

NETWORKING & SYSTEM ADMINISTRATIVE LAB

Experiment No.: 1

Aim

Introduction to Computer hardware: Physical identification of major components of a computer system such as mother board, RAM modules, daughter cards, bus slots, SMPS, internal storage devices, interfacing ports.

Name: ATHIRA BIJU

Roll No:4

Batch: MCA-B

Date:4-04-2022

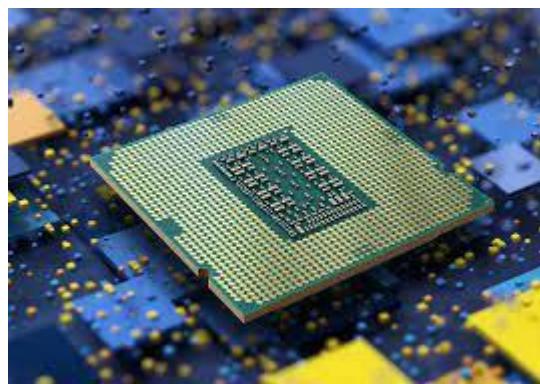
Procedure

1, CPU (Central Processing Unit)

The central processing unit (CPU) is the computer component that's responsible for interpreting and executing most of the commands from the computer's other hardware and software.

The CPU attaches directly to a CPU "socket" (or sometimes a "slot") on the motherboard. The CPU is inserted into the socket pin-side-down, and a small lever helps to secure the processor.

After running even a short while, modern CPUs can get very hot. To help dissipate this heat, it's almost always necessary to attach a heat sink and a fan directly on top of the CPU. Typically, these come bundled with a CPU purchase. The clock speed of a processor is the number of instructions it can process in any given second, measured in gigahertz (GHz).



2. Solid State Drive (SSD)

Solid state refers to electronic circuitry that is built entirely of semiconductors. The term was originally used to define those electronics, such as a transistor radio that used

semiconductors rather than vacuum tubes in its construction. An SSD is also a type of hard drive, but it doesn't have any moving parts. It consists of a bank of flash memory that can hold a reasonable amount of data.

While SSD's are increasing in size all the time, they aren't cost-effective for storing large amounts of data. However, the SSD is a high-performance drive. It's fast and cannot be easily damaged by dropping it or taking a few knocks.



3. HARD DISK STORAGE DEVICE

A computer hard disk drive (HDD) is a non-volatile data storage device. Non-volatile refers to storage devices that maintain stored data when turned off. All computers need a storage device, and HDDs are just one example of a type of storage device. HDDs are usually installed inside desktop computers, mobile devices, consumer electronics and enterprise storage arrays in data centers. They can store operating systems, software programs and other files using magnetic disks.

More specifically, hard disk drives control the reading and writing of the hard disk that provides data storage. HDDs are used either as the primary or secondary storage device in a computer. They are commonly found in the drive bay and are connected to the motherboard via an Advanced Technology Attachment (ATA), Serial ATA, parallel ATA or Small Computer System Interface (SCSI) cable, among other formats. The HDD is also connected to a power supply unit and can keep stored data while powered down.



4. Video card

The video card is an expansion card that allows the computer to send graphical information to a video display device such as a monitor, TV, or projector. Some other names for a video card include graphics card, graphics adapter, display adapter, video adapter, video controller, and add-in boards (AIBs). A staggering number of companies manufacture video cards, but almost every one includes a graphics processing unit (GPU) from either NVIDIA Corporation or AMD.



5. Power Supply Unit

The power supply unit is the piece of hardware that converts the power provided from the outlet into usable power for the many parts inside the computer case. It converts the alternating current from your wall outlet into a continuous form of power called direct current that the computer components require. It also regulates overheating by controlling voltage, which might change automatically or manually depending on the power supply.



6. Motherboard

The motherboard is the piece of computer hardware that can be thought of as the "backbone" of the PC, or more appropriately as the "mother" that holds all the pieces together.

Phones, tablets and other small devices have motherboards, too, but they're often called *logic boards* instead. Their components are usually soldered directly onto the board to save space, which means there aren't expansion slots for upgrades like you see in desktop computers.

The IBM Personal Computer that was released in 1981, is considered to be the very first computer motherboard (it was called a "planar" at the time). Popular motherboard manufacturers include ASUS, AOpen, Intel, ABIT, MSI, Gigabyte, and Biostar.



Parts

1. Back Panel Connectors & Ports

Connectors and ports for connecting the computer to external devices such as display ports, audio ports, USB ports, Ethernet ports, PS/2 ports etc.

2. PCI Slots

PCI: Peripheral Component Interconnect Slot for older expansion cards such as sound cards, network cards, connector cards.

3. PCI Express x1 Slots

Slot for modern expansion cards such as sound cards, network cards (Wi-Fi, Ethernet, Bluetooth), connector cards (USB, FireWire, eSATA) and certain low end graphics cards.

4. PCI Express x16 Slot

Slot for discrete graphic cards and high bandwidth devices such as top-end solid state drives.

5. Northbridge

Also known as Memory Controller Hub (MCH). Chipset that allows the CPU to communicate with the RAM and graphics card.

Beginning from Intel Sandy Bridge in 2011, this motherboard component is no longer present as it has been integrated within the CPU itself.

6. CPU Socket

Insert CPU here.

7. ATX 12V Power Connector

Connects to the 4-pin power cable of a power supply unit which supplies power to the CPU.

8. Front Panel USB 2.0 Connectors

Connects to USB 2.0 ports at the front or top of a computer case.

9. Front Panel Connectors

Connects to the power switch, reset switch, power LED, hard drive LED and front audio ports of a computer case.

10. IDE Connector

Connects to older hard drive disks and optical drives for data transfer.

11.CMOS Battery

Supplies power to store BIOS settings and keep the real-time clock running.

12.Southbridge

Also known as the Input/Output Controller Hub (ICH). Chipset that allows the CPU to communicate with PCI slots, PCI-Express x 1 slots (expansion cards), SATA connectors (hard drives, optical drives), USB ports (USB devices), Ethernet ports and on-board audio.

13.SATA Connectors

Connects to modern hard disk drives, solid state drives and optical drives for data transfer.

14. Fan Headers

Supplies power to the CPU heat sink fan and computer case fans.

15.RAM Slots

Insert RAM here.

16. ATX Power Connector

Connects to the 24-pin ATX power cable of a power supply unit which supplies power to the motherboard.

17.mSATA Connector

Connects to a mSATA solid state drive. In most cases, this SSD is used as cache to speed up hard disk drives, but it's possible to re-purpose it as a regular hard drive.

18.Front Panel USB 3.0 Connector

Connects to USB 3.0 ports at the front or top of the computer case.

19.Power & Reset Button

Onboard button to turn on, turn off and reboot the computer. This motherboard component is more common among high end boards.

6. Monitor

The monitor is a hardware device that displays the video and graphics information generated by the computer via the video card. Monitors can also be called video display units, video display terminals, or simply as screens.

Older monitors were bulky and built using cathode ray tubes, but nowadays they normally use LCD technology and are lighter and thinner.



7. Speakers

Computer speakers are a common output device and are used for listening to music, movies, and other audio. They are available in a range of different qualities and prices, the more sophisticated versions having an additional subwoofer to provide enhanced bass output.



8. USB Flash Drive

A USB flash drive is a portable data storage device. Unlike optical drives, flash drives have no moving parts, making them more durable. A USB flash drive has an integrated USB interface and connects to the computer via a USB port.

This content is accurate and true to the best of the author's knowledge and is not meant to substitute for formal and individualized advice from a qualified professional.



9. Printer

Printers are output devices that generate hard copies of electronic data stored on the computer, usually in the form of text or images on paper. The most common types of modern printer use inkjet or laser technology, and connect to the computer either via the computer's USB port, or via WI-FI.



10. Scanner

Computer scanners are devices that convert images into digital or computerized information. The first scanners were large and expensive, but today they're affordable and compact enough to fit on a desktop.

A scanner allows you to copy anything from a picture to a receipt as well as images from magazines, newspapers, and books as long as it's black and white. Scanners can be used for many purposes such as archiving family photos or creating an electronic form of your child's artwork.



Experiment No.: 2

Aim

Aim: Install latest version of Ubuntu on a virtual box

Name: ATHIRA BIJU

Roll No:4

Batch: S2 RMCA

Date:4-04-2022

Output:

1. Download and Virtualbox Windows 10 Installation
2. Ubuntu ISO download
3. Install Virtualbox
4. Create an Ubuntu VM
5. Install Ubuntu on Virtualbox Windows 10
6. Install Virtualbox Guest Additions

Download and Virtualbox Windows 10 Installation

1. Install Ubuntu on VirtualBox
2. How To Install Ubuntu On Virtual Box?
 1. Open VirtualBox
 2. Click on “New” to create a virtual machine
 3. Enter Name for your Virtual Machine
 4. Select “Linux” Operating System from “Type”
 5. Click “Next”
 6. Enter amount of memory (RAM) =1024 MB and click “Next”
 7. Click “Create” to create hard drive
 8. Click “Next”
 9. Click “Next”
10. Enter Size of Virtual Hard Drive= 20 GB and Click “Create”
11. Select Virtual Machine
12. Click on “Start” to start the virtual machine

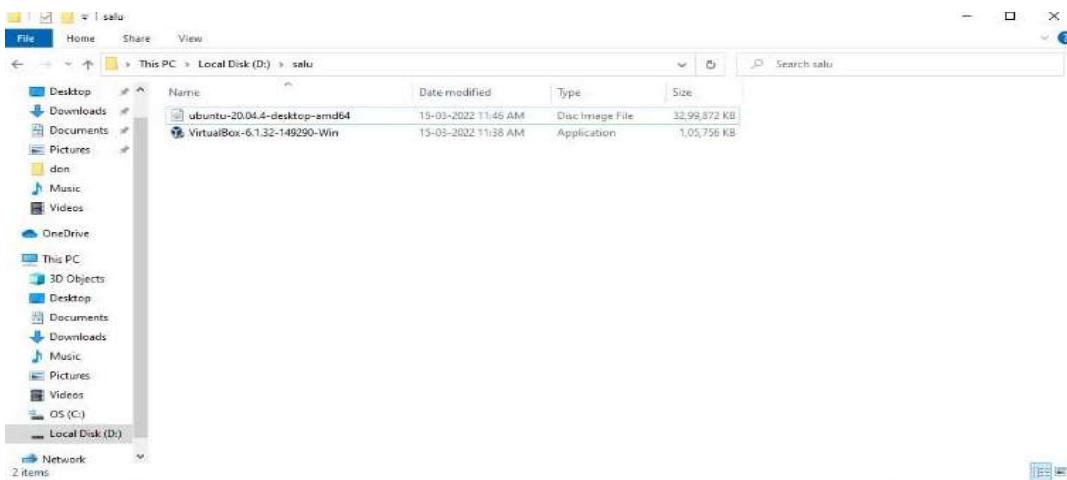
13. Select disk file source
14. After selecting the OS file to be installed click “Open”
15. Click “Start”
16. Click “Ok”
17. Click “Install Ubuntu”
18. Click “Continue”
19. Click “Install Now”
20. Click “Continue”
21. Select location and click “Continue”
22. Select keyboard layout & click “Continue”
23. Fill all the details and Click “Continue”
24. Now the installation process will start and installation window will appear
25. Click “Restart Now”
26. When the system will get restarted the following message will appear.
Press “Enter”
27. Close the pop-up messages by clicking on the Close (×) button

3. Steps To Maximize The Size Of Ubuntu Desktop

1. Go to “Devices”
2. Click “Insert Guest Additions CD Image...”
3. Click “Run”
4. Click “Authenticate”
5. Press “Enter”
6. Now “Restart” your system for the changes to be applied.
7. After the system gets restarted. Go to “View”
8. Click “Switch to Fullscreen”
9. Click “Switch”

Output Screenshot

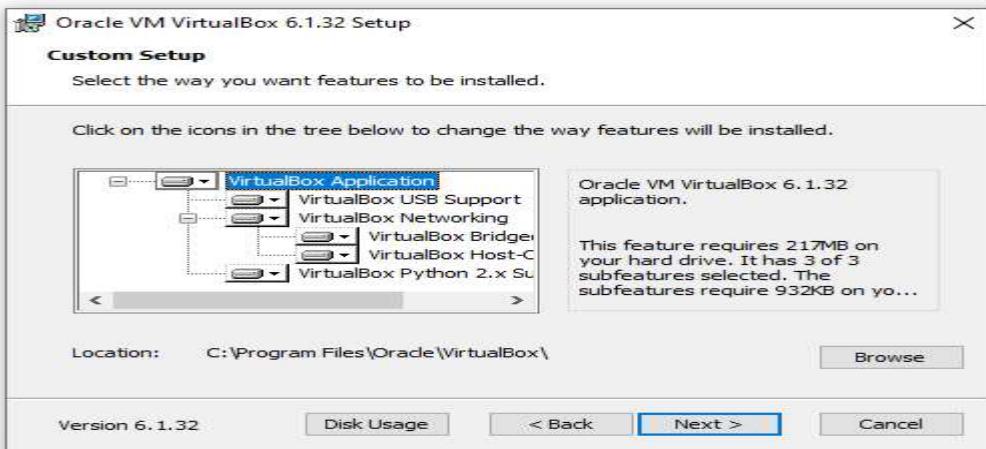
Step 1: Download VirtualBox for Windows and install it on your computer



Install Ubuntu Virtual Box



Click Next

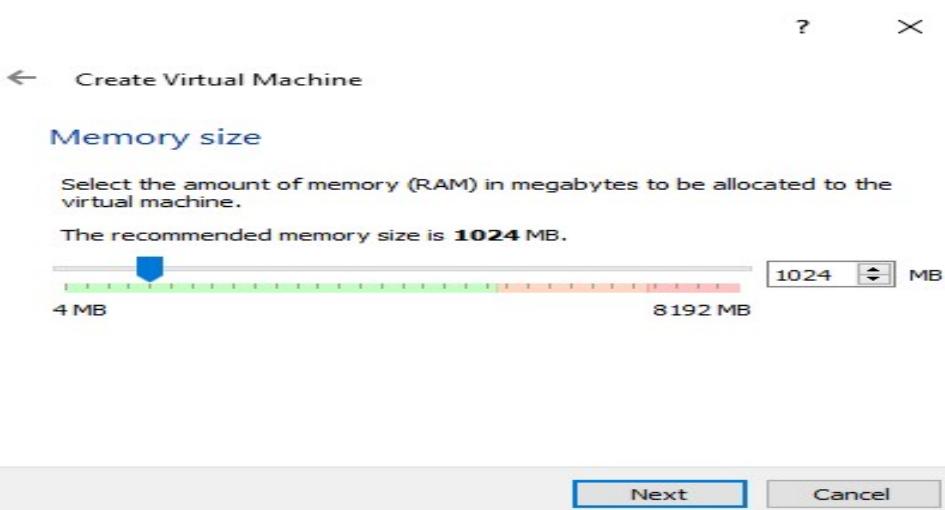


Step 2: Open VirtualBox and select **New** in the top toolbar.

Step 3: Give your VM a name, choose **Linux** as the **Type**, then choose **Ubuntu** as the **Version** and select **Next**.



Step 4: Choose how much **RAM** you want to assign to the virtual machine and select **Next**. The recommended minimum is **1024 MB**



Step 5: Choose **Create a virtual hard disk now** and select **Create**.

[← Create Virtual Machine](#)

Hard disk

If you wish you can add a virtual hard disk to the new machine. You can either create a new hard disk file or select one from the list or from another location using the folder icon.

If you need a more complex storage set-up you can skip this step and make the changes to the machine settings once the machine is created.

The recommended size of the hard disk is **10.00 GB**.

- Do not add a virtual hard disk
- Create a virtual hard disk now
- Use an existing virtual hard disk file



Step 6: Choose VDI (VirtualBox Disk Image) and select Next

[? X ← Create Virtual Hard Disk](#)

Hard disk file type

Please choose the type of file that you would like to use for the new virtual hard disk. If you do not need to use it with other virtualization software you can leave this setting unchanged.

- VDI (VirtualBox Disk Image)
- VHD (Virtual Hard Disk)
- VMDK (Virtual Machine Disk)

[Expert Mode Next Cancel](#)

Step 7: Choose Dynamically allocated or Fixed size for the storage type and select Next.

[? X ← Create Virtual Hard Disk](#)

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).

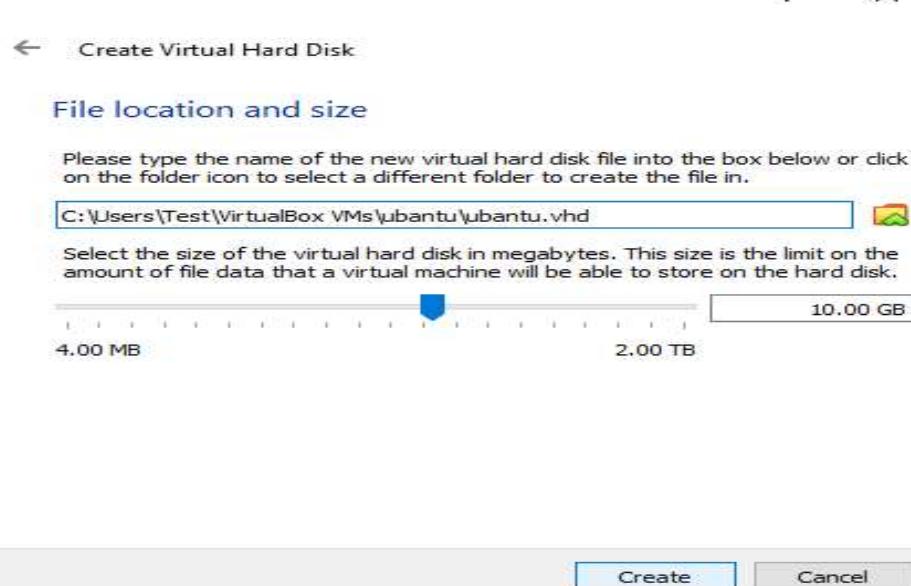
A **dynamically allocated** hard disk file will only use space on your physical hard disk as it fills up (up to a maximum **fixed size**), although it will not shrink again automatically when space on it is freed.

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

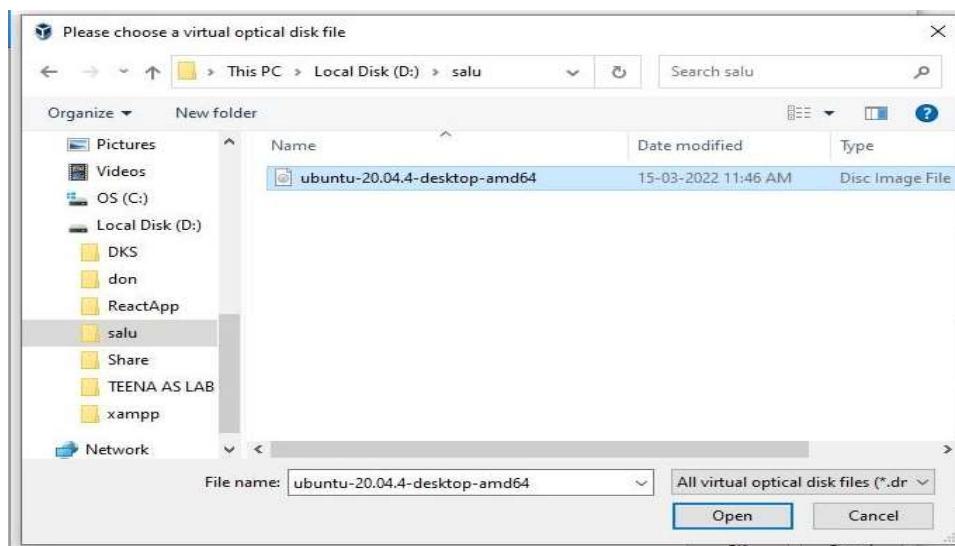
- Dynamically allocated
- Fixed size

[Next Cancel](#)

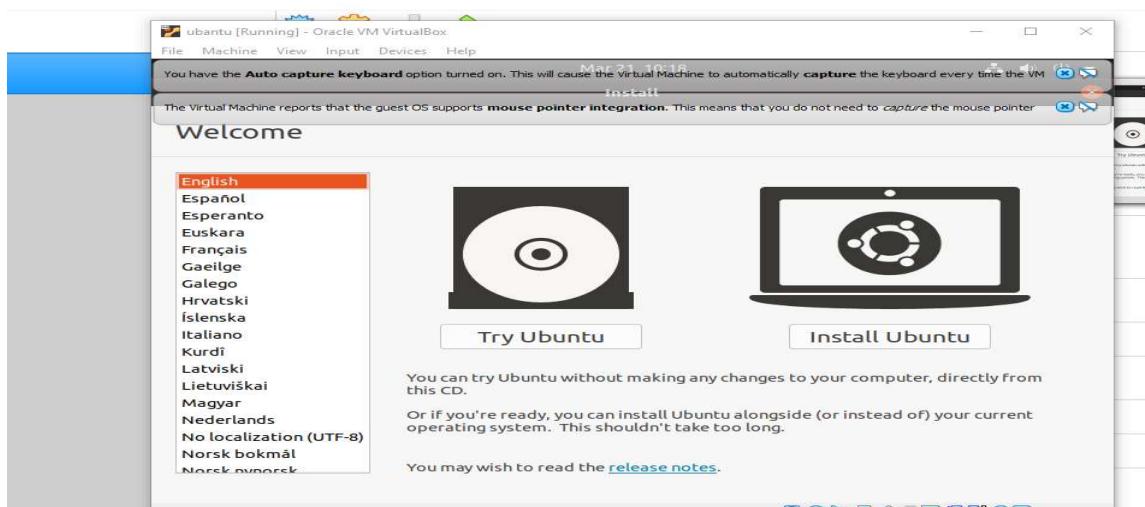
Step 8: Choose how much space you wish to set aside for Ubuntu and select Create.

