

NETWORKING & SYSTEM ADMINISTRATION LAB**Experiment No.: 1****Aim**

Familiarization of Hardware Components in a Computer.

Name: SHAMJAD MAZOOD NAZER**Roll No: 36****Batch: MCA-B****Date: 04-04-2022****Procedure****Motherboard**

A motherboard provides connectivity between the hardware components of a computer, like the processor (CPU), memory (RAM), hard drive, and video card. There are multiple types of motherboards, designed to fit different types and sizes of computers.

Each type of motherboard is designed to work with specific types of processors and memory, so they don't work with every processor and type of memory. However, hard drives are mostly universal and work with the majority of motherboards, regardless of the type or brand.

NIC (Network Interface Card)

Short for network interface card, the NIC is also referred to as an Ethernet card and network adapter. A NIC is a computer expansion card for connecting to a network (e.g., home network or Internet) using an Ethernet cable with an RJ-45 connector.



Random Access Memory

Random access memory (RAM) is fast-access memory that is cleared when the computer is power-down. RAM attaches directly to the motherboard, and is used to store programs that are currently running. RAM is a set of integrated circuits that allow the stored data to be accessed in any order (why it is called random). There are many different types of RAM. Distinctions between these different types include: writable vs. read-only, static vs. dynamic, volatile vs. non-volatile, etc.

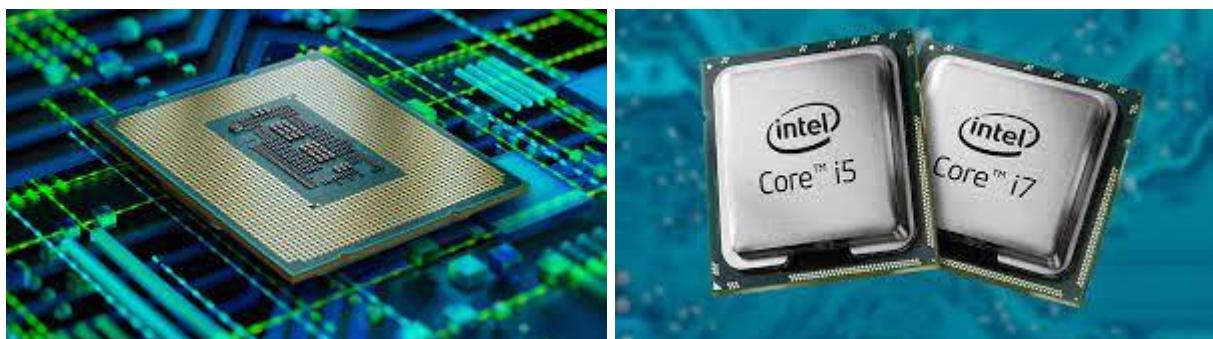


Hard Disk Drive

A hard disk drive (HDD) is a non-volatile storage device which stores digitally encoded data on rapidly rotating platters with magnetic surfaces. Just about every new computer comes with a hard disk these days unless it comes with a new solid-state drive. Typical desktop hard disk drives store between 120 and 400GB, rotate at 7,200 rpm, and have a media transfer rate of 1 Gbit/s or higher. Hard disk drives are accessed over one of a number of bus types, including parallel ATA(also called IDE), Serial ATA (SATA), SCSI, Serial Attached SCSI, and Fibre Channel.

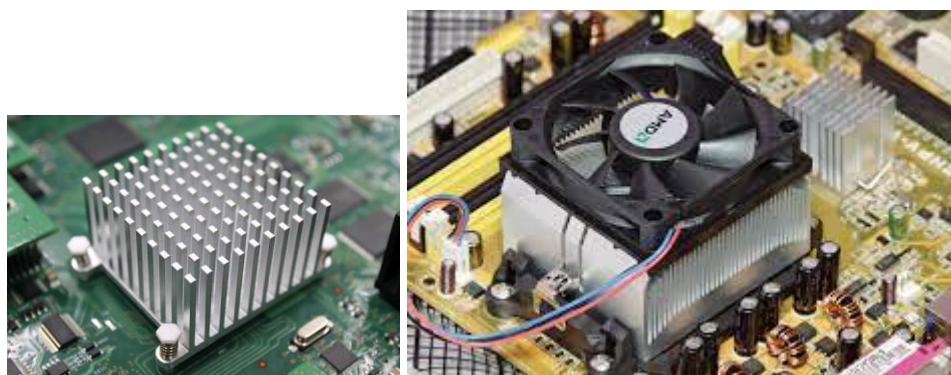


Processor



The processor, also called the microprocessor or CPU (for *Central Processing Unit*), is the brain of the PC. It performs all general computing tasks and coordinates tasks done by memory, video, disk storage, and other system components. The CPU is a very complex chip that resides directly on the motherboard of most PCs, but may sometimes reside on a daughter card that connects to the motherboard via a dedicated specialized slot.

Heat sink.



This is a passive piece of hardware that draws heat away from components to regulate/reduce their temperature to help ensure they continue to function properly. Typically, a heat sink is installed directly atop the CPU, which produces the most heat among internal components.

ROM Memory



ROM stands for a type of memory chip that can be read from but not written to.

In other words, it's a form of data storage that can't be changed after being programmed.

It's sometimes called "non-volatile" memory because the stored information will remain even when not powered up or in use.

ROM is often used to store a computer's basic start-up instructions and certain types of data, such as your car's onboard computer system and a calculator's data tables.

Optical Drive



Optical Drives are used in PCs to read and write CDs and DVDs.

The optical drive reads the data from the disc, which can then be transformed into a digital file that is readable by the computer.

This makes it easy to backup files, play music or movies, or copy data from one disc to another.

The term "CD" refers to Compact Discs, which are the most common type of optical drive on modern computers.

Power Supply



A power supply is an electrical appliance that provides the necessary power to operate a computer.

Computers are powered by electricity, and the power supply converts the alternating current (AC) from the electric outlet into direct current (DC).

The power supply in a computer can be an internal or external component.

It's important to make sure your power supply is functioning properly.

Graphics Processing Unit (GPU)



The graphics processing unit, or GPU, has become one of the most important types of computing technology, both for personal and business computing. Designed for parallel processing, the GPU is used in a wide range of applications, including graphics and video rendering. Although they're best known for their capabilities in gaming, GPUs are becoming more popular for use in creative production and artificial intelligence (AI).

Solid State Drive (SSD)



A solid-state drive (SSD) is a new generation of storage device used in computers. SSDs use flash-based memory, which is much faster than a traditional mechanical hard disk. Upgrading to an SSD is one of the best ways to speed up your computer. Learn how SSDs work and how to keep them optimized with a specialized performance-boosting tool.

NETWORKING & SYSTEM ADMINISTRATION LAB

Experiment No.: 2

Aim

Install the latest version of Ubuntu on an Oracle VM VirtualBox.

Name: SHAMJAD MAZOOD NAZER

Roll No: 36

Batch: MCA-B

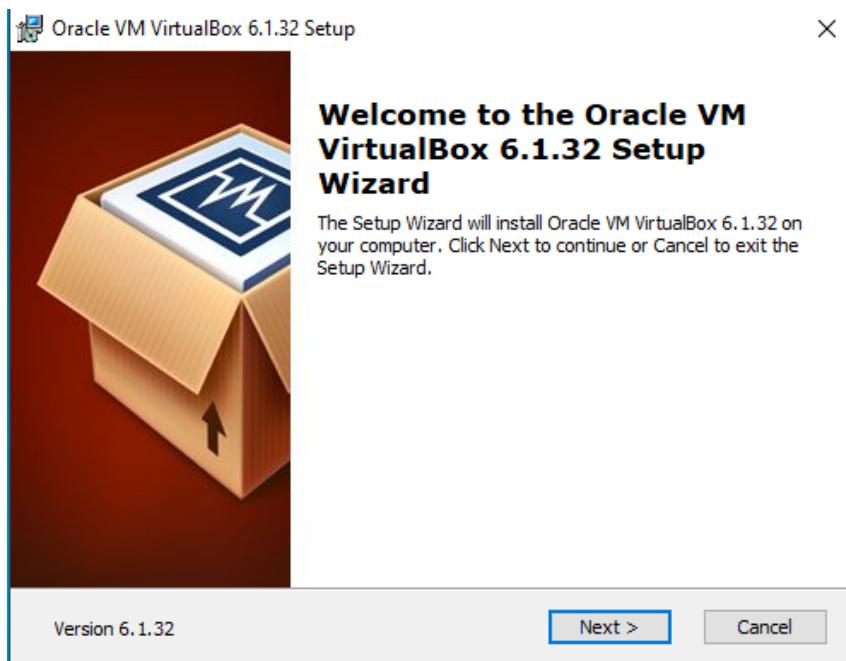
Date: 21-03-2022

Procedure

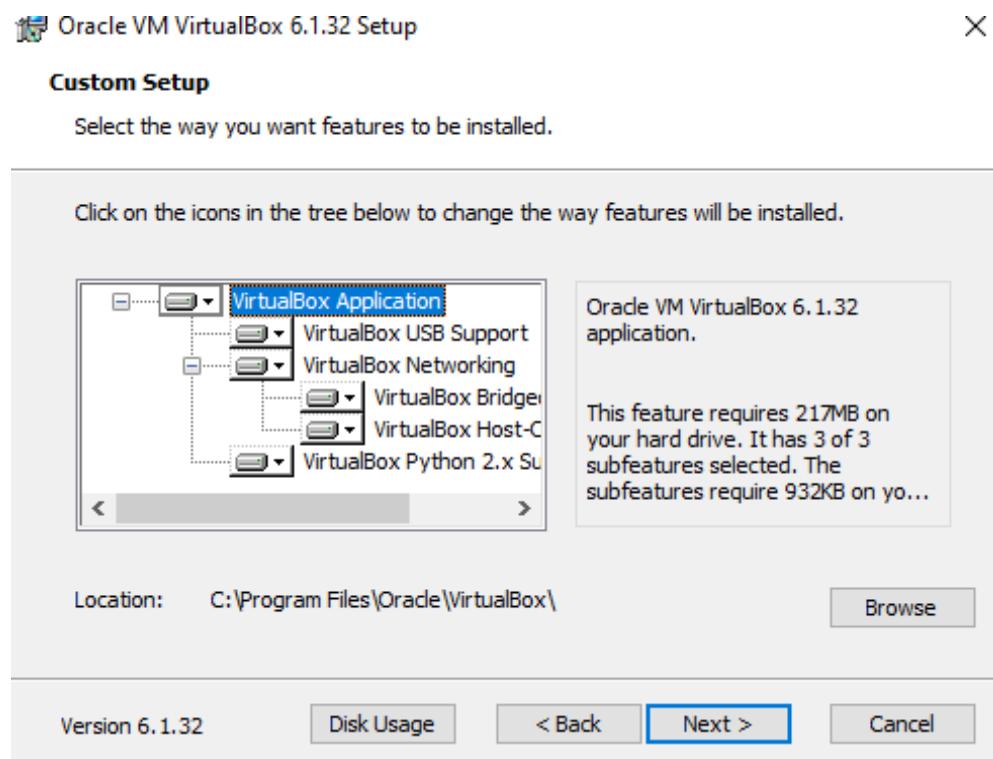
Below are the very easy steps with screenshots containing the installation procedure of Virtual Box.

Output Screenshot

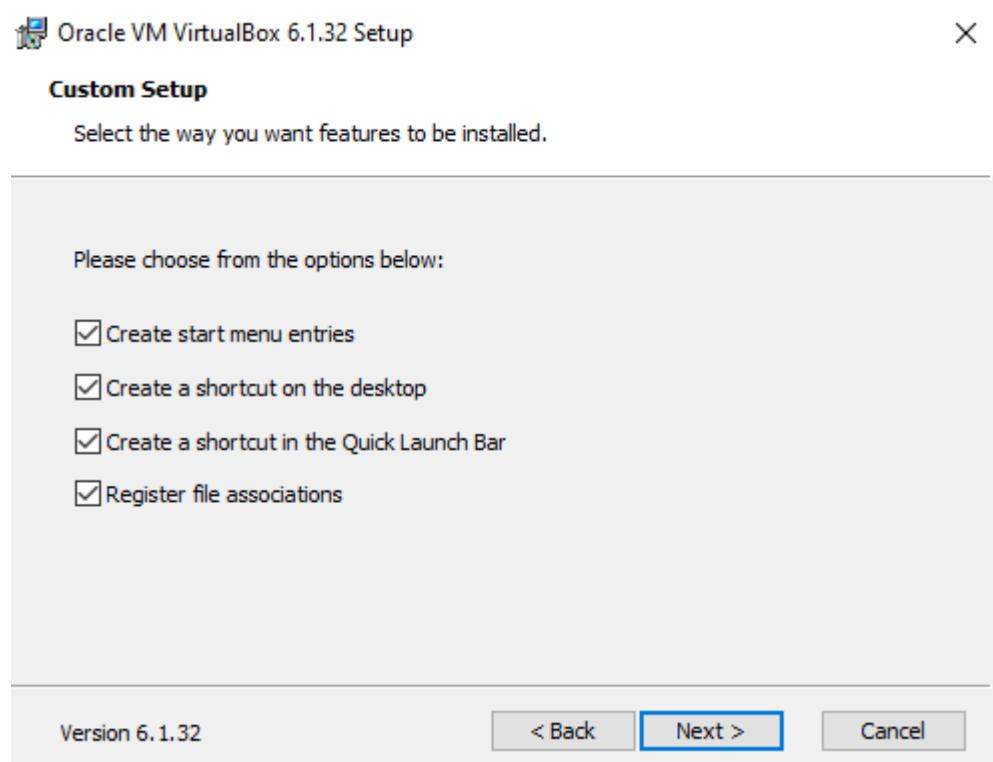
Step 1: Download VirtualBox for Windows and install it on the computer.



Step 2: click next



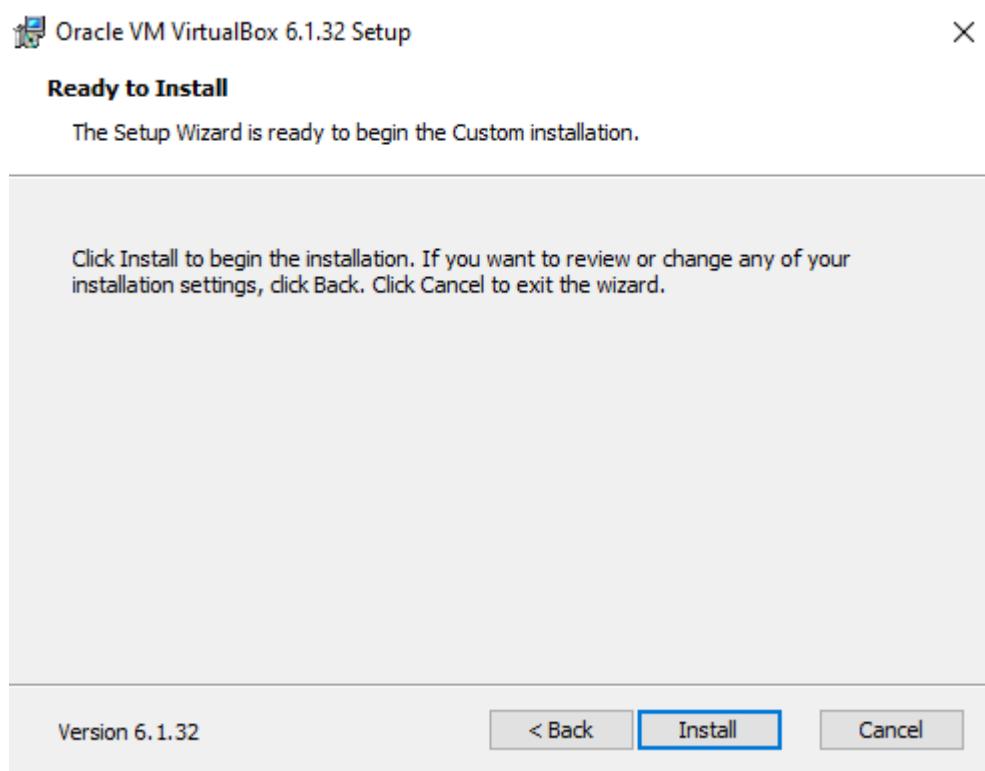
Step 3:click next

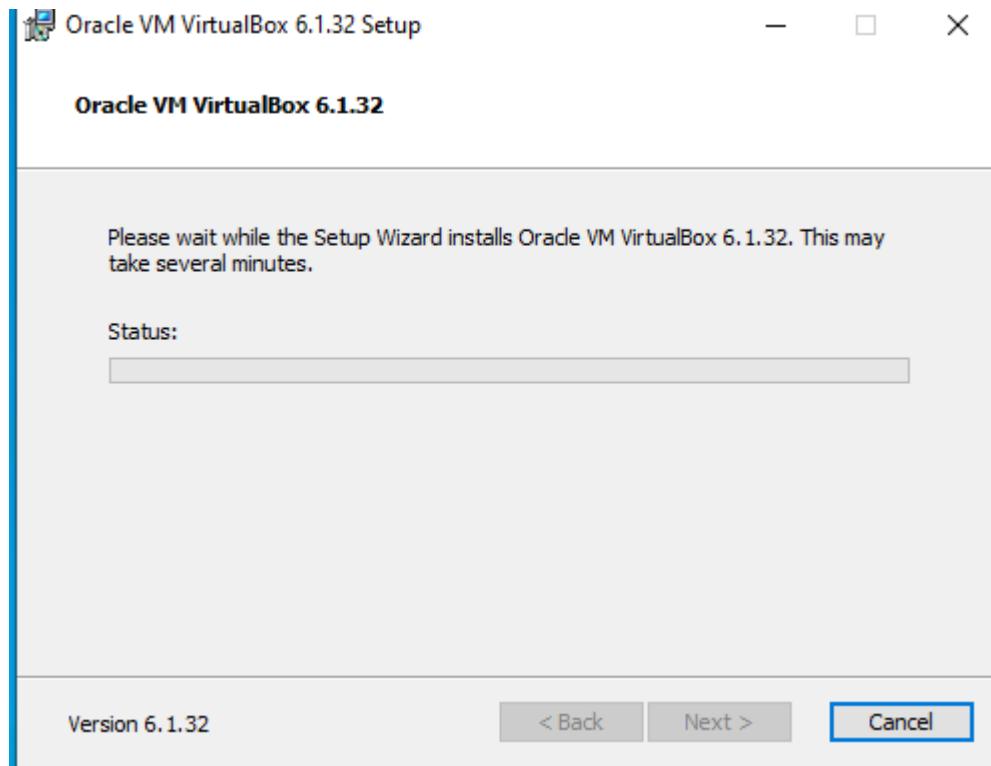


Step4:click yes

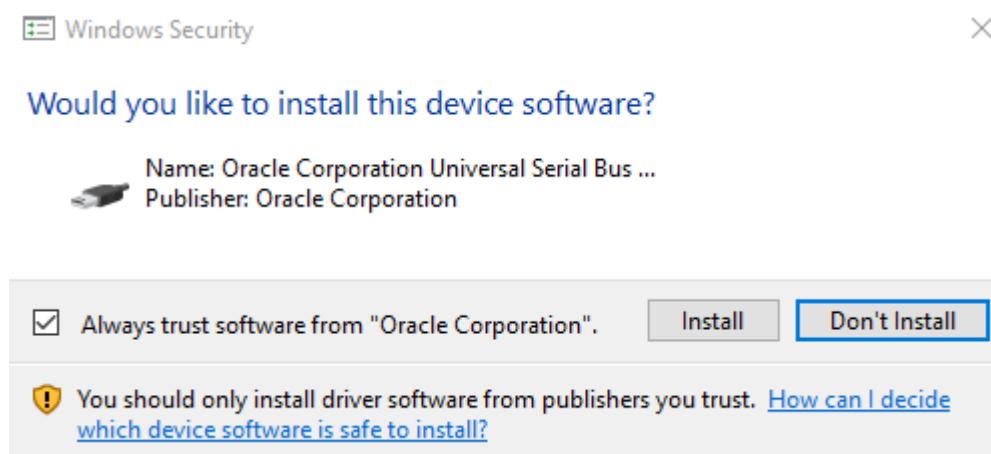


Step 5:click install





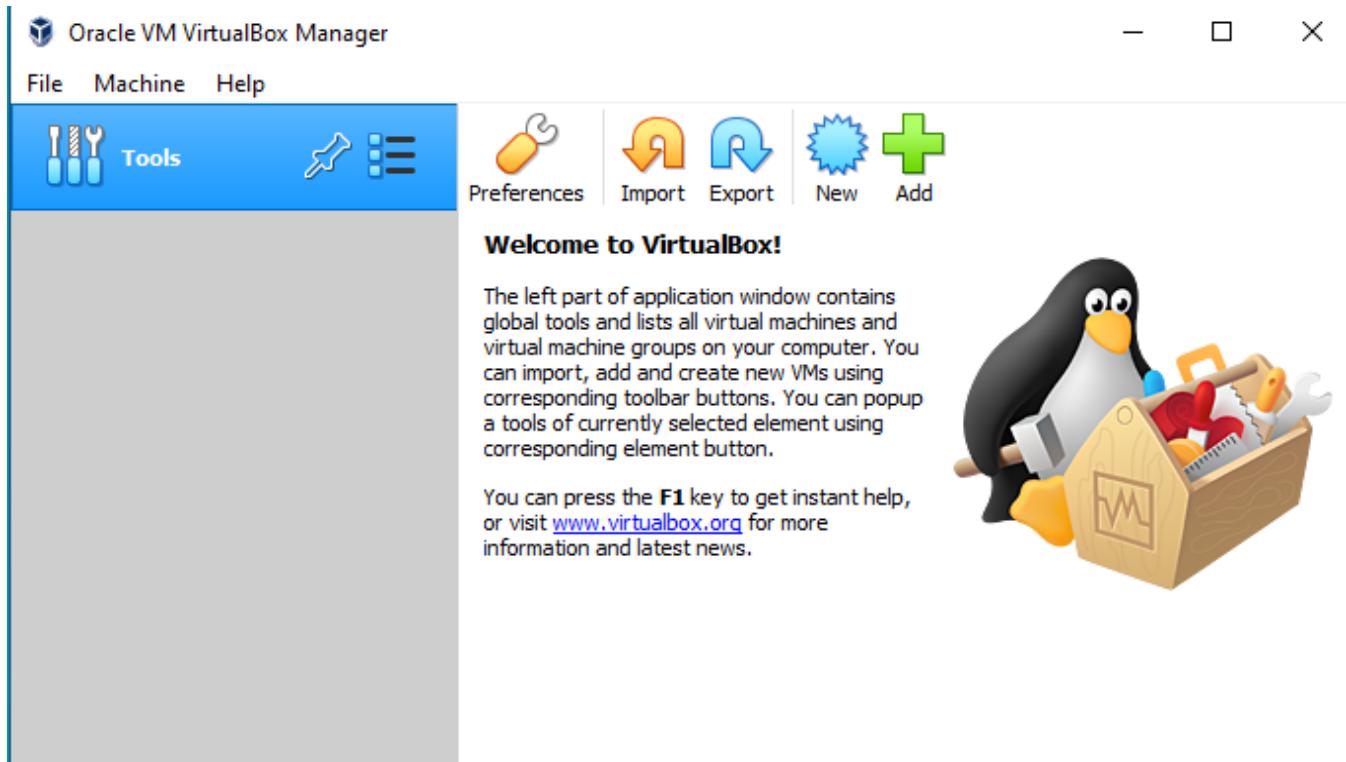
Step 6:install

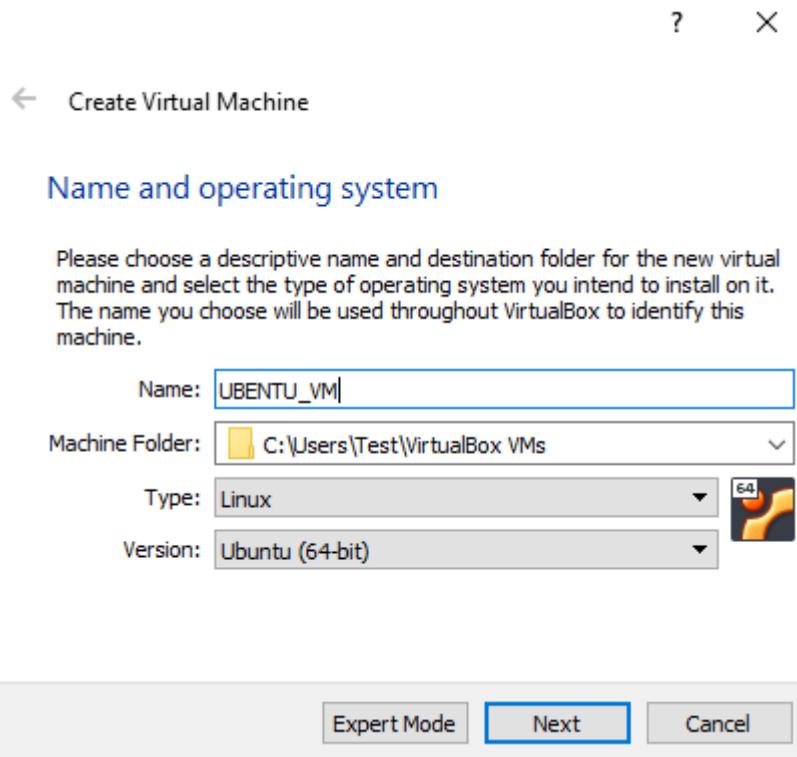
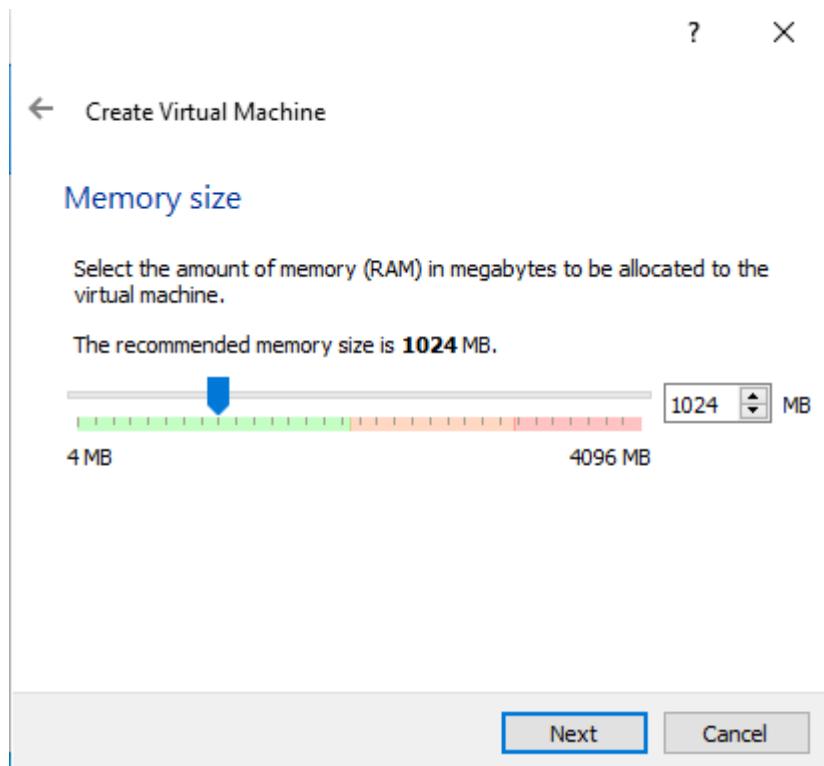


