Chapter #1: Basic Commands

1. ls: used to print the content (both files and directories) of the specific directory in the terminal in alphabetical order.
    - ls -l: This argument lists files and directories in a long list format along with additional information instead of a paragraph.
    - ls -a: This argument adds hidden files and directories to the list if there are any.
2. pwd (Print Working Directory): used to print the current working directory of the terminal.
3. cd (Change Directory): used to change the directory in the terminal.
    - cd .. will take you back to the parent directory
    - cd ../.. Will take you back to parent's parent directory
    - cd ../[directory name] will first take you to the parent directory and then to the [directory name] from the parent directory

Chapter #2: Files/Directories Manipulation

1. touch: either to create a new empty file or update the timestamp of an existing file.
    - file .[filename]: While using this command, the user must have enough permissions to create or modify the file information.
2. mkdir: mkdir can be divided into two words mk and dir. mk stands for make and dir stands for directory. This command allows one to create a directory in the current working directory of the terminal.
    - mkdir -m[permission] [directory name]: mkdir command by default gives rwx (read, write and execute) permission to the current user only
    - mkdir -p [directory name]: This argument is used to create a whole structure of directories.
3. rm: stands for remove.
    - rm -d [directory name]: The -d argument is used to delete an empty directory.
    - rm -r [directory name]: This argument performs recursive deletion.
4. rmdir: rmdir can be divided into two words rm and dir. rm stands for remove and dir stands for directory.
5. cat: used to view and concatenate files, it writes the data to standard output
    - cat -n [filename]: To view the data of the file with line number
    - cat -T [filename]: This argument is used to visually differentiate between spaces and tab.
    - cat [filename] >> [filename1]: This command is used to append the data of two files.
    - tac [filename]: We can display the data of the file in reverse order by reversing the cat command.
    - cat *: This will display the data of all the files in the directory
6. mv: used to move multiple files or directories.

7. head: used to print the top N (specified by user) lines of the given input file.
    - head -n [number of lines] [filename]: By using -n argument, we specify the total number of lines we wish to see on screen.
    - head -c [number of bytes] [filename]: By using the -c argument with head, we specify the total number of bytes we wish to see on screen
    - head -v [filename]: By using this argument, data from the file is preceded by its name.
8. tail : tail command prints from the end of the file.
    - tail -n [number of lines] [filename]: It will print last N (specified after -n) number of lines from the file.
    - tail -c [number of bytes] [filename]: It will print last N (specified after -n) number of bytes from the file.

Chapter #3: Storage Management

1. Mount: When you plug a portable hard disk, USB, or SD card; there is a chance that your system might not be able to show them directly, so you need it to mount to your existing tree (file-system). it will enlist all the mounts
    - mount -l: List all the mounted file systems
    - mount -h: Displays all the options for mount with the explanation.
    - mount -V: Display the information of the current version of mount.
    - mount -r: Mount the filesystem in read-only mode
2. df: df stands for disk free. This command is used to get information about available and used space
    - df [directory name]: Using directory name with df command can give storage information related to that particular directory
    - df -h: Using df without any argument gives us a result which is in bytes and it might require a calculation to convert into GB's or MB's
    - df -T: This argument will display the file type along with other information.
    - For more help and options related to df, you can use df --help.
3. lsblk: lsblk commands display information about all or specified block devices by reading the sysfs file system to gather information to display.
    - lsblk -a: This will display empty block devices as well.
    - lsblk -m: This will display information about the owner, group, and mode of block devices
    - lsblk -o [specific columns]: This will print selected columns of block devices. >>lsblk -
    - lsblk -d: This will skip all child nodes in tree.
    - lsblk --help : To display additional information about the options