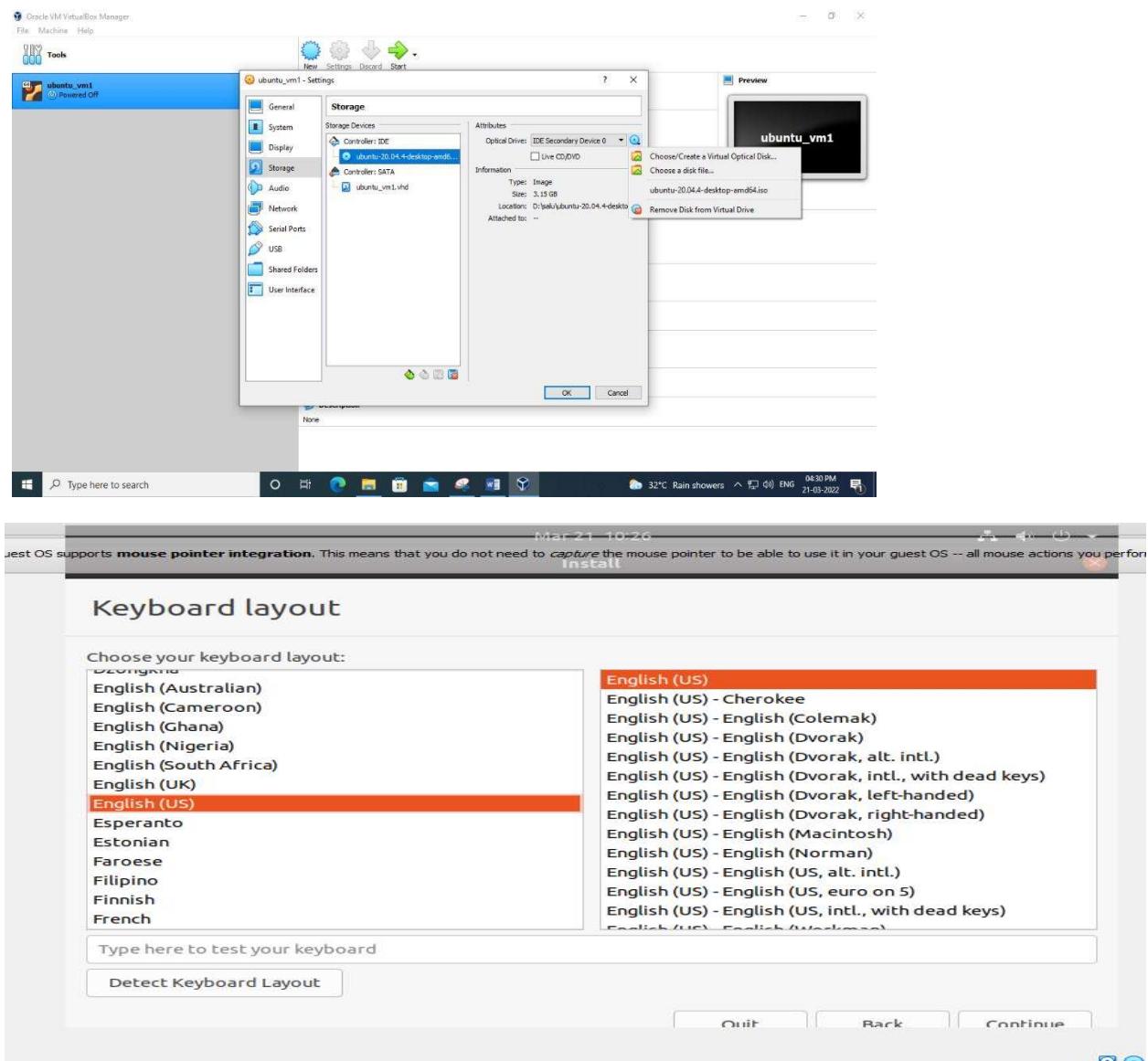


Step 9: The name of our virtual machine will now appear on the left side of the VirtualBox manager. Select **Start** in the toolbar to launch your VM.

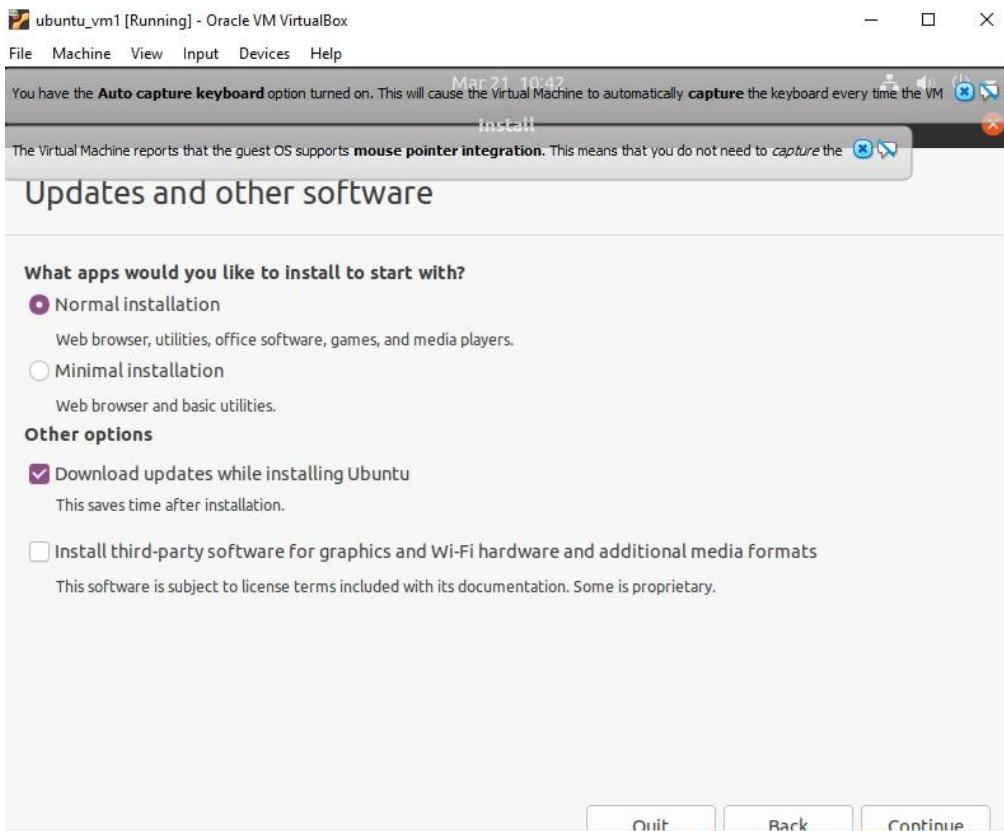


Step 10: VM will now boot into a live version of Ubuntu. Choose your language and select **Install Ubuntu**.

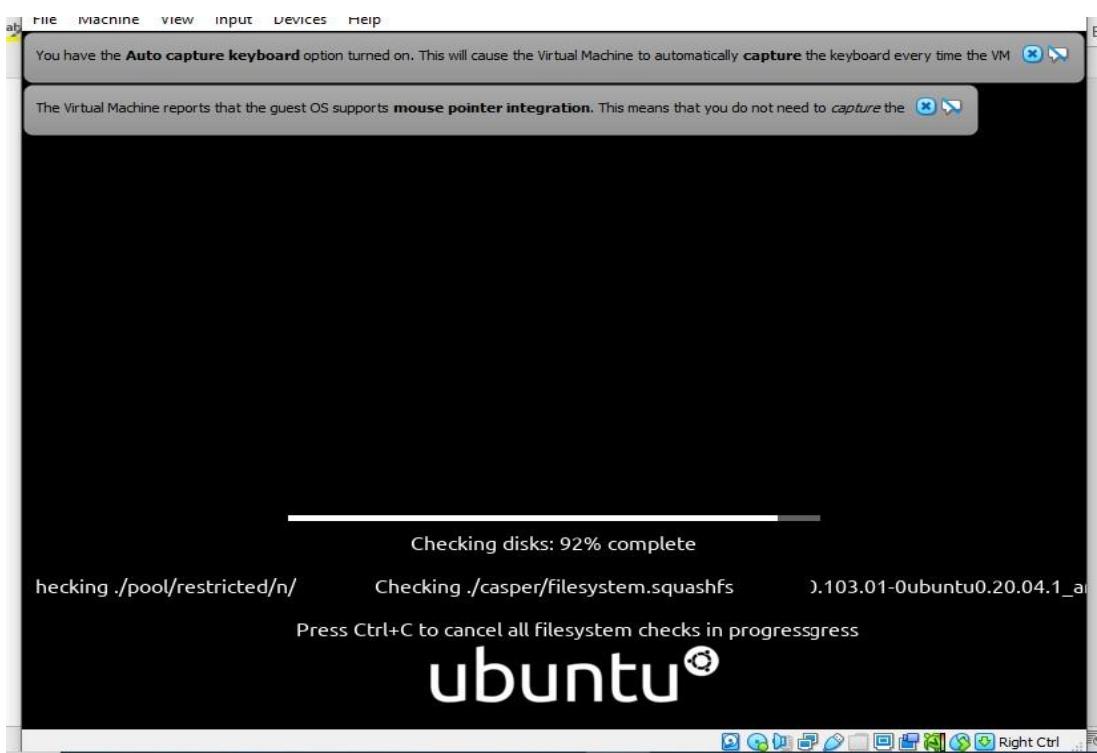




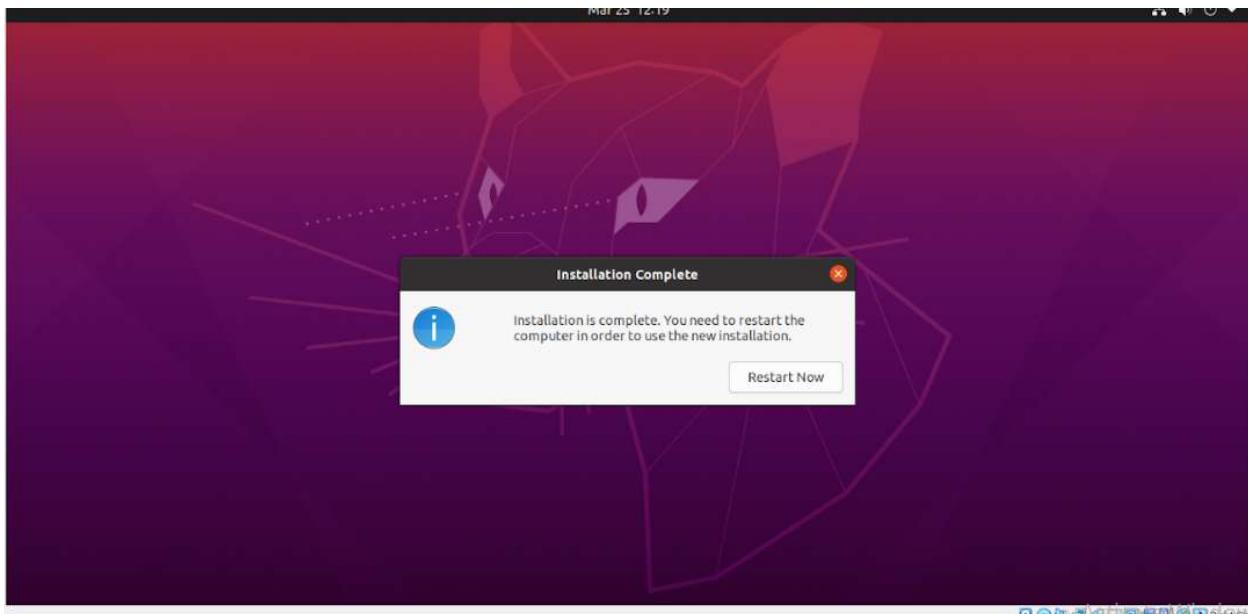
Step 11:Continue



Step 12:Choose **Erase disk and install Ubuntu** and select **Install Now**, then select **Continue** to ignore the warning.



Output screenshot



Name: Athira Biju

Roll No:4

Batch:MCA B

Date:24-3-2022

Experiment:3

Aim:

Study of a terminal based text editor such as Vim or Gedit, Basic Linux commands:- familiarity with following commands/operations expected

Procedure

Pwd:This command is used to display the location of the current working directory. Syntax :-\$ pwd Output:

```
student@s4:~$ pwd  
/home/student
```

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

Syntax :-\$ mkdir<directory name>

Output :-

```
student@s4:~$ mkdir athira  
student@s4:~$ pwd  
/home/student
```

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

Syntax :-\$ ls

Output :-

```
/home/student  
student@s4:~$ ls  
1.py DataScienceLab Documents examples.desktop Pictures PycharmProjects snap  
athira Desktop Downloads Music Public sample.py sum.py  
student@s4:~$ man
```

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:

```
ECHO(1)                               User Commands                         ECHO(1)

NAME
    echo - display a line of text

SYNOPSIS
    echo [SHORT-OPTION]... [STRING]...
    echo [LONG-OPTION]

DESCRIPTION
    Echo the STRING(s) to standard output.

    -n      do not output the trailing newline
    -e      enable interpretation of backslash escapes
    -E      disable interpretation of backslash escapes (default)
    --help  display this help and exit
    --version
            output version information and exit

    If -e is in effect, the following sequences are recognized:

    \\      backslash
    \a      alert (BEL)
```

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:-

```
student@54:~$ ls -l
total 92
-rw-rw-r-- 1 student student 16 Nov  1 11:38 1.py
drwxr-xr-x 2 student student 4096 Mar 24 14:28 athira
drwxr-xr-x 3 student student 4096 Nov 18 11:59 DataScienceLab
drwxr-xr-x 5 student student 4096 Feb 25 11:35 Desktop
drwxr-xr-x 3 student student 4096 Oct  5 09:55 Documents
drwxr-xr-x 5 student student 4096 Feb 21 10:48 Downloads
-rw-r--r-- 1 student student 8980 Oct  4 16:16 examples.desktop
drwxr-xr-x 2 student student 4096 Oct  5 09:50 Music
drwxr-xr-x 2 student student 4096 Dec 20 10:22 Pictures
drwxr-xr-x 2 student student 4096 Oct  5 09:50 Public
drwxrwxr-x 16 student student 4096 Jan  3 12:34 PycharmProjects
-rw-rw-r-- 1 student student 6 Nov  1 12:03 sample.py
drwxr----- 3 student student 4096 Nov  1 11:44 snap
-rw-rw-r-- 1 student student 15 Nov  1 11:41 sum.py
drwxr-xr-x 2 student student 4096 Oct  5 09:50 Templates
-rwxrwxr-x 1 student student 8768 Nov 22 08:57 test
-rw-rw-r-- 1 student student 78 Nov 22 08:57 test.cpp
-rw-rw-r-- 1 student student 2568 Nov 22 08:57 test.o
drwxr-xr-x 2 student student 4096 Oct  5 09:50 Videos
```

ls -r: This command is used to display files and directories in reverse order.

Syntax :-\$ls -r

Output :-

```
student@54:~$ ls -R
.:
1.py  DataScienceLab  Documents  examples.desktop  Pictures  PycharmProjects  snap  Templates
athira Desktop          Downloads   Music           Public    sample.py        sun.py  test

./athira:
aa ath a.txt b.txt create

./athira/aa:
./athira/ath:
./athira/create:
```

ls -a: This command is used to list all files including hidden files.

Syntax :- \$ls -a

Output :-

```
student@54:~$ ls -a
. Desktop      Music      sun.py
.. Documents    Pictures   Templates
1.py Downloads  .oracle_jre_usage test
athira examples.desktop .pki
.bash_history .gnupg     .profile  test.cpp
.bash_logout .ICEauthority .Public  test.o
.bashrc .idlerc    PycharmProjects .thunderbird
.cache .java     sample.py   Videos
.config .local    snap
DataScienceLab .mozilla  .xauth
```

ls -al

Syntax :-\$ ls -al

Output :-

```
student@54:~$ ls -al
total 172
drwxr-xr-x 25 student student 4096 Mar 24 14:28 .
drwxr-xr-x  6 root   root   4096 Jan 13 14:05 ..
-rw-rw-r--  1 student student 16 Nov  1 11:38 1.py
drwxr-xr-x  2 student student 4096 Mar 24 14:28 athira
-rw-r--r--  1 student student 116 Nov 19 08:57 .bash_history
-rw-r--r--  1 student student 220 Oct  4 16:16 .bash_logout
-rw-r--r--  1 student student 3771 Oct  4 16:16 .bashrc
drwxr----- 18 student student 4096 Dec 28 10:03 .cache
drwxr----- 20 student student 4096 Dec 13 12:52 .config
drwxr-xr-x  3 student student 4096 Nov 18 11:59 DataScienceLab
drwxr-xr-x  5 student student 4096 Feb 25 11:35 Desktop
drwxr-xr-x  3 student student 4096 Oct  5 09:55 Documents
drwxr-xr-x  5 student student 4096 Feb 21 10:48 Downloads
-rw-r--r--  1 student student 8980 Oct  4 16:16 examples.desktop
drwxr----- 3 student student 4096 Nov  1 11:21 .gnupg
-rw-r----- 1 student student 9664 Mar 24 14:01 .ICEauthority
drwxrwxr-x  2 student student 4096 Nov  1 11:41 .idlerc
drwxrwxr-x  4 student student 1096 Nov  1 11:44 .java
drwxr----- 5 student student 4096 Nov 18 09:41 .local
drwxr----- 5 student student 4096 Oct  5 11:38 .mozilla
drwxr-xr-x  2 student student 4096 Oct  5 09:50 Music
drwxrwxr-x  2 student student 4096 Nov 18 12:35 .oracle_jre_usage
drwxr-xr-x  2 student student 4096 Dec 20 10:22 Pictures
drwxr----- 3 student student 4096 Oct 29 15:19 .pki
-rw-r--r--  1 student student 807 Oct  4 16:16 .profile
drwxr-xr-x  2 student student 4096 Oct  5 09:50 Public
drwxrwxr-x 16 student student 4096 Jan  3 12:34 PycharmProjects
-rw-rw-r--  1 student student 6 Nov  1 12:03 sample.py
drwxr----- 3 student student 4096 Nov  1 11:44 snap
```

ls -t: This command is used to display files in the last modified order. Syntax

:-\$ ls -t

Output :-

```
student@s4:~$ ls -t
athira  Downloads      Pictures  test.o    DataScienceLab  snap    1.py      Music
Desktop PycharmProjects  test      test.cpp   sample.py    sum.py  Documents  Public
```

Cd: This command is used to change the current directory.

Syntax :-\$ cd <directory name>

Output :-

```
student@s4:~$ cd athira
```

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

Syntax :-\$ cd -

Output :-

```
student@s4:~$ cd -
```

cat > filename: This command is used to create a file and add contents to that file.