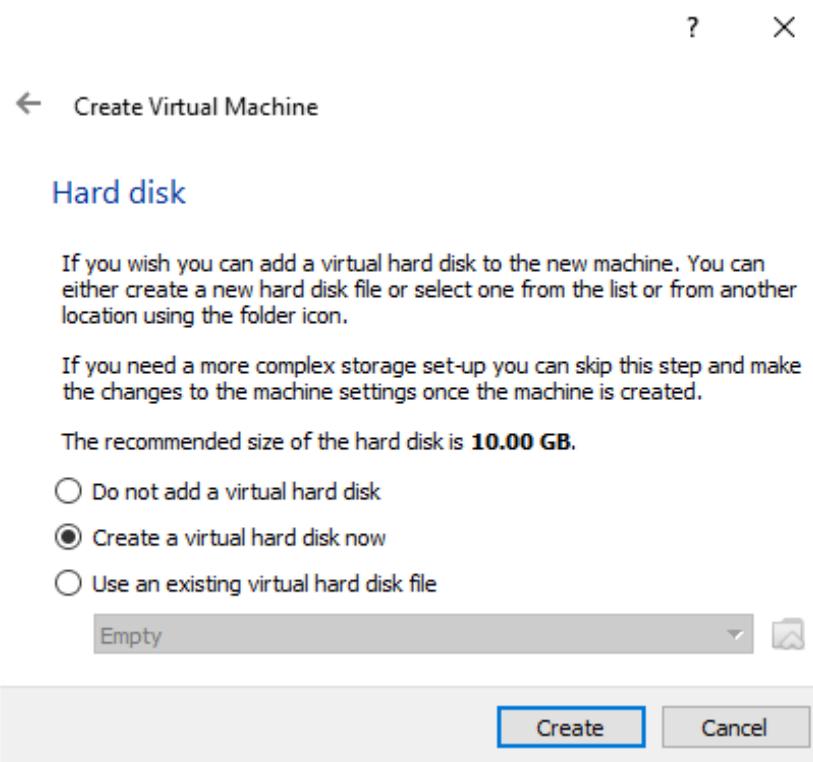
Step 7:finish



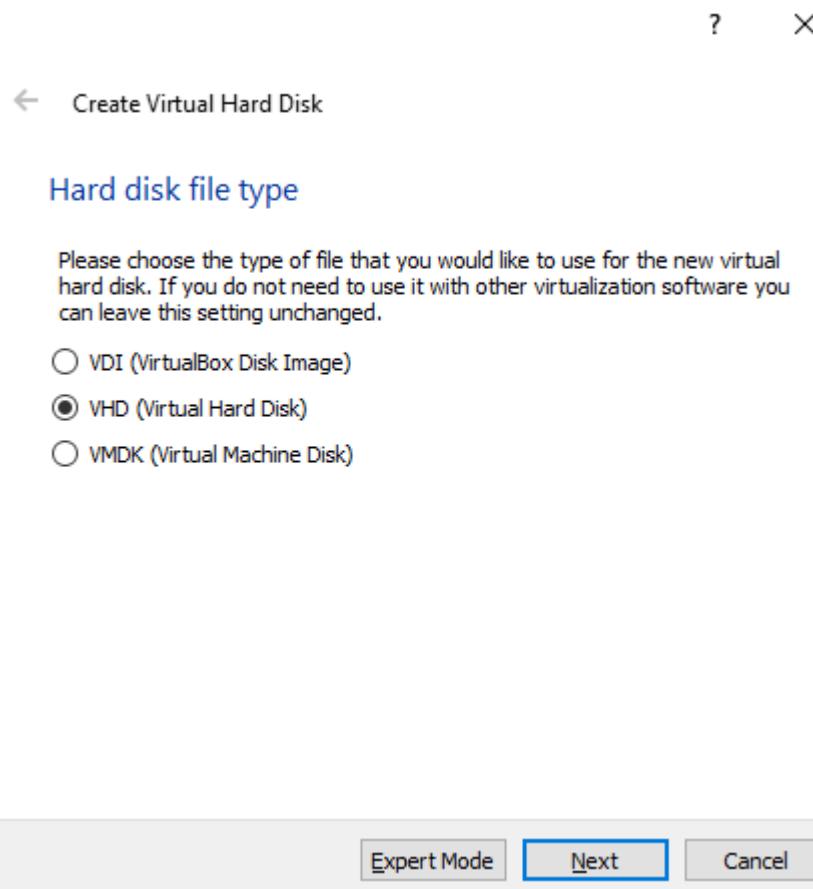
Step8: Click on “New” to create a virtual machine



Step 9: Enter Name for your Virtual Machine**Step10:** Enter amount of memory (RAM) =1024 MB and click “Next”



Step11: Click “Create” to create hard drive



Step 12:click next



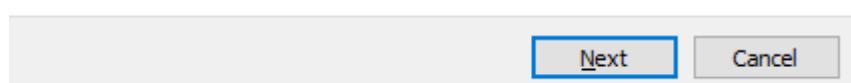
Storage on physical hard disk

Please choose whether the new virtual hard disk file should grow as it is used (dynamically allocated) or if it should be created at its maximum size (fixed size).

A **dynamically allocated** hard disk file will only use space on your physical hard disk as it fills up (up to a maximum **fixed size**), although it will not shrink again automatically when space on it is freed.

A **fixed size** hard disk file may take longer to create on some systems but is often faster to use.

- Dynamically allocated
 Fixed size



Step13: Enter Size of Virtual Hard Drive= 20 GB and Click “Create”

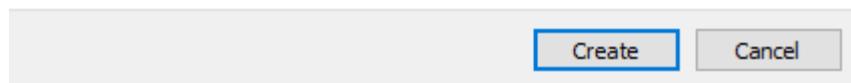


File location and size

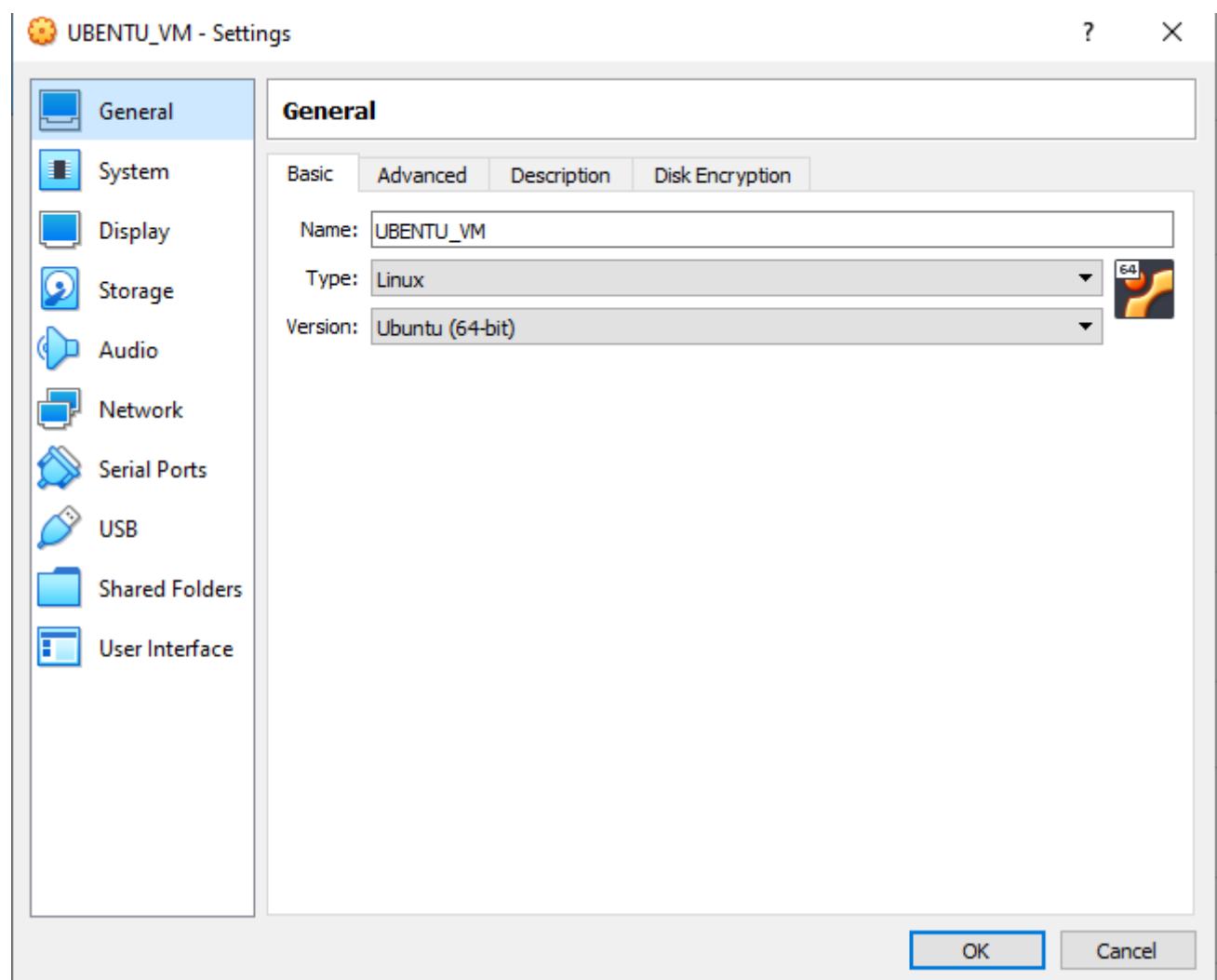
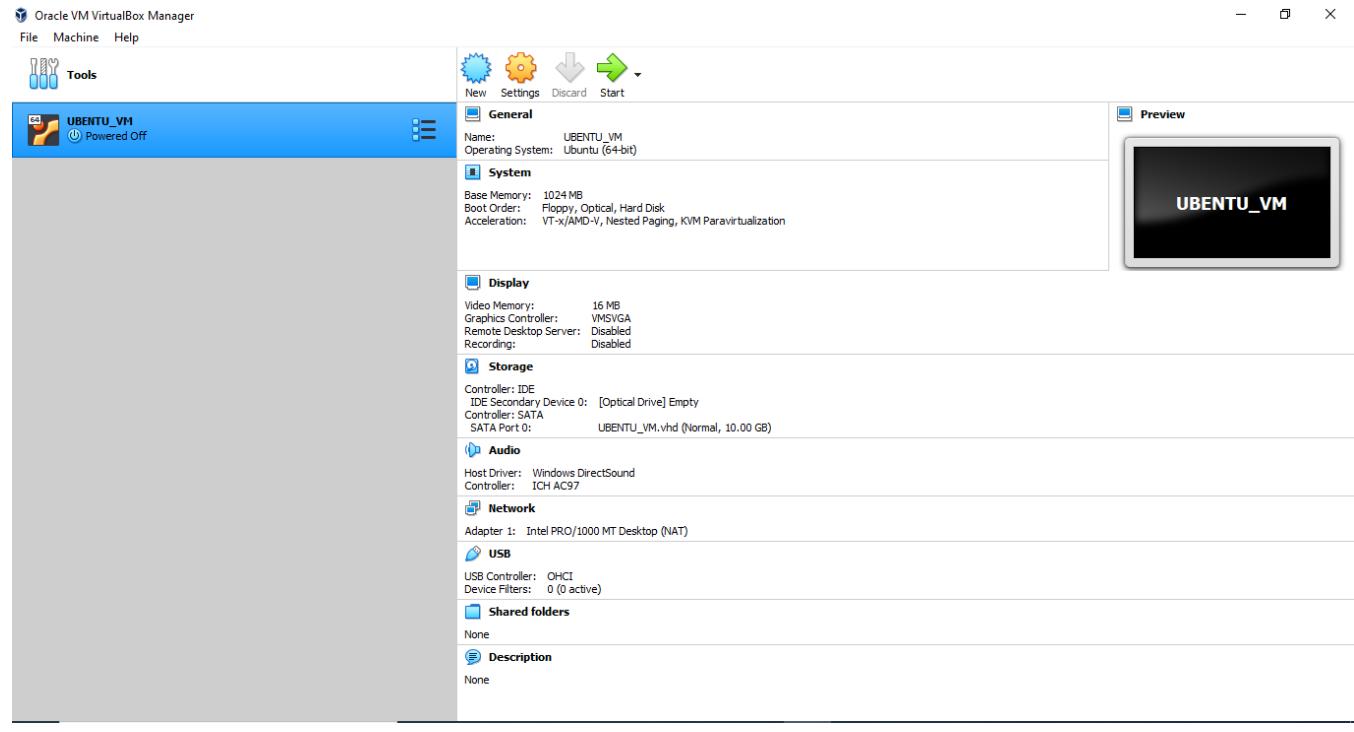
Please type the name of the new virtual hard disk file into the box below or click on the folder icon to select a different folder to create the file in.

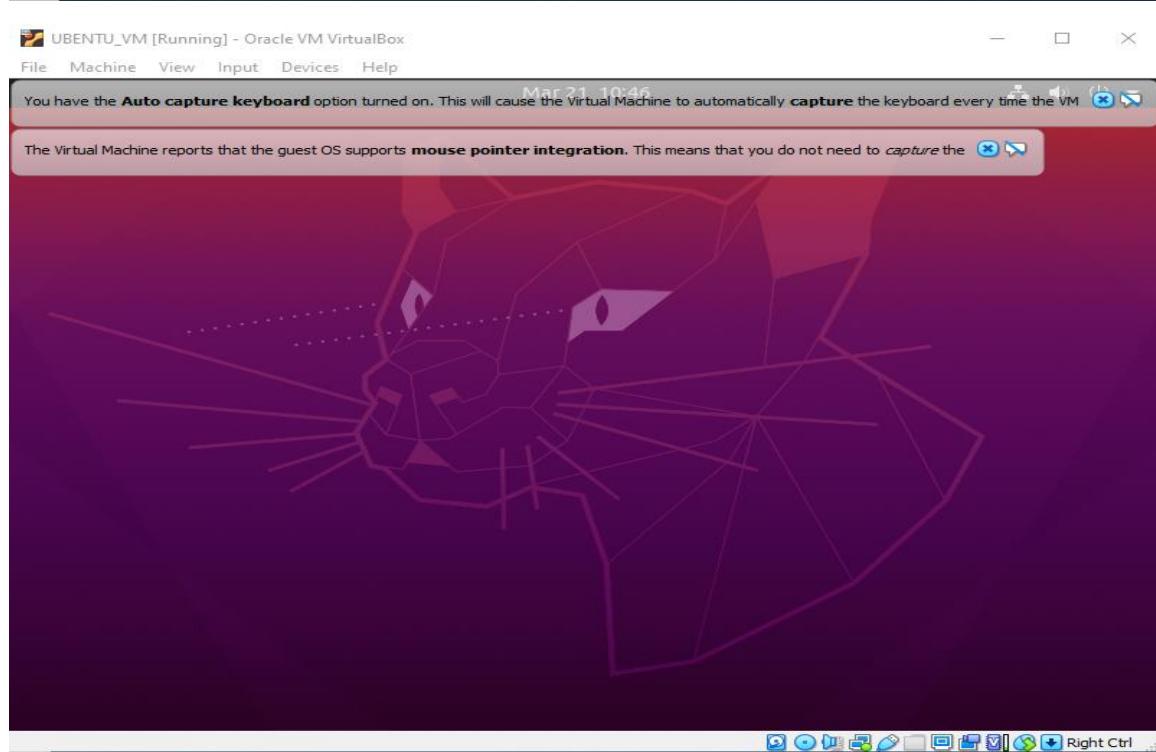
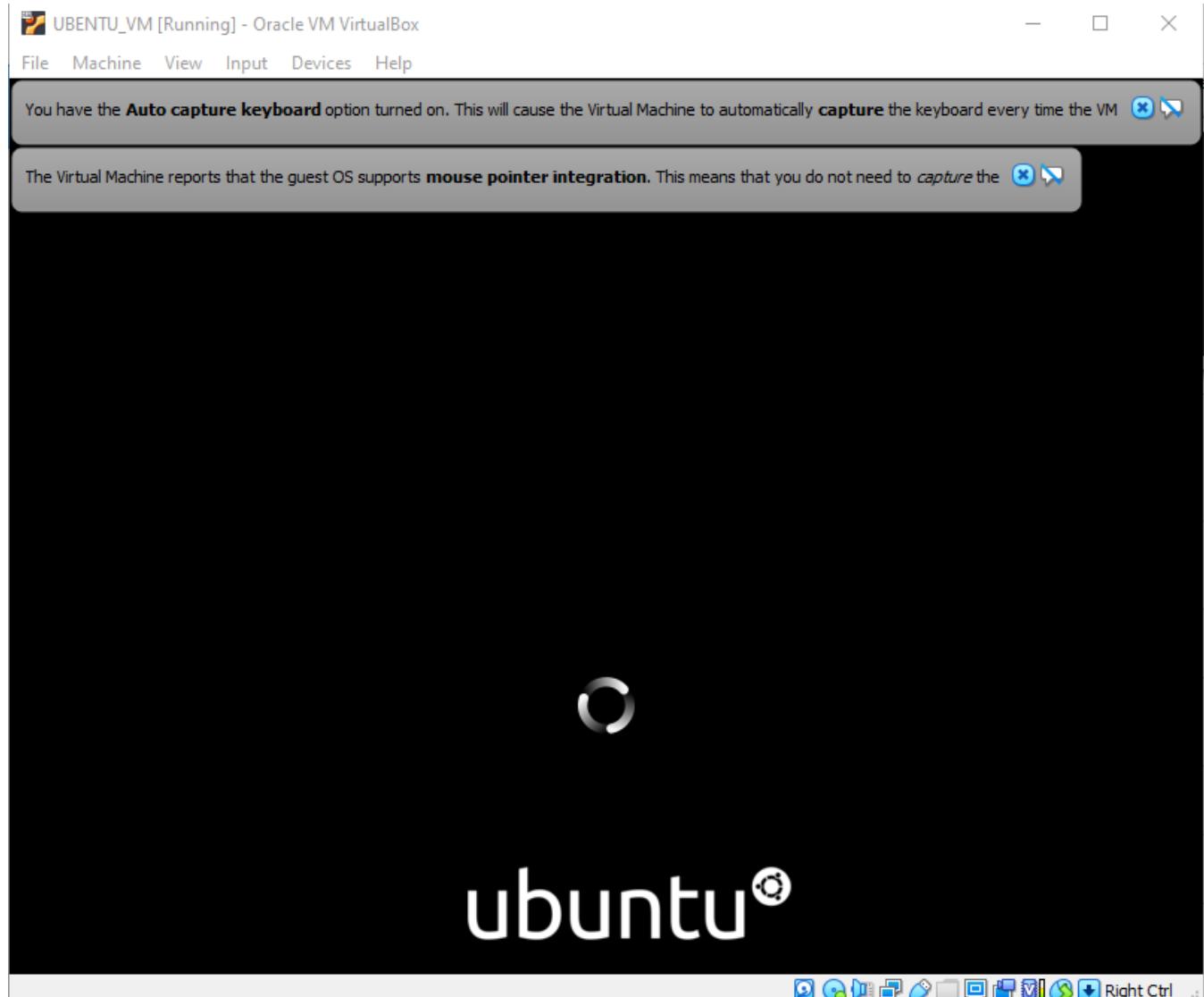
C:\Users\Test\VirtualBox VMs\UBENTU_VM\UBENTU_VM.vhd

Select the size of the virtual hard disk in megabytes. This size is the limit on the amount of file data that a virtual machine will be able to store on the hard disk.

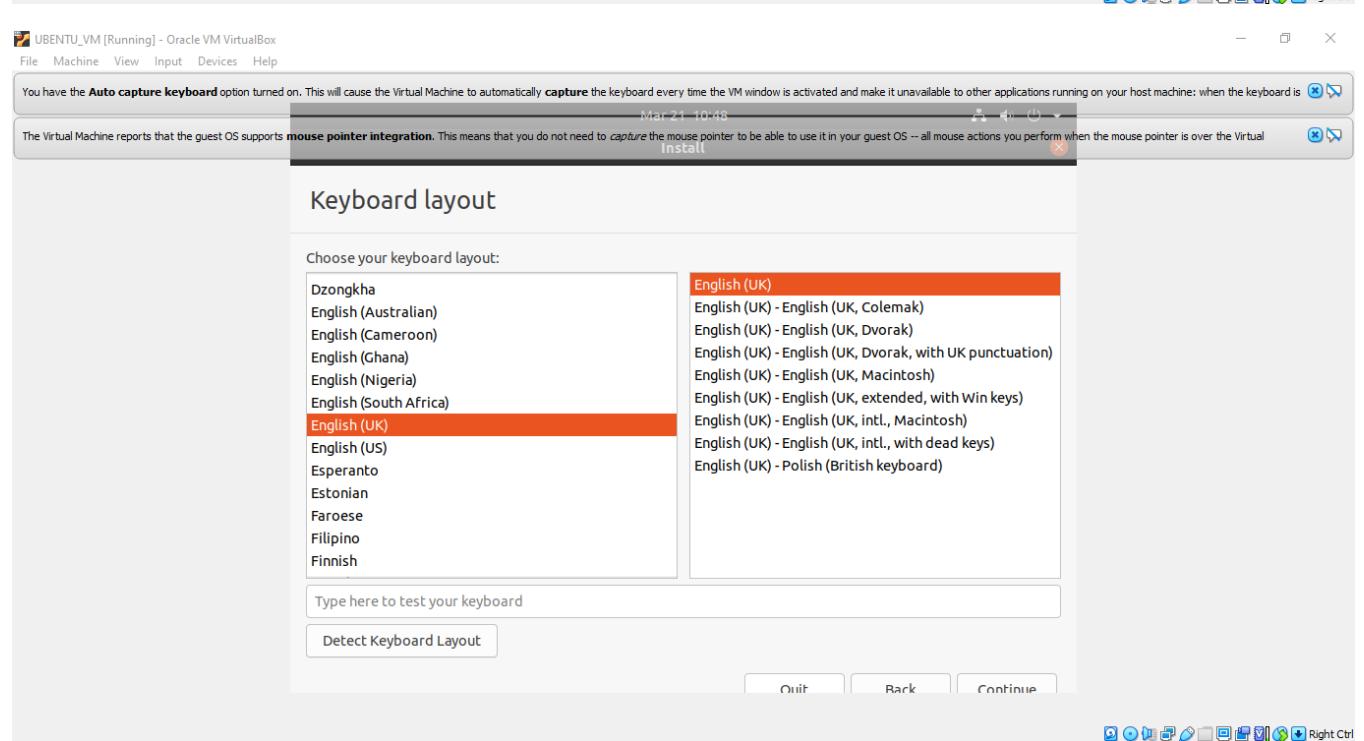
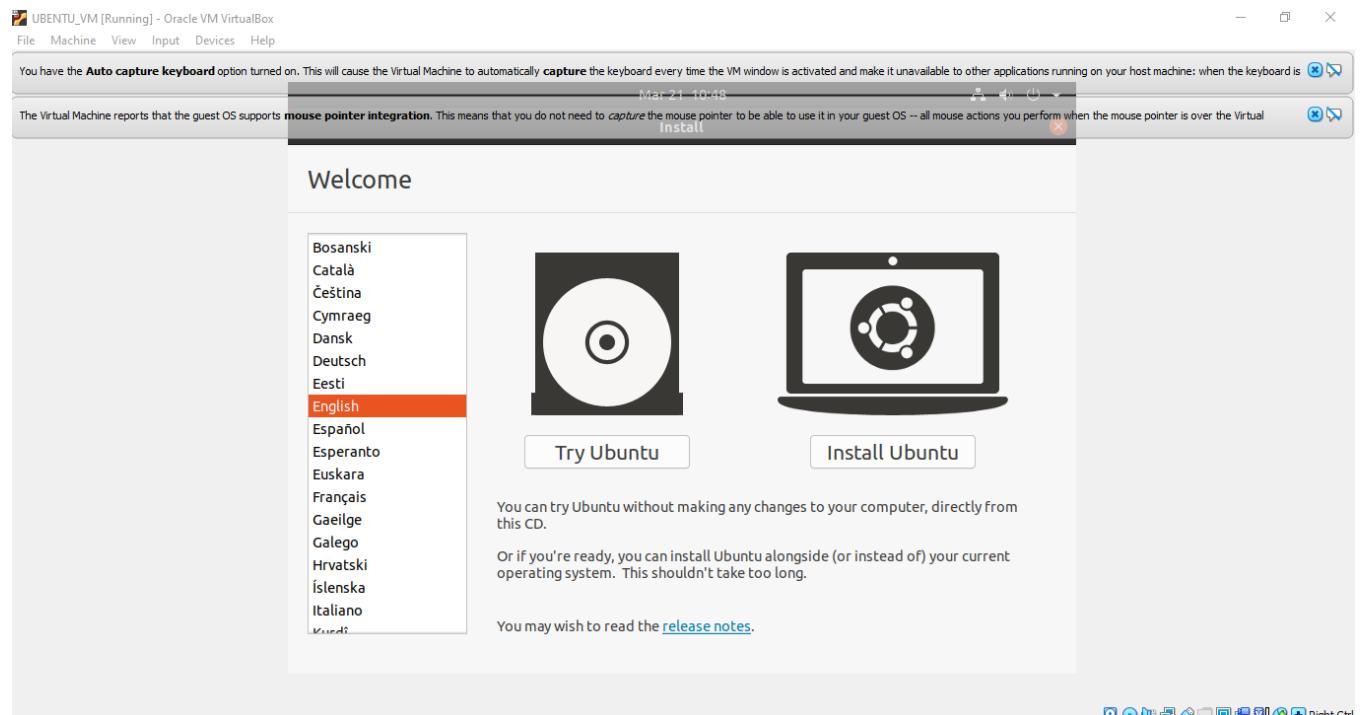


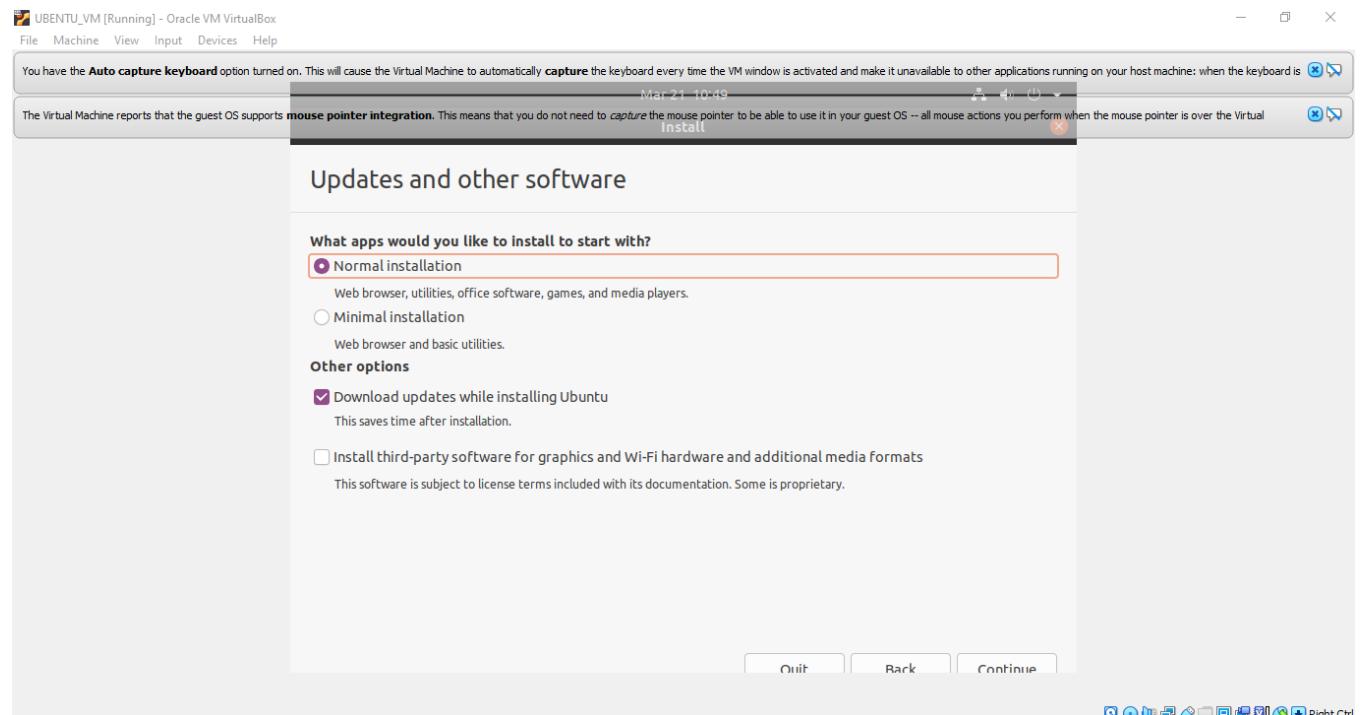
Step14: Select Virtual Machine





Step15: Click “Install Ubuntu”



Step16: Click “Continue”**Step17:** Select location and click “Continue”

Step18: Fill all the details and Click “Continue”

Who are you?