4. fdisk: fdisk stands for format disk. This command is used for the management of the disk partition table. It is used to create, view, delete, resize, and move partitions on HDD or SDD. To run the command, use sudo fdisk -l and enter the password.
    - sudo fdisk -l [disk name]: To view the partition of a specific disk, we pass the name of that disk after -l argument.
    - To create a new partition: To create a new partition on the disk, use sudo fdisk [disk name], this will prompt a menu, type m to see all available options.
    - To delete a partition: To delete a partition from the disk, use sudo fdisk [disk name], since we are going to delete a partition, we need to type d for this operation.
    - sudo fdisk -s [disk name]: This command print the size of that disk in bytes.
5. tree: This command is used to list the directories or files of the specified directory (if not specified then of the current working directory of the terminal) in the form tree.
    - tree -f: To print the full path of each file and directory.
    - tree -d: To print the directories only.
    - tree -a: To print the hidden files and directories.
    - tree -s: To print the size (in bytes).
    - tree -D: To print the last modified time of the files and directories.
    - For further information about tree command, use tree --help .
6. du: du stands for disk usage. This command is used to display the total size of a file or a directory
    - du -a [directory path]: This argument will ask the du command to print the usage of all the files inside the subdirectories.
    - du -h [directory path]: By default, this command print the size in bytes but by using -h argument with this command, we can print the total space used in more human-readable form.
    - du -c [directory path]: This will print the total size consumed by the specified directory along with individual sizes.
    - du --time [directory path]: This will print the last modification time of each individual directory or file.
7. free: This command is used to display the available space, along with displaying available storage it displays information about the total, and used memory.
    - free -b: It displays the result in bytes.
    - free -k: It displays the result in kilo-bytes.
    - free -m: It displays the result in mega-bytes.
    - free -g: It displays the result in giga-bytes
    - For further information about the free command, use free --help .

Chapter #4: Process Management

1. ps: ps stands for “Process Status”. This command is used to list the process running on the system.
    - The list contains four attributes: PID: It is a process ID and it is unique for every process. TTY: Terminal type in which the user is logged in. TIME: the amount of CPU in minutes and seconds consumed by the process. CMD: command that started this process.
    - ps -T: To view the process only associated with the terminal, we use -T argument.
    - ps -a: To view the processes that are not associated with the terminal. It lists all the processes that are not session leaders(Session leaders is a process that can hold multiple processes inside it.
    - ps -x: To view all the processes which are owned by you(which are running under your login).
2. top: top command is one of the most frequently used command by administrators. It is used to monitor the processor activity. It provides a real-time view of the processes running on the system. In the above photo, PID stands for process ID, PR stands for the priority of the process, USER stands for the owner of that process, %CPU stands for CPU usage and %MEM stands for RAM usage.
    - top -n [number of refreshes]: By using -n argument with top, it will shut down after specified number of refreshes.
    - top -u [specific user]: By using the -u argument, we can only display the processes started by a specific user, this command is frequently used by the administrator to monitor the activities of employees or students.
    - top -u root: This command will display all the processes started by the root user.
3. pstree: This command is used to display all the currently running processes in the form of a tree.
    - pstree -p: This argument will ask the command to show Process ID of each process along with their name in the tree.
    - pstree -u: This argument will display the owner of each process also.
    - pstree [user]: We can also display the pstree of the specific user.
4. nice: nice command is used to change the priority of the process.
    - nice -n 10 [specific process]

Chapter #5: Administration and System Management

1. history: This command as it names suggests is used to view the previously executed commands on shell.
    - history [total number of commands to fetch (from the bottom)]
    - history -c: This will delete the whole history from the history file and history -c will not be saved in the file too.

    - history -d [command number]: What if we wish to delete the specific command from history.
    - For further information about history command, you can use history --help
2. last: last command is used to display the list of all users login-ed to the system previously. It displays information about the login and logout time. It is used to track down a security breach or investigate an unauthorized login from employees. This record is stored in /var/log/wtmp file.
    - last [user name]: To display the login information of a specific user, we can specify the name of that user after the command.
    - last -[number of total recent records] [username(optional)]: This will list down only the specified number of records. U
3. sudo: sudo stands for Super User Do, it is used to run commands with elevated privileges, few of the commands like fdisk or touch that we used previously requires elevated privileges for their execution, so for such commands, we use sudo as a prefix, it then asks for admin passwords.
    - sudo -s: This command will take the user in sudo mode.
    - sudo -l: This will list out all the commands allowed for the current user.
    - sudo -V: This will print the current version of the sudo command
    - sudo -b: This will run the specified command after sudo in the background by returning the prompt immediately back to the shell, the command called with sudo -b as a prefix can't be manipulated by the user as it will have already the control back to shell
    - sudo -u [user name] [command]: This argument will make the shell to run the given command from the specified user instead of root.
4. lscpu: lscpu command is used to print complete information about CPU architecture.
5. mpstat: This command is used to display the statistics of CPU.
    - mpstat -A: This will list all the information about the CPU as much as it can get.
    - mpstat [interval after which display the report] [total reports]: This will display the report [total report] times after [specific interval] time.
6. kill: kill command is used to terminate in process in Linux. It sends a signal to terminate the process.
    - kill [process id]
    - kill -l: This will list all signals that you can use with the kill command.
7. w: w command is used to keep an eye on employees or students. It prints the information in the following order: Current time, How long the system has been running, How many users are logged in at this moment, and The averages of loads on the system: 1, 5, and 15 minutes.
    - w -h: This will not print the first line and the second line, will only print information about users
    - w -s: This will shorten the output by not printing login time, JCPU and PCPU
    - w [user]: This will show the information about the specified user only