Syntax :-\$ cat > filename.txt **cat filename:** This command is used to

view the contents in the file.

Syntax :-\$ cat filename.txt

Output :-

```
student@s4:~$ cat > c.txt
familiarization of cat command

cat having different options
adding content
new file
append content
updating
adding

deleting
```

cat filename1 > filename2: This command is used to copy the content from one file to another file.

Syntax :-\$ cat filename1 > filename2

Output :-

```
student@S4:~/athira$ cat a.txt > b.txt
student@S4:~/athira$ cat b.txt
athira
```

read : This command is used to read the content of a line to a variable.

Syntax :-\$ read variablename

Output :-

```
student@S4:~$ read name
My name is Athira
student@S4:~$ echo $name
My name is Athira
```

Find: This command is used to display contents of particular directory.

Syntax :-\$ find filename.txt

Output :-

```
student@S4:~$ find a.txt
a.txt
```

grep : This command will let you search through all the text in a given file.

Syntax :-\$ grep word filename.txt

Output:-

```
student@S4:~$ cat > student
Athira Biju
rollno 4
Amal jyothi college
^Z
[3]+ Stopped                  cat > student
student@S4:~$ grep Amal student
Amal jyothi college
```

grep -A1

-A n : Prints searched line and nlines after the result.

```
student@S4:~$ grep -A1 of details.txt
Amal jyothi College of engineering
koovapally
```

grep -B1

-B n : Prints searched line and n line before the result.

```
student@S4:~$ grep -B1 xmen marvel1
spiderman
xmen
```

grep c1

-C n : Prints searched line and n lines after before the result.

```
student@S4:~$ grep -C1 xmen marvel1
spiderman
xmen
```

grep -i

-i : Ignores, case for matching

```
student@S4:~$ grep -i OF details.txt
Amal jyothi College of engineering
```

grep -v

-v : This prints out all the lines that do not matches the pattern

```
student@S4:~$ grep -v Biju details.txt
2021-23
Amal jyothi College of engineering
koovapally
```

wc -word count:This command is used for counting purpose which is used to find the number of lines, the number of words, the number of characters and the number of bytes.

```
student@S4:~$ cat marvel1
captain america
iron man
black widow
hulk
spiderman
xmen
student@S4:~$ wc marvel1
6 9 57 marvel1
```

Options

wc -c

It is used to print the byte counts.

```
student@S4:~$ wc -c marvel1
57 marvel1
```

wc -l

It is used to print the newline counts.

```
student@S4:~$ wc -l marvel1
6 marvel1
```

wc -m

It is used to print the character counts.

```
student@S4:~$ wc -m marvel1
57 marvel1
```

wc -w

It is used to print the word counts.

```
student@S4:~$ wc -w marvel1
9 marvel1
```

df

The df command (short for disk free), is used to display information related to file systems about total space and available space.

```
student@S4:~$ df
Filesystem      1K-blocks    Used Available Use% Mounted on
udev            3989732      0   3989732   0% /dev
tmpfs           803848     1844   802004   1% /run
/dev/sda6      114460828 34591864 74011584 32% /
tmpfs          4019220    17816  4001404   1% /dev/shm
tmpfs           5120        4     5116   1% /run/lock
tmpfs          4019220      0   4019220   0% /sys/fs/cgroup
/dev/loop2       2688       2688      0 100% /snap/gnome-system-monitor/174
/dev/loop3       254848    254848      0 100% /snap/gnome-3-38-2004/99
/dev/loop4       168832    168832      0 100% /snap/gnome-3-28-1804/161
/dev/loop10      66816     66816      0 100% /snap/gtk-common-themes/1519
/dev/loop22      640        640      0 100% /snap/gnome-logs/106
/dev/loop21      768        768      0 100% /snap/gnome-characters/741
/dev/loop13      768        768      0 100% /snap/gnome-characters/761
/dev/loop7        1024      1024      0 100% /snap/gnome-logs/81
/dev/loop9       302848    302848      0 100% /snap/vlc/2344
/dev/loop6       63488     63488      0 100% /snap/core20/1405
/dev/loop11      128        128      0 100% /snap/bare/5
/dev/loop14      56960     56960      0 100% /snap/core18/2284
/dev/loop8       56960     56960      0 100% /snap/core18/2344
/dev/loop15      46080     46080      0 100% /snap/gtk-common-themes/1440
/dev/loop19      144128    144128      0 100% /snap/gnome-3-26-1604/98
/dev/loop25      2560       2560      0 100% /snap/gnome-calculator/884
/dev/loop27      207872    207872      0 100% /snap/vlc/1397
/dev/loop5       63488     63488      0 100% /snap/core20/1376
/dev/loop1       540928    540928      0 100% /snap/pycharm-community/274
/dev/loop16      144128    144128      0 100% /snap/gnome-3-26-1604/104
/dev/loop17      2688       2688      0 100% /snap/gnome-calculator/920
/dev/loop28      2688       2688      0 100% /snap/gnome-system-monitor/169
/dev/loop0      113408    113408      0 100% /snap/core/12821
/dev/loop23      224256    224256      0 100% /snap/gnome-3-34-1804/77
/dev/loop18      224256    224256      0 100% /snap/gnome-3-34-1804/72
/dev/loop26      164096    164096      0 100% /snap/gnome-3-28-1804/116
/dev/loop20      253952    253952      0 100% /snap/gnome-3-38-2004/87
/dev/loop24      113280    113280      0 100% /snap/core/12834
```

df -m

displays the amount of disk space available on the file system.

Filesystem	1M-blocks	Used	Available	Use%	Mounted on
udev	3897	0	3897	0%	/dev
tmpfs	786	2	784	1%	/run
/dev/sda6	111779	33782	72277	32%	/
tmpfs	3926	18	3908	1%	/dev/shm
tmpfs	5	1	5	1%	/run/lock
tmpfs	3926	0	3926	0%	/sys/fs/cgroup
/dev/loop2	3	3	0	100%	/snap/gnome-system-monitor/174
/dev/loop3	249	249	0	100%	/snap/gnome-3-38-2004/99
/dev/loop4	165	165	0	100%	/snap/gnome-3-28-1804/161
/dev/loop10	66	66	0	100%	/snap/gtk-common-themes/1519
/dev/loop22	1	1	0	100%	/snap/gnome-logs/106
/dev/loop21	1	1	0	100%	/snap/gnome-characters/741
/dev/loop13	1	1	0	100%	/snap/gnome-characters/761
/dev/loop7	1	1	0	100%	/snap/gnome-logs/81
/dev/loop9	296	296	0	100%	/snap/vlc/2344
/dev/loop6	62	62	0	100%	/snap/core20/1405
/dev/loop11	1	1	0	100%	/snap/bare/5
/dev/loop14	56	56	0	100%	/snap/core18/2284
/dev/loop8	56	56	0	100%	/snap/core18/2344
/dev/loop15	45	45	0	100%	/snap/gtk-common-themes/1440
/dev/loop19	141	141	0	100%	/snap/gnome-3-26-1604/98
/dev/loop25	3	3	0	100%	/snap/gnome-calculator/884
/dev/loop27	203	203	0	100%	/snap/vlc/1397
/dev/loop5	62	62	0	100%	/snap/core20/1376
/dev/loop1	529	529	0	100%	/snap/pycharm-community/274
/dev/loop16	141	141	0	100%	/snap/gnome-3-26-1604/104
/dev/loop17	3	3	0	100%	/snap/gnome-calculator/920
/dev/loop28	3	3	0	100%	/snap/gnome-system-monitor/169
/dev/loop0	111	111	0	100%	/snap/core/12821
/dev/loop23	219	219	0	100%	/snap/gnome-3-34-1804/77
/dev/loop18	219	219	0	100%	/snap/gnome-3-34-1804/72
/dev/loop26	161	161	0	100%	/snap/gnome-3-28-1804/116
/dev/loop20	248	248	0	100%	/snap/gnome-3-38-2004/87
/dev/loop24	111	111	0	100%	/snap/core/12821

cut -d: This command is used to cut and display the content based on the delimiter given.

Syntax :-\$ cut –d delimiter –fieldnumber filename

Output :-

```
student@S14:~/sample$ cat > b5.txt
english-45
maths-46
hindi-50
^Z
[4]+  Stopped                  cat > b5.txt
student@S14:~/sample$ cut -d- -f2 b5.txt
45
46
50
student@S14:~/sample$ cut -d- -f1 b5.txt
english
maths
hindi
student@S14:~/sample$ cat > mark2
```

cut -b: This command is used to cut and display the content based on the specified byte number.

Syntax :-\$ cut –b bytelenumber filename

Output :-

cut --complement -c: This command is used to erase the specified character and display the remaining content of the file.

Syntax :-\$ cut --complement -c characternumber filename.txt Output

```
student@s4:~$ cut --complement -c 1 mark1
nglish 67
aths 89
cience 90
```

Paste: This command is used to paste the contents from the specified file. Syntax

:-\$ paste filename

paste file1 file2 > file3: This command is used to paste the contents from the specified files to another file.

Syntax :-\$ paste file1 file2 > file3

Output:-

```
student@s4:~$ paste marvel1 marvel2
captain america doctor strange
iron man peter parker
black widow bat man
hulk superman
spiderman chottabeem
xmen tom
```

paste -s: This command is used to paste the contents sequentially. It reads all the lines from the file and merges all these lines into a single line with each line separated by tab.

Syntax :-paste -s file1 file2

Output :-

```
student@s4:~$ paste -s marvel1 marvel2
captain america iron man black widow hulk spiderman xmen
doctor strange peter parker bat man superman chottabeem tom
```

paste -d: This command is used to paste the contents from the given files with the delimiter given.

Syntax :-\$ paste -d delimiter file1 file2

```
student@s4:~$ paste -d '-' marvel1 marvel2
captain america-doctor strange
iron man-peter parker
black widow-bat man
hulk-superman
spiderman-chottabeem
xmen-tom
```

Output :-

More:This command is used to view the text files in the command prompt, displaying one screen at a time in case the file is large.

Syntax :-\$ more filename

Output :-

```
In older days man worshipped Sun and Moon thinking them to be scared. But the scientists proved that the sun is a star and the moon is a planet like other planets. After the atomic age man has entered the age of space travel.
In 1957 the scientists succeeded in launching the first earth satellite into the outer surface. A Russian dog called Laika was the first living being to go into space. In April 1961 Yuri Gagarin of the USSR became the first man to make an orbit of the earth. USA then sent spacemen into the space. In 1969 Russia launched Lunik 1. It passed within 6580 kms of the moon. It was the first space-ship which went into its own orbit round earth. In the same year the Russians landed Lunik 3 and Americans Ranger 7 on the moon.
In July 1969 the American Apollo 11 landed on the moon with Neil Armstrong, Aldrin and Collins. Neil Armstrong was the first man to step on the moon. He was joined by Edwin Aldrin. They took photographs, collected rock samples and planted the US flag on the moon.
After atomic age dawned the space age. Man has been now using space to a great advantage. For example, travel through space by means of aeroplanes of various types has brought the world much closer. Now we can fly from one continent to another in few hours. The progress in space technology and travel during the last three decades has almost been miraculous. During this period, several satellites and space craft's have been launched for various purposes. The launching of satellites in the space has revolutionized the means of mass communication like radio and T.V. broadcasting, but the possibility of use of space for military purpose has been a source of constant worry.
The space age began in 1957 with the successful launching of the Russian Satellite Sputnik-I. Then Sputnik-II was sent into space carrying the dog Laika. Space travel has immensely enriched our knowledge of the solar system. It has afforded us a new dimension of space travel. The earth, through photographs taken by the astronauts. In April 1961 Russian cosmonaut Yuri Gagarin made man's first space-flight. It was also the first man to travel in 1962 American astronaut John Glenn made three orbits of the earth in space.
The U.S. Ranger IV was the first uncrewed spacecraft to reach the moon. The moon is our nearest neighbour. Therefore, it was quite natural that space scientists tried to reach the moon first of all. It was only on July 20, 1969 that two American astronauts reached the moon in their space-ship Apollo-II. American astronaut Neil Armstrong became the first man to walk on the moon. He was followed by his co-astronaut Edwin B. Aldrin. They landed on the moon on 21-month mission into space past Jupiter, Saturn, Uranus, Neptune and Pluto. It became the first man made object to escape the solar system. Apollo-16 made the fifth landing on the earth on July 24, 1969. The U.S. made second landing on the moon on November 14, 1969.
In 1970 the Russians soft landed their unnnamed Luna-II on the moon and then sent a first propelled space-ship on the Venus. The Americans again landed on the moon for the third time in 1971 in their space craft Apollo-14. Then Apollo-15 landed on the moon for the fourth time. But the conquest of the moon is not enough. Man's quest of the space knows no limits and therefore, the flights to other planets continue. The America ns landed on Mars in March 1971 on 21-month mission into space past Jupiter, Saturn, Uranus, Neptune and Pluto. The two astronauts stayed on the surface of the moon for about 21 hours collecting rock samples, etc. and then returned to the earth on July 24, 1972. The same year Apollo-17 landed on the moon in December. The two astronauts Cernan and Schmitt stayed there for 72 hours collecting various samples.
Since man's last landing on the moon there have been scores of space-flights by the U.S. and the U.S.S.R. In 1978 the U.S.S.R. sent the first international crew in the space consisting a Russian and a Czech Cosmonaut. In 1979 the Soviet
Cosmonauts succeeded in growing onion sprouts on board Salut-6. In 1977 the U.S. launched Voyager-I to probe the outer space and the solar system. The Voyager-II was sent into space the same year past the planet Saturn.
Columbia, the first space-shuttle was launched by America on April 12, 1981 which returned to the earth after 54 hours in space. It is a multi-purpose reusable space craft which take off like a satellite and a glid
er land like an aircraft. It was launched in June 1983 to travel over parts of the earth, the sun and the moon amidst the stars. In 1984 the U.S. space shuttle challenger became the first space-craft to return from space to its launching site. Again successfully retrieved and repaired, it was flying once again. Columbia April 12, 1981.
Thus, great progress has been made in space travel in these years. The day is not far when the moon may be used as a Spring-board for our research and travel to the other planets and neighbouring stars. But it is imperative that the various countries reach an agreement at the earliest so as to confine the use of space for peaceful purposes only.
After atomic age dawned the space age has brought a great change by means of various types of vehicles which have brought the world much closer. Now we can fly from one continent to another in few hours. The progress in space technology and travel during the last three decades has almost been miraculous. During this period, several satellites and space craft's have been launched for various purposes. The launching of satellites in the space has revolutionized the means of mass communication like radio and T.V. broadcasting, but the possibility of use of space for military purpose has been a source of constant worry.
The space age began in 1957 with the successful launching of the Russian Satellite Sputnik-I. Then Sputnik-II was sent into space carrying the dog Laika. Space travel has immensely enriched our knowledge of the solar system. It has afforded us a new dimension of space travel. The earth, through photographs taken by the astronauts. In April 1961 Russian cosmonaut Yuri Gagarin made man's first space-flight. It was a milestone in space travel. In 1962 American astronaut John Glenn made three orbits of the earth in the space.
The U.S. Ranger IV was the first uncrewed spacecraft to reach the moon. The moon is our nearest neighbour. Therefore, it was quite natural that space scientists tried to reach the moon first of all. It was only on July 20, 1969 that two American astronauts reached the moon in their space-ship Apollo-II. American astronaut Neil Armstrong became the first man to walk on the moon. He was followed by his co-astronaut Edwin B. Aldrin. They landed on the moon on 21-month mission into space past Jupiter, Saturn, Uranus, Neptune and Pluto. The two astronauts stayed on the surface of the moon for about 21 hours collecting rock samples, etc. and then returned to the earth on July 24, 1969. The U.S. made second landing on the moon on November 14, 1969.
In 1970 the Russians soft landed their unnamed Luna-II on the moon and then sent a first propelled space-ship on the Venus. The Americans again landed on the moon for the third time in 1971 in their space-craft Apollo-14. Then Apollo-15 landed on the moon for the fourth time. But the conquest of the moon is not enough. Man's quest of the space knows no limits and therefore, the flights to other planets continue. The America ns landed on Mars in March 1971 on 21-month mission into space past Jupiter, Saturn, Uranus, Neptune and Pluto. The two astronauts stayed on the surface of the moon for about 21 hours collecting rock samples, etc. and then returned to the earth on July 24, 1972. The same year Apollo-17 landed on the moon in December. The two astronauts Cernan and Schmitt stayed there for 72 hours collecting various samples.
```

more -number:This command is used to display display the lines to the specified number from head.

Syntax :-\$ more -number

Output :-

```
student@s4:~$ more -3 space.txt
In olden days man worshipped Sun and Moon thinking them to be scared. But the scientists proved that the Sun is a star and the moon is a planet like other planets. After the atomic age man has entered the age of space travel.

--More--(1%)
[9]+ Stopped                  more -3 space.txt
```

more +number:This command use the line number from where we want to displaying the text content.

Syntax :-\$ more +number

Output :-

```
student@S4:~$ more +3 space.txt
In 1957 the scientists succeeded in launching the first earth satellite into the outer surface. A Russian dog called Laika was the first living being to go into space. In April 1961 Yuri Gagarin of the USSR became the first man to make an orbit of the earth. USA then sent spacemen into the space. In 1969 Russia launched Lunik I. It passed within 6500 kms of the moon. This was the first space-ship which went into its own orbit round earth. In the same year the Russians landed Lunik 3 and Americans Ranger 7 on the moon.
```

In July 1969 the American Apollo II landed on the moon with Neil Armstrong, Aldrin and Collins. Neil Armstrong was the first man to step on the moon. He was joined by Edwin Aldrin. They took photographs, collected rock and soil samples and returned to the earth safely. After atomic age dawned the space age. Man has been now using space to a great advantage. For example, travel through space by means of aeroplanes of various types has brought the world much closer. Now we can fly from one continent to another in a few hours. The progress in space technology and travel during the last three decades has almost been miraculous. During this period, several satellites and space craft's have been launched for various purposes. The launching of satellites in the space has revolutionized the means of mass communication like radio and T.V. broadcasting, but the possibility of use of space for military purposes has been a source of constant worry.

The space age began in 1957 with the successful launching of the Russian Satellite Sputnik-I. Then Sputnik-II was sent into space carrying the dog Laika. Space travel has immensely enriched our knowledge of the solar system. It has afforded us a new scientific understanding of our own planet, the earth, through photographs taken by the astronauts. In April 1961 Russian cosmonaut Yuri Gagarin made man's first space-flight. It was a milestone in space travel. In 1962 American astronaut John Glenn made three orbits of the earth in the space.

The U.S. Ranger IV was the first unmanned spacecraft to reach the moon. The moon is our nearest neighbour. Therefore, it was quite natural that space scientists tried to reach the moon first of all. It was only on July 20, 1969 that two American astronauts could reach the moon in their space-ship Apollo-II. American astronaut Neil Armstrong became the first man to walk on the moon. He was followed by his co-astronaut Edwin Buzz Aldrin. The third co-astronaut Michael Collins remained in orbit commanding the module. The two astronauts stayed on the surface of the moon for about 21 hours collecting rock samples, etc. and then returned to the earth on July 24, 1969. The U.S. made second landing on the moon on November 14, 1969.

In 1970 the Russians soft landed their unmanned Luna-II on the moon and then sent a first propelled space-ship on the Venus. The Americans again landed on the moon for the third time in 1971 in their space-craft Apollo-14. Then Apollo-15 landed on the moon for the fourth time. But the conquest of the moon is not enough. Man's quest of the space knows no limits and therefore, the flights to other planets continue. The Americans landed Pioneer-I in March 1972 on 21-month mission into space past Jupiter, Saturn, Uranus, Neptune and Pluto. It became the first man made object to escape the solar system. Apollo-16 made the fifth landing on the moon in 1972. The same year Apollo-17 landed on the moon in December. The two astronauts Cernan and Schmitt stayed there for 75 hours collecting various samples.

Since man's last landing on the moon there have been scores of space-flights by the U.S. and the U.S.S.R. In 1978 the U.S.S.R. sent the first international crew in the space consisting of a Russian and a Czech Cosmonaut. In 1979 the Soviet

Cosmonauts succeeded in growing onion sprouts on board Salyut-6. In 1977 the U.S. launched Voyager-I to probe the outer space and the solar system. The Voyager-II was sent into space the same year past the planet Saturn.

