

Introduction to
Linux Shell

COMP201 Lab Session
Fall 2020



**KOÇ
UNIVERSITY**

What is shell?

```
farzin@COMP201: /home
File Edit View Search Terminal Help
farzin@COMP201:/home$
```

- 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

Executing system programs

```
farzin@COMP201: /home
File Edit View Search Terminal Help
farzin@COMP201:/home$ date
Sun Oct 11 01:33:31 +03 2020
farzin@COMP201:/home$ echo Hello
Hello
farzin@COMP201:/home$ echo "Hello COMP201"
Hello COMP201
farzin@COMP201:/home$
```

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

Path and \$PATH

```
farzin@COMP201: /home
File Edit View Search Terminal Help
farzin@COMP201:/home$ echo $PATH
/opt/ros/melodic/bin:/home/farzin/.local/bin:/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/usr/games:/usr/local/games:/snap/bin
farzin@COMP201:/home$ which echo
/bin/echo
farzin@COMP201:/home$ /bin/echo Hello
Hello
farzin@COMP201:/home$ pwd
/home
farzin@COMP201:/home$
```

- \$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”

Path

```
farzin@COMP201: ~  
File Edit View Search Terminal Help  
farzin@COMP201:/home$ pwd  
/home  
farzin@COMP201:/home$ cd ~  
farzin@COMP201:~$ pwd  
/home/farzin  
farzin@COMP201:~$ cd /home  
farzin@COMP201:/home$ cd ..  
farzin@COMP201:/$ pwd  
/  
farzin@COMP201:/$ cd ./home/farzin/  
farzin@COMP201:~$ pwd  
/home/farzin  
farzin@COMP201:~$
```

- \$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

Listing files and directories

```
farzin@COMP201: /
File Edit View Search Terminal Help
farzin@COMP201:/home$ ls
farzin
farzin@COMP201:/home$ ls -l
total 4
drwxr-xr-x 44 farzin farzin 4096 Oct 11 02:02 farzin
farzin@COMP201:/home$ cd ..
farzin@COMP201:/ $ ls
bin      etc      lib      media    root    srv      usr
boot    home    lib32    mnt      run     swapfile var
cdrom   initrd.img lib64    opt      sbin   sys      vmlinuz
dev     initrd.img.old lost+found proc     snap   tmp      vmlinuz.old
farzin@COMP201:/ $ ls /home
farzin
farzin@COMP201:/ $ ls ./home
farzin
farzin@COMP201:/ $
```

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

Redirection

```
farzin@COMP201: ~/COMP201
File Edit View Search Terminal Help
farzin@COMP201:~/COMP201$ touch myfile.txt
farzin@COMP201:~/COMP201$ cat myfile.txt
farzin@COMP201:~/COMP201$ echo "Test1: Hello!" > myfile.txt
farzin@COMP201:~/COMP201$ cat myfile.txt
Test1: Hello!
farzin@COMP201:~/COMP201$ cat < myfile.txt
Test1: Hello!
farzin@COMP201:~/COMP201$ echo "Test2: Anybody there?" >> myfile.txt
farzin@COMP201:~/COMP201$ cat myfile.txt
Test1: Hello!
Test2: Anybody there?
farzin@COMP201:~/COMP201$ mkdir myfolder
farzin@COMP201:~/COMP201$ ls
myfile.txt  myfolder
farzin@COMP201:~/COMP201$ cat < myfile.txt > ./myfolder/myfile2.txt
farzin@COMP201:~/COMP201$ ls ./myfolder
myfile2.txt
farzin@COMP201:~/COMP201$ cat ./myfolder/myfile2.txt
Test1: Hello!
Test2: Anybody there?
farzin@COMP201:~/COMP201$
```

- **\$touch**
 - Creates a file with desired extension and name
- **\$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
- **\$mkdir**
 - Makes a directory with the given name

Piping

```
farzin@COMP201: ~/COMP201
File Edit View Search Terminal Help
farzin@COMP201:~/COMP201$ cat myfile.txt
BaNaNA
apple
BaNaNA
orange
Apple
farzin@COMP201:~/COMP201$ cat myfile.txt | grep apple
apple
farzin@COMP201:~/COMP201$ cat myfile.txt | grep -i apple
apple
Apple
farzin@COMP201:~/COMP201$ cat myfile.txt | grep -i a
BaNaNA
apple
BaNaNA
orange
Apple
farzin@COMP201:~/COMP201$
```

- 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