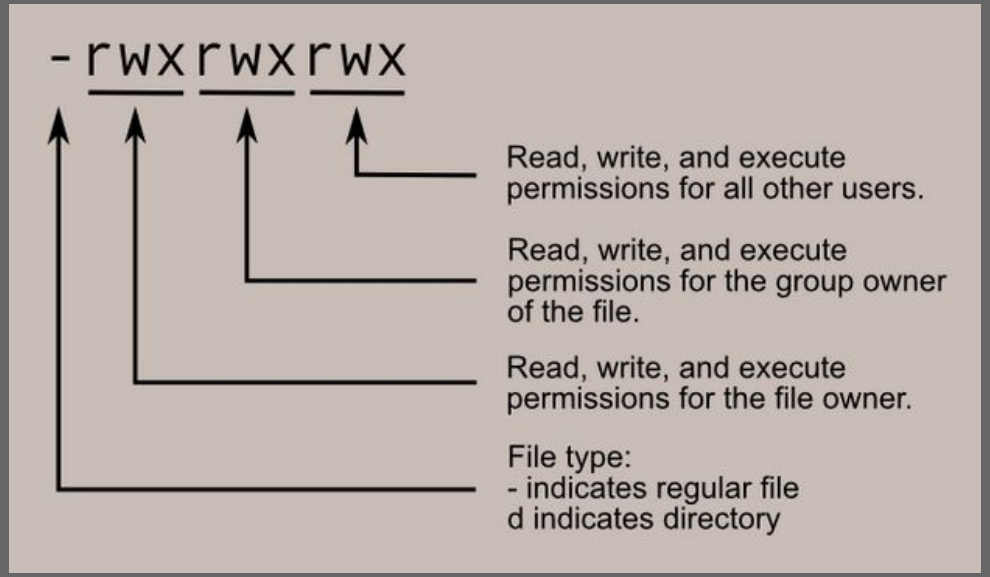


Image source: http://linuxcommand.org/lc3_lts0090.php

File Permission in Linux

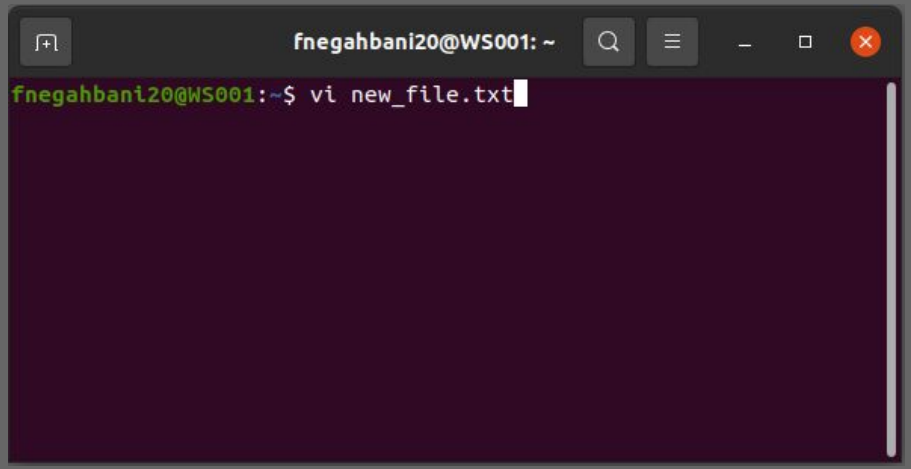
```
rwx rwx rwx = 111 111 111
rw- rw- rw- = 110 110 110
rwx --- --- = 111 000 000

and so on...

rwx = 111 in binary = 7
rw- = 110 in binary = 6
r-x = 101 in binary = 5
r-- = 100 in binary = 4
```

Image source: http://linuxcommand.org/lc3_lts0090.php

Initially, test.sh cannot be executed, to grant -rwx rwx r-x permission to test.sh file:

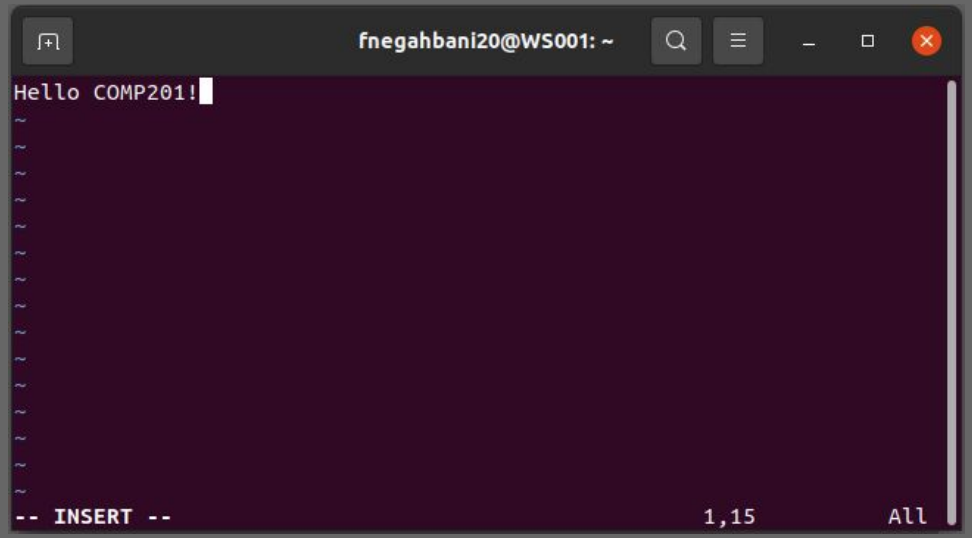
```
fnegahbani20@WS001:~$ chmod 775 test.sh
```

What is Vi?



- Vi is the default text editor in the UNIX operating system.
- Using vi, we can create a new file, read, and edit an existing file.
- To open vi, type “vi” or “vi filename”. If the file “filename” doesn’t exist, it will be created when you save it.

Operation Modes in vi or vim



- Normal mode
  - The default mode in vi.
  - In some source, like https://www.cs.colostate.edu/helpdocs/vi.html, it is also called command mode.
  - Every character you type is interpreted as a command.
- Insert mode
  - The one on the left picture.
  - To switch from normal mode to insert mode, type ‘i’ in the normal mode.
  - Every character you type is put to the file.
  - To switch back to normal mode, press <Esc>

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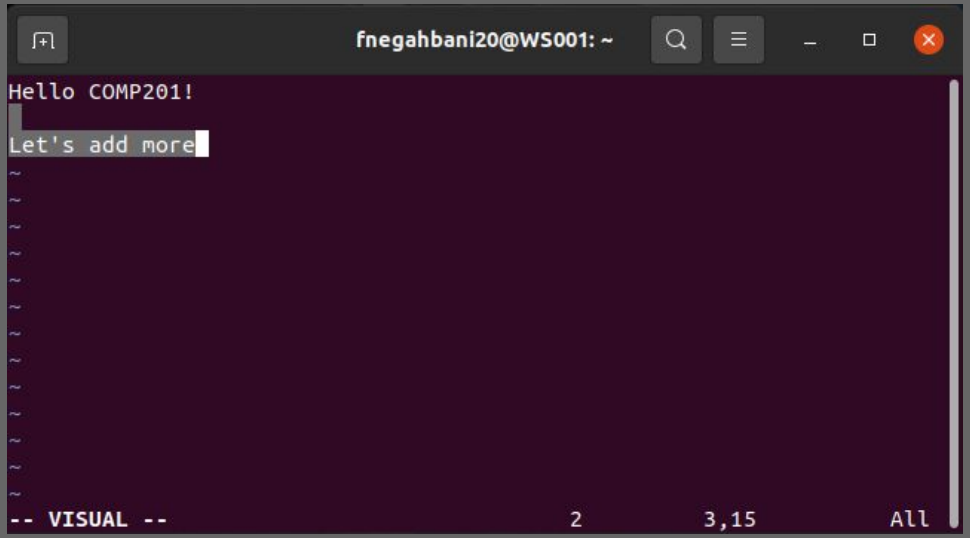
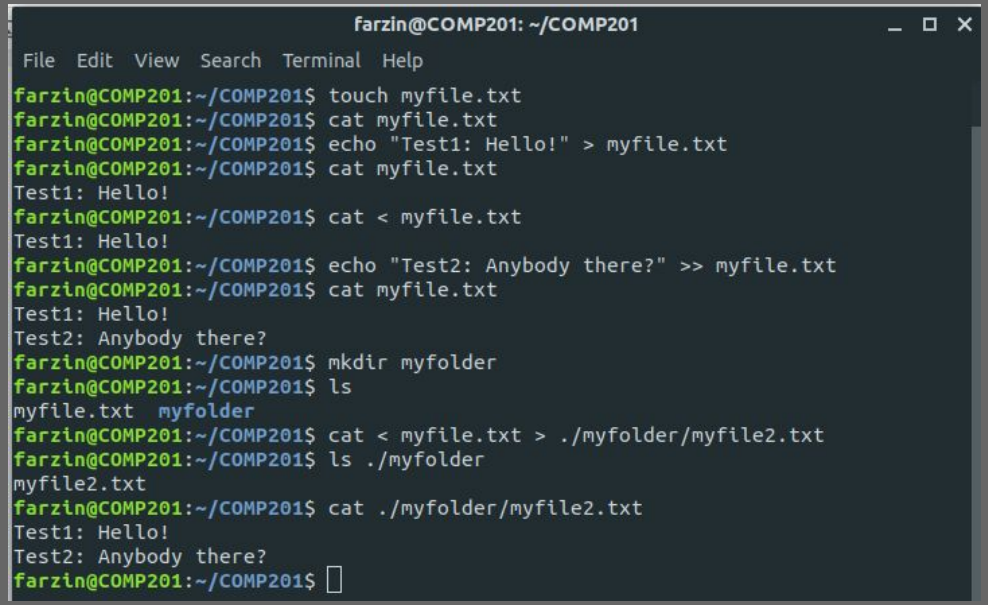
Operation Modes in vi or vim