Your name: ✓

Your computer's name: ✓
The name it uses when it talks to other computers.

Pick a username: ✓

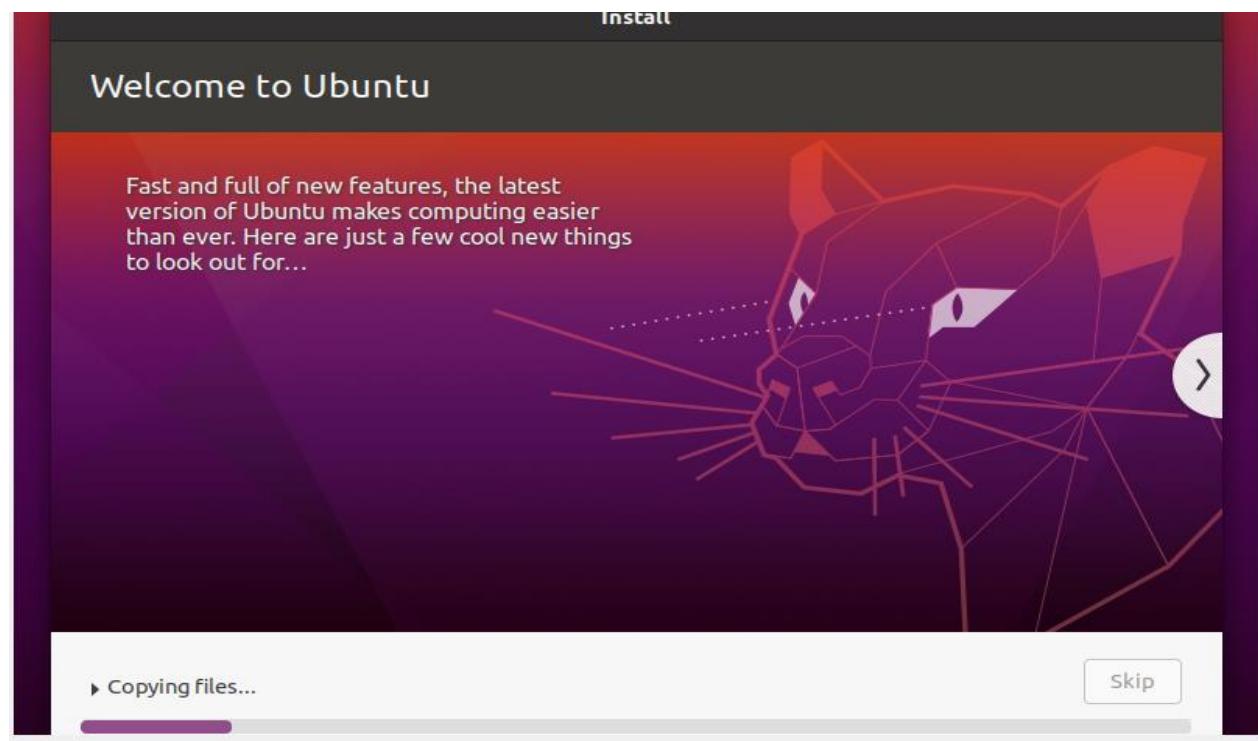
Choose a password: ⓘ Fair password

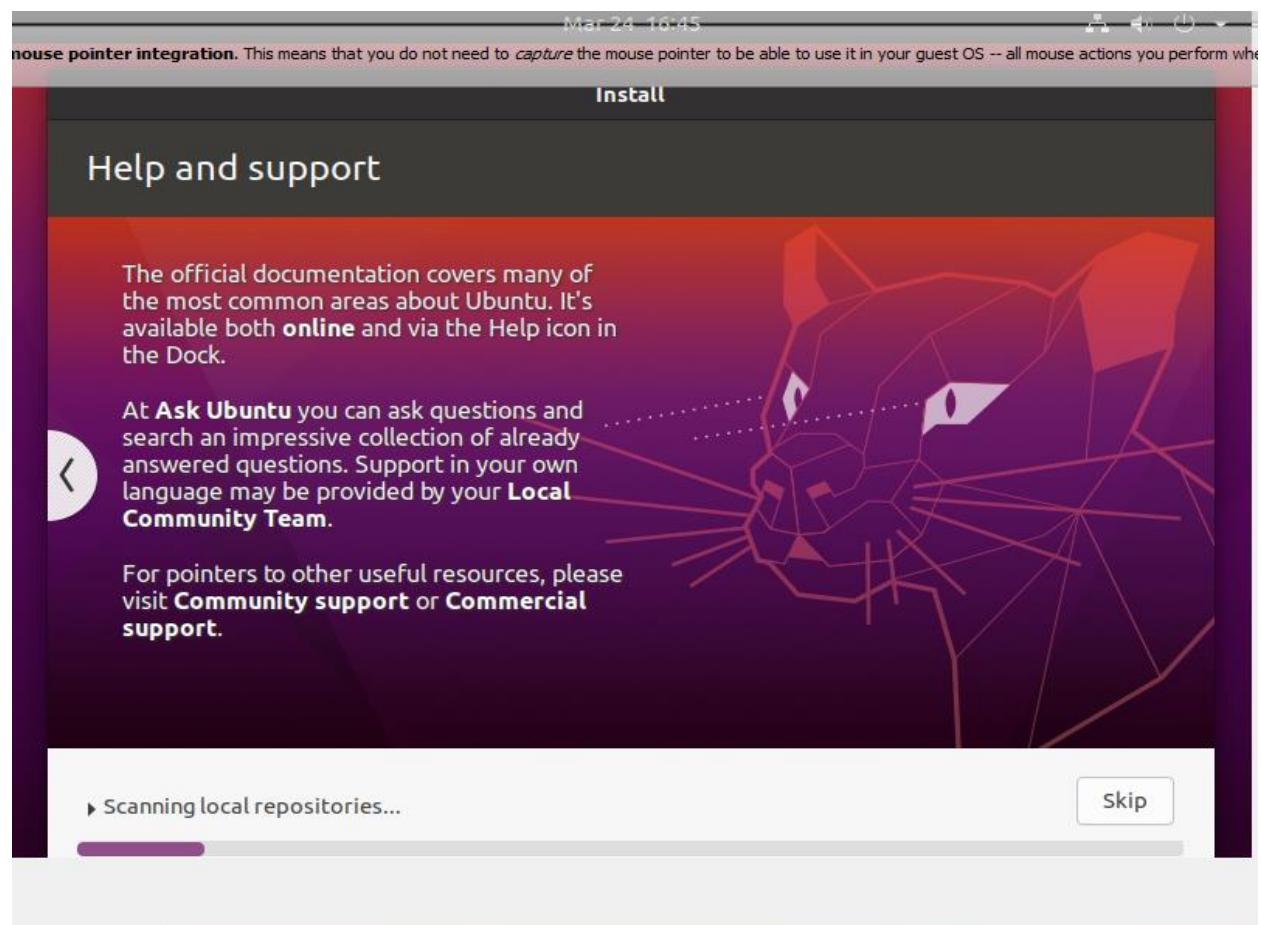
Confirm your password: ✓

Log in automatically
 Require my password to log in
 Use Active Directory

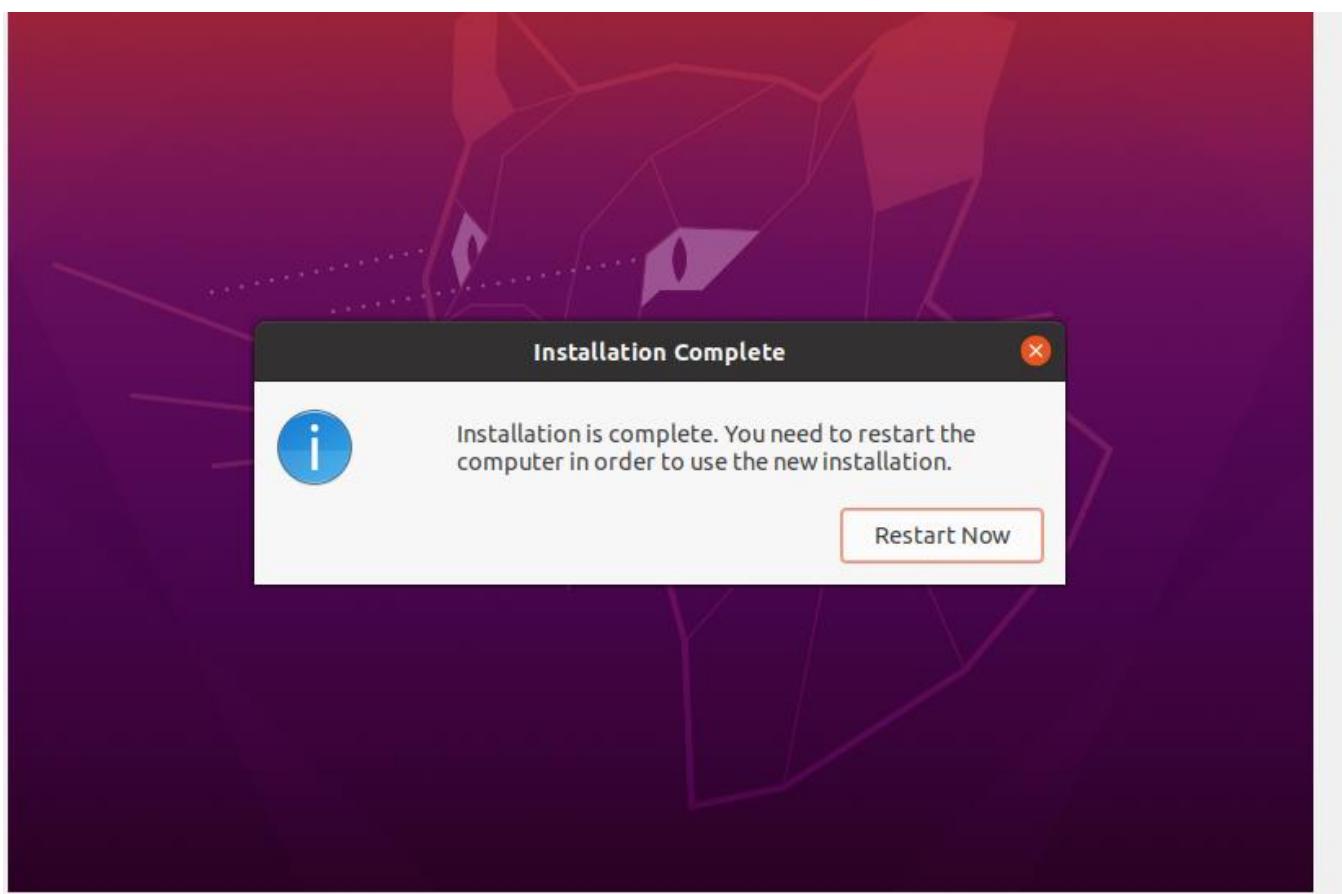
You'll enter domain and other details in the next step.

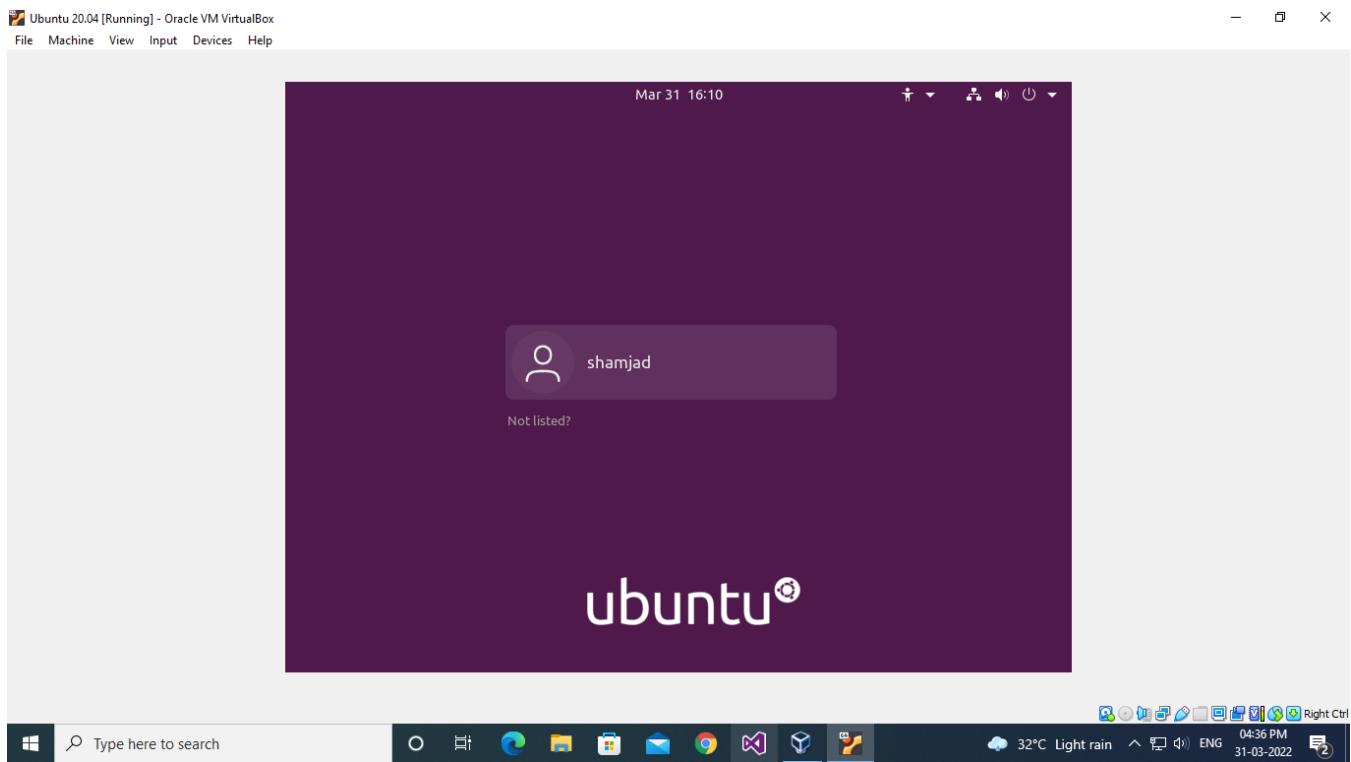
[Back](#) [Continue](#)

Step19: Now the installation process will start and installation window will appear



Step20: Click “Restart Now”





NETWORKING & SYSTEM ADMINISTRATION LAB**Experiment No.: 3****Aim**

Familiarization of the Linux commands.

Name: SHAMJAD MAZOOD NAZER

Roll No: 36

Batch: MCA-B

Date: 24-03-2022

Procedure1. **pwd**

This command is used to display the location of the current working directory.

Syntax :- \$ pwd

Output :-

```
ajc@s36:~$ pwd
/home/ajc
ajc@s36:~$ █
```

2. **mkdir**

This command is used to create a new directory under any directory.

Syntax :- \$ mkdir <directory name>

Output :-

```
ajc@s36:~$ mkdir file1
```

3. **ls**

This command is used to display a list of content of directory.

Syntax :- \$ ls

Output :-

```
ajc@s36:~$ ls
Desktop  Downloads  JAD    nano.save  Public  sudo      Videos
Documents  file1    Music   Pictures   snap    Templates  WhiteSur-gtk-theme
ajc@s36:~$ █
```

4. man

This command is used to display the user manual of any command that we can run on the terminal.

Syntax :- \$ man <command name>

Output :-

```
PWD(1)

NAME
    pwd - print name of current/working directory

SYNOPSIS
    pwd [OPTION]...

DESCRIPTION
    Print the full filename of the current working directory.
```

5. ls -l

This command is used to shows file or directory, size, modified date and time, file or folder name and owner of the file, and its permission.

Syntax :- \$ ls -l

Output:-

```
ajc@s36:~$ ls -l
total 60
drwxr-xr-x 4 ajc ajc 4096 Jun 23 21:26 Desktop
drwxr-xr-x 2 ajc ajc 4096 Jun 26 21:34 Documents
drwxr-xr-x 2 ajc ajc 12288 Jul 9 15:56 Downloads
drwxrwxr-x 2 ajc ajc 4096 Jul 9 15:51 file1
drwxrwxr-x 2 ajc ajc 4096 Apr 6 19:35 JAD
drwxr-xr-x 2 ajc ajc 4096 Jul 7 09:09 Music
-rw----- 1 ajc ajc 1 Jun 11 20:48 nano.save
drwxr-xr-x 2 ajc ajc 4096 Jul 8 21:03 Pictures
drwxr-xr-x 2 ajc ajc 4096 Mar 31 19:05 Public
drwx----- 6 ajc ajc 4096 Jun 6 21:12 snap
-rw-rw-r-- 1 ajc ajc 0 May 14 06:22 sudo
drwxr-xr-x 2 ajc ajc 4096 Mar 31 19:05 Templates
drwxr-xr-x 2 ajc ajc 4096 Mar 31 19:05 Videos
drwxrwxr-x 6 ajc ajc 4096 May 30 21:04 WhiteSur-gtk-theme
ajc@s36:~$
```

6. ls -r

This command is used to display files and directories in reverse order.

Syntax :- \$ls -r

Output :-

```
ajc@s36:~$ ls -r
Whitesur-gtk-theme Videos Templates sudo snap Public Pictures nano.save Muisc JAD file1 Downloads Documents Desktop
ajc@s36:~$
```

7. ls -a

This command is used to list all files including hidden files.

Syntax :- \$ls -a

Output :-

```
ajc@s36:~$ ls -a
. .bashrc Documents icons mozilla .pkf .sonarlint .sudo_as_admin_successful Videos
.. cache Downloads JAD Music .profile .ssh Templates .viminfo
.bash_history .config file1 java nano.save Public .steam themes .vscode
.bash_logout Desktop .gnupg local Pictures snap sudo thunderbird Whitesur-gtk-theme
```

8. ls -al

List all the files including hidden files in the current directory

Syntax :- \$ ls -al

Output :-

```
ajc@s36:~$ ls -al
total 168
drwxr-xr-x 28 ajc ajc 4096 Jul  9 15:51 .
drwxr-xr-x  5 root root 4096 Jun  7 21:37 ..
-rw-------  1 ajc ajc 19037 Jul  9 13:24 .bash_history
-rw-r--r--  1 ajc ajc  220 Mar 31 19:01 .bash_logout
-rw-r--r--  1 ajc ajc 3771 Mar 31 19:01 .bashrc
drwx----- 28 ajc ajc 4096 Jul  6 17:06 .cache
drwx----- 26 ajc ajc 4096 Jul  8 21:06 .config
drwxr-xr-x  4 ajc ajc 4096 Jun 23 21:26 Desktop
drwxr-xr-x  2 ajc ajc 4096 Jun 26 21:34 Documents
drwxr-xr-x  2 ajc ajc 12288 Jul  9 15:56 Downloads
drwxrwxr-x  2 ajc ajc 4096 Jul  9 15:51 file1
drwx-----  3 ajc ajc 4096 Jul  9 13:05 .gnupg
drwxrwxr-x  5 ajc ajc 4096 May 30 21:13 .icons
drwxrwxr-x  2 ajc ajc 4096 Apr  6 19:35 JAD
drwxrwxr-x  3 ajc ajc 4096 Jul  6 16:16 .java
```

9. ls -t

This command is used to display files in the last modified order.

Syntax :- \$ ls -t

Output :-

```
ajc@s36:~$ ls -t
Downloads  file1  Pictures  Music  Documents  Desktop  nano.save  snap  WhiteSur-gtk-theme  sudo  JAD  Public  Templates  Videos
```

10. cd

This command is used to change the current directory.

Syntax :- \$ cd <directory name>

Output :-

```
ajc@s36:~$ cd JAD
ajc@s36:~/JAD$
```

11. cd ..

This command is used to move to the parent directory of current directory, or the directory one level up from the current directory.

Syntax :- \$ cd ..

```
ajc@s36:~/JAD$ cd ..
ajc@s36:~$
```

Output :-

12. cd -

This command is used to switch back to previous directory we were working earlier.

Syntax :- \$ cd -

Output :-

```
ajc@s36:~$ cd -
/home/ajc/JAD
```

13. cat > filename

This command is used to create a file and add contents to that file.

Syntax :- \$ cat > filename.txt

Output :-

```
ajc@s36:~/JAD$ cat > file1.txt
SHAMJAD
R-MCA B
AJCE
^Z
[1]+  Stopped                  cat > file1.txt
```

14. cat>>filename

This command is used to add contents to an existing file.

Syntax :- \$ cat >> filename.txt

Output :-

```
ajc@s36:~/JAD$ cat >> file1.txt
Networks and system administrations
LAB No. 404
^Z
[2]+  Stopped                  cat >> file1.txt
```

15. cat filename

This command is used to view the contents in the file.

Syntax :- \$ cat filename.txt

Output :-

```
ajc@s36:~/JAD$ cat file1.txt
SHAMJAD
R-MCA B
AJCE
Networks and system administrations
LAB No. 404
```

16. cat filename1 > filename2

This command is used to copy the content from one file to another file.

Syntax :- \$ cat filename1 > filename2

Output :-

```
ajc@s36:~/JAD$ cat file1.txt > file2.txt
ajc@s36:~/JAD$ cat file2.txt
SHAMJAD
R-MCA B
AJCE
Networks and system administrations
LAB No. 404
```

NETWORKING & SYSTEM ADMINISTRATION LAB

Aim

Familiarization of the Linux commands.

Procedure

1 cat -n

Used to display the content of the file with line numbers.

Syntax :- \$ cat -n filename.txt

Output :-

```
ajc@s36:~/JAD$ cat -n file1.txt
 1 SHAMJAD
 2 R-MCA B
 3 AJCE
 4 Networks and system administrations
 5 LAB No. 404
```

2. cat -b

This command is used to remove empty lines from the file

Syntax :- \$ cat -b filename.txt

Output :-

```
ajc@s36:~/JAD$ cat -b file2.txt
 1 SHAMJAD
 2 R-MCA B
 3 AJCE
 4 Networks and system administrations
 5 LAB No. 404
 6 Linux

 7 Terminal
```

3. touch

The touch command is used to create a file. It can be anything, from an empty txt file to an empty zip file.

Syntax :- \$ touch filename.txt

Output :-

```
ajc@s36:~/JAD$ touch newfile.txt
ajc@s36:~/JAD$ ls
file1.txt  file2.txt  newfile.txt
ajc@s36:~/JAD$
```

Name: SHAMJAD MAZOOD NAZER

Roll No: 36

Batch: MCA-B

Date: 28-03-2022

4. echo

The "echo" command helps us move some data, usually text into a file. For example, if you want to create a new text file or add to an already made text file, you just need to type in, "echo hello, my name is alok >> new.txt". You do not need to separate the spaces by using the backward slash here, because we put in two triangular brackets when we finish what we need to write.

Syntax :- \$ echo hai dear >> filename.txt

Output :-

```
ajc@s36:~/JAD$ echo shamjad mazood nazer >> newfile.txt
ajc@s36:~/JAD$ cat newfile.txt
shamjad mazood nazer
```

5. head

This command is used to display the first N number of lines

Syntax :- \$ head filename.txt

Output :-

```
ajc@s36:~/JAD$ head file2.txt
SHAMJAD
R-MCA B
AJCE
Networks and system administrations
LAB No. 404
Linux

Terminal
ajc@s36:~/JAD$
```

6. head -4

This command is used to display the first 4 number of lines

Syntax :- \$ head -4 filename.txt

Output:-

```
ajc@s36:~/JAD$ head -3 file2.txt
SHAMJAD
R-MCA B
AJCE
```

7. tail

This command is used to display the last N number of lines

Syntax :- \$tail filename.txt

Output :-

```
ajc@s36:~/JAD$ tail file2.txt
SHAMJAD
R-MCA B
AJCE
Networks and system administrations
LAB No. 404
Linux

Terminal
```

8. cut -d- -f1

. -f (field): **-c** option is useful for fixed-length lines. Most unix files doesn't have fixed-length lines. To extract the useful information you need to cut by fields rather than columns. List of the fields number specified must be separated by comma. *Ranges are not described with -f option.* **cut** uses **tab** as a default field delimiter but can also work with other delimiter by using **-d** option.

Syntax :- \$ cut -d- -f1 filename.txt

Output :-

```
ajc@s36:~/JAD$ cut -d- -f1 cut.txt
VC
CN
JAVA
NSA
DBMS
IPR
```

9. cut -d- -f2

This command is used to display files in the last modified order.

