CM1604
Computer Systems Fundamentals

Introduction to Linux

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In this week lecture..

- Introduction to Linux environment
- Command line basics
  - What is a shell and how to use it
  - Format of command
- Commonly used commands
- Understanding Scripts
- Multi-tasking in command line

- https://brb.nci.nih.gov/seqtools/installUbuntu.html
- https://www.kali.org/
- https://rufus.ie/
- https://www.virtualbox.org/

Ways to interact with the computer

- **GUI** - Graphical User Interface
- **CLI** - Command Line Interface

Intodunction to Linux

- Open source- free to use, free to modify
- Have many distributions

  Slackware, Redhat, CentOS, Ubuntu

  even your Android !!!

- Highly used in industry

Different flavours on Linux

Logos source: http://www.muylinux.com/wp-content/uploads/2009/04/logos-distros.jpg

Setting up the enviroment

Using virtual machine

https://www.virtualbox.org/

https://ubuntu.com/download/desktop

https://brb.nci.nih.gov/seqtools/installUbuntu.html

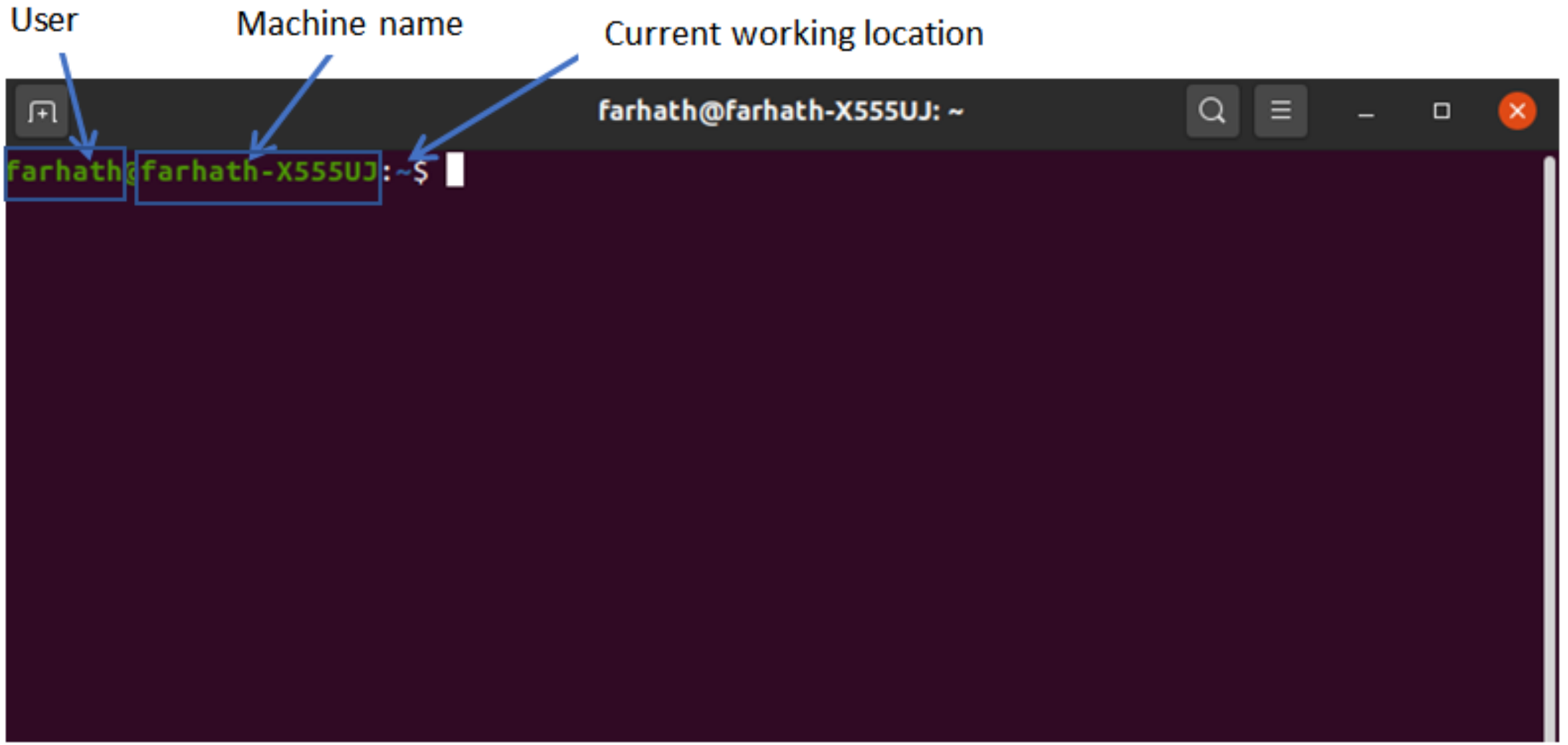
https://cocalc.com/

Bootable USB

https://rufus.ie/

MacOS

Command -Line Basics


User
Machine name
Current working location
farhath@farhath-X555UJ: ~
farhath@farhath-X555UJ:~$