Columbia, the first space-shuttle was launched by America on April 12, 1981 which returned to the earth after 54 hours in space. It is a multi-purpose reusable space craft which takes off like a satellite and a glider. It can be used to launch satellites, contact, retrieve and repair space crafts in the orbit. The U.S. space craft Pioneer-10 was launched in June 1983 to travel for over past the planets and the sun amidst the stars. In 1984 the U.S. space shuttle challenger became the first space-craft to return from space to its launching site. Again spaceship retrieved and repaired an ailing solar satellite April, 1984.

Thus, great progress has been made in space travel in these years. The day is not far when the moon may be used as a Spring board for deep research and travel to the other planets and neighbouring stars. But it is imperative that the various countries reach an agreement at the earliest so as to confine the use of space for peaceful purposes only. After atomic age dawned the space age. Man has been now using space to a great advantage. For example, travel through space by means of aeroplanes of various types has brought the world much closer. Now we can fly from one continent to another in a few hours. The progress in space technology and travel during the last three decades has almost been miraculous. During this period, several satellites and space craft's have been launched for various purposes. The launching of satellites in the space has revolutionized the means of mass communication like radio and T.V. broadcasting, but the possibility of use of space for military purposes has been a source of constant worry.

[More...]

Cp:This command is used to copy the contents from an existing file to a new file.

Syntax :-\$ cpexisting_filenamenew_filename

Output :-

```
student@S4:~$ cat marvel1
captain america
iron man
black widow
hulk
spiderman
xmen
student@S4:~$ cat marvel2
doctor strange
peter parker
bat man
superman
chottabeem
tom
jerry
ennten
student@S4:~$ cp marvel1 marvel2
student@S4:~$ cat marvel2
captain america
iron man
black widow
hulk
spiderman
xmen
```

Cp -r:

Option 'r' with the copy command can be used to copy a directory including all its content from a source directory to the destination directory.

```

student@S4:~$ cd athira
student@S4:~/athira$ ls
aa ath a.txt b.txt create c.txt
student@S4:~/athira$ cd ..
student@S4:~$ mkdir network
student@S4:~$ cd network
student@S4:~/network$ ls
student@S4:~/network$ cd ..
student@S4:~$ cat > dd.txt
hello world
^Z
[1]+  Stopped                  cat > dd.txt
student@S4:~$ cp -r network athira
student@S4:~$ cd athira
student@S4:~/athira$ ls
aa ath a.txt b.txt create c.txt network

```

cp-i:This command is used to ask the confirmation message once before overwriting the file. We give ‘y’ or ‘n’ as the response.

Syntax :- \$ cp -i filename destination_directory

Output :-

```

student@S4:~$ cat > ab.txt
networking lab
^Z
[4]+  Stopped                  cat > ab.txt
student@S4:~$ cd samples
student@S4:~/samples$ cat > ab.txt
Commands
^Z
[5]+  Stopped                  cat > ab.txt
student@S4:~/samples$ cd ..
student@S4:~$ cp ab.txt samples
student@S4:~$ cat ab.txt
networking lab
student@S4:~$ cp -i ab.txt samples
cp: overwrite 'samples/ab.txt'? y
student@S4:~$ ls
 1.py      b.txt      dd.txt    doc1      d.txt      marvel3    pictures      sample    sum.py    test.o
ab.txt    cp.png     demo      doc2      examples.desktop  move.png   Public      sample.py  Templates  t.txt
athira   'cp -r.png' demo1     Documents  marvel1    Music      pwd.png    samples   test      Videos
a.txt     DataScienceLab Desktop  Downloads  marvel2    network   PyCharmProjects  snap     test.cpp
student@S4:~$ 

```

Mv:This command is used to move an existing file or directory from one location to another.

Syntax :-\$ mv filename directory_name

Output:-

```

student@S4:~$ mv ab.txt athira
student@S4:~$ cd athira
student@S4:~/athira$ ls
aa ab.txt ath a.txt b.txt create c.txt dd.txt network
student@S4:~/athira$ 

```

mv -i:This method is used to overwrite the contents of an existing file from one directory to an existing file with the same name in another directory with the mv command.

Syntax :-\$ mv -I filename directory_name

Output :-

```
student@s4:~$ mv -i demo1 marvel3
mv: overwrite 'marvel3'? y
student@s4:~$ cat marvel3
The command line is your direct access to a computer. It's where you ask software to perform hardware actions that point-and-click graphical user interfaces (GUIs) simply can't ask.

Command lines are available on many operating systems—proprietary or open source. But it's usually associated with Linux, because both command lines and open source software, together, give users unrestricted access to their computer.

Our latest release of Red Hat® Enterprise Linux comes with even more built-in command line capabilities than ever before and includes consoles that bundle those capabilities in easy-to-use modules that exist off of the command line. The command line is your direct access to a computer. It's where you ask software to perform hardware actions that point-and-click graphical user interfaces (GUIs) simply can't ask.
```

Head:This command is used to display the first 10 lines of the file by default.

Syntax :-\$ head filename

```
student@s4:~$ head c.txt
familiarization of cat command

cat having different options
adding content
new file
append content
updating
adding
```

head -number:This command is used to display the lines of the file to the specified number from head.

Syntax :-\$ head -number filename

Output :-

Tail:This command is used to display the last 10 lines of the file by default.

Syntax :-\$ tail filename

```
student@s4:~$ tail c.txt
cat having different options
adding content
new file
append content
updating
adding

deleting
```

tail -number:This command is used to display the lines of the file to the specified number from tail.

Syntax :-\$ tail -number filename

```
student@s4:~$ tail -2 c.txt
deleting
```

sudo useradd :This command is used to add new user.

Syntax :-\$ sudo useradd username

Output :-

```
mca@U4:~$ sudo useradd athira
[sudo] password for mca:
```

sudo passwd :This command is used to add password to the user.

Syntax :-\$ sudo passwd username

Output :-

```
mca@U4:~$ sudo passwd athira
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
mca@U4:~$
```

sudo usermod :This command is used to add members.

Syntax :-\$sudo usermod -G groupname username **delete**

```
mca@U4:~$ sudo usermod -G avanthika athira
mca@U4:~$ id athira
uid=1009(athira) gid=1012(athira) groups=1012(athira),2000(avanthika)
mca@U4:~$
```

sudo userdel username - used to delete user.

```
mca@U4:~$ sudo userdel athira
mca@U4:~$ compgen -g avanthika
avanthika
```

chmod :This command is used change directory permission of files.

chmod +rwx

chmod -wx

chmod -rwx

Syntax :- \$ chmod +wx filename

\$ chmod -wx filename

\$ chmod -rwx filename

Output :-

```
mca@S3:~$ ls
a1.txt Desktop Documents Downloads examples.desktop mozilla.pdf Music Pictures Public PycharmProjects
mca@S3:~$ chmod +rwx a1.txt
mca@S3:~$ chmod -wx a1.txt
mca@S3:~$ cat >>a1.txt
bash: a1.txt: Permission denied
mca@S3:~$ chmod -rwx a1.txt
mca@S3:~$ cat a1.txt
a1.txt: Permission denied
```

chown:This command is used to give ownership to user .

Syntax :- \$ sudo chown username filename

Output :-

```
mca@S3:~$ sudo useradd Anjali
mca@S3:~$ sudo chown Anjali a1.txt
```

Ssh:This command is used to provide a secure encrypted connection between two hosts over an insecure network.

Syntax :- \$ ssh mca@ipaddress

```
mca@S40:~$ sudo ssh mca@192.168.6.46
The authenticity of host '192.168.6.46 (192.168.6.46)' can't be established.
ECDSA key fingerprint is SHA256:hQC0bgw7WBI7zuABHq2AKWIpGnXDeBBGWGvJqDHDPNY.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.6.46' (ECDSA) to the list of known hosts.
mca@192.168.6.46's password:
Welcome to Ubuntu 18.04 LTS (GNU/Linux 4.15.0-23-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage
```

- **expr**

The expr command in Unix evaluates a given expression and displays its corresponding output.

Syntax

```
$expr --help
```

- **rm**

rm stands for remove here. rm command is used to remove objects such as files, directories, symbolic links and so on from the file system.

Syntax

```
rm [OPTION]... FILE...
```

- **tar**

The Linux 'tar' stands for **tape archive**, is used to create Archive and extract the Archive files.

```
tar [options] [archive-file] [file or directory to be archived]
```

Experiment No.: 4

Name: Athira Biju

Roll No:4

Batch: MCA B

Date:5-5-2022

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.

Procedure&Output

1. Write a shell script to print the sum of two numbers.

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

```
echo "enter first number"
```

```
read num1
```

```
echo "enter second number"
```

```
read num2
```

```
sum=$((num1+num2))
```

```
echo "sum of entered number is" $num1 "and" $num2 ":" $sum
```

```
if [ $sum -gt0 ]
```

```
then
```

```
echo "greater than zero"
```

```
else
```

```
echo "less than zero"
```

```
fi
```

Output Screenshot

```
mca@S4:~/Documents/Shell Scripting$ bash add.sh
enter first number
10
enter second number
20
sum of entered number is 10 and 20: 30
greater then zero
mca@S4:~/Documents/Shell Scripting$
```

2. Write a shell script to print the largest of two numbers.

```
#!/bin/bash

echo "enter the first number:"

read n1

echo "enter the second number:"

read n2

if [ $n1 -gt $n2 ]
then
echo $n1" is large"
else
echo $n2" is large"
fi
```

Output Screenshot

```
mca@S4:~/Documents/Shell Scripting$ bash largetwo.sh
enter the first number:
20
enter the second number:
10
20 is large
mca@S4:~/Documents/Shell Scripting$
```

3. Write a shell script to print the largest of three numbers.

```
#!/bin/bash

echo "enter the first number"

read n1

echo "enter the second number"

read n2

echo "enter the third number"
```

```
read n3
```

```
if [ $n1 -gt $n2 -o $n1 -gt $n3 ]
```

```
then
```

```
echo $n1 "is greater"
```

```
elif [ $n2 -gt $n3]
```

```
then
```

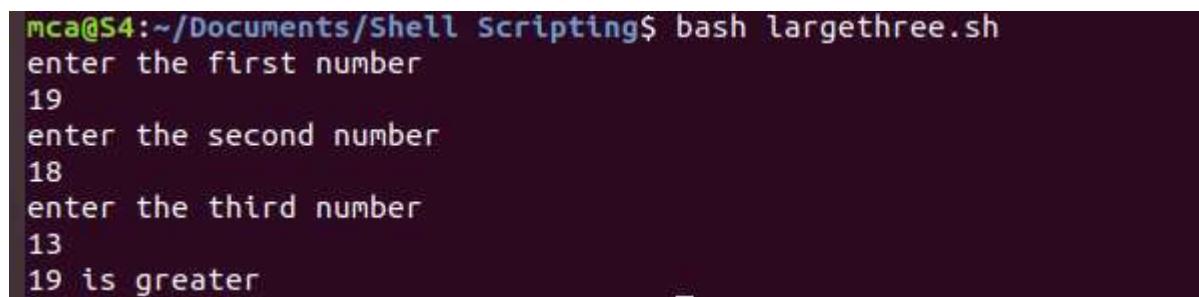
```
echo $n2 "is greater"
```

```
else
```

```
echo $n3 "is greater"
```

```
fi
```

Output Screenshot



```
mca@S4:~/Documents/Shell Scripting$ bash largethree.sh
enter the first number
19
enter the second number
18
enter the third number
13
19 is greater
```

4. Write a shell script to check whether the given number is even or odd.

Procedure

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

```
echo "ente a number"
```

```
read n
```

```
if [ $n % 2 == 0 ]
```

```
then
```

```
echo $n "is even"
```

```
else
```

```
echo $n "is odd"
```

```
fi
```

Output Screenshot

```
mca@s4:~$ bash oddeven.sh
Enter the number
1
The given number 1 is odd.
```

5. Write a shell script sum of first N number

```
#!/bin/bash

echo "Enter Size:"

read N

sum=0

echo "Enter Numbers:"

for((i=1;i<=N;i++))

do

    read num

    sum=$((sum + num))

done

echo "Sum ="$sum
```

Output Screenshot

```
mca@s4:~$ bash sum.sh
Enter Size:
10
Enter Numbers:
1
2
3
4
5
6
7
8
9
10
Sum =55
```

6. Write a shell script sum of first N number

```
#!/bin/bash

echo "today is $(date)"

echo ""
```

```
echo "calendar"
```

```
cal
```

Output Screenshot

```
mca@s4:~$ bash cal.sh
today is Mon May  9 10:23:24 AST 2022

calendar
      May 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
```

7. Write a shell script factorial of a number

```
#!/bin/bash

echo "enter a number"

read n

fact=1

for((i=2;i<n;i++))

{
    fact=$((fact *i))
}

echo $fact
```

Output Screenshot

```
mca@s4:~$ bash fact.sh
enter a number
8
5040
```

8. Write a shell script sum, average,product

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

```
echo "enter 1st integers"
```

```
read a
```

```
echo "enter 2nd integers"
```

```
read b
```

```
echo "enter 3rd integers"
```

```
read c
```

```
echo "enter 4th integers"
```

```
read d
```

```
sum=$(echo "$a + $b + $c + $d" | bc -l)
```

```
average=$(echo "$sum / 4" | bc -l)
```

```
product=$(echo "$a * $b * $c * $d" | bc -l)
```

```
echo "sum = $sum"
```

```
echo "Average = $average"
```

```
echo "Product = $product"
```

Output Screenshot

```
mca@s4:~/Documents$ bash sap.sh
enter 1st integers
10
enter 2nd integers
15
enter 3rd integers
20
enter 4th integers
25
sum = 70
Average = 17.500000000000000000000000000000
Product = 75000
mca@s4:~/Documents$
```

9. Write a shell script largest among 2 numbers.

```
#!/bin/bash
echo "enter the 1st number"
read a
echo "enter the 2nd number"
```

read b

if [\$a -eq \$b]

then

echo \$a "is equal to" \$b

elif [\$a -gt \$b]

then

echo \$a "is greater than" "\$b

elif [\$a -lt \$b]

then

echo \$a "is less than" \$b

else

echo "None of the condition met"

fi

Output Screenshot

```
mca@S4:~$ bash number.sh
enter the 1st number
4
enter the 2nd number
2
4 is greater than 2
mca@S4:~$ bash number.sh
enter the 1st number
2
enter the 2nd number
4
2 is less than 4
mca@S4:~$ bash number.sh
enter the 1st number
4
enter the 2nd number
4
4 is equal to 4
mca@S4:~$
```

10. Write a shell script prime or not.

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

```
clear
```

```
echo "Enter No : "
```

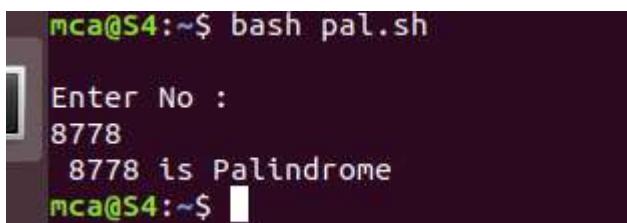
```
read no
```

```

m=$no
rev=0
while [ $no -gt 0 ]
do
    r=`expr $no % 10`
    rev=`expr $rev \* 10 + $r`
    no=`expr $no / 10`
done
if [ $m = $rev ]
then
    echo "$m is Palindrome"
else
    echo "$m is not Palindrome"
fi

```

Output Screenshot



```
mca@S4:~$ bash pal.sh
Enter No :
8778
8778 is Palindrome
mca@S4:~$
```

11. Write a shell script leap year.

```

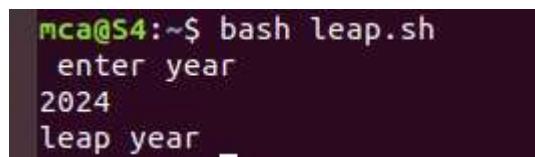
#!/bin/bash
echo " enter year"
read leap
if [ `expr $leap % 400` -eq 0 ]
then
    echo leap year
elif [ `expr $leap % 100` -eq 0 ]
then
    echo not a leap year

```

```

elif [ `expr $leap % 4` -eq 0 ]
then
echo leap year
else
echo not a leap year
fi

```

Output Screenshot


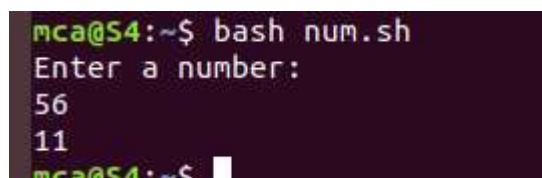
```
mca@S4:~$ bash leap.sh
enter year
2024
leap year
```

12.write a shell script to find the sum of all digit in a number

```

#!/bin/bash
echo "Enter a number:"
read num
sum=0
while [ $num -gt 0 ]
do
mod=$((num % 10))
sum=$((sum + mod))
num=$((num / 10))
done
echo $sum

```

Output Screenshot


```
mca@S4:~$ bash num.sh
Enter a number:
56
11
mca@S4:~$
```

13.write a shell script to find the average of the numbers entered in command line.

```

#!/bin/bash
echo "Enter Size(N)"

```

```

read N
i=1
sum=0
echo "Enter Numbers"
while [ $i -le $N ]
do
read num
sum=$((sum + num))
i=$((i + 1))
done
avg=$(echo "scale=3; $sum / $N "| bc -l)
echo $avg

```

Output Screenshot

```
mca@s4:~$ bash avgnum.sh
Enter Size:
4
Enter Numbers:
10
20
30
40
25.000
mca@s4:~$
```

14. write a shell script program to perform switch case
addition, subtraction, multiplication and division

```

echo "Enter Two numbers : "
read a
read b
echo "Enter Choice :"
echo "1. Addition"
echo "2. Subtraction"
echo "3. Multiplication"
echo "4. Division"
read ch

```

```
case $ch in
```

```
    1)res=`echo $a + $b | bc`  
    ;;  
    2)res=`echo $a - $b | bc`  
    ;;  
    3)res=`echo $a \* $b | bc`  
    ;;  
    4)res=`echo "scale=2; $a / $b" | bc`  
    ;;  
esac
```

```
echo "Result is : $res"
```

Output

```
mca@S4:~$ bash additon.sh
Enter Two numbers :
5
4
Enter Choice :
1. Addition
2. Subtraction
3. Multiplication
4. Division
1
Result is : 9
mca@S4:~$ bash additon.sh
Enter Two numbers :
5
4
Enter Choice :
1. Addition
2. Subtraction
3. Multiplication
4. Division
2
Result is : 1
mca@S4:~$ bash additon.sh
Enter Two numbers :
5
4
Enter Choice :
1. Addition
2. Subtraction
3. Multiplication
4. Division
3
Result is : 20
```

Experiment:5

Name: Athira Biju

Roll No:4

Batch:MCA B

Date:23-5-2022

Aim

Installation and configuration of LAMP stack. Deploy an open source application such as phpmyadmin and Wordpress.

Procedure

Step 1 — Installing Apache and Updating the Firewall

```
mca@S4:~$ sudo apt update
[sudo] password for mca:
Get:1 http://dl.google.com/linux/chrome/deb stable InRelease [1,811 B]
Hit:2 http://in.archive.ubuntu.com/ubuntu bionic InRelease
Ign:3 https://repo.mongodb.org/apt/ubuntu trusty/mongodb-org/3.6 InRelease
Get:4 http://packages.microsoft.com/repos/code stable InRelease [10.4 kB]
Err:1 http://dl.google.com/linux/chrome/deb stable InRelease
  The following signatures couldn't be verified because the public key is not available: NO_PUBKEY 78BD65473CB3BD13
Err:5 http://ppa.launchpad.net/jonathonf/python-3.6/ubuntu bionic InRelease
  403 Forbidden [IP: 185.125.190.52 80]
Get:6 https://repo.mongodb.org/apt/ubuntu trusty/mongodb-org/3.6 Release [2,495 B]
Get:7 http://packages.microsoft.com/repos/code stable/main arm64 Packages [89.4 kB]
Get:8 http://packages.microsoft.com/repos/code stable/main armhf Packages [89.0 kB]
Get:9 http://packages.microsoft.com/repos/code stable/main amd64 Packages [88.4 kB]
Get:10 https://repo.mongodb.org/apt/ubuntu trusty/mongodb-org/3.6 Release.gpg [801 B]
Hit:11 http://ppa.launchpad.net/webupd8team/java/ubuntu bionic InRelease
Err:10 https://repo.mongodb.org/apt/ubuntu trusty/mongodb-org/3.6 Release.gpg
```

First, make sure your apt cache is updated with:

➤ sudo apt update

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

➤ sudo apt install apache2

```
mca@S4:~$ sudo apt install apache2
Reading package lists... Done
Building dependency tree
Reading state information... Done
apache2 is already the newest version (2.4.29-1ubuntu4).
0 upgraded, 0 newly installed, 0 to remove and 2 not upgraded.
```

After entering this command, apt will tell you which packages it plans to install and how much extra disk space they'll take up. Press Y and hit ENTER to confirm, and the installation will proceed.