- w -V: This will display version info

8. whoami: displays the user name of the current user when executed.
    - whoami --version: It gives the information about the current version of whoami
9. finger: finger command is used to get detailed information about all users logged on the system. It provides the following details: 1. Login name 2. User name 3. Idle time 4. Login Time 5. Maybe office phone number too
10. uname: This command gives information about the operating system
    - uname -v: It prints the version of the kernel.
    - uname -m: It prints the machine hardware name.
    - uname -o: It prints the name of the Operating system
    - uname -n: It prints the network node hostname.
    - uname -r: It prints the kernel release date.
    - uname -a : To get all information about the Operating system, use -a argument with uname.
11. passwd: passwd command is used to change the password of the user account.
    - passwd [arguments] [user_name]: While changing the name, one must keep in mind that a normal user can change the password of his or her account meanwhile root user can change the password of all users.
    - passwd -d [user_name]: This will delete the password of the user, the user can log in without any password
    - passwd -e [user_name]: This argument will push the user to change their password on the next login.
    - passwd -i [number of days] [user_name]: This argument will make the account for a specified number of days. After that, the account will be deactivated.
    - passwd -n [days after which password can be changed] [user_name]: This argument will restrict the user not to change the password before a specified number of days.
12. shutdown: This command is used to shut down the system. This command notifies all the processes currently running on the system that it needs to shut down, this command issues a SIGTERM signal to all process to shutdown and as mentioned earlier SIGTERM signal allow the process to shut down gracefully
    - shutdown [arguments] [TIME] [message]
    - sudo shutdown 23:00: This will schedule to shut down the system at 11 pm.
    - sudo shutdown +50: This will schedule to shut down the system after 50 mins.
    - sudo shutdown +50 “Going for maintenance”: This will schedule to shut down the system after 50 mins and after 50 mins, it will notify the users with the message “Going for maintenance”.
    - shutdown -r: This will reboot the system.

- shutdown -r +50 “Going for maintenance”: This will reboot the system after 50 mins with the message “Going for maintenance”.
- shutdown -c “MESSAGE”: This will cancel the scheduled shutdown with the message “MESSAGE”.
- shutdown -k: This will send a warning to users of system shutdown but it won’t shut down.

13. reboot: reboot command is used to restart the system.
14. useradd: This command is used to add a user account in the system.
    - sudo useradd -c “comment” [new user name]: This will create the new account with the comment.
    - sudo useradd -u ‘id’ [new user name]: This argument is used to make the user account with a specific id.
    - For further information about useradd command, use useradd --help .

Chapter #6: Network Management

1. ifconfig: Internet Configuration. used to configure, control (add or delete) or display the information related to network but for now, we will use it only to display the information related to the network so you might not mistakenly change the setting of the network and making it inaccessible for yourself.
    - ifconfig -a: This argument will display all the interfaces available.
    - ifconfig -s: This argument will display the result in shortlisting
2. wget: used to download files from websites.
    - wget [webpage url]: To download the webpage itself. For example , wget www.thisisexample.com/example.html
    - wget -c [URL]: This will resume the download if only the downloading has resuming capability otherwise it will not resume the file.
    - wget -b [URL]: This will start downloading the file in the background.
3. netstat: lists out all the network connections of the system. It displays all the socket’s connection. two types of port; TCP(Transmission Control Protocol) and UDP(User Datagram Protocol)
    - netstat -a: To show all ports (Listening and non-Listening)
    - netstat -au: To show UDP ports only
    - netstat -at: To show TCP ports only.
    - netstat -lx: To list all lsitening ports only
    - netstat -c: This will update the result after every few seconds.
    - netstat -r: This will give you information about routing.
4. ping: one the most widely used command for testing, and troubleshooting the network. sends the data packet composed of the message “PING” on the specified IP Address or the URL. The time