- Visual mode
  - To switch from normal mode to visual mode, type ‘v’.
  - You can select blocks of text.
  - Type d to delete the block, c to delete the block and switch to insert mode to replace the deleted block with another string.
  - To switch back to normal mode, type <Esc>.
- Exit without saving
  - To exit from a file without saving it, go to the Normal mode (command mode) by pressing <Esc> then type :q!

Redirection



- $cat
  - Print the content of the given file
- “< file” and “> file”
  - You can wire the input and output of a program to a file
  - “>> file” appends to end of file

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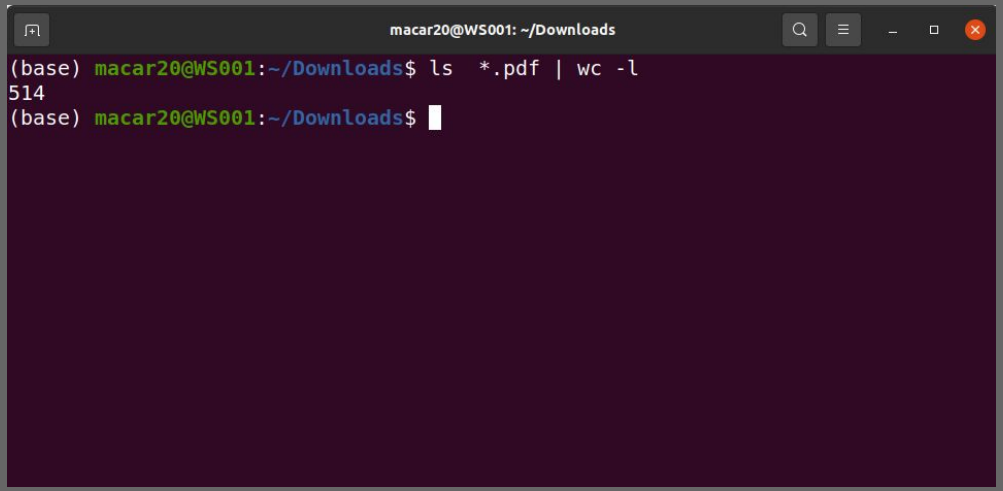
Piping

- Pipe character “ | “
  - Connects output of a program to input of another one
- $grep
  - Searches for a particular information
  - By default it is case sensitive
- Try “grep --help” and find what does -i option do

Piping



- We can pass output of ls to wc (“word count”) to count number of PDF files in a directory