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 like so:

➤ sudoufw app list

```
mca@S4:~$ sudo ufw app list
Available applications:
 Apache
 Apache Full
 Apache Secure
 CUPS
 OpenSSH
```

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

➤ sudoufw app info "Apache Full"

```
mca@S4:~$ 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
mca@S4:~$
```

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

➤ sudoufw allow "Apache Full"

```
80,443/tcp
mca@S4:~$ sudo ufw allow in "Apache Full"
Skipping adding existing rule
Skipping adding existing rule (v6)
```

You can do a spot check right away to verify that everything went as planned by visiting your server's public IP address in your web browser:

➤ http://your_server_ip

You will see the default Ubuntu 18.04 Apache web page, which is there for informational and testing purposes. It should look something like this:



The Apache2 default index page will be displayed in case the webserver is up and running.

Root directory is /var/www/html

Step 2 — Installing MySQL

Again, use apt to acquire and install this software:

➤ sudo apt install mysql-server

```
mca@S4:~$ sudo apt install mysql-server
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  libevent-core-2.1-6 libhtml-template-perl mysql-client-5.7 mysql-client-core-5.7 mysql-common mysql-server-5.7 mysql-server-core-5.7
Suggested packages:
  libipc-sharedcache-perl mailx tinyca
The following NEW packages will be installed:
  libevent-core-2.1-6 libhtml-template-perl mysql-client-5.7 mysql-client-core-5.7 mysql-common mysql-server-5.7 mysql-server-core-5.7
  mysql-server-core-5.7
0 upgraded, 8 newly installed, 0 to remove and 2 not upgraded.
Need to get 20.4 MB of archives.
After this operation, 160 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 mysql-common all 5.8+1.0.4 [7,308 B]
Get:2 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 mysql-client-core-5.7 amd64 5.7.21-1ubuntu1 [6,967 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 mysql-client-5.7 amd64 5.7.21-1ubuntu1 [2,300 kB]
```

This command, too, will show you a list of the packages that will be installed, along with the amount of disk space they'll take up. Enter Y to continue.

When the installation is complete, run a simple security script that comes pre-installed with MySQL which will remove some dangerous defaults and lock down access to your database system. Start the interactive script by running:

➤ sudomysql_secure_installation

```
mca@S4:~$ sudo mysql_secure_installation
Securing the MySQL server deployment.

Connecting to MySQL using a blank password.

VALIDATE PASSWORD PLUGIN can be used to test passwords
and improve security. It checks the strength of password
and allows the users to set only those passwords which are
secure enough. Would you like to setup VALIDATE PASSWORD plugin?

Press y|Y for Yes, any other key for No: y

There are three levels of password validation policy:

LOW    Length >= 8
MEDIUM Length >= 8, numeric, mixed case, and special characters
STRONG Length >= 8, numeric, mixed case, special characters and dictionary file

Please enter 0 = LOW, 1 = MEDIUM and 2 = STRONG: 0
Please set the password for root here.

New password:
Re-enter new password:

Estimated strength of the password: 25
Do you wish to continue with the password provided?(Press y|Y for Yes, any other key for No) : y
By default, a MySQL installation has an anonymous user,
allowing anyone to log into MySQL without having to have
a user account created for them. This is intended only for
testing, and to make the installation go a bit smoother.
```

This will ask if you want to configure the VALIDATE PASSWORD PLUGIN. Answer Y for yes, or anything else to continue without enabling. When you're finished, test if you're able to log in to the MySQL console by typing:

➤ sudomysql

```
mca@S4:~$ sudo mysql
Welcome to the MySQL monitor. Commands end with ; or \g.
Your MySQL connection id is 4
Server version: 5.7.21-1ubuntu1 (Ubuntu)

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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.

mysql> exit
Bye
mca@S4:~$
```

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. To exit the MySQL console, type:

➤ exit

Step 3 — 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:

➤ sudo apt install php libapache2-mod-php php-mysql

```
mca@S4:~$ 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-php7.2 php-common php7.2-cli php7.2-common php7.2-json php7.2-mysql php7.2-opcache php7.2-readline
Suggested packages:
php-pear
The following NEW packages will be installed:
libapache2-mod-php libapache2-mod-php7.2 php php-common php-mysql php7.2 php7.2-cli php7.2-common php7.2-json php7.2-mysql php7.2-opcache
php7.2-readline
0 upgraded, 12 newly installed, 0 to remove and 2 not upgraded.
Need to get 3,973 kB of archives.
After this operation, 17.6 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 php-common all 1:60ubuntu1 [12.1 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 php7.2-common amd64 7.2.3-1ubuntu1 [879 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 php7.2-json amd64 7.2.3-1ubuntu1 [18.8 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 php7.2-opcache amd64 7.2.3-1ubuntu1 [165 kB]
Get:5 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 php7.2-readline amd64 7.2.3-1ubuntu1 [12.1 kB]
Get:6 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 php7.2-cli amd64 7.2.3-1ubuntu1 [1,404 kB]
```

After this, restart the Apache web server in order for your changes to be recognized. You can do that with the following command:

➤ sudo systemctl restart apache2

```
mca@S46:~$ sudo systemctl restart apache2
```

Step 4 — Testing PHP Processing on your Web Server

In order to test that your system is properly configured for PHP, create a PHP script called info.php. In order for Apache to find this file and serve it correctly, it must be saved to your web root directory. Create the file at the web root you created in the previous step by running:

➤ sudo nano /var/www/your_domain/info.php

```
mca@S4:~$ sudo nano /var/www/html/info.php
mca@S4:~$
```

This will open a blank file. Add the following text, which is valid PHP code, inside the file:

➤ <?php

```
phpinfo();
?>
```

```
<?php
phpinfo();
?>
```

When you are finished, save and close the file.

Now you can test whether your web server is able to correctly display content generated by this PHP script. To try this out, visit this page in your web browser. You'll need your server's public IP address or domain name again.

The address you will want to visit is:

http://your_domain/info.php

The page that you come to should look something like this:

PHP Version 7.2.3-1ubuntu1



System	Linux S46 4.15.0-23-generic #25-Ubuntu SMP Wed May 23 18:02:16 UTC 2018 x86_64
Build Date	Mar 14 2018 22:03:58
Server API	Apache 2.0 Handler
Virtual Directory Support	disabled
Configuration File (php.ini) Path	/etc/php/7.2/apache2
Loaded Configuration File	/etc/php/7.2/apache2/php.ini
Scan this dir for additional .ini files	/etc/php/7.2/apache2/conf.d
Additional .ini files parsed	/etc/php/7.2/apache2/conf.d/10-mysqlnd.ini, /etc/php/7.2/apache2/conf.d/10-opcache.ini, /etc/php/7.2/apache2/conf.d/10-pdo.ini, /etc/php/7.2/apache2/conf.d/20-calendar.ini, /etc/php/7.2/apache2/conf.d/20-ctype.ini, /etc/php/7.2/apache2/conf.d/20-exif.ini, /etc/php/7.2/apache2/conf.d/20-fileinfo.ini, /etc/php/7.2/apache2/conf.d/20-ftp.ini, /etc/php/7.2/apache2/conf.d/20-gettext.ini, /etc/php/7.2/apache2/conf.d/20-iconv.ini, /etc/php/7.2/apache2/conf.d/20-json.ini, /etc/php/7.2/apache2/conf.d/20-mysqli.ini, /etc/php/7.2/apache2/conf.d/20-pdo_mysql.ini, /etc/php/7.2/apache2/conf.d/20-phar.ini, /etc/php/7.2/apache2/conf.d/20-posix.ini, /etc/php/7.2/apache2/conf.d/20-readline.ini, /etc/php/7.2/apache2/conf.d/20-shmop.ini, /etc/php/7.2/apache2/conf.d/20-sockets.ini, /etc/php/7.2/apache2/conf.d/20-sysvmsg.ini, /etc/php/7.2/apache2/conf.d/20-sysvsem.ini, /etc/php/7.2/apache2/conf.d/20-sysvshm.ini, /etc/php/7.2/apache2/conf.d/20-tokenizer.ini
PHP API	20170718
PHP Extension	20170718
Zend Extension	320170718
Zend Extension Build	API320170718.NTS
PHP Extension Build	API20170718.NTS
Debug Build	no
Thread Safety	disabled
Zend Signal Handling	enabled
Zend Memory Manager	enabled
Zend Multibyte Support	disabled
IPv6 Support	enabled

Configuration

apache2handler

Apache Version	Apache/2.4.29 (Ubuntu)
Apache API Version	20120211
Server Administrator	webmaster@localhost
Hostname:Port	127.0.1.1:80
User/Group	www-data(33)/33
Max Requests	Per Child: 0 - Keep Alive: on - Max Per Connection: 100
Timeouts	Connection: 300 - Keep-Alive: 5
Virtual Server	Yes
Server Root	/etc/apache2
Loaded Modules	core mod_so mod_watchdog http_core mod_log_config mod_logio mod_version mod_unixd mod_access_compat mod_alias mod_authn_core mod_authn_file mod_authz_core mod_authz_host mod_authz_user mod_autoindex mod_deflate mod_dir mod_env mod_filter mod_mime mod_negotiation mod_php7 mod_reqtimeout mod_setenvif mod_status

Install WordPress with LAMP on Ubuntu 18.04

Step 1 – Download WordPress

Download the latest version of the WordPress package and extract it by issuing the commands below on the terminal:

➤ wget -c http://wordpress.org/latest.tar.gz

```
mca@S4:~$ wget -c http://wordpress.org/latest.tar.gz
--2022-06-13 11:23:39-- 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 11:23:39-- 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%[=====] 20.19M  6.50MB/s   in 3.4s

2022-06-13 11:23:44 (6.02 MB/s) - 'latest.tar.gz' saved [21166276/21166276]
```

➤ tar -xzvf latest.tar.gz

```
mca@S4:~$ tar -xzvf 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/
wordpress/wp-content/themes/twentytwentyone/template-parts/header/excerpt-header.php
wordpress/wp-content/themes/twentytwentyone/template-parts/header/site-nav.php
wordpress/wp-content/themes/twentytwentyone/template-parts/header/site-header.php
wordpress/wp-content/themes/twentytwentyone/template-parts/header/entry-header.php
wordpress/wp-content/themes/twentytwentyone/template-parts/header/site-branding.php
wordpress/wp-content/themes/twentytwentyone/template-parts/footer/
wordpress/wp-content/themes/twentytwentyone/template-parts/footer/footer-widgets.php
wordpress/wp-content/themes/twentytwentyone/template-parts/post/
wordpress/wp-content/themes/twentytwentyone/template-parts/post/author-bio.php
wordpress/wp-content/themes/twentytwentyone/template-parts/excerpt/
```

Then move the WordPress files from the extracted folder to the Apache default root directory, /var/www/html/:

➤ sudo mv wordpress/* /var/www/html/

```
mca@S4:~$ sudo mv wordpress/* /var/www/html/
[sudo] password for mca:
[REDACTED]
```

Next, set the correct permissions on the website directory, that is give ownership of the WordPress files to the webserver as follows:

➤ sudo chown -R www-data:www-data /var/www/html/

➤ sudo chmod -R 755 /var/www/html/

```
mca@S4:~$ sudo chmod -R 755 /var/www/html/
```

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:

➤ sudo mysql

```
mca@S4:~$ sudo mysql
Welcome to the MySQL monitor. Commands end with ; or \g.
Your MySQL connection id is 5
Server version: 5.7.21-1ubuntu1 (Ubuntu)

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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.

mysql> mysql -u root -p
-> 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 'mysql -u root -p
CREATE DATABASE wordpress DEFAULT CHARACTER SET utf8
COLLATE ut' at line 1
mysql> CREATE DATABASE wordpress DEFAULT CHARACTER SET utf8 COLLATE utf8_unicode_ci;
Query OK, 1 row affected (0.00 sec)

mysql> GRANT ALL ON wordpress.* TO 'wordpressuser'@'localhost' IDENTIFIED BY 'password';
Query OK, 0 rows affected, 1 warning (0.01 sec)

mysql> FLUSH PRIVILEGES;
Query OK, 0 rows affected (0.00 sec)

mysql> EXIT;
Bye
mca@S4:~$
```

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:

➤ mysql -u root -p

```
mca@S4:~$ mysql -u mysql_user -p
Enter password:
ERROR 1045 (28000): Access denied for user 'mysql_user'@'localhost' (using password: YES)
```

From there, you'll create a new database that WordPress will control. You can call this whatever you would like, but we will be using wordpress in this guide as an example. Create the database for WordPress by writing the following:

➤ CREATE DATABASE wordpress DEFAULT CHARACTER SET utf8
COLLATE utf8_unicode_ci;

```
mysql> CREATE DATABASE wordpress DEFAULT CHARACTER SET utf8
      -> COLLATE utf8_unicode_ci;
Query OK, 1 row affected (0.00 sec)

mysql> show databases;
+-----+
| Database      |
+-----+
| information_schema |
| mysql          |
| performance_schema |
| sys            |
| wordpress      |
+-----+
5 rows in set (0.00 sec)
```

Next, you're going to create a separate MySQL user account that you'll use exclusively to operate on the new database. Creating one-function databases and accounts is a good idea from a management and security standpoint. We will use the name `wordpressuser` as an example in this guide. Feel free to change this if you'd like.

You can create this account, set a password for it, and then grant it access to the database you created all by running the following command. Remember to choose a strong password here for your database user:

- GRANT ALL ON `wordpress.*` TO '`wordpressuser`'@'localhost' IDENTIFIED BY '`password`';

```
mysql> GRANT ALL ON wordpress.* TO 'wordpressuser'@'localhost' IDENTIFIED BY 'password';
Query OK, 0 rows affected, 1 warning (0.00 sec)
```

After creating this user, flush the privileges to ensure that the current instance of MySQL knows about the recent changes you've made:

- FLUSH PRIVILEGES;

```
mysql> FLUSH PRIVILEGES;
Query OK, 0 rows affected (0.00 sec)
```

Exit out of MySQL:

- EXIT

```
mysql> exit;
Bye
```

You now have a database and user account in MySQL, each made specifically for WordPress.

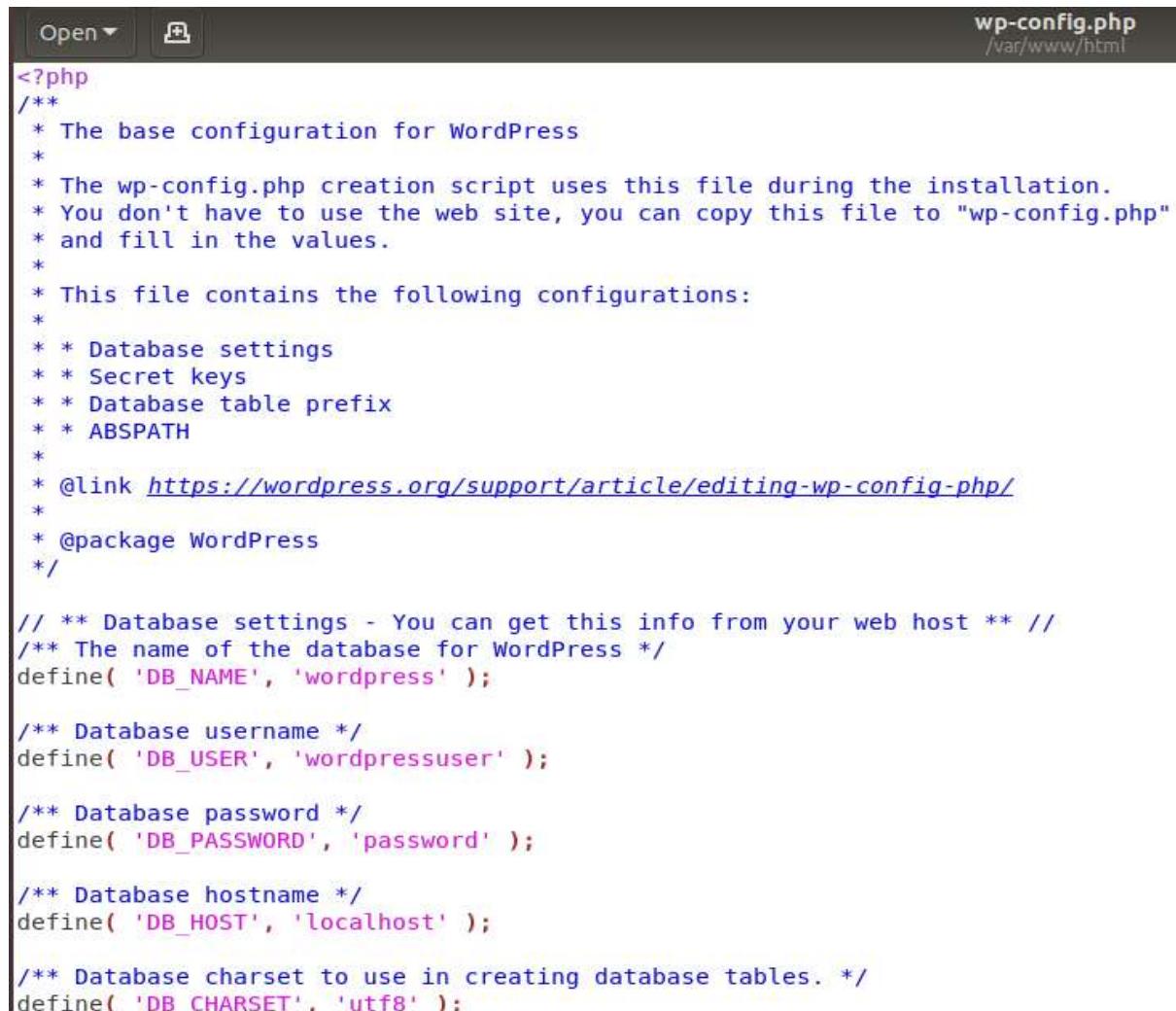
Go the `/var/www/html/` directory and rename existing `wp-config-sample.php` to `wpconfig.php`. Also, make sure to remove the default Apache index page.

- `cd /var/www/html/`
- `sudo mv wp-config-sample.php wpconfig.php`
- `sudo rm -rf index.html`
-
- `mca@S4:~$ cd /var/www/html/`
- `mca@S4:/var/www/html$ sudo mv wp-config-sample.php wpconfig.php`
- `rm -rf index.html`

```
> mca@S4:/var/www/html$ sudo rm -rf index.html
mca@S4:/var/www/html$ . .
bash: .: .: is a directory
```

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:



```
wp-config.php
/var/www/html

<?php
/**
 * The base configuration for WordPress
 *
 * The wp-config.php creation script uses this file during the installation.
 * You don't have to use the web site, you can copy this file to "wp-config.php"
 * and fill in the values.
 *
 * This file contains the following configurations:
 *
 * * Database settings
 * * Secret keys
 * * Database table prefix
 * * ABSPATH
 *
 * @link https://wordpress.org/support/article/editing-wp-config-php/
 *
 * @package WordPress
 */

// ** Database settings - You can get this info from your web host ** //
/** The name of the database for WordPress */
define( 'DB_NAME', 'wordpress' );

/** Database username */
define( 'DB_USER', 'wordpressuser' );

/** Database password */
define( 'DB_PASSWORD', 'password' );

/** Database hostname */
define( 'DB_HOST', 'localhost' );

/** Database charset to use in creating database tables. */
define( 'DB_CHARSET', 'utf8' );
```

Save and close the file when you are finished.