taken to receive a response from that specified address or URL is known as latency. This command uses ICMP which stands for Internet Control Message Protocol data packets to the specified address or URL.

- ping [destination address]: When this command is used, it keeps on pinging the address until it is forcefully stopped by signal
- ping -c [total number of pings] [destination address]: Since, without using any argument, it will keep on pinging destination address infinitely.
- ping -i [total time to wait for next ping] [destination address]: ping command by default wait for one second before sending the next data packet to the destination address.
- ping -i [total time to ping] [destination address]: We can also tell the command to ping for a specific time and then stop.

Chapter #7: More commands

1. cmp: comparison. used to compare two files byte by byte (character by character) and find out whether two files are identical or not.
    - cmp -b [filename] [filename1]: This argument is used to print the byte at which difference occurred.
    - cmp -l [filename] [filename1]: This will print all the different bytes along with bytes value until one of the files has ended.
    - cmp -n [total number of bytes to be compare] [filename] [filename1]: This argument allows you to compare the specified number of bytes in two files.
    - cmp -i [skip bytes] [filename] [filename1]: This argument is used to skip the specified number of bytes from the start of files and then compare the two files.
    - cmp -i [skip bytes from 1st file]:[skip bytes from 2nd file] [filename] [filename1]: By using this syntax, we can skip a specified number of bytes from each file.
2. clear: After executing so many commands, do you feel the need to wipe out the terminal because it is feeling a little bit messy.
3. find: find command is used to find files or directories while working on a large project.
    - find -name [additional argument] [filename]
    - find [directory path] -name [filename]
    - find -empty: This command will list down all the empty files.
    - find -user [name]: List down all the files owned by the specified user.
    - For further information, use find --help
4. grep: grep stands for Global Regular Expression Point and it is used to search a pattern of characters in particular files.
    - grep [Pattren of characters(string)] [filename]: Grep can also be used to search same pattern in multiple files.

- grep -n [string] [filename]: What if we are searching in a very large file and we also want to know where we found our matching string.
- grep -c [string] [filename]: To print the total count of lines that contains the string.
- grep -h [string] [filename]: When this argument is used, it will only display the matched lines and not the filename in which that line was found.
- grep -i [string] [filename]: Use to ignore cases while matching.
- Use grep --help to know further about grep

5. wc: wc stands for word count. It is mainly used for counting purposes. This command can display the number of lines, words, and characters in the specified file after its name.
    - wc [argument] [filename]: wc command output four columns. The first column represents the total number of lines. The second column represents the total number of words. The third column represents the total number of characters or bytes. The fourth column is the name of a file.
    - wc [argument] [filename] [filename1]: When used with multiple files, it lists the count of individual files as well as the total count of all the files
    - wc -l [filename] [filename1]: This will print the number of lines only.
    - wc -w [filename] [filename1]: This will print the total number of words only.
    - wc -c [filename] [filename1]: This will print the total number of characters only.
    - wc --version: This will display the current version of wc command.
    - For further information about wc command, use wc --help .
6. echo: This command is used to display the pattern of characters (string) on the screen.
    - echo [arguments] [string]: This command can also act as an alternative to ls command. When used with *, it will print all the files and directories.
    - echo *: try to print the files and directories inside Work2 Directory.
7. uniq: comes from the ‘unique’ keyword, and like its name, it is used to print unique lines.
    - uniq [arguments] [filename]: This command filtered out the duplicate adjacent line from the file data in the above photo.
    - uniq -c [filename]: Using -c argument with uniq command will also print times the duplicate was found and that count can be seen before the line.
    - uniq -d [filename]: Using -d argument with uniq command will print only those lines which have adjacent duplicates.
    - uniq -u [filename]: Using -u argument with uniq command will print only those lines which are unique.\
    - uniq -i [filename]: Using -i argument with uniq command will make the match to be case insensitive
    - For further information about uniq command, use uniq --help .