Command Syntax

- Command is a program you are running

```
ls   -l   Downloads
rm   -i   junk
sort -u   Words.txt
```

Command Option(s) Argument(s)

Writing comand in terminal

- Increase the font size - Ctrl + Shift + plus
- Tab completion
- Arrow key
- `man, -- help, apropos`

Commonly used commands

- `ls , -a -l` - *listing of content of a directory*
- `pwd` - *print working directory*
- `cd , cd.. cd /` - *change directory*
- `file` - *display the file type*
- `locate` - *find files by names*
- `which` - *locate a command*

Commonly used commands - file manipulation

- `mkdir` - *make a directory*
- `rmdir` - *remove a directory*
- `touch` - *create a blank file*
- `cp` - *copy file*
- `mv` - *move file*
- `rm` - *remove file*

Commonly used commands - text manipulation

- `cat` *- create, append, display, concatenate a file*
- `grep` *- search for plain text (can use regular expression)*
- `wc` *- word count*
- `head` *- displays the beginning of the file*
- `tail` *- displays the end of the file*

Commonly used commands - administrative

- `ps` - *list the running processes*
- `top` - *real time status of the machine*
- `echo` - *displays the text*
- `kill` - *stop a running process*
- `ssh` - *makes remote connection with a linux machine*
- `sudo` - *gives administrative privilege to the ser*

Commonly used commands - administrative ...

- `w` *- current logged in uses*
- `whoami` *- print the current user*
- `uname` *- print system information*
- `cat /etc/*release` *- information about the OS*
- `cat proc/cpuinfo` *- information about the cpu*
- `df -h` *- disk space, usage*

Understanding Scripts

What is a Script?

- A set of instructions put in an organized way in a file and the file is executed instead of each individual command
- Actually a programing way.
- But, the scripting languages are interpreted (remember the lecture on Compiler!!)
- The Shell command can be put into a file and run as script

Anatomy of a Script file

hashbang or shebang –path to the script interpreter

```
1  #!/bin/bash
2
3  # Author : Farhath
4  # Just to give and idea about what is a script
5  # Script follows here:
6
7
8  pwd
9  ls
```

Comments – give a summary of what it does. #optional

Whatever the commands

Anatomy of a Script file ….

- Path to the script interpreter. If the path is wrong or wrong interpreter is specified - it will not work.

```
#!/bin/bash
```
- a bash script

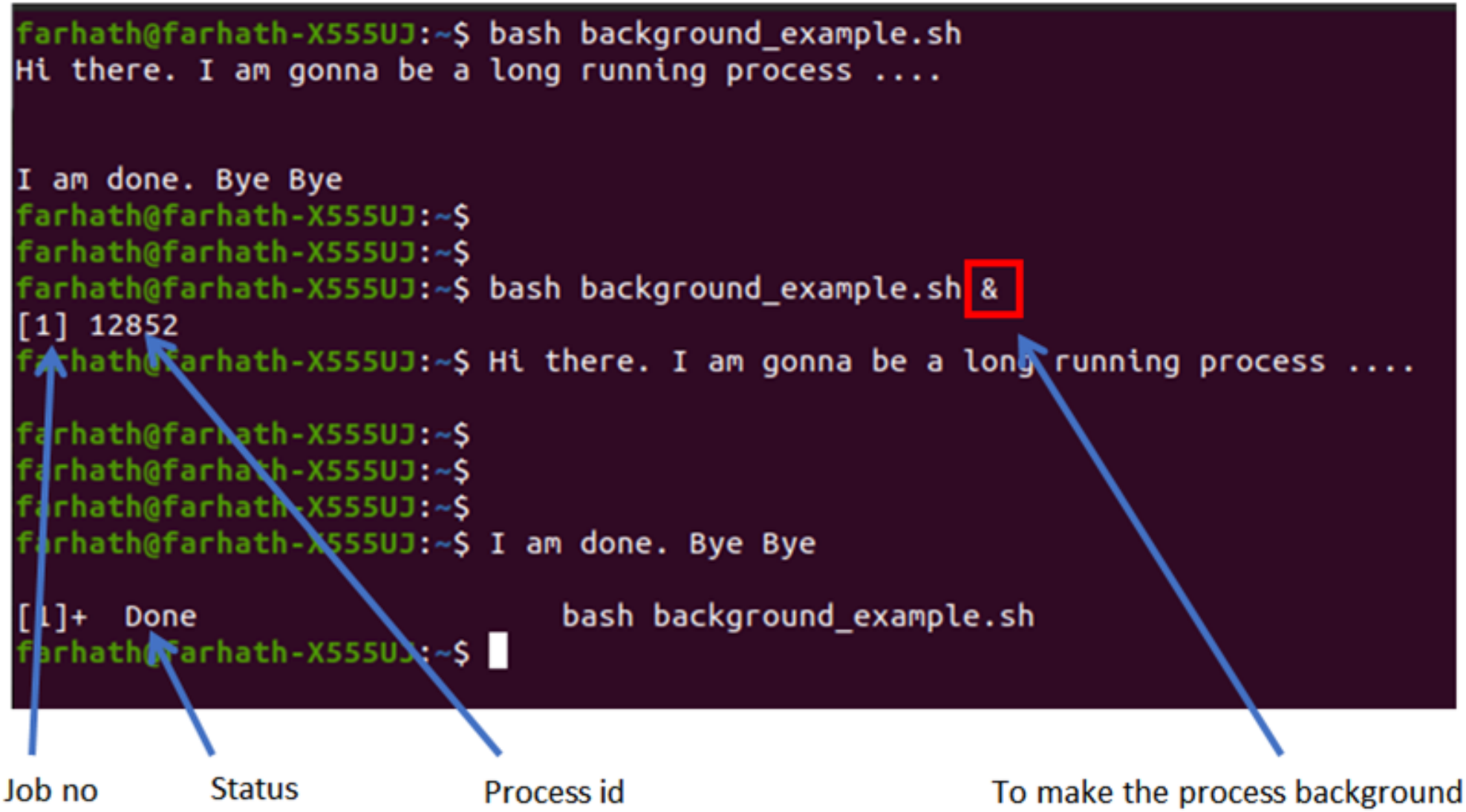
```
#!/bin/sh
```
- a shell script

```
#!/bin/php
```
- a PHP script file

```
#!/bin/perl
```
- a perl script file