Restart the web server and mysql service using the commands below:

- sudo systemctl restart apache2.service
- sudo systemctl restart mysql.service

```
mca@S4:/var/www/html$ sudo chmod 777 wp-config.php
[sudo] password for mca:
mca@S4:/var/www/html$ sudo systemctl restart apache2.service
mca@S4:/var/www/html$ sudo systemctl restart mysql.service
mca@S4:/var/www/html$
```

Step 3 – Completing the Installation Through the Web Interface

Now that 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:

➤ https://server_domain_or_IP

Select the language you would like to use:



Next you will be directed to the main setup page. Select a name for your WordPress site and choose a username (it is recommended not to choose something like “admin” for security purposes). A strong password is generated automatically. Save this password or select an alternative strong password.

Enter your email address and select whether you want to discourage search engines from indexing your site:

Username Usernames can have only alphanumeric characters, spaces, underscores, hyphens, periods, and the @ symbol.

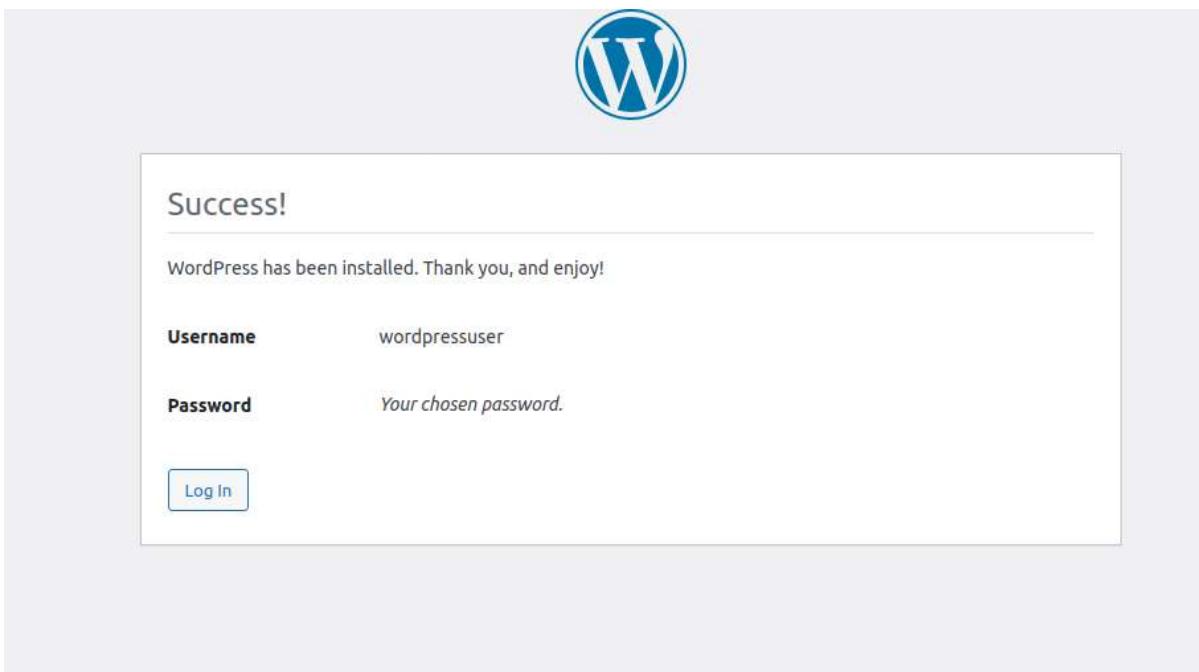
Password Weak

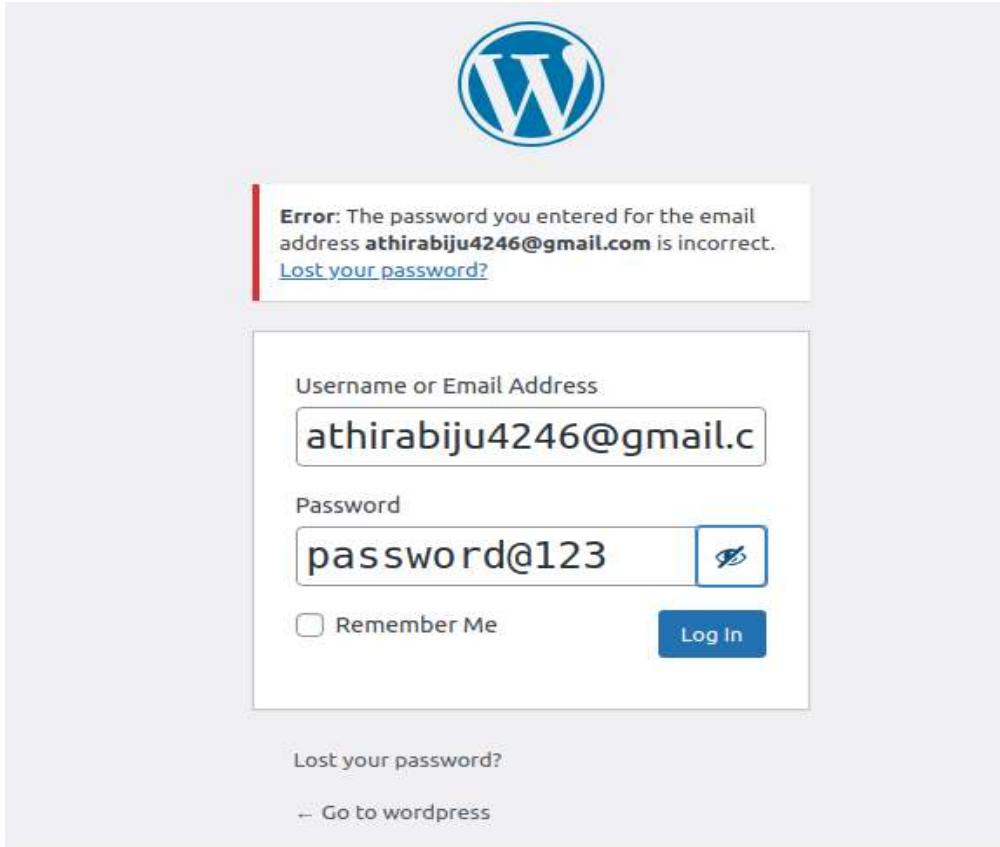
Important: You will need this password to log in. Please store it in a secure location.

Confirm Password Confirm use of weak password

Your Email Double-check your email address before continuing.

Search engine visibility Discourage search engines from indexing this site
It is up to search engines to honor this request.





Once you log in, you will be taken to the WordPress administration dashboard:

From there, you can begin using and customizing your WordPress site.

Experiment:.6

Name: Athira Biju

Roll No:4

Batch:MCA B

Date:4-4-2022

Aim

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

Procedure& Output Screenshot

Install the cmake

Apt show cmake

```
mca@S4:~/Documents/CMake$ 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 MB
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), libjsoncpp1 (>= 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: 5y
Download-Size: 3,138 kB
APT Sources: http://in.archive.ubuntu.com/ubuntu bionic/main amd64 Packages
```

\$sudo apt install cmake g++ make: To install cmake , g++ and make using the apt command.

```
mca@S4:~/Documents/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 2 not upgraded.
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 1.18.0-3 [64.4 kB]
Get:6 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 cmake amd64 3.10.2-1ubuntu2 [3,138 kB]
Fetched 4,900 kB in 1s (3,950 kB/s)
Selecting previously unselected package cmake-data.
(Reading database ... 179052 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.
```

Create directory

Mkdir cmake: creating a different directory for our project using the mkdir and cd commands.

```
mca@S4:~/Documents/CMake$ mkdir myproject
```

Cd cmake

```
mca@S4:~/Documents/CMake$ cd myproject
```

gedit Helloworld.cpp

Now create a C++ source file named Hello_world.cpp and add the following :

```
mca@S4:~/Documents/CMake/myproject$ gedit Hello_world.cpp
```

gedit CmakeLists.txt

Create a CMakeLists.txt file(with this exact capitalization) which is required by CMake:

```
mca@S4:~/Documents/CMake/myproject$ gedit CMakeLists.txt
```

Create directory called

Mkdir build:

```
mca@S4:~/Documents/CMake/myproject$ mkdir build
mca@S4:~/Documents/CMake/myproject$ cd build
```

To run cmake we need to change into the build directory: **Cmake ..**

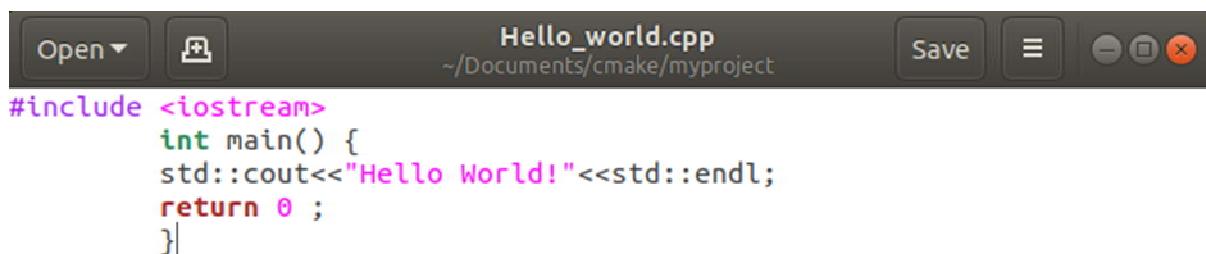
```
mca@S4:~/Documents/CMake/myproject$ mkdir build
mca@S4:~/Documents/CMake/myproject$ cd build
mca@S4:~/Documents/CMake/myproject/build$ cmake ..
-- The C compiler identification is GNU 7.3.0
-- The CXX compiler identification is GNU 7.3.0
-- Check for working C compiler: /usr/bin/cc
-- Check for working 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
```

Cmake –build : To generate the executable simply by typing: **run hello**

```
mca@S4:~/Documents/CMake/myproject/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
```

./hello: Run the executable by typing:

```
mca@S4:~/Documents/CMake/myproject/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
mca@S4:~/Documents/CMake/myproject/build$ ./hello
Hello World!
mca@S4:~/Documents/CMake/myproject/build$ █
```



Name: ATHIRA BIJU

Roll No:4

Batch: S2 RMCA

Date:6-06-2022

Experiment No.: 7

Aim

Introduction to command line tools for networking IPv4 networking, network commands: ping route traceroute, nslookup, ip. Setting up static and dynamic IP addresses. Concept of Subnets, CIDR address schemes, Subnet masks, iptables, setting up a firewall for LAN, Application layer (L7) proxies.

Procedure

1. ipconfig:This commands in windows allows you to see a summarized information of your network such as ip address, subnet mask , server address etc.

Syntax :- \$ ipconfig

Output :-

```
C:\Users\Student>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet 2:

  Connection-specific DNS Suffix  . : 
  Link-local IPv6 Address . . . . . : fe80::11df:a5d4:f0b7:1a72%8
  IPv4 Address . . . . . : 192.168.6.4
  Subnet Mask . . . . . : 255.255.255.0
  Default Gateway . . . . . : 192.168.6.100

Ethernet adapter VirtualBox Host-Only Network:

  Connection-specific DNS Suffix  . : 
  Link-local IPv6 Address . . . . . : fe80::84db:6234:a681:d282%7
  Autoconfiguration IPv4 Address. . . : 169.254.210.130
  Subnet Mask . . . . . : 255.255.0.0
  Default Gateway . . . . . : 

Tunnel adapter Teredo Tunneling Pseudo-Interface:

  Connection-specific DNS Suffix  . : 
  IPv6 Address. . . . . : 2001:0:2851:fcb0:1413:22c3:8a3e:b01e
  Link-local IPv6 Address . . . . . : fe80::1413:22c3:8a3e:b01e%13
  Default Gateway . . . . . : ::
```

2. ipconfig/all: To see the the network information in detail. It is an extension of ipconfig command

Syntax :- \$ ipconfig/all

Output :-

```
Default Gateway . . . . . : 192.168.6.1

C:\Users\Student>ipconfig/all

Windows IP Configuration

Host Name . . . . . : S4
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 2:

Connection-specific DNS Suffix . . . . . : mca.com
Description . . . . . : Realtek PCIe GBE Family Controller #2
Physical Address. . . . . : 78-24-AF-BA-C2-0D
DHCP Enabled. . . . . : No
Autoconfiguration Enabled . . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::11df:a5d4:f0b7:1a72%8(Preferred)
IPv4 Address. . . . . : 192.168.6.4(Preferred)
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 192.168.6.100
DHCPv6 IAID . . . . . : 259531951
DHCPv6 Client DUID. . . . . : 00-01-00-01-24-05-61-96-78-24-AF-BA-C2-0D
DNS Servers . . . . . : 192.168.6.254
                                         8.8.8.8
NetBIOS over Tcpip. . . . . : Enabled

Ethernet adapter VirtualBox Host-Only Network:

Connection-specific DNS Suffix . . . . . : mca.com
Description . . . . . : VirtualBox Host-Only Ethernet Adapter
Physical Address. . . . . : 0A-00-27-00-00-07
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::84db:6234:a681:d282%7(Preferred)
Autoconfiguration IPv4 Address. . . . . : 169.254.210.130(Preferred)
Subnet Mask . . . . . : 255.255.0.0
Default Gateway . . . . . :
DHCPv6 IAID . . . . . : 420085799
DHCPv6 Client DUID. . . . . : 00-01-00-01-24-05-61-96-78-24-AF-BA-C2-0D
DNS Servers . . . . . : fec0:0:0:ffff::1%1
```

3. nslookup

To show the server to which the system is connected by default. If we want to find the ip address of a particular domain name, we can also use nslookup

Syntax :- \$ nslookup

Output :-

```
:\\Users\\Student>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
```

4. ping

The command used to check the availability of a host. The response shows the URL you are pinging, the ip address associated with the URL and the size of packets being sent on the first line . The next four lines shows the replies from each individual packets including the time(in milliseconds) for the response and the time to live(TLL) of the packet, that is the amount of time that must pass before the packet discarded.

Syntax :- \$ ping <IP_address>

Output :-

```
>
C:\Users\Student>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
Reply from 142.250.195.164: bytes=32 time=20ms TTL=59
Reply from 142.250.195.164: bytes=32 time=20ms TTL=59
Reply from 142.250.195.164: bytes=32 time=21ms 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 = 21ms, Average = 20ms

C:\Users\Student>ping 192.168.6.254

Pinging 192.168.6.254 with 32 bytes of data:
Reply from 192.168.6.254: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.6.254:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

5. tracert

The command used to show the packets that are passed through the router to which our system is connected to.

Syntax :- \$ tracert <ip_address_of_system>

Output :-

```
C:\Users\Student>tracert

Usage: tracert [-d] [-h maximum_hops] [-j host-list] [-w timeout]
                [-R] [-S srcaddr] [-4] [-6] target_name

Options:
    -d                  Do not resolve addresses to hostnames.
    -h maximum_hops     Maximum number of hops to search for target.
    -j host-list        Loose source route along host-list (IPv4-only).
    -w timeout          Wait timeout milliseconds for each reply.
    -R                  Trace round-trip path (IPv6-only).
    -S srcaddr          Source address to use (IPv6-only).
    -4                  Force using IPv4.
    -6                  Force using IPv6.

C:\Users\Student>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      1 ms      1 ms      5 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    17 ms      19 ms      18 ms  216.239.43.133
  7    16 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.
```

6. route print:The command used to display and updates network routing table

Syntax :- \$ route print

Output :-

```
C:\Users\Student>route print
=====
Interface List
 8...78 24 af ba c2 0d ....Realtek PCIe GBE Family Controller #2
 7...0a 00 27 00 00 07 ....VirtualBox Host-Only Ethernet Adapter
 1.....Software Loopback Interface 1
13...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  192.168.6.4    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
         169.254.0.0    255.255.0.0   On-link      169.254.210.130  281
 169.254.210.130  255.255.255.255  On-link      169.254.210.130  281
 169.254.255.255  255.255.255.255  On-link      169.254.210.130  281
         192.168.6.0    255.255.255.0   On-link      192.168.6.4    281
         192.168.6.4    255.255.255.255  On-link      192.168.6.4    281
 192.168.6.255  255.255.255.255  On-link      192.168.6.4    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      169.254.210.130  281
         224.0.0.0     240.0.0.0   On-link      192.168.6.4    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      169.254.210.130  281
 255.255.255.255  255.255.255.255  On-link      192.168.6.4    281
=====
Persistent Routes:
 Network Address      Netmask     Gateway Address Metric
          0.0.0.0        0.0.0.0   192.168.6.100 Default
          0.0.0.0        0.0.0.0   192.168.6.100 Default
=====
```

```
IPv6 Route Table
=====
Active Routes:
 If Metric Network Destination      Gateway
 12     331 ::/0           On-link
  1     331 ::1/128        On-link
 12     331 2001::/32       On-link
 12     331 2001:0:2851:fcb0:d3:14b6:8a3e:b01e/128
                                On-link
  3     281 fe80::/64       On-link
  7     281 fe80::/64       On-link
 12     331 fe80::/64       On-link
 12     331 fe80::d3:14b6:8a3e:b01e/128
                                On-link
  7     281 fe80::142f:9783:684f:a27d/128
                                On-link
  3     281 fe80::60c6:9871:f4d0:b304/128
                                On-link
  1     331 ff00::/8        On-link
  3     281 ff00::/8        On-link
  7     281 ff00::/8        On-link
 12     331 ff00::/8        On-link
=====
Persistent Routes:
 None
```

7. netstat: The network statistics or netstat command is a networking tool used for troubleshooting and configuration that can also serve a monitoring tool for the connections over the network.

Syntax :- netstat Output :-

```
C:\Users\Student>netstat  
Active Connections  
  
Proto Local Address          Foreign Address          State  
TCP   192.168.6.4:1026      20.198.162.76:https    ESTABLISHED  
TCP   192.168.6.4:1151      a104-104-60-83:https  CLOSE_WAIT  
TCP   192.168.6.4:1228      52.143.87.28:https    ESTABLISHED  
TCP   [2001:0:2851:fcb0:1413:22c3:8a3e:b01e]:1219  [2001:0:2851:fcb0:204e:4eb0:989f:cc92]:ms-do  ESTABLISHED  
TCP   [2001:0:2851:fcb0:1413:22c3:8a3e:b01e]:1233  [2001:0:2851:fcb0:c51:1e53:4963:b7d]:ms-do  SYN_SENT  
TCP   [2001:0:2851:fcb0:1413:22c3:8a3e:b01e]:1234  [2001:0:2851:fcb0:18b7:2fd7:854f:ce25]:ms-do  SYN_SENT  
  
C:\Users\Student>
```

Experiment No : 8

Name: ATHIRA BIJU

Roll No:4

Batch: S2 RMCA

Date:6-06-2022

Aim

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

Procedure

Install the the wireshark on ubuntu **sudo apt update & apt install tcpdump** : Update and install tcpdump on system.

sudo tcpdump -D : To display all available interfaces.

```
mca@S4:~$ 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)
```

sudo tcpdump -i enp5s0 :

```
mca@S4:~$ sudo tcpdump -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
10:55:38.548950 IP 192.168.6.177.52634 > 239.255.255.1900: UDP, length 175
10:55:38.551730 IP S4.32946 > dns.google.domain: 63447+ [1au] PTR? 177.6.168.192.in-addr.arpa. (55)
10:55:38.568490 IP dns.google.domain > S4.32946: 63447 NXDomain 0/0/1 (55)
10:55:38.570590 IP S4.40775 > dns.google.domain: 59785+ [1au] PTR? 4.6.168.192.in-addr.arpa. (53)
10:55:38.588242 IP dns.google.domain > S4.40775: 59785 NXDomain 0/0/1 (53)
10:55:38.639151 IP 192.168.6.36.mdns > 224.0.0.251.mdns: 0 PTR (QM)? _googlecast._tcp.local. (40)
10:55:38.640703 IP S4.60643 > dns.google.domain: 32626+ [1au] PTR? 36.6.168.192.in-addr.arpa. (54)
10:55:38.650926 IP 192.168.6.190.58079 > 239.255.255.250.1900: UDP, length 174
10:55:38.655104 IP dns.google.domain > S4.60643: 32626 NXDomain 0/0/1 (54)
10:55:38.656504 IP S4.50462 > dns.google.domain: 8034+ [1au] PTR? 190.6.168.192.in-addr.arpa. (55)
10:55:38.673552 ARP, Request who-has 10.128.8.77 tell 192.168.6.117, length 46
10:55:38.674212 IP dns.google.domain > S4.50462: 8034 NXDomain 0/0/1 (55)
10:55:38.675807 IP S4.52169 > dns.google.domain: 37803+ [1au] PTR? 77.8.128.10.in-addr.arpa. (53)
10:55:38.692610 IP 192.168.6.71.59351 > 239.255.255.250.1900: UDP, length 174
10:55:38.692763 IP dns.google.domain > S4.52169: 37803 NXDomain 0/0/1 (53)
10:55:38.694123 IP S4.44341 > dns.google.domain: 35319+ [1au] PTR? 117.6.168.192.in-addr.arpa. (55)
10:55:38.710408 IP dns.google.domain > S4.44341: 35319 NXDomain 0/0/1 (55)
10:55:38.711877 IP S4.45193 > dns.google.domain: 22126+ [1au] PTR? 71.6.168.192.in-addr.arpa. (54)
```

sudo tcpdump -c 4 -i enp3s0 : 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.