Syntax :- \$ cut -d- -f2 filename.txt

Output :-

```
ajc@s36:~/JAD$ cut -d- -f2 cut.txt
28
40
15
13
35
32
```

NETWORKING & SYSTEM ADMINISTRATION LAB

Aim

Familiarization of the Linux commands.

Name: SHAMJAD MAZOOD NAZER

Roll No: 36

Batch: B

Date: 01-04-2022

Procedure

1 cut -d ‘ ’

If -d option is used then it considered space as a field separator or delimiter:

Syntax :- \$ cut -d ' ' f2 filename

Output :-

```
ajc@s36:~/JAD$ cut -d ' ' -f2 file3.txt
36
93
9
```

2. cut -b

To extract the specific bytes, you need to follow -b option with the list of byte numbers separated by comma. Range of bytes can also be specified using the hyphen(-). It is necessary to specify list of byte numbers otherwise it gives error. **Tabs and backspaces** are treated like as a character of 1 byte.

Syntax :- \$ cut -b 2 filename

Output :-

```
ajc@s36:~/JAD$ cut -b 2 file3.txt
h
a
a
```

3. cut –complement

As the name suggests it complement the output. This option can be used in the combination with other options either with -f or with -c.

Syntax :- \$ cut –complement -c 1 filename

Output :-

```
ajc@s36:~/JAD$ cut --complement -c 1 file3.txt
hamjad 36
adsprit 93
ad 9
```

4. paste

Paste command is one of the useful commands in Unix or Linux operating system. It is used to join files horizontally (parallel merging) by outputting lines consisting of lines from each file specified, separated by **tab** as delimiter, to the standard output.

Syntax :- \$ paste file1 file2

Output :-

```
student@536:~/Desktop/HWLAB/31-03-2022$ cat > marvel1
Captain America
Iron Man
Thor
Black Widow
Hulk
Spider Man
Groot
^Z
[3]+  Stopped                  cat > marvel1
student@536:~/Desktop/HWLAB/31-03-2022$ cat > marvel2
Nebula
Gamora
Wanda
Dr Strange
^Z
[4]+  Stopped                  cat > marvel2
student@536:~/Desktop/HWLAB/31-03-2022$ paste marvel1 marvel2
Captain America Nebula
Iron Man      Gamora
Thor      Wanda
Black Widow     Dr Strange
Hulk
Spider Man
Groot
student@536:~/Desktop/HWLAB/31-03-2022$ paste marvel1 marvel2 > marvel3
student@536:~/Desktop/HWLAB/31-03-2022$ cat  marvel3
Captain America Nebula
Iron Man      Gamora
Thor      Wanda
Black Widow     Dr Strange
Hulk
Spider Man
Groot
```

5. Paste -d (delimiter):

Paste command uses the tab delimiter by default for merging the files. The delimiter can be changed to any other character by using the **-d** option. If more than one character is specified as delimiter then paste uses it in a circular fashion for each file line separation.

Syntax : \$paste -d ‘-‘ file1 file2

Output :-

```
ajc@s36:~/JAD$ paste -d '-' marvel1 marvel2
Captain America-Nebula
Iron Man-Gamora
Thor-Wanda
Black Widow-Dr Strange
Hulk-
Spider Man-
Groot-
```

6.Paste -s (serial):

We can merge the files in sequentially manner using the -s option. It reads all the lines from a single file and merges all these lines into a single line with each line separated by tab. And these single lines are separated by newline.

Syntax : \$paste -s file1 file2

Output:-

```
ajc@s36:~/JAD$ paste -s marvel1 marvel2
Captain America Iron Man      Thor    Black Widow      Hulk      Spider Man      Groot
Nebula   Gamora   Wanda   Dr Strange
```

7. paste file1 file2 > file3

First and second files are merged into a third file.

Output:-

```
ajc@s36:~/JAD$ paste marvel1 marvel2 > marvel3
ajc@s36:~/JAD$ cat marvel3
Captain America Nebula
Iron Man      Gamora
Thor      Wanda
Black Widow     Dr Strange
Hulk
Spider Man
Groot
```

8. more :

more command is used to view the text files in the command prompt, displaying one screen at a time in case the file is large (For example log files). The more command also allows the user do scroll up and down through the page.

SPACE Key is act as a NEXT button.

B Key act as a PREVIOUS button.

ENTER key is used to view line by line.

Syntax :- \$more filename

Output :-

```
student@T70:~/NehaAntony$ more princess
Twelve princesses sleep in twelve beds in the same room. Every night, their doors are securely locked by their father. But in the morning, their dancing shoes are found to be worn through as if they had been dancing all night. The king, perplexed, asks his daughters to explain, but they refuse. The king then promises his kingdom and each daughter to any man who can discover the princesses' midnight secret within three days and three nights, but those who fail within the set time limit will be sentenced to death.

An old soldier returned from war comes to the king's call after several princes have failed in the attempt. Whilst traveling through a wood he comes upon an old woman, who gives him an enchanted cloak that he can use to observe the king's unaware daughters and tells him not to eat or drink anything given to him in the evening by any of the princesses and to pretend to be fast asleep until they leave.

The soldier is well received at the palace just as the others had been and indeed, in the evening, the princess royal (the eldest daughter) comes to his chamber and offers him a cup of wine. The soldier, remembering the old woman's advice, secretly throws it away and begins to snore loudly as if asleep.

The twelve princesses, assured that the soldier is asleep, dress themselves in fine dancing gowns and escape from their room by a trap door in the floor. The soldier, seeing this, puts on his magic cloak and follows them. He steps on the go
wn of the youngest princess, whose cry of alarm to her sisters is rebuffed by the eldest. The passageway leads them to three groves of trees;
--More--(26%)
```

9. more -s :

This option squeezes multiple blank lines into one single blank line.

Syntax :- \$more -s filename

Output :-

```
The soldier is well received at the palace just as the others had been and indeed, in the evening, the princess royal (the eldest daughter) comes to his chamber and offers him a cup of wine. The soldier, remembering the old woman's advice, secretly throws it away and begins to snore loudly as if asleep.

The twelve princesses, assured that the soldier is asleep, dress themselves in fine dancing gowns and escape from their room by a trap door in the floor. The soldier, seeing this, puts on his magic cloak and follows them. He steps on the go
wn of the youngest princess, whose cry of alarm to her sisters is rebuffed by the eldest. The passageway leads them to three groves of trees; the first having leaves of silver, the second of gold, and the third of glittering diamonds. The soldier, wishing for a token, breaks off a twig of each as evidence. They walk on until they come upon a great clear lake. Twelve boats, with twelve princes, appear where the twelve princesses are waiting. Each princess gets into one, and the soldier steps into the same boat with the twelfth and youngest princess. The youngest princess complains that the prince is not rowing fast enough, not knowing the soldier is in the boat. On the other side of the lake stands a castle, into which all the princesses go and dance the night away.

The twelve princesses happily dance all night until their shoes are worn through and they are obliged to leave. The strange adventure continues on the second and third nights, and everything happens just as before, except that on the third night the soldier carries away a golden cup as a token of where he has been. When it comes time for him to declare the princesses' secret, he goes before the king with the three branches and the golden cup, and tells the king about all he has seen. The princesses know that there is no use in denying the truth, and confess. The soldier chooses the eldest princess as his bride for he is not a very young man, and is made the King's heir. The twelve princes are put under a curse for as many nights as they danced with the princesses.

Twelve princesses sleep in twelve beds in the same room. Every night, their doors are securely locked by their father. But in the morning, their dancing shoes are found to be worn through as if they had been dancing all night. The king, perplexed, asks his daughters to explain, but they refuse. The king then promises his kingdom and each daughter to any man who can discover the princesses' midnight secret within three days and three nights, but those who fail within the set time limit will be sentenced to death.

An old soldier returned from war comes to the king's call after several princes have failed in the attempt. Whilst traveling through a wood he comes upon an old woman, who gives him an enchanted cloak that he can use to observe the king's unaware daughters and tells him not to eat or drink anything given to him in the evening by any of the princesses and to pretend to be fast asleep until they leave.

The soldier is well received at the palace just as the others had been and indeed, in the evening, the princess royal (the eldest daughter) comes to his chamber and offers him a cup of wine. The soldier, remembering the old woman's advice, secretly throws it away and begins to snore loudly as if asleep.

The twelve princesses, assured that the soldier is asleep, dress themselves in fine dancing gowns and escape from their room by a trap door in
```

10. more +n :

This option displays the text after the specified number of lines of the document.

Syntax :- \$ more +n filename

Output :-

An old soldier returned from war comes to the king's call after several princes have failed in the attempt. Whilst traveling through a wood he comes upon an old woman, who gives him an enchanted cloak that he can use to observe the king's unaware daughters and tells him not to eat or drink anything given to him in the evening by any of the princesses and to pretend to be fast asleep until they leave.

The soldier is well received at the palace just as the others had been and indeed, in the evening, the princess royal (the eldest daughter) comes to his chamber and offers him a cup of wine. The soldier, remembering the old woman's advice, secretly throws it away and begins to snore loudly as if asleep.

The twelve princesses, assured that the soldier is asleep, dress themselves in fine dancing gowns and escape from their room by a trap door in the floor. The soldier, seeing this, puts on his magic cloak and follows them. He steps on the gown of the youngest princess, whose cry of alarm to her sisters is rebuffed by the
--More--(26%)

11. more -n :

type the number of lines that you want to display per screen.

Syntax :- \$ more -n filename

Output :-

Twelve princesses sleep in twelve beds in the same room. Every night, their doors are securely locked by their father. But in the morning, their dancing shoes are found to be worn through as if they had been dancing all night. The king, perplexed, asks his daughters to explain, but they refuse. The king then promises his kingdom and each daughter to any man who can discover the princesses' midnight secret within three days and three nights, but those who fail within the set time limit will be sentenced to death.

An old soldier returned from war comes to the king's call after several princes have failed in the attempt. Whilst traveling through a wood he comes upon an old woman, who gives him an enchanted cloak that he can use to observe the king's unaware daughters and tells him not to eat or drink anything given to him in the evening by any of the princesses and to pretend to be fast asleep until they leave.

The soldier is well received at the palace just as the others had been and indeed, in the evening, the princess royal (the eldest daughter) comes to his chamber and offers him a cup of wine. The soldier, remembering the old woman's advice, secretly throws it away and begins to snore loudly as if asleep.

NETWORKING & SYSTEM ADMINISTRATION LAB

Aim

Familiarization of the Linux commands

Procedure

1 cp

cp command is used to copy a file or a directory.

Syntax:

\$cp sourcefile destinationfile

Output :

```
ajc@s36:~/JAD$ cp cut.txt file1.txt
ajc@s36:~/JAD$ cat file1.txt
VC-28
CN-40
JAVA-15
NSA-13
DBMS-35
IPR-32
```

2 cp -r

To copy a directory along with its sub directories.

Syntax :

\$cp -r sourcedirectory destinationdirectory

Output :

```
ajc@s36:~$ cp -r JAD MCA36
ajc@s36:~$ cd MCA36
ajc@s36:~/MCA36$ ls
cut.txt      marvel1
file1.txt    marvel2
file2.txt    marvel3
file3.txt    newfile.txt
ajc@s36:~/MCA36$
```

3 cp -i

The cp '-i' option allows you to confirm once before overwriting your file.

Syntax :

\$cp -i filename directory

Output :

```
student@S36:~/Desktop/HWLAB/04-04-2022$ cd sample
student@S36:~/Desktop/HWLAB/04-04-2022/sample$ cat doc1
hello
student@S36:~/Desktop/HWLAB/04-04-2022/sample$ cd ..
student@S36:~/Desktop/HWLAB/04-04-2022$ cp -i doc1 sample
cp: overwrite 'sample/doc1'? y
student@S36:~/Desktop/HWLAB/04-04-2022$
```

Name: SHAMJAD MAZOOD NAZER

Roll No: 36

Batch: MCA-B

Date: 04-04-2022

4 mv

mv stands for **move**. **mv** is used to move one or more files or directories from one place to another in a file system like UNIX. It has two distinct functions:

- (i) It renames a file or folder.
- (ii) It moves a group of files to a different directory.

Syntax :

```
$ mv sourcefile destinationfile
```

Output :

```
student@536:~/Desktop/HWLAB/04-04-2022$ mv doc1 sample
student@536:~/Desktop/HWLAB/04-04-2022$ ls
sample
student@536:~/Desktop/HWLAB/04-04-2022$
```

5 mv -i

The **-i** option makes the command ask the user for confirmation before moving a file that would overwrite an existing file

Syntax :

```
$ mv -i sourcefile destinationdirectory
```

Output:

```
student@536:~/Desktop/HWLAB/04-04-2022$ mv -i doc1 sample
mv: overwrite 'sample/doc1'? y
student@536:~/Desktop/HWLAB/04-04-2022$ cd sample
student@536:~/Desktop/HWLAB/04-04-2022/sample$ cat doc1
mv -i command
```

NETWORKING & SYSTEM ADMINISTRATION LAB

Aim

Familiarization of Linux commands

Procedure

1 read

The Linux **read** command is used to read the contents of a line into a variable.

Syntax

```
$read variable_name
```

```
student@S36:~/Desktop/S2/HWLAB/21-04-2022$ read name
SHAMJAD MAZOOD NAZER
student@S36:~/Desktop/S2/HWLAB/21-04-2022$ echo $name
SHAMJAD MAZOOD NAZER
student@S36:~/Desktop/S2/HWLAB/21-04-2022$ █
```

Name: SHAMJAD MAZODD NAZER

Roll No: 36

Batch: MCA -B

Date: 21-04-2022

2. locate

The locate command and [find](#) command is used to search a file by name. But, the difference between both commands is that locate command is a background process and searches the file in the database whereas, find command searches in the filesystem. The locate command is much faster than find command.

Syntax

```
$locate filename.txt
```

```
student@S36:~/Desktop/S2/HWLAB/21-04-2022$ locate marvel1
/home/student/Desktop/S2/HWLAB/31-03-2022/marvel1
student@S36:~/Desktop/S2/HWLAB/21-04-2022$ █
```

3. locate -i

It is used to ignore case sensitivity of the specified patterns.

Syntax

```
$locate -i filename.txt
```

```
student@S36:~/Desktop/S2/HWLAB/21-04-2022$ locate -i MarVeL1
/home/student/Desktop/S2/HWLAB/31-03-2022/marvel1
student@S36:~/Desktop/S2/HWLAB/21-04-2022$ █
```

4 find

The find command helps us to find a particular file within a directory. It is used to find the list of files for the various conditions like permission, user ownership, modification, date/time, size, and more.

Syntax

\$find filename.txt

```
student@S36:~/Desktop/S2/HWLAB/31-03-2022$ ls
content  file2.txt  file.txt  marvel1  marvel2  marvel3
student@S36:~/Desktop/S2/HWLAB/31-03-2022$ find marvel2
marvel2
student@S36:~/Desktop/S2/HWLAB/31-03-2022$
```

5.grep

The 'grep' command stands for "**g**lobal **r**egular **e**xpression **p**rint". grep command filters the content of a file which makes our search easy.

Syntax

\$grep word filename.txt

```
student@S36:~/Desktop/S2/HWLAB/31-03-2022$ grep "Captain America" marvel1
Captain America
student@S36:~/Desktop/S2/HWLAB/31-03-2022$
```

6. grep -i

The 'grep -i' command filters output in a case-insensitive way.

Syntax

\$grep -i word filename.txt

```
student@S36:~/Desktop/S2/HWLAB/31-03-2022$ grep -i iRoN marvel1
Iron Man
student@S36:~/Desktop/S2/HWLAB/31-03-2022$
```

7 grep -v

The 'grep -v' command displays lines not matching to the specified word.

Syntax

\$grep -v word filename.txt

```
student@S36:~/Desktop/S2/HWLAB/31-03-2022$ grep -v Iron marvel1
Captain America
Thor
Black Widow
Hulk
Spider Man
Groot
student@S36:~/Desktop/S2/HWLAB/31-03-2022$
```

8. grep -A1

grep -A command is used to display the line after the result.

Syntax

```
$grep -A word file.txt
```

```
student@S36:~/Desktop/S2/HWLAB/31-03-2022$ grep -A1 Iron marvel1
Iron Man
Thor
```

9. grep -B1

grep -B command is used to display the line before the result.

Syntax

```
$grep -B word file.txt
```

```
student@S36:~/Desktop/S2/HWLAB/31-03-2022$ grep -B1 Iron marvel1
Captain America
Iron Man
```

10. grep -C1

grep -C command is used to display the line after and line before the result.

Syntax

```
$grep -C word file.txt
```

```
student@S36:~/Desktop/S2/HWLAB/31-03-2022$ grep -C1 Iron marvel1
Captain America
Iron Man
Thor
```

11. df

Linux df command is used to display the disk space used in the file system. The 'df' stands for "disk filesystem." It defines the number of blocks used, the number of blocks available, and the directory where the file system is mounted.

Syntax

\$df

Filesystem	1K-blocks	Used	Available	Use%	Mounted on
udev	3989832	0	3989832	0%	/dev
tmpfs	803864	1852	802012	1%	/run
/dev/sda6	114460828	35098700	73504748	33%	/
tmpfs	4019320	0	4019320	0%	/dev/shm
tmpfs	5120	4	5116	1%	/run/lock
tmpfs	4019320	0	4019320	0%	/sys/fs/cgroup
/dev/loop0	207872	207872	0	100%	/snap/vlc/1397
/dev/loop18	256	256	0	100%	/snap/gtk2-common-themes/9
/dev/loop1	66816	66816	0	100%	/snap/gtk-common-themes/1519
/dev/loop2	63488	63488	0	100%	/snap/core20/1376
/dev/loop26	1024	1024	0	100%	/snap/gnome-logs/81
/dev/loop28	164096	164096	0	100%	/snap/gnome-3-28-1804/116
/dev/loop4	46080	46080	0	100%	/snap/gtk-common-themes/1440
/dev/loop6	56960	56960	0	100%	/snap/core18/2344
/dev/loop10	768	768	0	100%	/snap/gnome-characters/761
/dev/loop21	640	640	0	100%	/snap/gnome-logs/106
/dev/loop11	128	128	0	100%	/snap/bare/5
/dev/loop9	302848	302848	0	100%	/snap/vlc/2344
/dev/loop13	768	768	0	100%	/snap/gnome-characters/741
/dev/loop16	256	256	0	100%	/snap/gtk2-common-themes/13
/dev/loop25	2688	2688	0	100%	/snap/gnome-calculator/920
/dev/loop31	2688	2688	0	100%	/snap/gnome-system-monitor/174
/dev/loop15	2560	2560	0	100%	/snap/gnome-calculator/884
/dev/loop17	56960	56960	0	100%	/snap/core18/2284
/dev/loop20	144128	144128	0	100%	/snap/gnome-3-26-1604/104
/dev/loop24	224256	224256	0	100%	/snap/gnome-3-34-1804/77
/dev/loop22	63488	63488	0	100%	/snap/core20/1405
/dev/loop27	144128	144128	0	100%	/snap/gnome-3-26-1604/98
/dev/loop32	540928	540928	0	100%	/snap/pycharm-community/274
/dev/loop30	2688	2688	0	100%	/snap/gnome-system-monitor/169
/dev/loop7	400768	400768	0	100%	/snap/gimp/383
/dev/loop12	253952	253952	0	100%	/snap/gnome-3-38-2004/87
/dev/loop19	168832	168832	0	100%	/snap/gnome-3-28-1804/161
/dev/loop23	283776	283776	0	100%	/snap/gimp/380
/dev/loop5	254848	254848	0	100%	/snap/gnome-3-38-2004/99
/dev/loop29	114304	114304	0	100%	/snap/core/12941

12. df -m

it is used to see the report in mega byte

Syntax

\$df -m

Filesystem	1M-blocks	Used	Available	Use%	Mounted on
udev	3897	0	3897	0%	/dev
tmpfs	786	2	784	1%	/run
/dev/sda6	111779	34277	71782	33%	/
tmpfs	3926	0	3926	0%	/dev/shm
tmpfs	5	1	5	1%	/run/lock
tmpfs	3926	0	3926	0%	/sys/fs/cgroup
/dev/loop0	203	203	0	100%	/snap/vlc/1397
/dev/loop18	1	1	0	100%	/snap/gtk2-common-themes/9
/dev/loop1	66	66	0	100%	/snap/gtk-common-themes/1519
/dev/loop2	62	62	0	100%	/snap/core20/1376
/dev/loop26	1	1	0	100%	/snap/gnome-logs/81
/dev/loop28	161	161	0	100%	/snap/gnome-3-28-1804/116
/dev/loop4	45	45	0	100%	/snap/gtk-common-themes/1440
/dev/loop6	56	56	0	100%	/snap/core18/2344
/dev/loop10	1	1	0	100%	/snap/gnome-characters/761
/dev/loop21	1	1	0	100%	/snap/gnome-logs/106
/dev/loop11	1	1	0	100%	/snap/bare/5
/dev/loop9	296	296	0	100%	/snap/vlc/2344
/dev/loop13	1	1	0	100%	/snap/gnome-characters/741
/dev/loop16	1	1	0	100%	/snap/gtk2-common-themes/13
/dev/loop25	3	3	0	100%	/snap/gnome-calculator/920
/dev/loop31	3	3	0	100%	/snap/gnome-system-monitor/174
/dev/loop15	3	3	0	100%	/snap/gnome-calculator/884
/dev/loop17	56	56	0	100%	/snap/core18/2284
/dev/loop20	141	141	0	100%	/snap/gnome-3-26-1604/104
/dev/loop24	219	219	0	100%	/snap/gnome-3-34-1804/77
/dev/loop22	62	62	0	100%	/snap/core20/1405
/dev/loop27	141	141	0	100%	/snap/gnome-3-26-1604/98
/dev/loop32	529	529	0	100%	/snap/pycharm-community/274
/dev/loop30	3	3	0	100%	/snap/gnome-system-monitor/169
/dev/loop7	392	392	0	100%	/snap/gimp/383
/dev/loop12	248	248	0	100%	/snap/gnome-3-38-2004/87
/dev/loop19	165	165	0	100%	/snap/gnome-3-28-1804/161
/dev/loop23	278	278	0	100%	/snap/gimp/380
/dev/loop5	249	249	0	100%	/snap/gnome-3-38-2004/99
/dev/loop29	112	112	0	100%	/snap/core/12941

13. du

To check how much space a file or directory take.

Syntax

\$du

```
student@S36:~/Desktop/S2/HWLAB$ du
36      ./31-03-2022
4       ./21-04-2022
12      ./04-04-2022/sample
808     ./04-04-2022
720     ./24-03-2022
1572    .
student@S36:~/Desktop/S2/HWLAB$ █
```

14. wc

Linux wc command helps in counting the lines, words, and characters in a file. It displays the number of lines, number of characters, and the number of words in a file. Mostly, it is used with pipes for counting operation.

Syntax

\$wc filename.txt

```
student@S36:~/Desktop/S2/HWLAB/31-03-2022$ wc marvel3
7 16 98 marvel3
```

-l, --lines: It is used to print the newline counts.

-w, --words: It is used to print the word counts.

-c, --bytes: It is used to print the byte counts.

-m, --chars: It is used to print the character counts.

```
student@S36:~/Desktop/S2/HWLAB/31-03-2022$ wc -c marvel3
98 marvel3
```

```
student@S36:~/Desktop/S2/HWLAB/31-03-2022$ wc -m marvel3
98 marvel3
```

```
student@S36:~/Desktop/S2/HWLAB/31-03-2022$ wc -l marvel3
7 marvel3
```

```
student@S36:~/Desktop/S2/HWLAB/31-03-2022$ wc -w marvel3
16 marvel3
student@S36:~/Desktop/S2/HWLAB/31-03-2022$ █
```

NETWORKING & SYSTEM ADMINISTRATION LAB

Aim

Familiarization of Linux commands

Procedure

1 useradd

useradd is a command in Linux that is used to add user accounts to your system

Output

```
mca@S36:~/Desktop/S2/25-04-2022$ sudo useradd SHAMJAD
[sudo] password for mca:
mca@S36:~/Desktop/S2/25-04-2022$ sudo useradd SHAMJAD
useradd: user 'SHAMJAD' already exists
```

2 passwd

passwd command in Linux is used to change the user account passwords. The root user reserves the privilege to change the password for any user on the system, while a normal user can only change the account password for his or her own account.

Syntax:

passwd [options] [username]

Output

```
mca@S36:~/Desktop/S2/25-04-2022$ sudo passwd SHAMJAD
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
```

3. groupadd

groupadd command is used to create a new user group.

Syntax:

groupadd [option] group_name

Output

Name: SHAMJAD MAZOOD NAZER

Roll No: 36

Batch: MCA -B

Date: 25-04-2022

```
mca@S36:~/Desktop/S2/25-04-2022$ sudo groupadd -g 404 R-MCA-B
mca@S36:~/Desktop/S2/25-04-2022$ sudo groupadd -g 404 R-MCA-B
groupadd: group 'R-MCA-B' already exists
```

4.usermod

usermod command or modify user is a command in Linux that is used to change the properties of a user in Linux through the command line

Output

```
mca@S36:~/Desktop/S2/25-04-2022$ sudo usermod -G R-MCA-B SHAMJAD
mca@S36:~/Desktop/S2/25-04-2022$ id SHAMJAD
uid=1004(SHAMJAD) gid=1007(SHAMJAD) groups=1007(SHAMJAD),404(R-MCA-B)
```

5. compgen

compgen is a bash built-in command which is used to list all the commands that could be executed in the Linux system. This command could also be used to count the total number of commands present in the terminal or even to look for a command with the specific keyword.

Output

```
mca@S36:~/Desktop/S2/25-04-2022$ sudo groupadd -g 403 AMAL
mca@S36:~/Desktop/S2/25-04-2022$ compgen -g
root
daemon
bin
sys
adm
tty
disk
lp
```

```
rdma
student
exam
RMCA-B
SHAMJAD
R-MCA-B
AMAL
```

6. userdel

userdel command in Linux system is used to delete a user account and related files. This command basically modifies the system account files, deleting all the entries which refer to the username LOGIN. It is a low-level utility for removing the users.

Output

```
mca@S36:~/Desktop/S2/25-04-2022$ sudo userdel SHAMJAD
mca@S36:~/Desktop/S2/25-04-2022$ sudo userdel SHAMJAD
userdel: user 'SHAMJAD' does not exist
```

7.groupdel

groupdel command is used to delete a existing group. It will delete all entry that refers to the group, modifies the system account files, and it is handled by superuser or root user.

Output

```
mca@S36:~/Desktop/S2/25-04-2022$ sudo groupdel AMAL
groupdel: group 'AMAL' does not exist
```

8.chmod

the chmod command is used to change the access mode of a file. The name is an abbreviation of change mode.

Output

```
mca@S36:~/Desktop/S2/25-04-2022$ cat > sample.txt
This is a sample text file.
we perform some file prvlg oprtns.
here we go...
^Z
[1]+  Stopped                  cat > sample.txt
mca@S36:~/Desktop/S2/25-04-2022$ chmod +rwx sample.txt
mca@S36:~/Desktop/S2/25-04-2022$ chmod -wx sample.txt
mca@S36:~/Desktop/S2/25-04-2022$ cat >> sample.txt
bash: sample.txt: Permission denied
```

9 chown

chown command is used to change the file Owner or group. Whenever you want to change ownership you can use chown command.