Multi-tasking at command line

Running a process in the background



Redirection

- Sending the output to either a ***file or a stream***

> *overwrite the file*

Command > output

>> *append the file*

Command >> output

```
farhath@farhath-X555UJ:~$ bash background_example.sh
Hi there. I am gonna be a long running process ....
I am done. Bye Bye
farhath@farhath-X555UJ:~$ bash background_example.sh >> testredirect
farhath@farhath-X555UJ:~$ cat testredirect
Hi there. I am gonna be a long running process ....
I am done. Bye Bye
farhath@farhath-X555UJ:~$ bash background_example.sh >> testredirect &
[1] 48233
farhath@farhath-X555UJ:~$
farhath@farhath-X555UJ:~$ ps
    PID TTY          TIME CMD
  36447 pts/0    00:00:00 bash
  48233 pts/0    00:00:00 bash
  48234 pts/0    00:00:00 sleep
  48262 pts/0    00:00:00 ps
farhath@farhath-X555UJ:~$ ps
    PID TTY          TIME CMD
  36447 pts/0    00:00:00 bash
  48266 pts/0    00:00:00 ps
[1]+  Done                    bash background_example.sh >> testredirect
farhath@farhath-X555UJ:~$
```

To learn more on managing process in foreground and background

https://www.linkedin.com/learning/linux-multitasking-at-the-command-line/welcome?u=76664938

Running multiple command at once

- Semicolon operator (;)

  Execute multiple commands in succession

  (regardless of the status of the previous)

  Command1 ; Command2

```
farhath@farhath-X555UJ:~$ ls;pwd
Apache_OpenOffice_4.1.7_Linux_x86-64_install-deb_en-US.tar.gz  Minecraft.deb.1
background_example.sh                                          Minecraft.deb.2
Desktop                                                        Music
Documents                                                      Pictures
Downloads                                                      Public
en-US                                                          snap
google-chrome-stable_current_amd64.deb                         Templates
Minecraft.deb                                                  Videos
/home/farhath
farhath@farhath-X555UJ:~$
```

Running multiple command at once …

- Logical AND operator (&&)

  Second command will run if only first command is successful

  Command1 && Command2

```
farhath@farhath-X555UJ:~$ mkdir test && cd test
farhath@farhath-X555UJ:~/test$ cd
farhath@farhath-X555UJ:~$ mkdir test && cd test
mkdir: cannot create directory ‘test’: File exists
farhath@farhath-X555UJ:~$
```

Running multiple command at once …

- Logical OR operator (||)

  Second command will run if the first one will fail

  Command 1 || Command 2

```
farhath@farhath-X555UJ:~/test1$ ls
farhath@farhath-X555UJ:~/test1$ mkdir test || cd test
farhath@farhath-X555UJ:~/test1$ ls
test
farhath@farhath-X555UJ:~/test1$ mkdir test || cd test
mkdir: cannot create directory ‘test’: File exists
farhath@farhath-X555UJ:~/test1/test$
```

Pipes (|)

- Sending the output of one command to another ***command***

  Command1 | Command2 | Command3

```
farhath@farhath-X555UJ:~$ cat sample.txt |grep 'Denmark'
47      Denmark 5,792,202       42,430  137
farhath@farhath-X555UJ:~$
```

REFERENCE

- https://www.linkedin.com/learning/learning-linux-command-line-2/learning-linux-command-line?u=76664938
- https://www.linkedin.com/learning/linux-multitasking-at-the-command-line/welcome?u=76664938

READING