```
mca@S4:~$ sudo tcpdump -c 4 -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
10:59:05.676072 ARP, Request who-has 10.128.8.77 tell 192.168.6.117, length 46
10:59:05.677597 IP S4.35393 > dns.google.domain: 63355+ [1au] PTR? 77.8.128.10.in-addr.arpa. (53)
10:59:05.694250 IP dns.google.domain > S4.35393: 63355 NXDomain 0/0/1 (53)
10:59:05.695749 IP S4.54989 > dns.google.domain: 56153+ [1au] PTR? 117.6.168.192.in-addr.arpa. (55)
4 packets captured
7 packets received by filter
0 packets dropped by kernel
```

sudo tcpdump -c 4 -xx -I enp3s0 : command -xx capture the data of each packet,including its link level header in HEX and ASCII format.

```
mca@S4:~$ 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
11:00:10.572979 ARP, Request who-has 192.168.6.160 tell _gateway, length 46
    0x0000: ffff ffff 001a 8c6b 54cf 0806 0001 .....kT....
    0x0010: 0800 0604 0001 001a 8c6b 54cf c0a8 0664 .....kT....d
    0x0020: 0000 0000 0000 c0a8 06a0 0000 0000 0000 .....
    0x0030: 0000 0000 0000 0000 0000 0000 0000 0000 .....
11:00:10.574538 IP S4.48047 > dns.google.domain: 46593+ [1au] PTR? 160.6.168.192.in-addr.arpa. (55)
    0x0000: 001a 8c6b 54cf 7824 afba c20d 0800 4500 ..kT.x$.....E.
    0x0010: 0053 4500 4000 4011 1ede c0a8 0604 0808 .SE.@@.....
    0x0020: 0808 bbaf 0035 003f c919 b601 0100 0001 ....5.?.....
    0x0030: 0000 0000 0001 0331 3630 0136 0331 3638 .....160.6.168
    0x0040: 0331 3932 0769 6e2d 6164 6472 0461 7270 .192.in-addr.arp
    0x0050: 6100 000c 0001 0000 2902 0000 0000 0000 a.....).....
    0x0060: 00 .
11:00:10.590873 IP dns.google.domain > S4.48047: 46593 NXDomain 0/0/1 (55)
    0x0000: 7824 afba c20d 001a 8c6b 54cf 0800 4580 x$.....kT...E.
    0x0010: 0053 29cb 0000 7c11 3d93 0808 0808 c0a8 .S)...|=.....
    0x0020: 0604 0035 bbaf 003f 4896 b601 8183 0001 ...5...?H.....
    0x0030: 0000 0000 0001 0331 3630 0136 0331 3638 .....160.6.168
    0x0040: 0331 3932 0769 6e2d 6164 6472 0461 7270 .192.in-addr.arp
    0x0050: 6100 000c 0001 0000 2902 0000 0000 0000 a.....).....
```

Sudo tcpdump -i enp3s0 -c5 port 80 : To filter packets based on the desired service or port, use the port filter.

```
mca@S4:~$ sudo tcpdump -i enp3s0 -c 5 port 80
[sudo] password for mca:
Sorry, try again.
[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
10:14:12.775240 IP 123.35.104.34.bc.googleusercontent.com.http > S4.34668: Flags [F.], seq 3644508853, ack 2606084356, win 261, options [nop,nop,TS val 807683393 ecr 3030704304], length 0
10:14:12.817448 IP S4.34668 > 123.35.104.34.bc.googleusercontent.com.http: Flags [.], ack 1, win 627, options [nop,nop,TS val 3030789327 ecr 8 07683393], length 0
10:14:15.353524 IP S4.34668 > 123.35.104.34.bc.googleusercontent.com.http: Flags [.], ack 1, win 627, options [nop,nop,TS val 3030835864 ecr 8 07683393], length 0
10:15:44.409538 IP S4.34668 > 123.35.104.34.bc.googleusercontent.com.http: Flags [.], ack 1, win 627, options [nop,nop,TS val 3030880920 ecr 8 07683393], length 0
^C
4 packets captured
4 packets received by filter
0 packets dropped by kernel
```

sudo tcpdump -i enp3s0 -c 10 -w icmp.pcap : 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@S4:~$ sudo tcpdump -i enp3s0 -c 10 -w icmp.pcap
tcpdump: listening on enp3s0, link-type EN10MB (Ethernet), capture size 262144 bytes
10 packets captured
19 packets received by filter
0 packets dropped by kernel
```

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

```
mca@S4:~$ sudo tcpdump -r icmp.pcap
reading from file icmp.pcap, link-type EN10MB (Ethernet)
10:19:28.705865 IP S4.40068 > maa05s23-in-f14.1e100.net.https: Flags [P.], seq 1144746779:1144747241, ack 1356740466, win 2024, options [nop,nop,TS val 1628701997 ecr 2351999506], length 462
10:19:28.705884 IP S4.40068 > maa05s23-in-f14.1e100.net.https: Flags [.], seq 462:1880, ack 1, win 2024, options [nop,nop,TS val 1628701997 ecr 2351999506], length 1418
10:19:28.706049 IP S4.40068 > maa05s23-in-f14.1e100.net.https: Flags [.], seq 1880:3298, ack 1, win 2024, options [nop,nop,TS val 1628701997 ecr 2351999506], length 1418
10:19:28.706052 IP S4.40068 > maa05s23-in-f14.1e100.net.https: Flags [P.], seq 3298:4056, ack 1, win 2024, options [nop,nop,TS val 1628701997 ecr 2351999506], length 758
10:19:28.720608 IP maa05s23-in-f14.1e100.net.https > S4.40068: Flags [F.], ack 1880, win 1050, options [nop,nop,TS val 2352001714 ecr 1628701997]
```

Wireshark and Netcat

Sudo apt install wireshark : Wireshark's latest version has been added to the APT, you can download and install.

```
mca@S4:~$ sudo apt install wireshark
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  geoip-database-extra javascript-common libc-ares2 libjs-openlayers libqt5multimedias5 libsmi2ldbl libspandsp2 libwireshark-data
  libwireshark10 libwiretap7 libwscodecs1 libwsutil8 wireshark-common wireshark-qt
Suggested packages:
  snmp-mibs-downloader wireshark-doc
The following NEW packages will be installed:
  geoip-database-extra javascript-common libc-ares2 libjs-openlayers libqt5multimedias5 libsmi2ldbl libspandsp2 libwireshark-data
  libwireshark10 libwiretap7 libwscodecs1 libwsutil8 wireshark wireshark-common wireshark-qt
0 upgraded, 15 newly installed, 0 to remove and 2 not upgraded.
Need to get 30.9 MB of archives.
After this operation, 138 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/universe amd64 geoip-database-extra all 20180315-1 [11.1 MB]
Get:2 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 javascript-common all 11 [6,066 B]
Get:3 http://in.archive.ubuntu.com/ubuntu bionic/universe amd64 libqt5multimedias5 amd64 5.9.5-0ubuntu1 [293 kB]
```

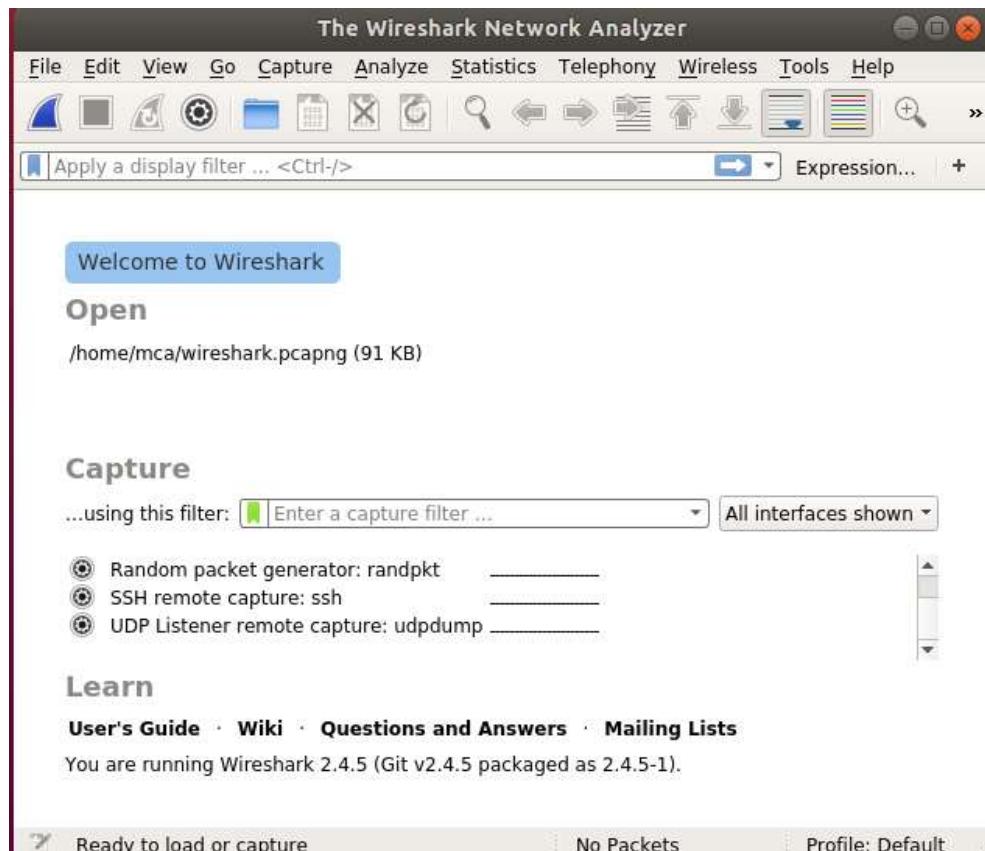
Sudo adduser \$USER wireshark :

```
mca@S4:~$ sudo adduser $mca wireshark
adduser: The group `wireshark' already exists.
```

Sudo wireshark : To start wireshark application.

```
mca@S4:~$ sudo wireshark
QStandardPaths: XDG_RUNTIME_DIR not set, defaulting to '/tmp/runtime-root'
```

Capturing packet using wireshark : List of interfaces that you can capture packets to and from. There are many types of interfaces you can monitor using Wireshark, for example, Wired, Wireless, USB and many external devices. You can choose to show specific types of interfaces in the welcome screen from the marked section of the screenshot below:



Many packets were captured:

No.	Time	Source	Destination	Protocol	Length	Info
430	11.536042020	192.168.6.219	142.250.196.170	QUIC	474	57512 - 443 Len=432[Malformed Packet]
431	11.552055543	142.250.196.170	192.168.6.219	QUIC	78	443 - 57512 Len=28[Malformed Packet]
432	11.556425201	192.168.6.219	142.250.196.170	QUIC	75	57512 - 443 Len=33[Malformed Packet]
433	11.566637773	192.168.6.219	142.250.196.170	QUIC	75	37504 - 443 Len=33[Malformed Packet]
434	11.572671731	142.250.196.170	192.168.6.219	QUIC	67	Version Negotiation, CID: 14950794791141520026
435	11.708522224	0c:9d:92:0e:92:27	Broadcast	ARP	60	Who has 192.168.6.241? Tell 192.168.6.223
436	11.75333278	192.168.6.219	142.250.196.170	QUIC	75	57512 - 443 Len=33[Malformed Packet]
437	11.772957894	142.250.196.170	192.168.6.219	QUIC	67	Version Negotiation, CID: 10547405347537719894
438	11.791537216	fe80::a062:acf0:cb2. ff02::1:ff5e:a676		ICMPv6	86	Neighbor Solicitation for fe80::3019:d2fc:855e:a676 from 1c:87:2c:71:8c:3b
439	11.8083897242	142.250.196.170	192.168.6.219	QUIC	128	Payload (Encrypted), PKN: 130
440	11.804129914	192.168.6.219	142.250.196.170	QUIC	78	57512 - 443 Len=36[Malformed Packet]
441	11.824369361	142.250.196.170	192.168.6.219	QUIC	67	443 - 57512 Len=25[Malformed Packet]

Sudo apt –get install netcat : Installing netcat.

```
mca@S4:~$ sudo apt-get install netcat
[sudo] password for mca:
Reading package lists... Done
Building dependency tree
Reading state information... Done
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 2 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://in.archive.ubuntu.com/ubuntu bionic/universe amd64 netcat-traditional amd64 1.10-41.1 [61.7 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu bionic/universe amd64 netcat all 1.10-41.1 [3,436 B]
Fetched 65.1 kB in 0s (180 kB/s)
Selecting previously unselected package netcat-traditional.
(Reading database ... 179013 files and directories currently installed.)
Preparing to unpack .../netcat-traditional_1.10-41.1_amd64.deb
```

nc -l -p 1234 : To set up the server using Netcat in listening mode. We will use port 12345 and will specify the port number with the -p option.

```
mca@S4:~$ nc -l -p 1234
Athira
[
```

nc localhost 1234 : The client needs the server ip to connect to it. My server and my client are on the same machine so I use localhost for the hostname. The command ‘nc hostname port’ puts Netcat in client mode and connects to the specified hostname on the specified port.

```
mca@S4:~$ nc 127.0.0.1 1234
Athira
[
```

Name: Athira Biju

Roll No:4

Batch:S2 MCA

Date:23/05/2022

Experiment No.: 9

Aim

Aim: Introduction to Hypervisors and VMs: KVM installation and commands.

Procedure:

For the Ubuntu system, all packages required to run KVM are available on official upstream repositories. Install them using the commands:

`sudo apt update`

`apt-get install qemu qemu-kvm libvirt-bin bridge-utils virt-manager virtviewer-y`

Create Virtual Machine • You can create virtual machine using virt-manager utility. Run the following command to start the virt-manager:

`sudo virt-manager`

`virsh help virsh`

`help`

`virsh help list Sudo`

`virsh nodeinfo`

`Virsh start vm`

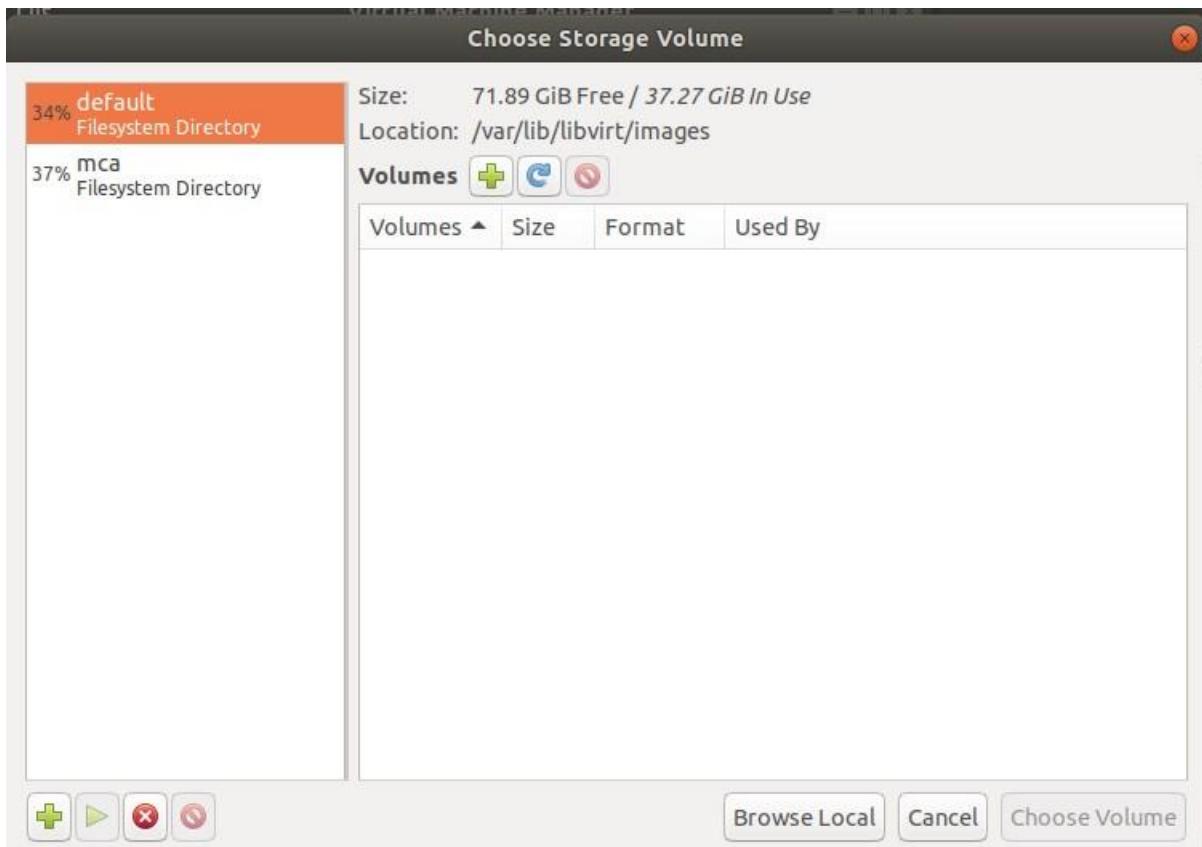
`virsh start`

`virsh start testvm1`

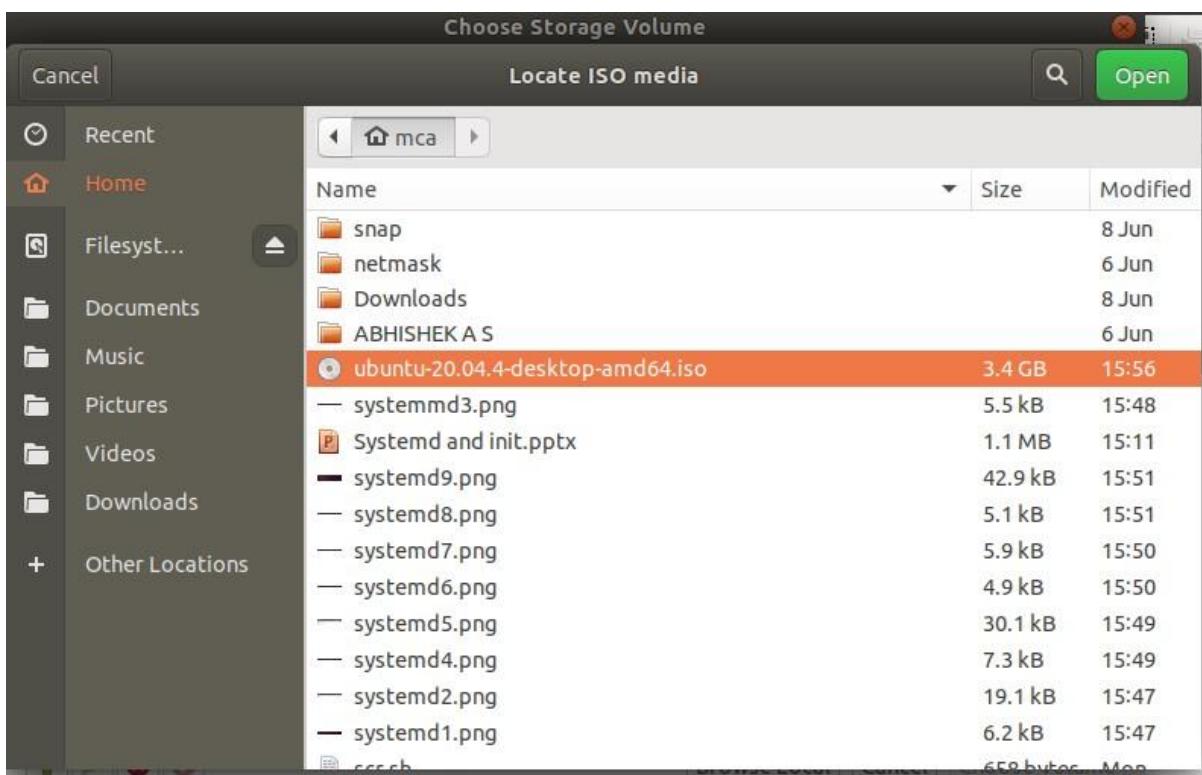
```
mca@U4:~$ sudo apt install qemu-kvm libvirt-daemon-system libvirt-clients bridge-utils virt-manager
Reading package lists... Done
Building dependency tree
Reading state information... Done
bridge-utils is already the newest version (1.5-15ubuntu1).
libvirt-clients is already the newest version (4.0.0-1ubuntu8).
libvirt-daemon-system is already the newest version (4.0.0-1ubuntu8).
qemu-kvm is already the newest version (1:2.11+dfsg-1ubuntu7.4).
The following additional packages will be installed:
  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
  libgovirt-common libgovirt2 libgtk-vnc-2.0-0 libgvnc-1.0-0 libosinfo-1.0-0
```