Output

```
mca@S36:~/Desktop/S2/25-04-2022$ sudo chown JAD ownership.txt
mca@S36:~/Desktop/S2/25-04-2022$ ls -l ownership.txt
-rw-r--r-- 1 JAD mca 53 Apr 25 15:01 ownership.txt
```

NETWORKING & SYSTEM ADMINISTRATION LAB

Experiment No.: 4

Name: SHAMJAD MAZOOD NAZER

Roll No: 36

Batch: MCA -B

Date: 05-05-2022

Aim

Shell scripting: study bash syntax, environment variables, variables, control constructs such as if, for and while, aliases and functions, accessing command line arguments passed to shell scripts. Study of startup scripts, login and logout scripts, familiarity with systemd and system 5 init scripts is expected.

Question

Shell program to print a value

Procedure

```
#!/bin/bash
# This is my first shell
echo "Hello World"
```

Output

```
ajc@s36:~/JAD$ bash basic.sh
Hello World!
```

NETWORKING & SYSTEM ADMINISTRATION LAB

Question

Shell program to add 2 numbers

Procedure

```
#!/bin/bash
```

```
echo "enter the value 1"
```

```
read a
```

```
echo "enter the value 2"
```

```
read b
```

```
d=$((a + b))
```

```
echo "sum=\"$d"
```

Output

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Roll No:36

Batch: MCA -B

Date: 05-05-2022

```
student@S36:~/Desktop/SHAMJAD/HWLAB/SHELL SCRIPT/05-05-2022$ bash addTwoNumbers.sh
Enter the value of A :
5
Enter the value of B :
4
The sum of 5 + 4 is : 9
9 is greater than Zero
student@S36:~/Desktop/SHAMJAD/HWLAB/SHELL SCRIPT/05-05-2022$ █
```

NETWORKING & SYSTEM ADMINISTRATION LAB

Question

Shell program to check largest of 2 numbers

Procedure

```
#!/bin/bash  
echo "enter 2 numbers"  
read a  
read b  
echo $a $b  
if [ $a -gt $b ]  
then  
echo "$a is greater"  
else  
echo "$b is greater"  
fi
```

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Roll No: 36

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Date: 05-05-2022

Output

```
student@S36:~/Desktop/SHAMJAD/HWLAB/SHELL SCRIPT/05-05-2022$ ./largestOfTwo.sh  
Enter the Var 1 :  
20  
Enter the Var 2 :  
10  
20 is greater than 10!  
student@S36:~/Desktop/SHAMJAD/HWLAB/SHELL SCRIPT/05-05-2022$
```

NETWORKING & SYSTEM ADMINISTRATION LAB

Question

Shell program to check largest of 3 numbers

Procedure

```
#!/bin/bash
```

```
echo "enter 3 numbers"
```

```
read a
```

```
read b
```

```
read c
```

```
if [ $a -gt $b -a $a -gt $c ]
```

```
then
```

```
echo "$a is greater"
```

```
elif [ $b -gt $a -a $b -gt $c ]
```

```
then
```

```
echo "$b is greater"
```

```
else
```

```
echo "$c is greater"
```

```
fi
```

Name: SHAMJAD MAZOOD NAZER

Roll No: 36

Batch: MCA -B

Date: 05-05-2022

Output

```
student@S36:~/Desktop/SHAMJAD/HWLAB/SHELL SCRIPT/05-05-2022$ ./largestofThree.sh
Enter the var1 :
10
Enter the var2 :
50
Enter the var3 :
25
50 is largest among 10 and 25
student@S36:~/Desktop/SHAMJAD/HWLAB/SHELL SCRIPT/05-05-2022$ █
```

NETWORKING & SYSTEM ADMINISTRATION LAB

Question

Shell program to check given number is odd or even

Procedure

```
#!/bin/bash
echo "enter the value"
read a
if [ $((a % 2)) -eq 0 ]
then
echo "even"
else
echo "odd"
fi
```

Output

```
student@S36:~/Desktop/SHAMJAD/HWLAB/SHELL SCRIPT/05-05-2022$ bash oddOrEven.sh
Enter the Value :
93
93 is an Odd Number!
student@S36:~/Desktop/SHAMJAD/HWLAB/SHELL SCRIPT/05-05-2022$ █
```

Name: SHAMJAD MAZOOD NAZER

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Batch: MCA -B

Date: 05-05-2022

NETWORKING & SYSTEM ADMINISTRATION LAB

Question

Write a shellscript to display current date and calendar

Procedure

```
#!/bin/bash
```

```
echo " Todays date="
```

```
echo $(date)
```

```
echo "Calender="
```

```
cal
```

Name: SHAMJAD MAZOOD NAZER

Roll No: 23

Batch: MCA -B

Date: 09-05-2022

Output

```
ajc@s36:~/JAD$ bash calender.sh
      Calendar is
      July 2022
Su Mo Tu We Th Fr Sa
          1  2
 3  4  5  6  7  8  9
10 11 12 13 14 15 16
17 18 19 20 21 22 23
24 25 26 27 28 29 30
31
Today is : Saturday 09 July 2022 05:24:49 PM IST
```

NETWORKING & SYSTEM ADMINISTRATION LAB

Question

Write a shell script to check a number is greater than or less than or equal to another number

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Roll No: 36

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Date: 09-05-2022

Procedure

```
#!/bin/bash

echo "enter the two numbers"
read a
read b
if [ $a -gt $b ]
then
echo "$a is greater than $b"
elif [ $a -lt $b ]
then
echo "$a is less than $b"
elif [ $a -eq $b ]
then
echo "$a is equal to $b "
else
echo "invalid"
fi
```

Output

```
ajc@s36:~/JAD$ bash checkNumbers.sh
Enter the first number :
3
Enter the number to compare:
1
3 is greater than 1
ajc@s36:~/JAD$ █
```

NETWORKING & SYSTEM ADMINISTRATION LAB

Question

Find the sum of first 10 numbers

Procedure

```
#!/bin/bash
i=1
summ=0
while [ $i -le 10 ]
do
    summ=$((summ+i))
    i=$((i+1))
done
echo "sum of first 10 numbers = $summ"
```

Name: SHAMJAD MAZOOD NAZER

Roll No: 23

Batch: MCA-B

Date: 09-05-2022

Output Screenshot

```
ajc@s36:~/JAD$ bash sumNumbers.sh
Sum of First 10 numbers is : 55
```

NETWORKING & SYSTEM ADMINISTRATION LAB

Question

Write a shell script to find the sum, average and product of 4 numbers

Procedure

```
#!/bin/bash
echo "enter 4 numbers"
read a
read b
read c
read d
sum1=$((a+b+c+d))
p=`expr $a \* $b \* $c \* $d`
avg=$((sum1/4| bc -l))
echo "Sum=$sum1"
echo "product= $p"
echo "average=$avg"
```

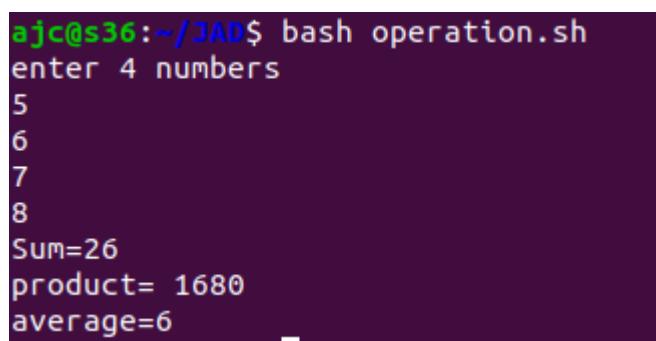
Name: SHAMJAD MAZOOD NAZER

Roll No: 36

Batch: MCA-B

Date: 09-05-2022

Output Screenshot



A terminal window showing the execution of a shell script named 'operation.sh'. The user enters four numbers (5, 6, 7, 8) and the script calculates their sum (26), product (1680), and average (6).

```
ajc@s36:~/JAD$ bash operation.sh
enter 4 numbers
5
6
7
8
Sum=26
product= 1680
average=6
```

NETWORKING & SYSTEM ADMINISTRATION LAB

Question

Find the factorial of the given number

Procedure

```
#!/bin/bash
fact=1
echo "enter the number"
read n
for (( i=2 ; i<=n ; i++ ))
do
fact=`expr $fact \* $i`
done
echo "$n != $fact"
```

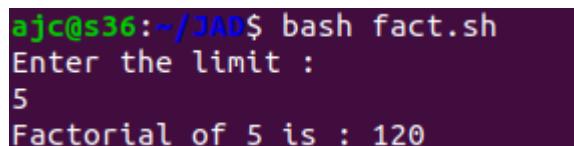
Name: SHAMJAD MAZOOD NAZER

Roll No: 36

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Output Screenshot



```
ajc@s36:~/JAD$ bash fact.sh
Enter the limit :
5
Factorial of 5 is : 120
```

NETWORKING & SYSTEM ADMINISTRATION LAB

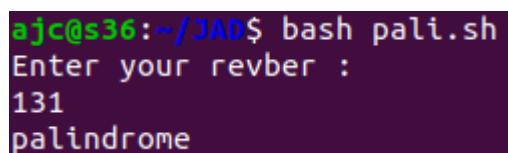
Question

Find the palindrome of a given number

Procedure

```
#!/bin/bash  
  
echo "enter the number"  
  
read n  
  
a=$n  
  
rev=0  
  
while [ $n -gt 0 ]  
  
do  
  
r=$((n%10))  
  
rev=`expr $rev \* 10 + $r`  
  
n=`expr $n / 10 `  
  
done  
  
if [ $a -eq $rev ]  
  
then  
  
echo "palindrome"  
  
else  
  
echo "not palindrome"  
  
fi
```

Output Screenshot



A terminal window showing the execution of a bash script named pali.sh. The user enters the number 131, and the script outputs "palindrome".

```
ajc@s36:~/JAD$ bash pali.sh  
Enter your revber :  
131  
palindrome
```

Name: SHAMJAD MAZOOD NAZER

Roll No: 36

Batch: MCA-B

Date: 09-05-2022

NETWORKING & SYSTEM ADMINISTRATION LAB

Question

Check whether the given year is leap year or not

Procedure

```
#!/bin/bash  
  
echo "enter the year"  
  
read y  
  
if [ $(($y%4)) == 0 ] && [ $(($y%100)) != 0 ] || [ $(($y%400)) == 0 ]  
then  
    echo "$y is a leap year"  
else  
    echo "$y is not a leap year"  
fi
```

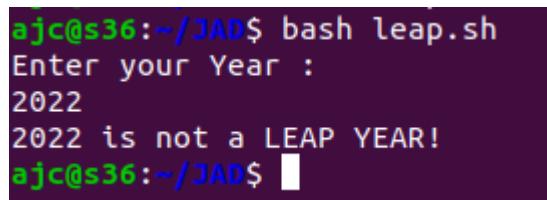
Name: SHAMJAD MAZOOD NAZER

Roll No: 36

Batch: MCA-B

Date: 09-05-2022

Output Screenshot



```
ajc@s36:~/JAD$ bash leap.sh  
Enter your Year :  
2022  
2022 is not a LEAP YEAR!  
ajc@s36:~/JAD$ █
```

A terminal window showing the execution of a bash script named 'leap.sh'. The user enters '2022' when prompted for a year. The script outputs that 2022 is not a leap year.

NETWORKING & SYSTEM ADMINISTRATION LAB

Question

Write a shell script program to find the sum of all the digits in a number

Name: SHAMJAD MAZOOD NAZER

Roll No: 36

Batch: MCA-B

Date: 12-05-2022

Procedure

```
#!/bin/bash
echo "Enter the number"
read a
while [ $a -ne 0 ]
do
r=$((a%10))
s=$((s+r))
a=$((a/10))
done
echo "Sum of digit = "$s
```

Output Screenshot

```
student@S36:~/Desktop/R-MCA(B)/12-05-2022$ bash sumOfDigit.sh
Enter the number :
143
Sum of Digits is : 8
student@S36:~/Desktop/R-MCA(B)/12-05-2022$
```

NETWORKING & SYSTEM ADMINISTRATION LAB

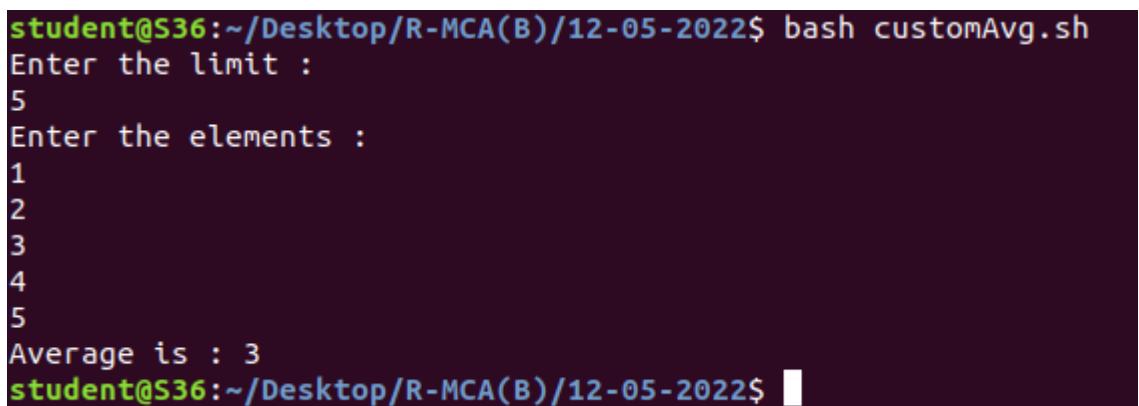
Question

Write a shell script program to find the sum and average of numbers in command line

Procedure

```
#!/bin/bash  
  
i=0  
  
echo "enter the size"  
  
read n  
  
echo "enter the numbers"  
  
while [ $i -lt $n ]  
  
do  
  
read a  
  
sum=$((sum+a))  
  
avg=$((sum/n))  
  
i=$((i+1))  
  
done  
  
echo "sum=$sum"  
  
echo "average= $avg"
```

Output Screenshot



A terminal window showing the execution of a shell script named customAvg.sh. The user enters the limit as 5 and the elements as 1, 2, 3, 4, 5. The output shows the average is 3.

```
student@S36:~/Desktop/R-MCA(B)/12-05-2022$ bash customAvg.sh  
Enter the limit :  
5  
Enter the elements :  
1  
2  
3  
4  
5  
Average is : 3  
student@S36:~/Desktop/R-MCA(B)/12-05-2022$ █
```

Name: SHAMJAD MAZOOD NAZER

Roll No: 23

Batch: MCA-B

Date: 12-05-2022

NETWORKING & SYSTEM ADMINISTRATION LAB

Question

Write a shell script program to do mathematical calculations using switch case

Name: SHAMJAD MAZOOD NAZER

Roll No: 36

Batch: MCA-B

Date: 12-05-2022

Procedure

```
#!/bin/bash

echo "enter two number"
read a
read b

echo " 1.Addition "
echo " 2.Substraction "
echo " 3.Multiplication "
echo "4.Division"
echo "5.Exit"

s=1

while [ $s == 1 ]
do
echo "Enter the choice"
read ch
case $ch in
1)
echo "sum= $"((a+b))
;;
2)
echo "Substraction=" $"((a-b))
;;
3)
echo "Multiplication=" $"((a*b))
;;
esac
done
```

4)

```
echo "divison=\"$((a/b))"
```

```
::
```

```
5)exit
```

```
::
```

```
*
```

```
echo "invalid"
```

```
::
```

```
esac
```

```
done
```

Output Screenshot

```
student@S36:~/Desktop/R-MCA(B)/12-05-2022$ bash switchCaseCalculator.sh
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Modulus(%)
6. Exit
Enter Your Choice :
1
Enter the number 1 :
4
Enter the number 2 :
2
4 + 2 = 6
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Modulus(%)
6. Exit
Enter Your Choice :
2
Enter the number 1 :
4
Enter the number 2 :
2
4 - 2 = 2
1. Addition
2. Subtraction
3. Multiplication
4. Division
5. Modulus(%)
6. Exit
Enter Your Choice :
3
Enter the number 1 :
4
Enter the number 2 :
```

NETWORKING & SYSTEM ADMINISTRATION LAB

Question

Accessing command line arguments passed to shell

Name: SHAMJAD MAZOOD NAZER

Roll No: 36

Batch: MCA -B

Date: 07-06-2022

Procedure

```
#!/bin/bash
echo "Average of four numbers="$1 $2 $3 $4
sum=$((1+$2+$3+$4))
echo "Sum is : "$sum
avg=$((sum/4|bc-l))
echo "Average : "
echo $avg
```

Output

```
ajc@s36:~/JAD$ bash cmdSumAvg.sh 1 2 3 4
Sum is : 10
Average :
2.50000000000000000000000000000000
```

NETWORKING & SYSTEM ADMINISTRATION LAB

Experiment No.: 5

Aim

Installation and configuration of LAMP stack.

Deploy an open source application such as phpMyAdmin and WordPress.

Name: SHAMJAD MAZOOD NAZER

Roll No: 36

Batch: MCA-B

Date: 07-06-2022

Procedure

INSTALLING APACHE

Step 1 :Installing Apache and Updating the Firewall

The Apache web server is a popular open source web server that can be used along with PHP to host dynamic websites.

First, make sure your apt cache is updated with:

Syntax: \$sudo apt update

Output:

```
mca@ajce:~$ sudo apt update
[sudo] password for mca:
Hit:1 http://in.archive.ubuntu.com/ubuntu focal InRelease
Hit:2 http://in.archive.ubuntu.com/ubuntu focal-updates InRelease
Hit:3 http://in.archive.ubuntu.com/ubuntu focal-backports InRelease
Get:4 http://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Get:5 http://security.ubuntu.com/ubuntu focal-security/main amd64 Packages [1,544 kB]
Get:6 http://security.ubuntu.com/ubuntu focal-security/main i386 Packages [452 kB]
Get:7 http://security.ubuntu.com/ubuntu focal-security/main Translation-en [264 kB]
Get:8 http://security.ubuntu.com/ubuntu focal-security/main amd64 DEP-11 Metadata [40.7 kB]
Get:9 http://security.ubuntu.com/ubuntu focal-security/restricted amd64 Packages [1,001 kB]
Get:10 http://security.ubuntu.com/ubuntu focal-security/restricted Translation-en [142 kB]
Get:11 http://security.ubuntu.com/ubuntu focal-security/universe amd64 DEP-11 Metadata [66.2 kB]
Get:12 http://security.ubuntu.com/ubuntu focal-security/multiverse amd64 DEP-11 Metadata [2,464 B]
Fetched 3,626 kB in 2s (1,480 kB/s)
Reading package lists... Done
Building dependency tree
Reading state information... Done
602 packages can be upgraded. Run 'apt list --upgradable' to see them.
```

Step2 :Install Apache 2

Once the cache has been updated, you can install Apache with:

Syntax: \$ sudo apt update

Press Y and hit ENTER to confirm, and the installation will proceed.

Output:

```
mca@ajce:~$ sudo apt install apache2
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  apache2-bin apache2-data apache2-utils libapr1 libaprutil1
  libaprutil1-dbd-sqlite3 libaprutil1-ldap liblua5.2-0
Suggested packages:
  apache2-doc apache2-suexec-pristine | apache2-suexec-custom
The following NEW packages will be installed:
  apache2 apache2-bin apache2-data apache2-utils libapr1 libaprutil1
  libaprutil1-dbd-sqlite3 libaprutil1-ldap liblua5.2-0
0 upgraded, 9 newly installed, 0 to remove and 602 not upgraded.
Need to get 1,820 kB of archives.
After this operation, 7,945 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
```

Step 3 :Adjust the Firewall to Allow Web Traffic

Next, assuming that you have followed the initial server setup instructions and enabled the UFW firewall, make sure that your firewall allows HTTP and HTTPS traffic. You can check that UFW has an application profile for Apache.

Output:

```
mca@ajce:~$ sudo ufw app list
Available applications:
  Apache
  Apache Full
  Apache Secure
  CUPS
```

Step 4: Check Apache Full

Apache Full profile details, you'll see that it enables traffic to ports 80 and 443:

Syntax: sudoufw app info "Apache Full"

Output:

```
mca@ajce:~$ sudo ufw app info "Apache Full"
Profile: Apache Full
Title: Web Server (HTTP,HTTPS)
Description: Apache v2 is the next generation of the omnipresent Apache web
server.

Ports:
  80,443/tcp
```

To allow incoming HTTP and HTTPS traffic for this server, run

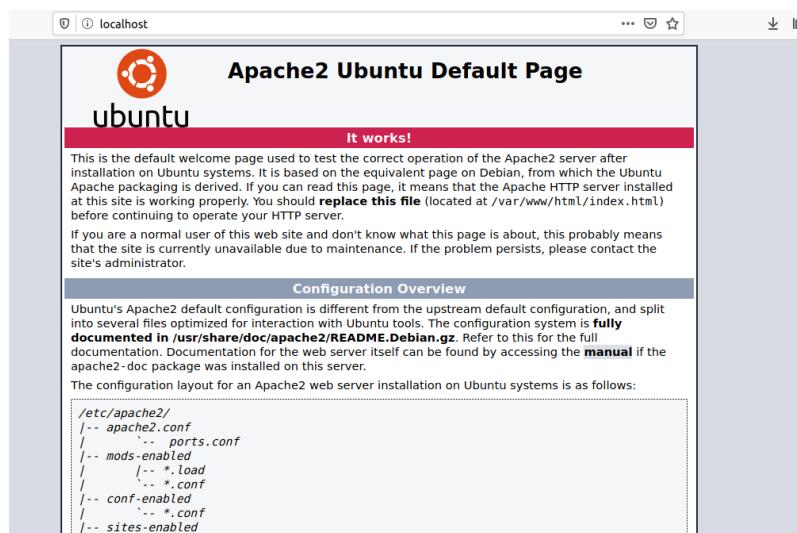
Syntax: sudoufw allow "Apache Full"

Output:

```
mca@ajce:~$ sudo ufw allow "Apache Full"
Rules updated
Rules updated (v6)
```

Step 5: A spot check right away to verify that everything went as planned by visiting your server's public IP address in your web browser

Output:



Installing MySQL

Step 1: In this case, you do not have to run sudo apt update prior to the command. This is because you recently ran it in the commands above to install Apache. The package index on your computer should already be up-to-date.

Syntax: \$ sudo apt install mysql-server

Output:

```
rca@rcaice:~$ sudo apt install mysql-server
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  libaio1 libcgifast-perl libcgipm-perl libevent-core-2.1-7
  libevent-pthreads-2.1-7 libfcgi-perl libhtml-template-perl libmecab2
  mecab-ipadic mecab-ipadic-utf8 mecab-utils mysql-client-8.0
  mysql-client-core-8.0 mysql-server-8.0 mysql-server-core-8.0
Suggested packages:
  libipc-sharedcache-perl mailx tinyca
The following NEW packages will be installed:
  libaio1 libcgifast-perl libcgipm-perl libevent-core-2.1-7
  libevent-pthreads-2.1-7 libfcgi-perl libhtml-template-perl libmecab2
  mecab-ipadic mecab-ipadic-utf8 mecab-utils mysql-client-8.0
  mysql-client-core-8.0 mysql-server mysql-server-8.0 mysql-server-core-8.0
0 upgraded, 16 newly installed, 0 to remove and 602 not upgraded.
Need to get 31.2 MB of archives.
After this operation, 261 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 mysql-client-core-8.0 amd64 8.0.29-0ubuntu0.20.04.3 [4,416 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 mysql-client-8.0 amd64 8.0.29-0ubuntu0.20.04.3 [22.0 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu focal/main amd64 libaio1 amd64 0.3.112.5 [7,184 B]
Get:4 http://in.archive.ubuntu.com/ubuntu focal/main amd64 libevent-core-2.1-7 amd64 2.1.11-stable-1 [89.1 kB]
Get:5 http://in.archive.ubuntu.com/ubuntu focal/main amd64 libevent-pthreads-2.1-7 amd64 2.1.11-stable-1 [7,372 B]
Get:6 http://in.archive.ubuntu.com/ubuntu focal/main amd64 libmecab2 amd64 0.996-10build1 [233 kB]
Get:7 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 mysql-server-core-8.0 amd64 8.0.29-0ubuntu0.20.04.3 [18.1 MB]
```

Step 2 :

This will connect to the MySQL server as the administrative database user root, which is inferred by the use of sudo when running this command.

Syntax: \$ sudo mysql

Output:

```
mca@ajce:~$ sudo mysql
[sudo] password for mca:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 11
Server version: 8.0.29-0ubuntu0.20.04.3 (Ubuntu)

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owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> show databases;
+-----+
| Database      |
+-----+
| information_schema |
| mysql          |
| performance_schema |
| sys            |
+-----+
4 rows in set (0.01 sec)

mysql> exit
Bye
```

Installing PHP

In addition to the php package, you'll also need libapache2-mod-php to integrate PHP into Apache, and the php-mysql package to allow PHP to connect to MySQL databases. Run the following command to install all three packages and their dependencies.

Step 1: Installation

Syntax: sudo apt install php libapache2-mod-php php-mysql

Output:

```
mca@ajce:~$ sudo apt install php libapache2-mod-php php-mysql
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  libapache2-mod-php7.4 php-common php7.4 php7.4-cli php7.4-common
    php7.4-json php7.4-mysql php7.4-opcache php7.4-readline
Suggested packages:
  php-pear
The following NEW packages will be installed:
  libapache2-mod-php libapache2-mod-php7.4 php php-common php-mysql php7.4
    php7.4-cli php7.4-common php7.4-json php7.4-mysql php7.4-opcache
    php7.4-readline
0 upgraded, 12 newly installed, 0 to remove and 602 not upgraded.
Need to get 4,149 kB of archives.
After this operation, 18.5 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu focal/main amd64 php-common all 2:75 [11.9 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 php7.4-common amd64 7.4.3-4ubuntu2.10 [981 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 php7.4-json amd64 7.4.3-4ubuntu2.10 [19.2 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 php7.4-opcache amd64 7.4.3-4ubuntu2.10 [198 kB]
Get:5 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 php7.4-readline amd64 7.4.3-4ubuntu2.10 [12.6 kB]
Get:6 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 php7.4-cli amd64 7.4.3-4ubuntu2.10 [1,422 kB]
Get:7 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 libapache2-mod-php7.4 amd64 7.4.3-4ubuntu2.10 [1,365 kB]
Get:8 http://in.archive.ubuntu.com/ubuntu focal/main amd64 libapache2-mod-php all 2:7.4+75 [2,836 B]
```

Step 2 :Restart

Syntax: sudosystemctl restart apache2

Output:

```
mca@ajce:~$ sudo systemctl restart apache2
mca@ajce:~$
```

Step 3: Testing PHP Processing on your Web Server

Output:

```
mca@ajce:~$ sudo gedit /var/www/html/info.php
(gedit:21368): Tepl-WARNING **: 15:10:04.836: GVfs metadata is not supported. Fallback to TeplMetadataManager. Either GVfs is not correctly installed or GVfs metadata are not supported on this platform. In the latter case, you should configure Tepl with --disable-gvfs-metadata.
mca@ajce:~$ 
```

The screenshot shows a web browser window with the URL 'localhost/info.php'. The title bar says 'PHP Version 7.4.3'. The content area displays the PHP configuration information. A large table lists numerous .ini files that have been parsed by PHP, including apache2, php, and MySQL-related files. The table has columns for 'System' and 'Additional .ini files parsed'.