8. env: used to print the list of environment variables. Environment variables are those variables that allow access to the command line and other tools to interact easily with the system.
    - env -i: This will print all empty environment variables.
    - To declare a global environment variable, we use following syntax: export [variable name] = [value]
9. split: used to split large files into smaller files.
    - split [arguments] [filename] [prefix of resulting file]: If no prefix for resulting file is specified, then by default system use x, then y and z in succession as a prefix.
    - split -l [number of lines] [filename] [prefix of resulting file]: This will split the file, based on the number of lines specified by the user
    - split -b [number of characters] [filename] [prefix of resulting file]: To split the file on the basis of characters
    - split -n [number of total files] [filename] [prefix of resulting file]: To split the file into a specific number of files, we use -n argument.
    - split [arguments] [filename] [prefix of resulting file] --verbose: While splitting the file into files, it will display a message with the creation of a new file that contains the message that whether the file had been created successfully or not.
10. paste: used to merge files horizontally.
    - paste -d [delimiter] [filename] [filename1]: This argument will change the delimiter used between the lines from different files.
    - paste -s [filename] [filename1]: This will merge the files vertically.
    - paste --version: This will display the current version of paste command.
11. watch: used to execute the other specified command after watch keyword periodically, this will run the specified command after a specific period repeatedly.
    - watch -n [period time] [command] [command input]: We can specify the time with argument after which command must be repeated.
    - watch -t [period time] [command] [command input]: This argument will turn off the title.
    - watch -d [period time] [command] [command input]: This argument will highlight the change in the file after every time command is repeated.
    - watch -v: This will display the current version of the watch command
    - For further information about the watch command, use watch -h
12. look: This command is used to look for lines in the files which start by the specific pattern of characters (string).
    - look -f [filename]: This will make look command to search for string while ignoring case sensitivity.
13. zip: This command is used to compress the files and directories into a single file.

- zip -d [zip-filename] [filename] [filename1] and so on..: This argument is used to remove the file or directory from the zip file if you have mistakenly added a wrong file to the zip.
- zip -u [zip-filename] [filename] [filename1] and so on..: To add the file or directory to zip file.
- zip -m [zip-filename] [filename] [filename1] and so on..: To delete the files or directories once they have been added to a zip file.
- zip -D [zip-filename] [filename] [filename1] and so on..: This will zip all the files only excluding directories.
- zip -e [zip-filename] [filename] [filename1] and so on..: We can put password on zip using this argument.
- unzip command is used to unzip the zipped file.
- zip -1 [zip-filename] [filename] [filename1] and so on..: While zipping a lot of files, the operation can get quite slow.
- For more information related to this command, use zip --help.

14. od: od command is used to convert the data of input file into an octal, or different format.
    - od -b [filename]: This will display the data in octal format.
    - od -d [filename]: This will display the data in decimal format.
    - od -f [filename]: This will display the data in float format
    - od -x [filename]: This will display the data in the hexadecimal 2-byte unit format.
    - od -j [number of bytes] [filename]: This will skip the total number of bytes from the start of the file.
15. cal: This command is used in Linux to see the calendar.
    - cal year
    - cal month year
16. sl: This is the fun command when used. it will display a train passing in the terminal and after the train has successfully passed the terminal will return the prompt.
17. date: date command is used to print date and time.
    - date -s=" new date ": -s argument is used with the command to change the current time and date of the system.
18. seq: seq command prints a list of numbers based on a specific pattern.
19. expr: works like a calculator, it is used to perform calculation, it has limited functionality.
20. man: used to print detailed information about any command that we can run on the terminal.
    - man [command] For example, man ps and man pwd .
    - last -F: By default, the command will not show years, and second, using the -F argument will allow us to see seconds in time and year in date.
21. exit: When used, this command will close the terminal.

Backlash Sequences:

1. \n in the string is used to go a new line.
2. \c in the string will stop further printing of text.
3. \t in the string will leave tab space at that position.
4. \v in the string will create vertical tab space.
5. \a will cause sound beep.