Install WordPress with LAMP on Ubuntu 18.04

Step 1: Download WordPress

Syntax: \$ wget -c http://wordpress.org/latest.tar.gz
\$ tar -xvf latest.tar.gz

Output:

```
mca@ajce:~$ wget -c http://wordpress.org/latest.tar.gz
--2022-06-13 15:20:08--  http://wordpress.org/latest.tar.gz
Resolving wordpress.org (wordpress.org)... 198.143.164.252
Connecting to wordpress.org (wordpress.org)|198.143.164.252|:80... connected.
HTTP request sent, awaiting response... 301 Moved Permanently
Location: https://wordpress.org/latest.tar.gz [following]
--2022-06-13 15:20:08--  https://wordpress.org/latest.tar.gz
Connecting to wordpress.org (wordpress.org)|198.143.164.252|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 21166276 (20M) [application/octet-stream]
Saving to: 'latest.tar.gz'

latest.tar.gz          100%[=====] 2.05M/s
```

```
mca@ajce:~$ tar -xvf latest.tar.gz
wordpress/
wordpress/xmlrpc.php
wordpress/wp-blog-header.php
wordpress/readme.html
wordpress/wp-signup.php
wordpress/index.php
wordpress/wp-cron.php
wordpress/wp-config-sample.php
wordpress/wp-login.php
wordpress/wp-settings.php
wordpress/license.txt
wordpress/wp-content/
wordpress/wp-content/themes/
wordpress/wp-content/themes/twentytwentyone/
wordpress/wp-content/themes/twentytwentyone/footer.php
wordpress/wp-content/themes/twentytwentyone/template-parts/
wordpress/wp-content/themes/twentytwentyone/template-parts/content/
wordpress/wp-content/themes/twentytwentyone/template-parts/content/content-excerpt.php
wordpress/wp-content/themes/twentytwentyone/template-parts/content/content-page.php
wordpress/wp-content/themes/twentytwentyone/template-parts/content/content-none.php
wordpress/wp-content/themes/twentytwentyone/template-parts/content/content.php
wordpress/wp-content/themes/twentytwentyone/template-parts/content/content-single.php
wordpress/wp-content/themes/twentytwentyone/template-parts/header/
```

Step 2 :Creating a MySQL Database and User for WordPress

The first step you'll take is a preparatory one. Even though MySQL is already installed, you still need to create a database to manage and store the user information for WordPress to use. To get started, log into the MySQL root (administrative) account by issuing the following command:

Syntax: \$ sudo mysql

You will be prompted for the password you set for the MySQL root account when you installed the software. However, if you have password authentication enabled for your root user, you can run the following command and enter your password information when prompted:

Syntax: \$ mysql -u root -p

Output:

```
mca@ajce:~$ sudo mysql
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 12
Server version: 8.0.29-0ubuntu0.20.04.3 (Ubuntu)

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Oracle is a registered trademark of Oracle Corporation and/or its
affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> mysql -u root -p
-> [REDACTED]
```

Step 3 :Create the database for WordPress

Output:

```
mca@ajce:~$ sudo mysql
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 14
Server version: 8.0.29-0ubuntu0.20.04.3 (Ubuntu)

Copyright (c) 2000, 2022, Oracle and/or its affiliates.

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version for the right syntax
to use near 'sudo CREATE DATABASE wordpress DEFAULT CHARACTER SET utf8 COLLATE utf8_unicode_ci' at line 1
mysql> sudo CREATE DATABASE wordpress DEFAULT CHARACTER SET utf8 COLLATE utf8_unicode_ci;
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version for the right syntax
to use near 'sudo CREATE DATABASE wordpress DEFAULT CHARACTER SET utf8 COLLATE utf8_unicode_ci' at line 1
mysql> sudo CREATE DATABASE wordpress DEFAULT CHARACTER SET utf8 COLLATE utf8_unicode_ci;
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version for the right syntax
to use near 'sudo CREATE DATABASE wordpress DEFAULT CHARACTER SET utf8 COLLATE utf8_unicode_ci' at line 1
mysql> CREATE DATABASE wordpress DEFAULT CHARACTER SET utf8 COLLATE utf8_unicode_ci;
ERROR 1007 (HY000): Can't create database 'wordpress'; database exists
mysql> show databases
-> show databases;
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version for the right syntax
to use near 'show databases' at line 2
mysql> show databases;

mysql> GRANT ALL ON wordpress.* TO 'wordpressuser'@'localhost' IDENTIFIED BY 'sree17';
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version for the right syntax
to use near 'IDENTIFIED BY 'sree17'' at line 1
mysql> FLUSH PRIVILEGES;
Query OK, 0 rows affected (0.04 sec)

mysql> exit;
Bye
```

```
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version for the right syntax
to use near 'show databases' at line 2
mysql> show databases;
+-----+
| Database |
+-----+
| information_schema |
| mysql |
| performance_schema |
| sys |
| wordpress |
+-----+
5 rows in set (0.00 sec)
```

Step 2 :

Go the /var/www/html/ directory and rename existing wp-config-sample.php to wpconfig.php.
Also, make sure to remove the default Apache index page.

Syntax: sudo mv wp-config-sample.php wpconfig.php
sudo rm -rf index.html

Output:

```
mca@ajce:/var/www/html$ sudo mv wp-config-sample.php wp-config.php
[sudo] password for mca:
mca@ajce:/var/www/html$ sudo rm -rf index.html
mca@ajce:/var/www/html$ █
```

Step 3 : Then update it with your database information under the MySQL settings section (refer to the highlighted boxes in the image below): This setting can be added after the database connection settings, or anywhere else in the file:.

Syntax:

```
define('DB_NAME', 'wordpress');

/** MySQL database username */
define('DB_USER', 'wordpressuser');
/** MySQL database password */
define('DB_PASSWORD', 'password');

...
define('FS_METHOD', 'direct');
```

Output:

```
mca@ajce:/var/www/html$ sudo mv wp-config-sample.php wp-config.php
[sudo] password for mca:
mca@ajce:/var/www/html$ sudo rm -rf index.html
mca@ajce:/var/www/html$ chmod +rwx index.html
chmod: cannot access 'index.html': No such file or directory
mca@ajce:/var/www/html$ sudo chmod +rwx wp-config.php
mca@ajce:/var/www/html$ sudo gedit wp-config.php
```

Save and close the file when you are finished.

Step 4: Restart the web server and mysql service

Syntax: \$sudo systemctl restart apache2.service

\$ sudo systemctl restart mysql.service

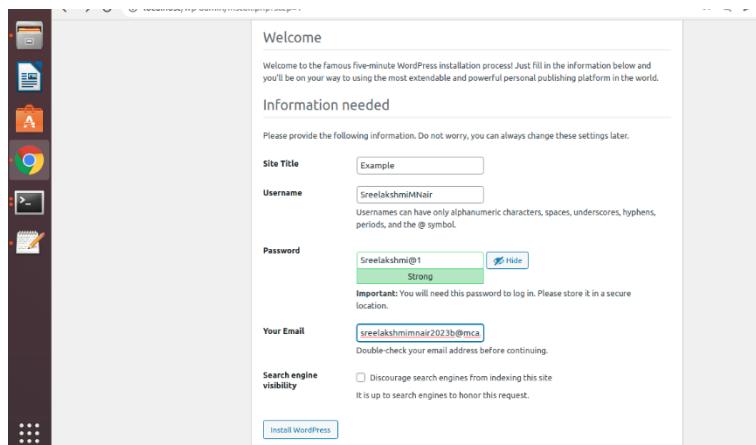
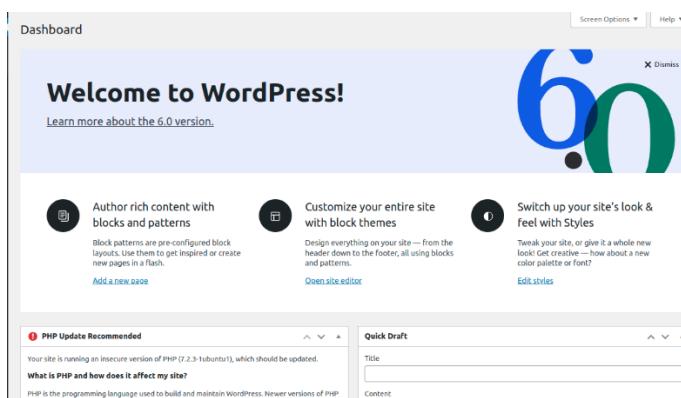
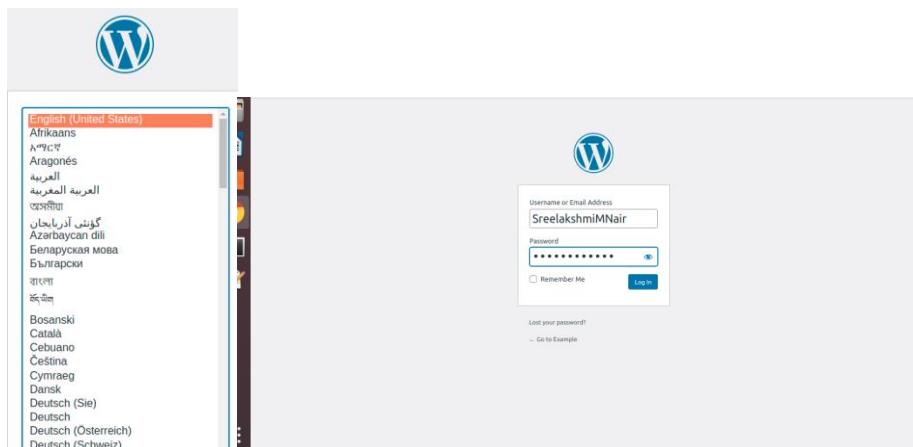
Output:

```
a@ajce:/var/www/html$ sudo systemctl restart apache2.service
a@ajce:/var/www/html$ sudo systemctl restart MySQL.service
a@ajce:/var/www/html$
```

Step 5: Completing the Installation Through the Web Interface

The server configuration is complete, you can complete the installation through the web interface. In your web browser, navigate to your server's domain name or public IP address

Output:



NETWORKING & SYSTEM ADMINISTRATION LAB

Experiment No.: 6

Name: SHAMJAD MAZOOD NAZER

Roll No: 36

Batch: MCA -B

Date: 06-06-2022

Aim

Build and install software from source code, familiarity with make and cmake utilities expected.

Procedure

- 1 We can obtain information of a package and its dependencies using the apt command. Doing that for cmake:

```
$ apt show cmake
```

```
student@U36:~/Desktop/RMCA-B/A-CN/06-06-2022$ apt show cmake
Package: cmake
Version: 3.10.2-1ubuntu2
Priority: optional
Section: devel
Origin: Ubuntu
Maintainer: Ubuntu Developers <ubuntu-devel-discuss@lists.ubuntu.com>
Original-Maintainer: Debian CMake Team <pkg-cmake-team@lists.alioth.debian.org>
Bugs: https://bugs.launchpad.net/ubuntu/+filebug
Installed-Size: 17.3 kB
Depends: cmake-data (= 3.10.2-1ubuntu2), procps, libarchive13 (>= 3.0.4), libc6 (>= 2.15), libcurl4 (>= 7.16.2), libexpat1 (>= 2.0.1), libgcc1 (>= 1:3.0), libjsoncpp (>= 1.7.4), librhash0 (>= 1.2.6), libstdc++6 (>= 5.2), libuv1 (>= 1.4.2), zlib1g (>= 1:1.2.3.3)
Recommends: gcc, make
Suggests: cmake-doc, ninja-build
Homepage: https://cmake.org/
Supported: ~
Download-Size: 3,138 kB
APT-Manual-Installed: yes
APT-Sources: http://archive.ubuntu.com/ubuntu bionic/main amd64 Packages
Description: cross-platform, open-source make system
CMake is used to control the software compilation process using simple platform and compiler independent configuration files. CMake generates native makefiles and workspaces that can be used in the compiler environment of your choice. CMake is quite sophisticated: it is possible to support complex environments requiring system configuration, pre-processor generation, code generation, and template instantiation.
.
CMake was developed by Kitware as part of the NLM Insight Segmentation and Registration Toolkit project. The ASCI VIEWS project also provided support in the context of their parallel computation environment. Other sponsors include the Insight, VTK, and VXL open source software communities.
```

- 2 To install cmake , g++ and make using the apt command, type:

```
$ sudo apt install cmake g++ make
```

```
mca@S66:~/Documents/neha/CMake$ sudo apt install cmake g++ make
[sudo] password for mca:
Reading package lists... Done
Building dependency tree
Reading state information... Done
g++ is already the newest version (4:7.3.0-3ubuntu2).
make is already the newest version (4.1-9.1ubuntu1).
make set to manually installed.
The following additional packages will be installed:
  cmake-data libcurl4 libjsoncpp1 librhash0 libuv1
Suggested packages:
  cmake-doc ninja-build
The following NEW packages will be installed:
  cmake cmake-data libcurl4 libjsoncpp1 librhash0 libuv1
0 upgraded, 6 newly installed, 0 to remove and 1 not upgraded.
3 not fully installed or removed.
Need to get 4,900 kB of archives.
After this operation, 25.3 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 cmake-data all 3.10.2-1ubuntu2 [1,331 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 libcurl4 amd64 7.58.0-2ubuntu3 [214 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 libjsoncpp1 amd64 1.7.4-3 [73.6 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 librhash0 amd64 1.3.6-2 [78.1 kB]
Get:5 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 libuv1 amd64 1.18.0-5 [64.4 kB]
Get:6 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 cmake amd64 3.10.2-1ubuntu2 [3,138 kB]
Selected: 4,900 kB in 1s (6,845 kB/s)
selecting previously unselected package cmake-data.
(Reading database ... 11165 files and directories currently installed.)
Preparing to unpack .../0--cmake-data_3.10.2-1ubuntu2_all.deb ...
Unpacking cmake-data (3.10.2-1ubuntu2) ...
Selecting previously unselected package libcurl4:amd64.
Preparing to unpack .../1-libcurl4_7.58.0-2ubuntu3_amd64.deb ...
Unpacking libcurl4:amd64 (7.58.0-2ubuntu3) ...
Selecting previously unselected package libjsoncpp1:amd64.
Preparing to unpack .../2-libjsoncpp1_1.7.4-3_amd64.deb ...
Unpacking libjsoncpp1:amd64 (1.7.4-3) ...
```

A Sample CMake project

```
student@U36:~/Desktop/RMCA-B/A-CN/06-06-2022$ mkdir cmakeFolder
```

```
student@U36:~/Desktop/RMCA-B/A-CN/06-06-2022$ cd cmakeFolder
```

```
student@U36:~/Desktop/RMCA-B/A-CN/06-06-2022/cmakeFolder$ gedit hello_world.cpp
```

```
#include <iostream>
int main() {
    std::cout<<"Hello World!"<<std::endl;
    return 0 ;
}
```

create configuration text file

```
cmake_minimum_required(VERSION 3.10)
project(MyProject)
add_executable(hello hello_world.cpp)
```

A directory to which CMake was executed is called “Built Directory”

```
student@U36:~/Desktop/RMCA-B/A-CN/06-06-2022/cmakeFolder$ mkdir build
```

```
student@U36:~/Desktop/RMCA-B/A-CN/06-06-2022/cmakeFolder$ cd build
```

```
student@U36:~/Desktop/RMCA-B/A-CN/06-06-2022/cmakeFolder/build$ cmake ..  
-- The C compiler identification is GNU 7.3.0  
-- The CXX compiler identification is GNU 7.3.0  
-- Check for working C compiler: /usr/bin/cc  
-- Check for working C compiler: /usr/bin/cc -- works  
-- Detecting C compiler ABI info  
-- Detecting C compiler ABI info - done  
-- Detecting C compile features  
-- Detecting C compile features - done  
-- Check for working CXX compiler: /usr/bin/c++  
-- Check for working CXX compiler: /usr/bin/c++ -- works  
-- Detecting CXX compiler ABI info  
-- Detecting CXX compiler ABI info - done  
-- Detecting CXX compile features  
-- Detecting CXX compile features - done  
-- Configuring done  
-- Generating done  
-- Build files have been written to: /home/student/Desktop/RMCA-B/A-CN/06-06-2022/cmakeFolder/build
```

```
student@U36:~/Desktop/RMCA-B/A-CN/06-06-2022/cmakeFolder/build$ cmake --build .  
Scanning dependencies of target hello  
[ 50%] Building CXX object CMakeFiles/hello.dir/hello_world.cpp.o  
[100%] Linking CXX executable hello  
[100%] Built target hello
```

```
student@U36:~/Desktop/RMCA-B/A-CN/06-06-2022/cmakeFolder/build$ ./hello  
Hello World!  
student@U36:~/Desktop/RMCA-B/A-CN/06-06-2022/cmakeFolder/build$ █
```

NETWORKING & SYSTEM ADMINISTRATION LAB

Experiment No.: 7

Aim

Introduction to command line tools for networking IPv4 networking, network commands: ping route traceroute, nslookup, ip.

Name: SHAMJAD MAZOOD NAZER

Roll No: 36

Batch: MCA-B

Date: 02-06-2022

Procedure

Ipconfig

"Ipconfig" often comes up as the most-used networking command on Windows. Not only is it useful for the information it provides, but you can combine it with a couple of switches to execute certain tasks.

```
C:\WINDOWS\System32>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet:

  Connection-specific DNS Suffix . :
  Link-local IPv6 Address . . . . . : fe80::30ae:2407:38c4:773%4
  IPv4 Address. . . . . : 192.168.6.66
  Subnet Mask . . . . . : 255.255.255.0
  Default Gateway . . . . . : 192.168.6.100

Tunnel adapter Teredo Tunneling Pseudo-Interface:

  Connection-specific DNS Suffix . :
  IPv6 Address. . . . . . . . . : 2001:0:2851:fcb0:1cb9:12f3:8a3e:b01e
  Link-local IPv6 Address . . . . . : fe80::1cb9:12f3:8a3e:b01e%9
  Default Gateway . . . . . : ::
```

```
Windows IP Configuration

Host Name . . . . . : S66
Primary Dns Suffix . . . . . : mca.com
Node Type . . . . . : Hybrid
IP Routing Enabled. . . . . : No
WINS Proxy Enabled. . . . . : No
DNS Suffix Search List. . . . . : mca.com

Ethernet adapter Ethernet:

  Connection-specific DNS Suffix . :
  Description . . . . . : Realtek PCIe GBE Family Controller
  Physical Address. . . . . : 1C-87-2C-71-89-3E
  DHCP Enabled. . . . . : No
  Autoconfiguration Enabled . . . . . : Yes
  Link-local IPv6 Address . . . . . : fe80::30ae:2407:38c4:773%4(Preferred)
  IPv4 Address. . . . . : 192.168.6.66(Preferred)
  Subnet Mask . . . . . : 255.255.255.0
  Default Gateway . . . . . : 192.168.6.100
  DHCPv6 IAID . . . . . : 102532908
  DHCPv6 Client DUID. . . . . : 00-01-00-01-25-48-EE-CF-1C-87-2C-71-89-3E
  DNS Servers . . . . . : 192.168.6.254
  NetBIOS over Tcpip. . . . . : 8.8.8.8
  NetBIOS over Tcpip. . . . . : Enabled

Tunnel adapter Teredo Tunneling Pseudo-Interface:

  Connection-specific DNS Suffix . :
  Description . . . . . : Microsoft Teredo Tunneling Adapter
  Physical Address. . . . . : 00-00-00-00-00-00-E0
  DHCP Enabled. . . . . : No
  Autoconfiguration Enabled . . . . . : Yes
  IPv6 Address. . . . . : 2001:0:2851:fcb0:1cb9:12f3:8a3e:b01e(Preferred)
  Link-local IPv6 Address . . . . . : fe80::1cb9:12f3:8a3e:b01e%9(Preferred)
  Default Gateway . . . . . : ::167772160
  DHCPv6 IAID . . . . . : 00-01-00-01-25-48-EE-CF-1C-87-2C-71-89-3E
  DHCPv6 Client DUID. . . . . : NetBIOS over Tcpip. . . . . : Disabled
```

Nslookup

"Nslookup" stands for Name Server Lookup. It packs a lot of power, but most users won't need that power. For regular folks like you and me, its main use is finding out the IP address behind a certain domain name.

```
C:\WINDOWS\System32>nslookup
Default Server: UnKnown
Address: 192.168.6.254

> www.google.com
Server: UnKnown
Address: 192.168.6.254

Non-authoritative answer:
Name: www.google.com
Addresses: 2404:6800:4007:826::2004
           142.250.195.164

> www.amazon.com
Server: UnKnown
Address: 192.168.6.254

Non-authoritative answer:
Name: d3ag4hukkh62yn.cloudfront.net
Address: 52.84.12.185
Aliases: www.amazon.com
          tp.47cf2c8c9-frontier.amazon.com
```

Ping

"Ping" is one of the most basic yet useful network commands to utilize in the command prompt application. It tells you whether your computer can reach some destination IP address or domain name, and if it can, how long it takes data to travel there and back again.

```
C:\WINDOWS\System32>ping 142.250.195.164

Pinging 142.250.195.164 with 32 bytes of data:
Reply from 142.250.195.164: bytes=32 time=20ms TTL=59

Ping statistics for 142.250.195.164:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
        Minimum = 20ms, Maximum = 20ms, Average = 20ms
```

Tracert

"Tracert" stands for Trace Route. And much like "ping," it sends out a data packet as a way to troubleshoot any network issues you might have, but it instead tracks the route of the packet as it hops from server to server.

```
C:\WINDOWS\System32>tracert 142.250.195.164

Tracing route to maa03s41-in-f4.1e100.net [142.250.195.164]
over a maximum of 30 hops:

 1  <1 ms    <1 ms    <1 ms  192.168.6.100
 2  2 ms     3 ms     1 ms   172.24.9.34
 3  *         *         *      Request timed out.
 4  *         *         *      Request timed out.
 5  17 ms    17 ms    17 ms  72.14.218.250
 6  18 ms    18 ms    17 ms  216.239.43.133
 7  15 ms    15 ms    15 ms  142.251.55.91
 8  20 ms    20 ms    20 ms  maa03s41-in-f4.1e100.net [142.250.195.164]

Trace complete.
```

Netstat

"Netstat" is a tool for network statistics, diagnostics, and analysis. It's powerful and complex but can be simple enough if you ignore the advanced aspects that you don't need to know about (assuming you aren't managing a massive business or campus network, for example).

The -f option clears the routing tables of all gateway entries. If you use the -f option in conjunction with one of the commands, the tables are cleared before you run the command.

By default, routes are not preserved when you restart the system. Use the -p option with the add command to make a route persistent. Use the -p option with the print command to view the list of registered persistent routes.

```
C:\WINDOWS\System32>netstat

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    192.168.6.66:7680      S26:1177             ESTABLISHED
  TCP    192.168.6.66:7680      S52:2371             ESTABLISHED
  TCP    192.168.6.66:7680      STDRJUBYMATHEW:55692 ESTABLISHED
  TCP    192.168.6.66:25090     20.198.162.76:https ESTABLISHED
  TCP    192.168.6.66:25116     si-in-f188:5228    ESTABLISHED
  TCP    192.168.6.66:25155     si-in-f188:5228    ESTABLISHED
  TCP    192.168.6.66:25272     a184-86-248-178:https CLOSE_WAIT
  TCP    192.168.6.66:25273     a184-86-248-178:https CLOSE_WAIT
  TCP    192.168.6.66:25274     a104-85-134-163:https ESTABLISHED
  TCP    192.168.6.66:25275     49.44.194.16:https CLOSE_WAIT
  TCP    192.168.6.66:25279     49.44.194.16:https CLOSE_WAIT
  TCP    192.168.6.66:25282     a104-85-134-163:https ESTABLISHED
  TCP    192.168.6.66:25283     maa05s23-in-f10:https ESTABLISHED
  TCP    192.168.6.66:25286     52.137.110.235:https ESTABLISHED
  TCP    192.168.6.66:25287     s3:https            CLOSE_WAIT
  TCP    192.168.6.66:25288     s3:https            CLOSE_WAIT
  TCP    192.168.6.66:25289     maa05s26-in-f14:https ESTABLISHED
  TCP    192.168.6.66:25292     S22:ms-do           ESTABLISHED
  TCP    [2001:0:2851:fcb0:1cb9:12f3:8a3e:b01e]:25182 [2001:0:2851:fcb0:387d:96d7:985e:9cf9]:ms-do ESTABLISHED
  TCP    [2001:0:2851:fcb0:1cb9:12f3:8a3e:b01e]:25293 [2001:0:2851:fcb0:2b:3856:8a3e:b01e]:ms-do SYN_SENT
  TCP    [2001:0:2851:fcb0:1cb9:12f3:8a3e:b01e]:25294 [2001:0:2851:fcb0:184c:383e:f174:159d]:ms-do SYN_SENT

C:\WINDOWS\System32>
```

Route print

You can use the route command to view, add and delete routes on a Microsoft Windows NT server that runs Cisco ICM. You can use these options with the route command

```
C:\WINDOWS\System32>route print
=====
Interface List
 4...1c 87 2c 71 89 3e ....Realtek PCIe GBE Family Controller
 1.....Software Loopback Interface 1
 9...00 00 00 00 00 00 e0 Microsoft Teredo Tunneling Adapter
=====

IPv4 Route Table
=====
Active Routes:
Network Destination      Netmask     Gateway       Interface Metric
          0.0.0.0        0.0.0.0   192.168.6.100  192.168.6.66    281
         127.0.0.0      255.0.0.0   On-link        127.0.0.1    331
         127.0.0.1      255.255.255.255  On-link        127.0.0.1    331
        127.255.255.255 255.255.255.255  On-link        127.0.0.1    331
         192.168.6.0      255.255.255.0   On-link      192.168.6.66    281
        192.168.6.66      255.255.255.255  On-link      192.168.6.66    281
        192.168.6.255      255.255.255.255  On-link      192.168.6.66    281
         224.0.0.0        240.0.0.0   On-link        127.0.0.1    331
         224.0.0.0        240.0.0.0   On-link      192.168.6.66    281
      255.255.255.255 255.255.255.255  On-link        127.0.0.1    331
      255.255.255.255 255.255.255.255  On-link      192.168.6.66    281
=====
Persistent Routes:
 Network Address      Netmask     Gateway Address Metric
          0.0.0.0        0.0.0.0   192.168.6.100 Default
=====

IPv6 Route Table
=====
Active Routes:
 If Metric Network Destination      Gateway
  9    331 ::/0           On-link
  1    331 ::1/128        On-link
  9    331 2001::/32       On-link
  9    331 2001:0:2851:fcb0:1cb9:12f3:8a3e:b01e/128
                           On-link
  4    281 fe80::/64       On-link
  9    331 fe80::/64       On-link
  9    331 fe80::1cb9:12f3:8a3e:b01e/128
                           On-link
  4    281 fe80::30ae:2407:38c4:773/128
```

NETWORKING & SYSTEM ADMINISTRATION LAB

Experiment No.: 8

Aim

Analyzing network packet stream using tcpdump and wireshark. Perform basic network service tests using nc.

Name: SHAMJAD MAZOOD NAZER

Roll No: 36

Batch: RMCA-B

Date: 23-05-2022

Procedure

1 How to Install tcpdump in Linux

Many Linux distributions already shipped with the tcpdump tool, if in case you don't have it on a system, you can install it using the command.

- \$ sudo apt-get install tcpdump [On Debian, Ubuntu and Mint]

```
mca@S36:~$ sudo apt update && sudo apt install tcpdump
[sudo] password for mca:
Sorry, try again.
[sudo] password for mca:
Hit:1 http://in.archive.ubuntu.com/ubuntu bionic InRelease
Tgn:2 https://repo.mongodb.org/apt/ubuntu trusty/mongodb-org/3.6 InRelease
Get:3 https://dl.google.com/linux/chrome/deb stable InRelease [1,811 B]
Err:4 http://ppa.launchpad.net/jonathonf/python-3.6/ubuntu bionic InRelease
  403  Forbidden [IP: 185.125.190.52:80]
```

```
mca@S36:~$ sudo tcpdump
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp3s0, link-type EN10MB (Ethernet), capture size 262144 bytes
14:50:18.890216 IP 192.168.6.193.55402 > 239.255.255.250.3702: UDP, length 621
14:50:18.901188 IP S36.50175 > dns.google.domain: 38600+ [1au] PTR? 250.255.255.239.in-addr.arpa. (57)
14:50:18.915441 TP dns.google.domain > S36.50175: 38600 NXDomain 0/1/1 (114)
14:50:18.916151 IP S36.59742 > dns.google.domain: 53450+ [1au] PTR? 193.6.168.192.in-addr.arpa. (55)
14:50:18.932054 IP dns.google.domain > S36.59742: 53450 NXDomain 0/0/1 (55)
14:50:18.932796 TP S36.46834 > dns.google.domain: 276271 [1au] PTR? 8.8.8.8.in-addr.arpa. (49)
14:50:18.949651 IP dns.google.domain > S36.46834: 27627 1/0/1 PTR dns.google. (73)
14:50:18.950299 IP S36.36493 > dns.google.domain: 47521+ [1au] PTR? 36.6.168.192.in-addr.arpa. (54)
14:50:19.133214 ARP, Request who-has 10.128.8.77 tell 192.168.6.117, length 46
14:50:19.133767 IP S36.54795 > dns.google.domain: 51083+ [1au] PTR? 77.8.128.10.in-addr.arpa. (53)
```

2 Display Available Interfaces

To list the number of available interfaces on the system, run the following command with -D option.

```
mca@S36:~$ sudo tcpdump -D
1.enp3s0 [Up, Running]
2.any (Pseudo-device that captures on all interfaces) [Up, Running]
3.lo [Up, Running, Loopback]
4.docker0 [Up]
5.nflog (Linux netfilter log (NFLOG) interface)
6.nfqueue (Linux netfilter queue (NFQUEUE) interface)
7.usbmon1 (USB bus number 1)
8.usbmon2 (USB bus number 2)
9.usbmon3 (USB bus number 3)
10.usbmon4 (USB bus number 4)
```

3 Capture Packets from Specific Interface

The command screen will scroll up until you interrupt and when we execute the tcpdump command it will captures from all the interfaces, however with -i switch only capture from the desired interface.

```
mca@566:~$ sudo tcpdump -l enp3s0
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp3s0, link-type EN10MB (Ethernet), capture size 262144 bytes
14:50:51.049423 ARP, Request who-has 192.168.6.129 tell _gateway, length 46
14:50:51.050719 IP S66.589959 > dns.google.domain: 56361+ [1au] PTR? 129.6.168.192.in-addr.arpa. (55)
14:50:51.065706 IP dns.google.domain > S66.589959: 56361 NXDomain 0/0/1 (55)
14:50:51.067564 IP S66.57195 > dns.google.domain: 55961+ [1au] PTR? 100.6.168.192.in-addr.arpa. (55)
14:50:51.082544 IP dns.google.domain > S66.57195: 55961 NXDomain 0/0/1 (55)
14:50:51.084331 IP S66.51765 > dns.google.domain: 42819+ [1au] PTR? 66.6.168.192.in-addr.arpa. (54)
14:50:51.100902 IP dns.google.domain > S66.51765: 42819 NXDomain 0/0/1 (54)
14:50:51.172312 ARP, Request who-has 192.168.6.92 tell 192.168.6.91, length 46
14:50:51.172719 IP S66.54283 > dns.google.domain: 31086+ [1au] PTR? 92.6.168.192.in-addr.arpa. (54)
14:50:51.187599 IP dns.google.domain > S66.54283: 31086 NXDomain 0/0/1 (54)
14:50:51.188298 IP S66.46752 > dns.google.domain: 62750+ [1au] PTR? 91.6.168.192.in-addr.arpa. (54)
14:50:51.202418 IP dns.google.domain > S66.46752: 62750 NXDomain 0/0/1 (54)
14:50:51.255146 IP 192.168.6.59.49717 > 239.255.255.250.1900: UDP, length 172
14:50:51.256240 IP S66.33091 > dns.google.domain: 44586+ [1au] PTR? 59.6.168.192.in-addr.arpa. (54)
14:50:51.258319 IP 192.168.6.83.60366 > 239.255.255.250.1900: UDP, length 174
14:50:51.272796 IP dns.google.domain > S66.33091: 44586 NXDomain 0/0/1 (54)
14:50:51.273877 IP S66.39602 > dns.google.domain: 4567+ [1au] PTR? 83.6.168.192.in-addr.arpa. (54)
14:50:51.288554 IP dns.google.domain > S66.39602: 4567 NXDomain 0/0/1 (54)
14:50:51.412232 IP 192.168.6.236.52332 > 239.255.255.250.1900: UDP, length 174
14:50:51.412253 IP 192.168.6.236.52329 > 239.255.255.250.1900: UDP, length 175
14:50:51.412563 IP S66.38699 > dns.google.domain: 52710+ [1au] PTR? 236.6.168.192.in-addr.arpa. (55)
14:50:51.429559 IP dns.google.domain > S66.38699: 52710 NXDomain 0/0/1 (55)
14:50:51.496305 IP 192.168.6.236.50872 > 192.168.6.255.6866: UDP, length 395
14:50:51.496757 IP S66.54688 > dns.google.domain: 37534+ [1au] PTR? 255.6.168.192.in-addr.arpa. (55)
14:50:51.512693 IP dns.google.domain > S66.54608: 37534 NXDomain 0/0/1 (55)
14:50:51.552703 ARP, Request who-has 192.168.6.168 tell _gateway, length 46
14:50:51.553036 IP S66.42661 > dns.google.domain: 29228+ [1au] PTR? 168.6.168.192.in-addr.arpa. (55)
14:50:51.569979 IP dns.google.domain > S66.42661: 29228 NXDomain 0/0/1 (55)
```

4 Capture Only N Number of Packets

When you run the tcpdump command it will capture all the packets for the specified interface, until you hit the cancel button. But using **-c** option, you can capture a specified number of packets.

```
# tcpdump -c 5 -i enp3s0
```

```
mca@536:~$ sudo tcpdump -c 5 -i enp3s0
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp3s0, link-type EN10MB (Ethernet), capture size 262144 bytes
14:58:40.091809 IP 192.168.6.190.61010 > 239.255.255.1900: UDP, length 175
14:58:40.092723 IP 536.40569 > dns.google.domain: 1113+ [1au] PTR? 190.6.168.192.in-addr.arpa. (55)
14:58:40.108302 IP dns.google.domain > 536.40569: 1113 NXDomain 0/0/1 (55)
14:58:40.108883 IP 536.58533 > dns.google.domain: 6003+ [1au] PTR? 36.6.168.192.in-addr.arpa. (54)
4 packets captured
5 packets received by filter
0 packets dropped by kernel
```

5 Display Captured Packets in HEX and ASCII

The following command with option **-XX** capture the data of each packet, including its link level header in HEX and ASCII format

```
mca@536:~$ sudo tcpdump -XX -i enp3s0
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp3s0, link-type EN10MB (Ethernet), capture size 262144 bytes
15:00:43.306431 IP 192.168.6.215.61605 > 239.255.255.1900: UDP, length 174
 0x0000: 0100 5e7f fffa 0c9d 920e 7dc6 0800 1500 ..^.....}...E.
 0x0010: 00ca 0ec8 0000 0111 92e1 c0a8 00d7 efff ..n.....
 0x0020: fffa f0a5 076c 08b6 544b 4d2d 5345 4152 .....l..TKM_SFAR
 0x0030: 4348 202a 2018 5151 502f 312e 310d 0a18 CH.*.HTTP/1.1..H
 0x0040: 4f53 543a 2032 3339 2e32 3535 2e32 3535 0SI:.239.255.255
 0x0050: 2e32 3530 3a31 3930 300d 0a4d 414c 3a20 .250:1900..MANI:
 0x0060: 2273 7364 703a 6469 7363 6f70 6572 220d "ssdp:discover".
 0x0070: 0a4d 583a 2031 0d0a 5354 3a20 7572 6e3a .MX:1..ST:urn:
 0x0080: 6460 616c 2d6d 756c 7469 7363 7265 656e dial-multiscreen
 0x0090: 2d6f 7267 3a73 6572 7669 6365 3a64 6961 -org:service:dia
 0x00a0: 6c3a 310d 0a55 5345 522d 4147 454e 543a l:1..USER-AGENT:
 0x00b0: 2017 6f6f 676c 6520 4368 726f 6d65 2f31 .Google.Chrome/1
 0x00c0: 3032 2e30 2e35 3030 352e 3633 2057 696e 92.0.5005.63.Win
 0x00d0: 646f 7773 0d0a 0d0a dows....
15:00:43.399509 IP 536.541590 > dns.google.domain: 57703+ [1au] PTR? 215.6.168.192.in-addr.arpa. (55)
 0x0000: 001a 8c6b 54cf 4016 7eac a96e 0800 4580 ...KT.@~.n..L.
 0x0010: 0053 810a 4000 4011 e2b3 c0a8 0024 0808 .S..@.0.....$..
 0x0020: 0808 d53e 0035 003f 88fe e167 0100 0001 ...>.5.?...g....
 0x0030: 0000 0000 0001 0332 3135 0136 0331 3638 .....215.6.168
 0x0040: 0331 3032 0769 6e2d 6164 5472 0461 7270 .102.in-addr.arp
 0x0050: 6100 000c 0001 0000 2902 0000 0000 0000 a.....).
 0x0060: 00 .
15:00:43.411252 IP dns.google.domain > 536.541590: 57703 NXDomain 0/0/1 (55)
 0x0000: 4016 7eac a96e 001a 8c6b 54cf 0800 4580 @~.n...kT...E.
 0x0010: 0053 b884 0000 7c11 aeb9 0808 0808 c0a8 .S....|.....
 0x0020: 0024 0035 d53e 003f 087b e167 8183 0001 .S.5.>?.{.g...
 0x0030: 0000 0000 0001 0332 3135 0136 0331 3638 .....215.6.168
 0x0040: 0331 3032 0769 6e2d 6164 5472 0461 7270 .102.in-addr.arp
 0x0050: 6100 000c 0001 0000 2902 0000 0000 0000 a.....).
```

6 Capture and Save Packets in a File

As we said, that tcpdump has a feature to capture and save the file in a .pcap format, to do this just execute the command with -w option.

```
mca@U36:~/Desktop/RMCA-B/06-06-2022$ sudo tcpdump -i enp5s0 -c 10 -w icmp.pcap
tcpdump: listening on enp5s0, link-type EN10MB (Ethernet), capture size 262144 bytes
10 packets captured
34 packets received by filter
0 packets dropped by kernel
mca@U36:~/Desktop/RMCA-B/06-06-2022$
```

7 Capture Packet from Specific Port

Let's say you want to capture packets for specific port 80, execute the below command by specifying port number 80 as shown below.

```
mca@s66:~$ sudo tcpdump -i enp3s0 -c 5 port 80
[sudo] password for mca:
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp3s0, link-type EN10MB (Ethernet), capture size 262144 bytes
14:18:09.213493 IP S66.59252 > 32.121.122.34.bc.googleusercontent.com.http: Flags [S], seq 18809714, win 29200, options [mss 1460,sackOK,TS val 1175571752 ecr 0,nop,wscale 7], length 0
14:18:10.244247 IP S66.59252 > 32.121.122.34.bc.googleusercontent.com.http: Flags [S], seq 18809714, win 29200, options [mss 1460,sackOK,TS val 1175572783 ecr 0,nop,wscale 7], length 0
14:18:10.489618 IP 32.121.122.34.bc.googleusercontent.com.http > S66.59252: Flags [S.], seq 131097005, ack 18809715, win 64768, options [mss 1420,sackOK,TS val 3319464738 ecr 1175572783,nop,wscale 7], length 0
14:18:10.489703 IP S66.59252 > 32.121.122.34.bc.googleusercontent.com.http: Flags [.], ack 1, win 229, options [nop,nop,TS val 1175573028 ecr 3319464738], length 0
14:18:10.489864 IP S66.59252 > 32.121.122.34.bc.googleusercontent.com.http: Flags [P.], seq 1:88, ack 1, win 229, options [nop,nop,TS val 1175573028 ecr 3319464738], length 87: HTTP: GET / HTTP/1.1
5 packets captured
5 packets received by filter
0 packets dropped by kernel
```

8 Read Captured Packets File

To read and analyze captured packet 0001.pcap file use the command with -r option.

```
mca@s66:~$ sudo tcpdump -r icmp.pcap
reading from file icmp.pcap, link-type EN10MB (Ethernet)
14:19:22.189957 ARP, Reply 192.168.1.1 is-at 04:09:73:99:63:ac (oui Unknown), length 46
14:19:22.190160 ARP, Reply 192.168.1.1 is-at 04:09:73:fd:e4:7c (oui Unknown), length 46
14:19:22.195693 ARP, Reply 192.168.1.1 is-at 04:09:73:99:e3:b0 (oui Unknown), length 46
14:19:22.216587 IP 192.168.6.204.32925 > 239.255.255.1900: UDP, length 172
14:19:22.586506 ARP, Request who-has 192.168.6.185 tell _gateway, length 46
14:19:22.595038 STP 802.1w, Rapid STP, Flags [Forward], bridge-id 8000.44:31:92:f1:0c:45.8012, length 47
14:19:23.157167 ARP, Reply 192.168.1.1 is-at 04:09:73:fd:e4:7c (oui Unknown), length 46
14:19:23.157170 ARP, Reply 192.168.1.1 is-at 04:09:73:99:e3:b0 (oui Unknown), length 46
14:19:23.157196 ARP, Reply 192.168.1.1 is-at 04:09:73:99:63:ac (oui Unknown), length 46
14:19:23.169605 IP 192.168.6.236.57786 > 192.168.6.255.6866: UDP, length 395
```

wire shark

Installing Wireshark on Ubuntu 20.04

The Wireshark utility is available on all major desktop platforms, i.e., Linux, Microsoft Windows, FreeBSD, MacOS, Solaris, and many more. Follow the steps below to install Wireshark on Ubuntu 20.04.

STEP1 : Update APT

First, as always, update and upgrade your APT through the following command.

Syntax:

\$ sudo apt update

```
mca@U36:~/Desktop/RMCA-B/06-06-2022$ sudo apt-get update
Hit:1 http://dl.google.com/linux/chrome/deb stable InRelease
Hit:2 http://ppa.launchpad.net/codeblocks-devs/release/ubuntu bionic InRelease
Hit:3 http://archive.ubuntu.com/ubuntu bionic InRelease
Err:4 http://ppa.launchpad.net/jonathonf/python-3.6/ubuntu bionic InRelease
   403 Forbidden [IP: 185.125.190.52 80]
Hit:5 http://ppa.launchpad.net/pasgui/ppa/ubuntu bionic InRelease
Hit:6 http://ppa.launchpad.net/webupd8team/java/ubuntu bionic InRelease
Reading package lists... Done
E: Failed to fetch http://ppa.launchpad.net/jonathonf/python-3.6/ubuntu/dists/bionic/InRelease 403 Forbidden [IP: 185.125.190.52 80]
E: The repository 'http://ppa.launchpad.net/jonathonf/python-3.6/ubuntu bionic InRelease' is no longer signed.
N: Updating from such a repository can't be done securely, and is therefore disabled by default.
N: See apt-secure(8) manpage for repository creation and user configuration details.
mca@U36:~/Desktop/RMCA-B/06-06-2022$
```

Step 2: Download and Install Wireshark

Now that Wireshark's latest version has been added to the APT, you can download and install it with the following command.

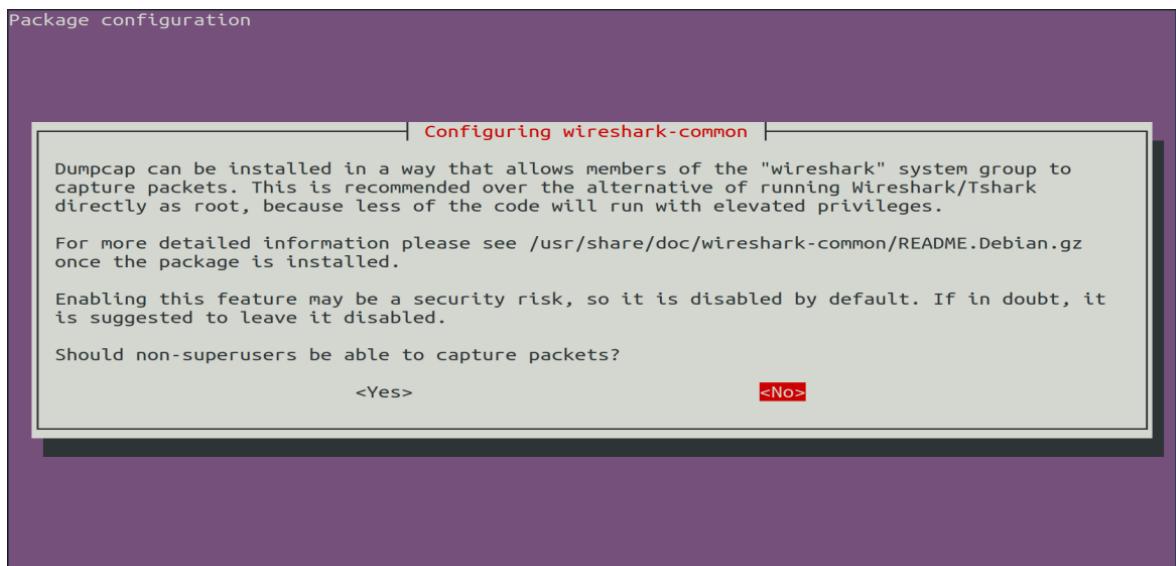
syntax

\$ sudo apt install wireshark

```
mca@U36:~/Desktop/RMCA-B/06-06-2022$ sudo apt-get install wireshark
Reading package lists... Done
Building dependency tree
Reading state information... Done
wireshark is already the newest version (2.4.5-1).
The following packages were automatically installed and are no longer required:
  debhelper dh-autoreconf dh-strip-nondeterminism libarchive-cpio-perl libfile-stripnondeterminism-perl libmail-sendmail-perl libpcre16-3
  libpcre3-dev libpcre32-3 libpcrecpp0v5 libssl-dev libssl-doc libsys-hostname-long-perl po-debconf shtool
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 6 not upgraded.
mca@U36:~/Desktop/RMCA-B/06-06-2022$
```

Step 3: Enable Root Privileges

When Wireshark installs on your system, you will be prompted by the following window. As Wireshark requires superuser/root privileges to operate, this option asks to enable or disable permissions for all every user on the system. Press the “Yes” button to allow other users, or press the “No” button to restrict other users from using Wireshark.



Step 4:

You must add a username to the Wireshark group so that this user can use Wireshark. To do this, execute the following command, adding your required username after “wireshark” in the command.

Syntax:

\$ sudo adduser \$user wireshark

```
mca@S66:~$ sudo adduser $mca wireshark
adduser: The group `wireshark' already exists.
```

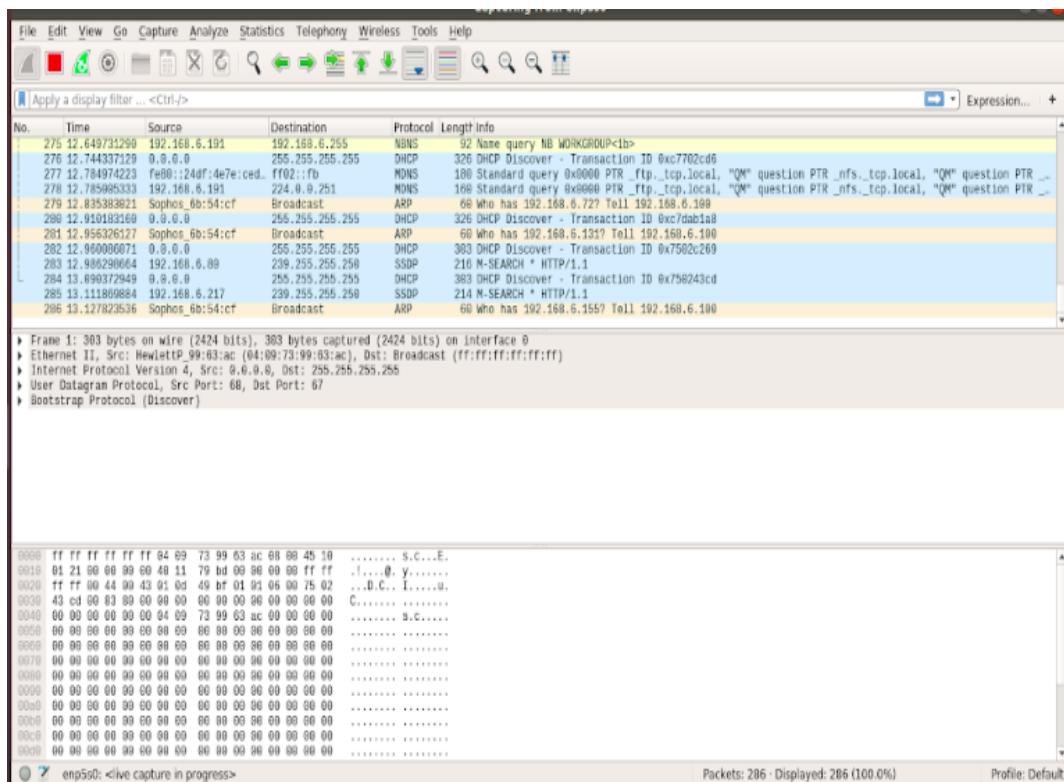
Step 5: Launch Wireshark

In the terminal window, type the following command to start the Wireshark application.

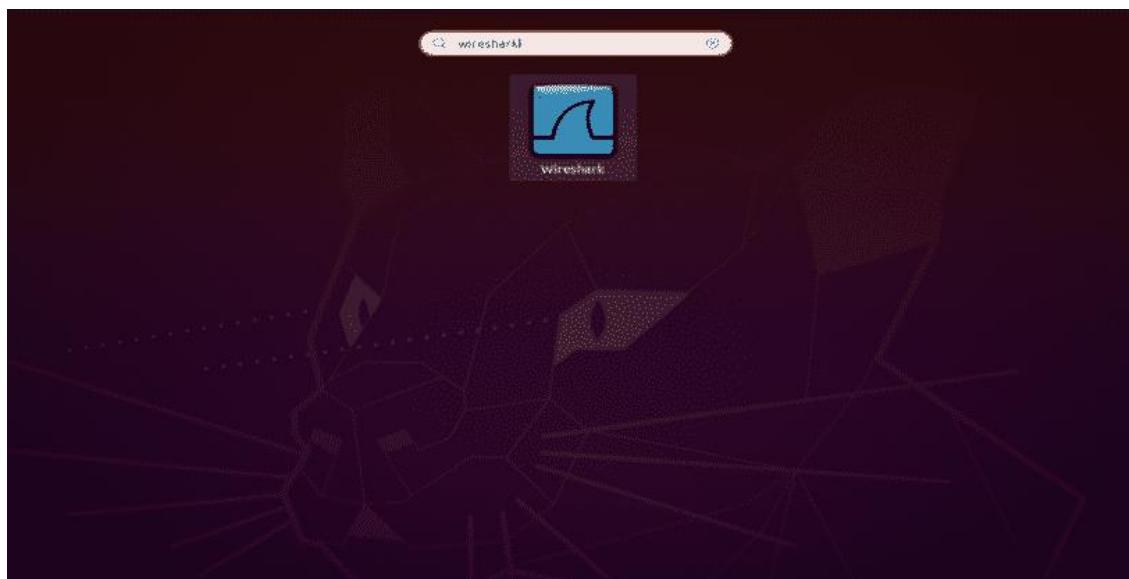
Syntax:

\$ wireshark

```
mca@U36:~/Desktop/RMCA-B/06-06-2022$ sudo wireshark
QStandardPaths: XDG_RUNTIME_DIR not set, defaulting to '/tmp/runtime-root'
mca@U36:~/Desktop/RMCA-B/06-06-2022$
```



You can also open Wireshark through the Graphical User Interface (GUI) by opening the activities on the Ubuntu desktop, and in the search bar, type “Wireshark,” and click on the application result.



netcat

STEP1 : Update APT

First, as always, update and upgrade your APT through the following command.

Syntax:

\$ sudo apt update

```
mca@U23:~$ sudo apt-get update
[sudo] password for mca:
Hit:1 http://ppa.launchpad.net/codeblocks-devs/release/ubuntu bionic InRelease
Get:2 https://dl.google.com/linux/chrome/deb stable InRelease [1,811 B]
Hit:3 http://archive.ubuntu.com/ubuntu bionic InRelease
Err:4 http://ppa.launchpad.net/jonathonf/python-3.6/ubuntu bionic InRelease
  403 Forbidden [IP: 185.125.190.52 80]
Get:5 https://dl.google.com/linux/chrome/deb stable/main amd64 Packages [1,097 B]
Hit:6 http://ppa.launchpad.net/pasgui/ppa/ubuntu bionic InRelease
Hit:7 http://ppa.launchpad.net/webupd8team/java/ubuntu bionic InRelease
Reading package lists... Done
E: Failed to fetch http://ppa.launchpad.net/jonathonf/python-3.6/ubuntu/dists/bionic/InRelease  403 Forbidden [IP: 185.125.190.52 80]
E: The repository 'http://ppa.launchpad.net/jonathonf/python-3.6/ubuntu bionic InRelease' is no longer signed.
N: Updating from such a repository can't be done securely, and is therefore disabled by default.
N: See apt-secure(8) manpage for repository creation and user configuration details.
```

step 2: Install netcat

```
mca@U36:~/Desktop/RMCA-B/06-06-2022$ sudo apt-get install netcat
Reading package lists... Done
Building dependency tree...
Reading state information... Done
The following packages were automatically installed and are no longer required:
  debhelper dh-autoreconf dh-strip-nondeterminism libarchive-cpio-perl libfile-stripnondeterminism-perl libmail-sendmail-perl libpcre16-3
  libpcre3-dev libpcre32-3 libpcrecpp0v5 libssl-dev libssl-doc libsys-hostname-long-perl po-debconf shtool
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  netcat-traditional
The following NEW packages will be installed:
  netcat netcat-traditional
0 upgraded, 2 newly installed, 0 to remove and 0 not upgraded.
Need to get 65.1 kB of archives.
After this operation, 157 kB of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 http://archive.ubuntu.com/ubuntu bionic/universe amd64 netcat-traditional amd64 1.10-41.1 [61.7 kB]
Get:2 http://archive.ubuntu.com/ubuntu bionic/universe amd64 netcat all 1.10-41.1 [3,436 B]
Fetched 65.1 kB in 1s (74.4 kB/s)
Selecting previously unselected package netcat-traditional.
(Reading database ... 185161 files and directories currently installed.)
Preparing to unpack .../netcat-traditional_1.10-41.1_amd64.deb ...
Unpacking netcat-traditional (1.10-41.1) ...
Selecting previously unselected package netcat.
Preparing to unpack .../netcat_1.10-41.1_all.deb ...
Unpacking netcat (1.10-41.1) ...
Setting up netcat-traditional (1.10-41.1) ...
Setting up netcat (1.10-41.1) ...
Processing triggers for man-db (2.8.3-2) ...
mca@U36:~/Desktop/RMCA-B/06-06-2022$
```

working with netcat security tool

To start listening on a port ,first open 2 window terminals

Terminal 1 for listening

```
mca@U36:~/Desktop/RMCA-B/06-06-2022$ nc -l -p 1234
This is a request
this is a response
|
```

Terminal 2 sending requesting

```
mca@U36:~$ nc -i 5 192.168.6.206 1234
This is a request
this is a response
|
```

NETWORKING & SYSTEM ADMINISTRATION LAB

Experiment No.: 9

Aim

Introduction to Hypervisors and VMs: KVM installation and commands

Name: SHAMJAD MAZOOD NAZER

Roll No: 36

Batch: MCA-B

Date: 07-06-2022

Procedure

Step 1: Update the repositories

```
mca@U36:~/Desktop/RMCA-B-NETWORK/16-06-2022$ sudo apt update
[sudo] password for mca:
Get:1 http://dl.google.com/linux/chrome/deb stable InRelease [1,811 B]
Hit:2 http://ppa.launchpad.net/codeblocks-devs/release/ubuntu bionic InRelease
Hit:3 http://archive.ubuntu.com/ubuntu bionic InRelease
Err:4 http://ppa.launchpad.net/jonathonf/python-3.6/ubuntu bionic InRelease
  403 Forbidden [IP: 185.125.190.52 80]
Hit:5 http://ppa.launchpad.net/pasgui/ppa/ubuntu bionic InRelease
Get:6 http://dl.google.com/linux/chrome/deb stable/main amd64 Packages [1,101 B]
Hit:7 http://ppa.launchpad.net/webupd8team/java/ubuntu bionic InRelease
```

Step 2: Install essential KVM packages

Install virt-manager, a tool for creating and managing VMs

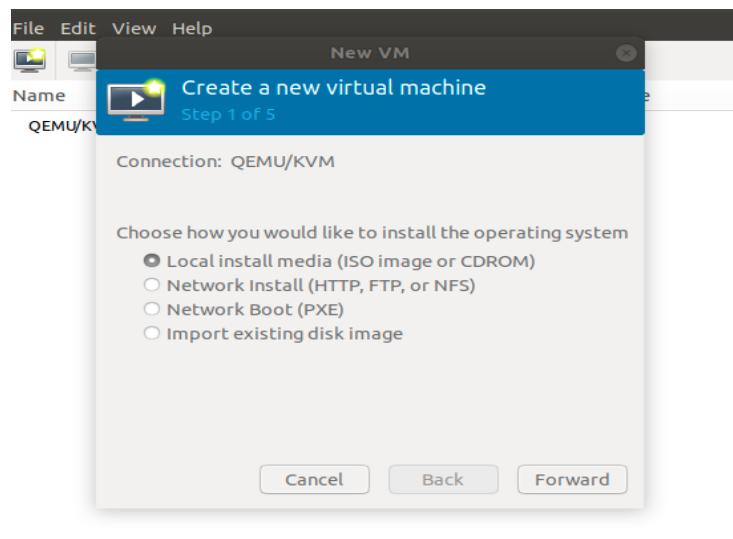
```
mca@U40:~$ sudo apt install qemu-kvm libvirt-daemon-system libvirt-clients bridge-utils virt-manager
Reading package lists... Done
Building dependency tree
Reading state information... Done
qemu-kvm is already the newest version (1:2.11+dfsg-1ubuntu7.4).
The following additional packages will be installed:
  augeas-lenses dmeventd ebttables gir1.2-appindicator3-0.1 gir1.2-gtk-vnc-2.0
  gir1.2-libosinfo-1.0 gir1.2-libvirt-glib-1.0 gir1.2-spiceclientglib-2.0
  gir1.2-spiceclientgtk-3.0 libaugeas0 libdevmapper-event1.02.1
  libgovirt-common libgovirt2 libgtk-vnc-2.0-0 libgvnc-1.0-0 liblvm2app2.2
  liblvm2cmd2.02 libnetcfi libosinfo-1.0-0 libphodav-2.0-0
  libphodav-2.0-0-common libspice-client-glib-2.0-8 libspice-client-gtk-3.0-5
  libusbredirhost1 libvirt-daemon libvirt-daemon-driver-storage-rbd
  libvirt-glib-1.0-0 libvirt0 libxml2-utils lvm2 osinfo-db python-asn1crypto
  python-certifi python-cffi-backend python-chardet python-cryptography
  python-dbus python-enum34 python-gi python-gi-cairo python-idna
  python-ipaddr python-ipaddress python-libvirt python-libxml2 python-openssl
  python-pkg-resources python-requests python-six python-urllib3
  spice-client-glib-usb-acl-helper virt-viewer virtinst
Suggested packages:
  augeas-doc augeas-tools libosinfo-l10n gstreamer1.0-plugins-bad
  gstreamer1.0-libav libvirt-daemon-driver-storage-gluster
  libvirt-daemon-driver-storage-sheepdog libvirt-daemon-driver-storage-zfs
```

Step 3: Start virt-manager with

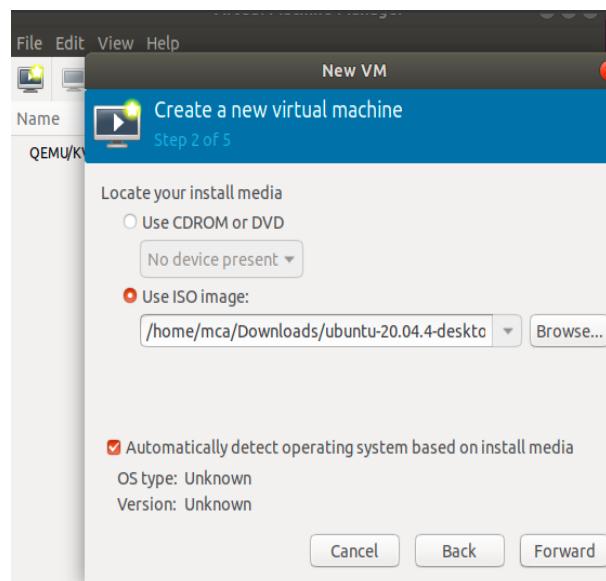
```
mca@U36:~/Desktop/RMCA-B-NETWORK/16-06-2022$ sudo virt-manager
mca@U36:~/Desktop/RMCA-B-NETWORK/16-06-2022$ █
```

Step 4: In the first window, click the computer icon in the upper-left corner,

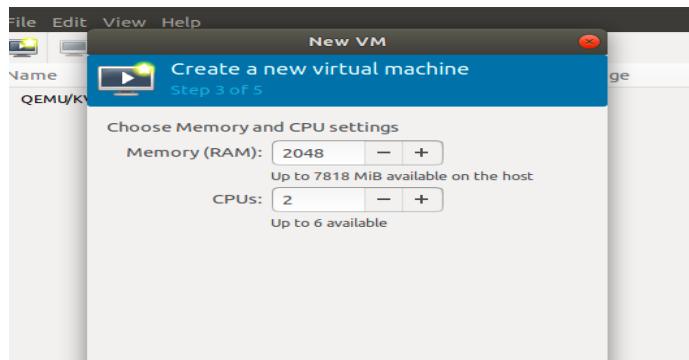
In the dialogue box that opens, select the option to install the VM using an ISO image. Then click **Forward**.



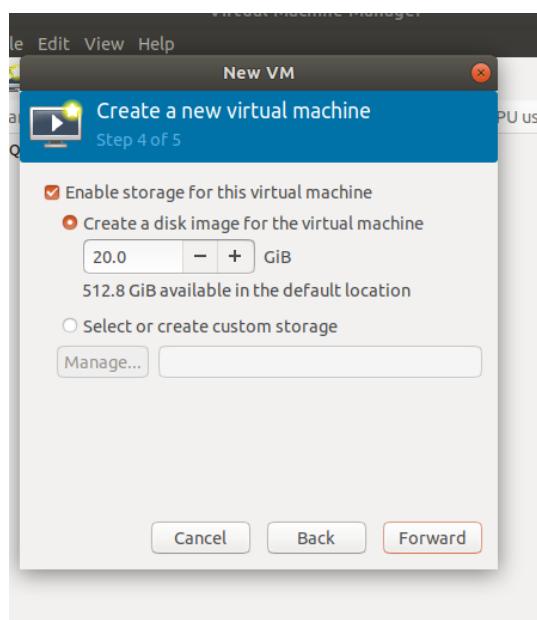
Step 5: Choose ISO,click Forward



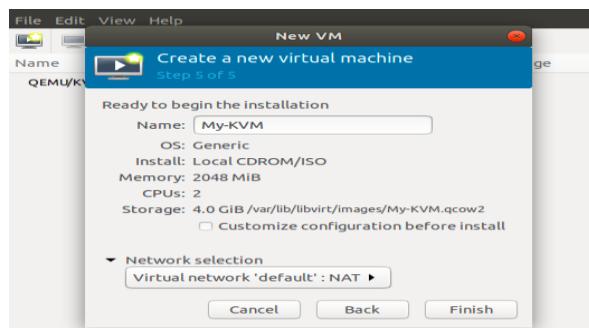
Step 6: Enter the amount of RAM and the number of CPUs you wish to allocate to the VM and proceed to the next step.



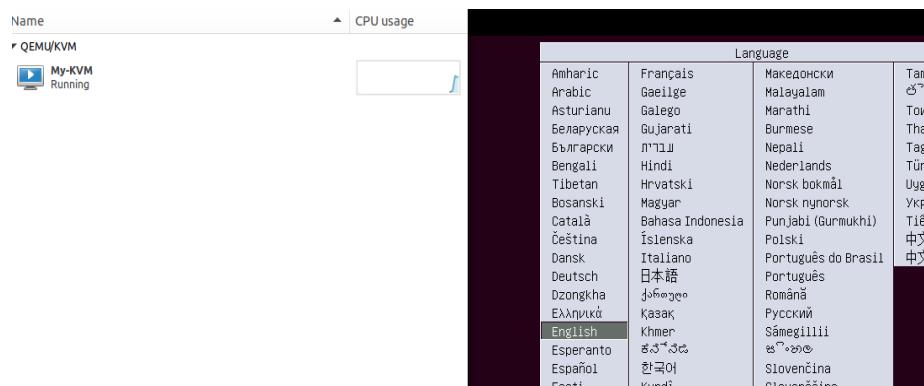
Step 7: Allocate hard disk space to the VM. Click **Forward** to go to the last step.



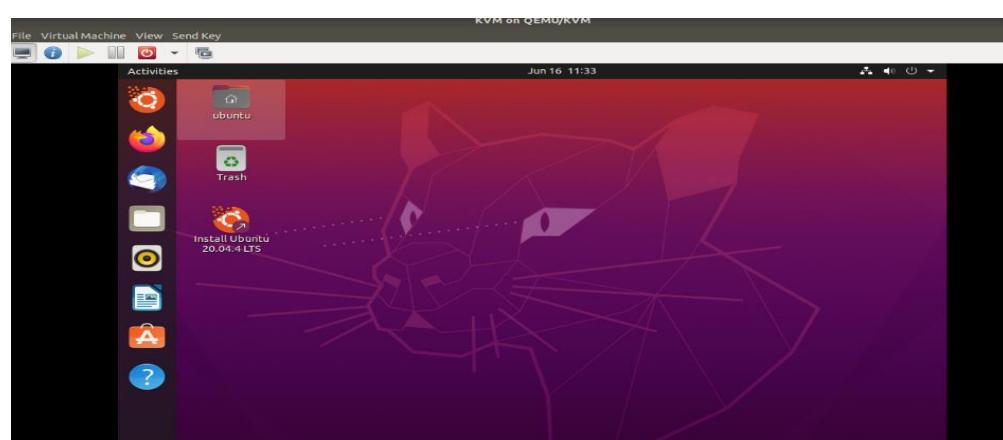
Step 8: Specify the name for your VM and click **Finish** to complete the setup.



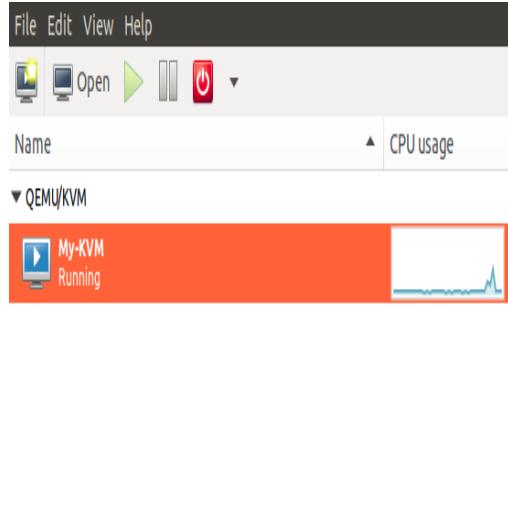
Step 9: Select language



Step 10: The VM starts automatically, prompting you to start installing the OS that's on the ISO file.



Step 11: Check the state of KVM



```
mca@U40:~$ sudo virsh list --all
  Id  Name      State
  --  --
  1   KVM      running

mca@U40:~$
```

```
mca@U40:~$ sudo virsh list --all
  Id  Name      State
  --  --
  -   KVM      shut off
```

NETWORKING & SYSTEM ADMINISTRATION LAB

Experiment No.: 10

Aim

Installation of Docker on Ubuntu

Name: SHAMJAD MAZOOD NAZER

Roll No: 36

Batch: RMCA-B

Date: 23-05-2022

Procedure

step 1: Open the terminal on Ubuntu.

step 2: Remove any Docker files that are running in the system, using the following command:

\$ sudo apt-get remove docker docker-engine docker.io

```
ajc@ubuntu20-04:~$ sudo apt-get remove docker docker-engine docker.io
Reading package lists... Done
Building dependency tree
Reading state information... Done
Package 'docker-engine' is not installed, so not removed
Package 'docker' is not installed, so not removed
The following packages were automatically installed and are no longer required:
  augeas-lenses bridge-utils certbot containerd dbconfig-common dbconfig-mysql icc-profiles-free javascript-common libaugeas0 libfwupdplugin1
  libjs-jquery libjs-openlayers libjs-sphinxdoc libjs-underscore php-bz2 php-google-recaptcha php-mysql php-phpmyadmin-motranslator
  php-phpmyadmin-shapefile php-phpmyadmin-sql-parser php-phpseclib php-psr-cache php-psr-container php-psr-log php-symfony-cache
  php-symfony-cache-contracts php-symfony-expression-language php-symfony-service-contracts php-symfony-var-exporter php-tcpdf php-twig
  php-twig-extensions php7.4 php7.4-bz2 pigz python3-acme python3-augeas python3-certbot python3-configargparse python3-configobj python3-icu
  python3-josepy python3-mock python3-parsedatetime python3-pbr python3-requests-toolbelt python3-zope.component python3-zope.event
  python3-zope.hookable python3-zope.interface runc ubuntu-fan wmdocker
Use 'sudo apt autoremove' to remove them.
The following packages will be REMOVED:
  docker.io
0 upgraded, 0 newly installed, 1 to remove and 3 not upgraded.
After this operation, 163 MB disk space will be freed.
Do you want to continue? [Y/n] y3
(Reading database ... 217729 files and directories currently installed.)
Removing docker.io (20.10.12-0ubuntu2~20.04.1) ...
/usr/share/docker.io/contrib/nuke-graph-directory.sh' -> '/var/lib/docker/nuke-graph-directory.sh'
Processing triggers for man-db (2.9.1-1) ...
```

step 3: Check if the system is up-to-date using the following command:

\$ sudo apt-get update

```
ajc@ubuntu20-04:~$ sudo apt-get update
Hit:1 http://in.archive.ubuntu.com/ubuntu focal InRelease
Hit:2 https://download.docker.com/linux/ubuntu focal InRelease
Hit:3 http://in.archive.ubuntu.com/ubuntu focal-updates InRelease
Hit:4 https://dl.google.com/linux/chrome/deb stable InRelease
Hit:5 http://in.archive.ubuntu.com/ubuntu focal-backports InRelease
Get:6 http://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Get:7 http://security.ubuntu.com/ubuntu focal-security/main amd64 Packages [1,491 kB]
Get:8 http://security.ubuntu.com/ubuntu focal-security/main amd64 DEP-11 Metadata [40.6 kB]
Get:9 http://security.ubuntu.com/ubuntu focal-security/universe amd64 DEP-11 Metadata [66.6 kB]
Get:10 http://security.ubuntu.com/ubuntu focal-security/multiverse amd64 DEP-11 Metadata [2,464 B]
Fetched 1,714 kB in 3s (508 kB/s)
Reading package lists... Done
```

Step 4: Install Docker using the following command:

```
$ sudo apt install docker.io
```

```
ajc@ubuntu20-04:~$ sudo apt install docker.io
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  augeas-lenses certbot dbconfig-common dbconfig-mysql icc-profiles-free javascript-common libaugeas0 libfwupdplugin1 libjs-jquery libjs-openlayers
  libjs-sphinxdoc libjs-underscore php-bz2 php-google-recaptcha php-mysql php-phpmyadmin-motranslator php-phpmyadmin-shapefile
  php-phpmyadmin-sql-parser php-phraseable php-psr-cache php-psr-container php-psr-log php-symfony-cache php-symfony-cache-contracts
  php-symfony-expression-language php-symfony-service-contracts php-symfony-var-exporter php-tcpdf php-twigi php-twigi-extensions php7.4 php7.4-bz2
  python3-acme python3-augeas python3-certbot python3-configargparse python3-configobj python3-icu python3-josepy python3-mock python3-parsedatetime
  python3-pbr python3-requests-toolbelt python3-zope.component python3-zope.event python3-zope.hookable python3-zope.interface wmdocker
Use 'sudo apt autoremove' to remove them.
Suggested packages:
  aufs-tools btrfs-progs cgroupfs-mount | cgroup-lite debootstrap docker-doc rinse zfs-fuse | zfsutils
The following NEW packages will be installed:
  docker.io
0 upgraded, 1 newly installed, 0 to remove and 5 not upgraded.
Need to get 31.8 MB of archives.
After this operation, 163 MB of additional disk space will be used.
Get:1 http://in.archive.ubuntu.com/ubuntu focal-updates/universe amd64 docker.io amd64 20.10.12-0ubuntu2~20.04.1 [31.8 MB]
Fetched 31.8 MB in 15s (2,064 kB/s)
Preconfiguring packages ...
Selecting previously unselected package docker.io.
(Reading database ... 217523 files and directories currently installed.)
Preparing to unpack .../docker.io_20.10.12-0ubuntu2~20.04.1_amd64.deb ...
Unpacking docker.io (20.10.12-0ubuntu2~20.04.1) ...
Setting up docker.io (20.10.12-0ubuntu2~20.04.1) ...
Processing triggers for man-db (2.9.1-1) ...
ajc@ubuntu20-04:~$
```

Step 5: Install all the dependency packages using the following command:

```
$ sudo snap install docker
```

```
ajc@ubuntu20-04:~$ sudo snap install docker
snap "docker" is already installed, see 'snap help refresh'
ajc@ubuntu20-04:~$
```

Step 6: Before testing Docker, check the version installed using the following command:

```
$ docker --version
```

```
ajc@ubuntu20-04:~$ docker --version
Docker version 20.10.12, build 20.10.12-0ubuntu2~20.04.1
```

Step 7: Pull an image from the Docker hub using the following command:

```
$ sudo docker run hello-world
```

```
ajc@ubuntu20-04:~$ sudo docker run hello-world
Hello from Docker!
This message shows that your installation appears to be working correctly.

To generate this message, Docker took the following steps:
 1. The Docker client contacted the Docker daemon.
 2. The Docker daemon pulled the "hello-world" image from the Docker Hub.
    (amd64)
 3. The Docker daemon created a new container from that image which runs the
    executable that produces the output you are currently reading.
 4. The Docker daemon streamed that output to the Docker client, which sent it
    to your terminal.
```

To try something more ambitious, you can run an Ubuntu container with:
`$ docker run -it ubuntu bash`

Share images, automate workflows, and more with a free Docker ID:
<https://hub.docker.com/>

For more examples and ideas, visit:
<https://docs.docker.com/get-started/>

```
ajc@ubuntu20-04:~$
```

Step 8: Check if the docker image has been pulled and is present in your system using the following command:

```
$ sudo docker images
```

```
ajc@ubuntu20-04:~$ sudo docker images
REPOSITORY          TAG      IMAGE ID      CREATED       SIZE
mysql/mysql-server  latest   5a9594052aec  5 weeks ago  438MB
hello-world         latest   feb5d9fea6a5  8 months ago  13.3kB
ajc@ubuntu20-04:~$
```

Step 9: To display all the containers pulled, use the following command:

\$ sudo docker ps -a

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
7432a1c74936	hello-world	"/hello"	40 seconds ago	Exited (0) 35 seconds ago		eloquent_nobel
66b3e55f4dbe	hello-world	"/hello"	2 weeks ago	Exited (0) 2 weeks ago		mystifying_montalcini

Step 10: To check for containers in a running state, use the following command:

\$ sudo docker ps

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES

step 11: **sudo docker run -dit --name tecmint-web -p 8080:80 -v**

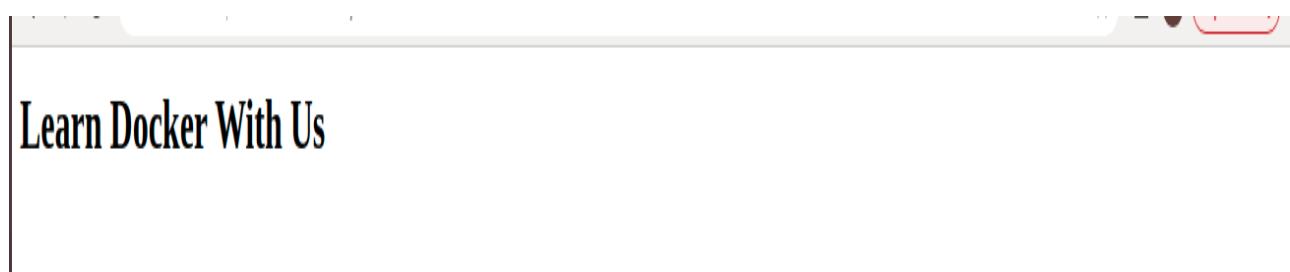
/home/user/website/:/usr/local/apache2/htdocs/ httpd:2.4

```
ajc@ubuntu20-04:~$ sudo docker run -dit --name tecmint-web -p 8080:80 -v /home/user/website/:/usr/local/apache2/htdocs/ httpd:2.4
Unable to find image 'httpd:2.4' locally
2.4: Pulling from library/httpd
42c077c10790: Pull complete
77a357ba66a8: Pull complete
c56c780a8904: Pull complete
90bcc5e941a7: Pull complete
571750298b32: Pull complete
Digest: sha256:c479bec394c5a7f8878b28e52d03cc95b1e784612ecd01ac7c7394fc5fa2e6e2
Status: Downloaded newer image for httpd:2.4
1ee1c762ed863fb050cbf1b16fe46dc313df3e26225970cc39e10c3f0dfd051
docker: Error response from daemon: driver failed programming external connectivity on endpoint tecmint-web (611ebf7bab30b40a03b9c018262fd74f536ce1211
23fd7db4252c91693c157fe): Error starting userland proxy: listen tcp4 0.0.0.0:8080: bind: address already in use.
ajc@ubuntu20-04:~$
```

step 12: **\$ sudo docker ps**

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS
AMES					
044e5fb945bf	httpd:2.4	"httpd-foreground"	2 minutes ago	Up 2 minutes	0.0.0.0:8080->80/tcp, :::8080->80/tcp
tecmint-web					

step 13 : \$ sudo gedit /home/user/website/docker.html



step 14 : \$ sudo docker stop tecmint-web

```
ajc@s36:~$ sudo docker stop tecmint-web
tecmint-web
ajc@s36:~$
```

step 15: \$ sudo docker rm tecmint-web

```
ajc@s36:~$ sudo docker rm tecmint-web
tecmint-web
ajc@s36:~$
```

step 16: \$ sudo docker image remove httpd:2.4

```
ajc@s36:~$ sudo docker image remove httpd:2.4
Untagged: httpd:2.4
Untagged: httpd@sha256:c479bec894c5a7f8878b28e52d03cc95b1e784612ecd01ac7c7394fc5fa2e6e2
Deleted: sha256:98f93cd0ec3b2e428f152d265d431bcb3f8a5ff56adaa5023e11a2b3b5a107e7
Deleted: sha256:f4592b579afa218a66285f3652418a826313aac1813be685ff9738dc06c0d8d9
Deleted: sha256:061811c2224e933b8ea3e2e0ffe7ec7bab8c2510f8f938ab13f9c4bacd425bd7
Deleted: sha256:b6ac17bbf3c4d8d63c1a085e9affa7a6c3f6e765f821837ff3d3e7fc0c0706e2
Deleted: sha256:3439b4fb9b4289be9427c14f2840d97e3573dc8d609584d9ceb2ad8bbd3ae9dc
Deleted: sha256:ad6562704f3759fb50f0d3de5f80a38f65a85e709b77fd24491253990f30b6be
ajc@s36:~$
```