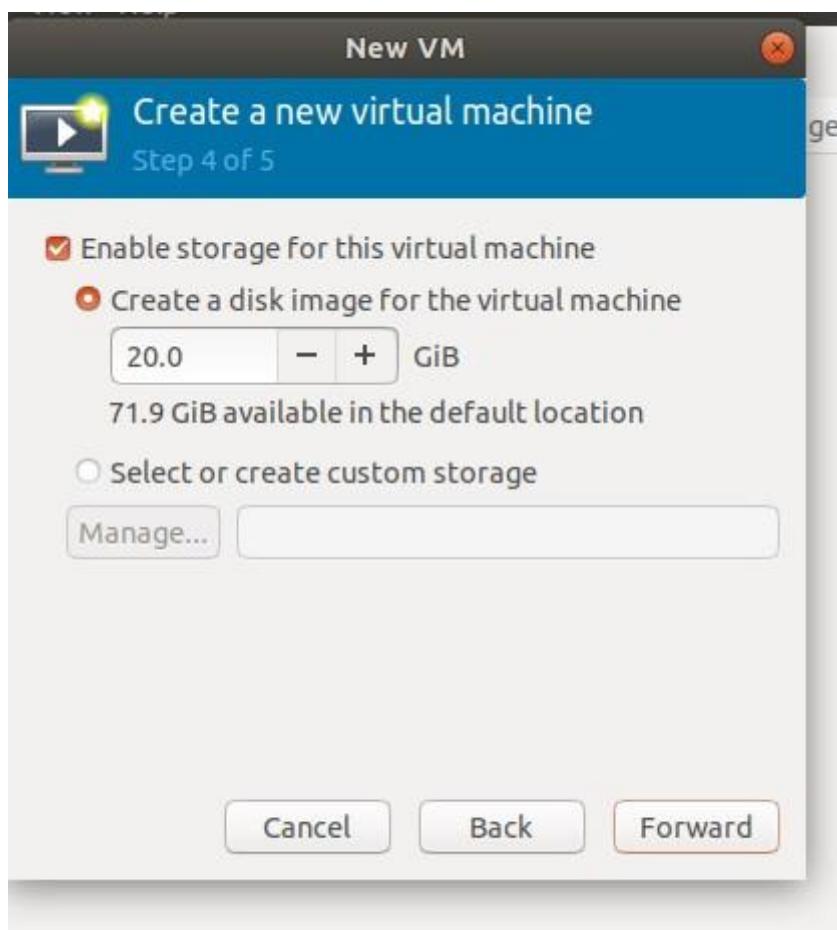
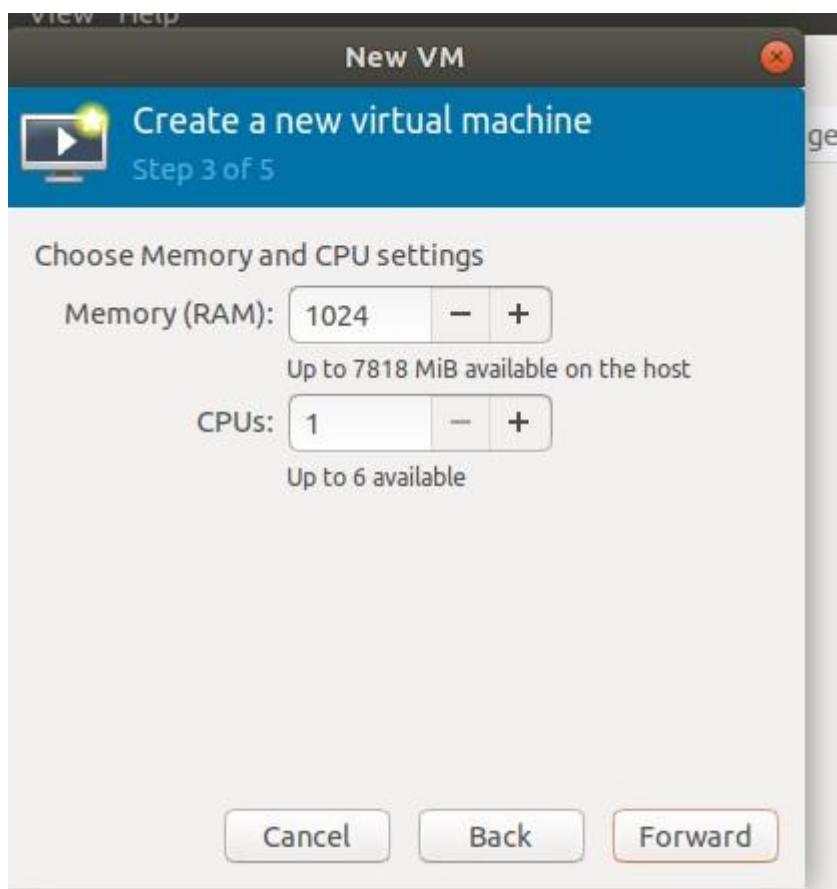
```
mca@U4:~$ sudo virt-manager
mca@U4:~$ █
```

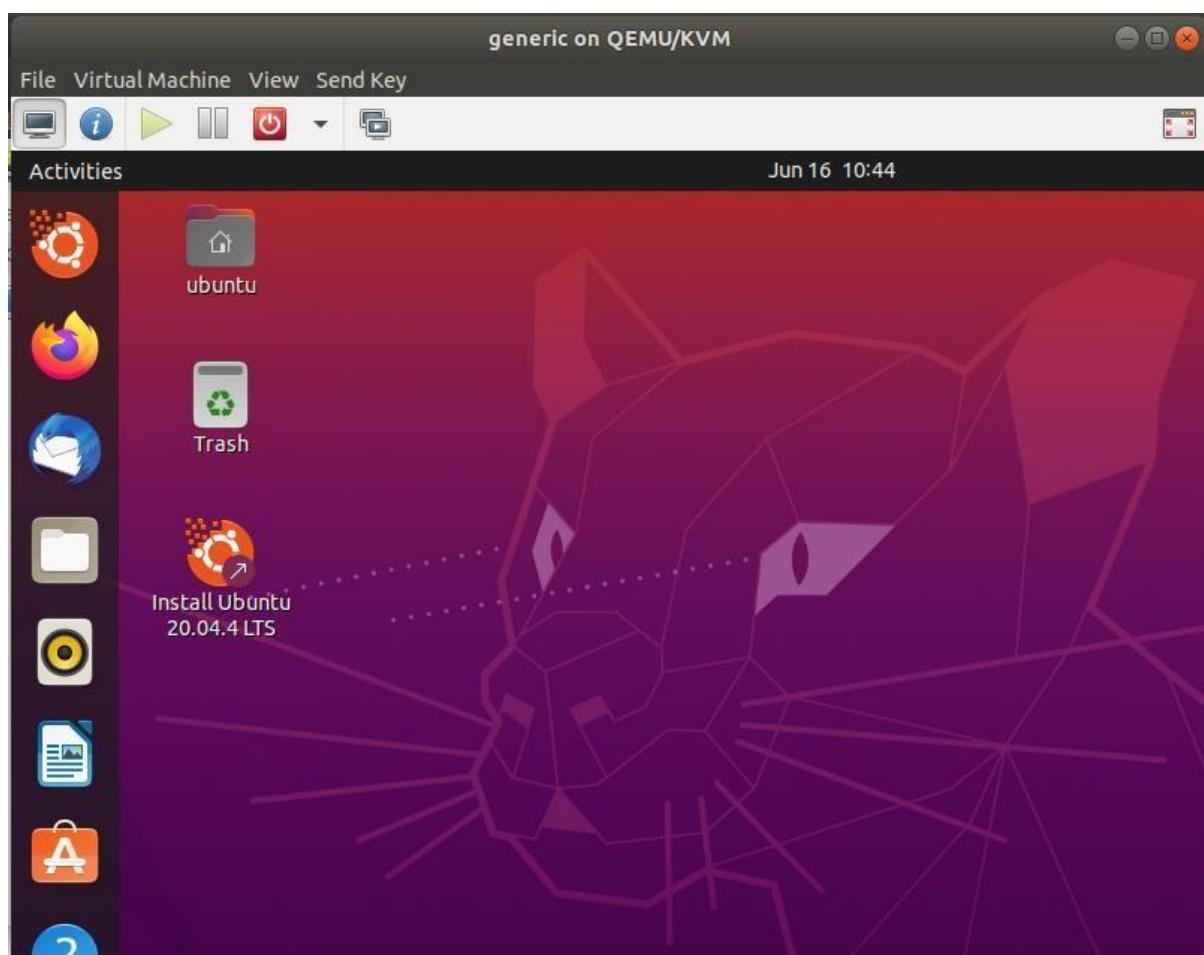
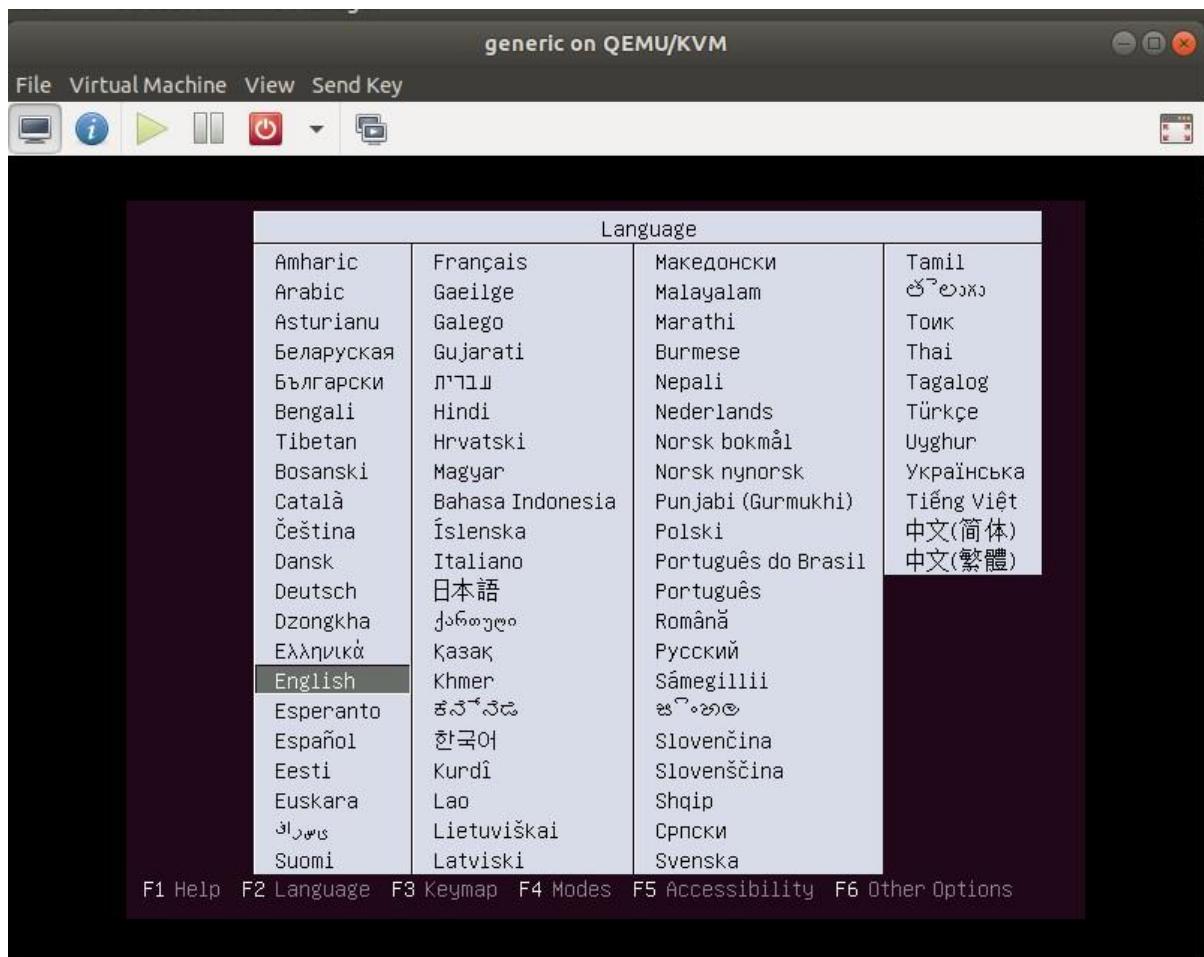
Next, right click on localhost(QEMU) and click on New button.



Next, provide the amount of storage that you want to assign to a virtual machine. Then, click on the Forward button







```
mca@U4:~$ sudo virsh list --all
 Id   Name           State
--- 
 2    generic        running
```

```
mca@U4:~$ sudo virsh nodeinfo
CPU model:          x86_64
CPU(s):             6
CPU frequency:      1428 MHz
CPU socket(s):      1
Core(s) per socket: 6
Thread(s) per core: 1
NUMA cell(s):       1
Memory size:        8006128 KiB
```

Experiment No.: 10

Name: ATHIRA BIJU

Roll No:4

Batch: S2 RMCA

Date:23-05-2022

Aim

Introduction to Containers: Docker installation and deployment

Procedure & Output

Steps for Installing Docker:

1. Open the terminal on Ubuntu.
2. Remove any Docker files that are running in the system, using the following command:

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

```
mca@S4:~$ sudo apt-get remove docker docker-engine docker.io
[sudo] password for mca:
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
Package 'docker.io' is not installed, so not removed
0 upgraded, 0 newly installed, 0 to remove and 3 not upgraded.
mca@S4:~$ █
```

After entering the above command, you will need to enter the password of the root and press enter.

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

```
$ sudo apt-get update
```

```
mca@S4:~$ sudo apt-get update
Get:1 http://dl.google.com/linux/chrome/deb stable InRelease [1,811 B]
Hit:2 http://in.archive.ubuntu.com/ubuntu bionic InRelease
Err:1 http://dl.google.com/linux/chrome/deb stable InRelease
  The following signatures couldn't be verified because the public key is not available: NO_PUBKEY 78BD65473CB3BD13
Get:3 http://packages.microsoft.com/repos/vscode stable InRelease [3,959 B]
Err:4 http://ppa.launchpad.net/jonathonf/python-3.6/ubuntu bionic InRelease
  403 Forbidden [IP: 185.125.190.52 80]
Get:5 http://packages.microsoft.com/repos/vscode stable/main amd64 Packages [300 kB]
Ign:6 https://repo.mongodb.org/apt/ubuntu trusty/mongodb-org/3.6 InRelease
Get:7 http://ppa.launchpad.net/webupd8team/java/ubuntu bionic InRelease [15.4 kB]
Get:8 https://repo.mongodb.org/apt/ubuntu trusty/mongodb-org/3.6 Release [2,495 B]
Get:9 https://repo.mongodb.org/apt/ubuntu trusty/mongodb-org/3.6 Release.gpg [801 B]
Err:9 https://repo.mongodb.org/apt/ubuntu trusty/mongodb-org/3.6 Release.gpg
  The following signatures were invalid: EXPKEYSIG 58712A2291FA4AD5 MongoDB 3.6 Release Signing Key <packaging@mongodb.com>
Reading package lists... Done
W: GPG error: http://dl.google.com/linux/chrome/deb stable InRelease: The following signatures couldn't be verified because the public key is not available: NO_PUBKEY 78BD65473CB3BD13
E: The repository 'http://dl.google.com/linux/chrome/deb stable InRelease' is not 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.
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 not 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.
```

4. Install Docker using the following command

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

```
mca@S4:~$ sudo apt install docker.io
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  bridge-utils cgroupfs-mount ubuntu-fan
Suggested packages:
  aufs-tools btrfs-tools debootstrap docker-doc rinse zfs-fuse | zfsutils
The following NEW packages will be installed:
  bridge-utils cgroupfs-mount docker.io ubuntu-fan
0 upgraded, 4 newly installed, 0 to remove and 4 not upgraded.
Need to get 30.1 MB of archives.
After this operation, 137 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 bridge-utils amd64 1.5-15ubuntu1 [30.1 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu bionic/universe amd64 cgroupfs-mount all 1.4 [6,320 B]
```

You'll then get a prompt asking you to choose between y/n - choose y

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

```
sudo snap install docker
```

```
!.. command not found
mca@S4:~$ sudo snap install docker
docker 20.10.14 from Canonical* installed
mca@S4:~$ █
```

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

```
$ docker --version
```

```
mca@S4:~$ docker --version
Docker version 17.12.1-ce, build 7390fc6
mca@S4:~$ █
```

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

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

```
mca@S4:~$ sudo docker run hello-world
Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
2db29710123e: Pull complete
Digest: sha256:80f31da1ac7b312ba29d65080fddf797dd76acfb870e677f390d5acba9741b17
Status: Downloaded newer image for hello-world:latest

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.
```

Here, *hello-world* is the docker image present on the Docker hub.

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

```
$ sudo docker images
```

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
hello-world	latest	feb5d9fea6a5	8 months ago	13.3kB

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

```
$ sudo docker ps -a
```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
b816f5515727	hello-world	"/hello"	2 minutes ago	Exited (0) 2 minutes ago		pensive_euclid

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

```
$ sudo docker ps
```

You've just successfully installed Docker on Ubuntu!

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
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Setting Up an Apache Container

Procedure:

Setting Up an Apache Container

One of the amazing things about the **Docker** ecosystem is that there are tens of standard containers that you can easily download and use.

In the following example, we will instantiate an **Apache 2.4** container named **tecmint-web**, detached from the current terminal. We will use an image called **httpd:2.4** from **Docker Hub**.

Our plan is to have requests made to our public IP address on port **8080** be redirected to port **80** on the container. Also, instead of serving content from the container itself, we will serve a simple web page from **/home/user/website**.

We do this by mapping **/home/user/website/** on the **/usr/local/apache2/htdocs/** on the container. Note that you will need to use **sudo** or login as **root** to proceed, and do not omit the forward slashes at the end of each directory.

```
$ sudo docker run -dit --name tecmint-web -p 8080:80 -v
/home/user/website:/usr/local/apache2/htdocs/ httpd:2.4
```

```
mca@U4:~$ sudo docker run -dit --name tecmint-web -p 8080:80 -v /home/user/website:/usr/local/apache2/htdocs/ httpd:2.4
[sudo] password for mca:
Sorry, try again.
[sudo] password for mca:
Unable to find image 'httpd:2.4' locally
2.4: Pulling from library/httpd
42c077c10790: Pull complete
77a357ba6a8: Pull complete
c56c780a8904: Pull complete
90bcc5e941a7: Pull complete
571750298b32: Pull complete
Digest: sha256:c479bec894c5a7f8878b28e52d03cc95b1e784612ecd01ac7c7394fc5fa2e6e2
Status: Downloaded newer image for httpd:2.4
f7971a6b73585ddffa934613f94799842fd87e01d737c26f9fa4b45f859eda4
```

Pull Docker Apache Container

At this point, our **Apache** container should be up and running.

```
$ sudo docker ps
```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS
f7971a6b7358	httpd:2.4	"httpd-foreground"	About a minute ago	Up 56 seconds	0.0.0.0:8080->80/tcp, :::8080->80/tcp
tecmint-web					

Check Apache Docker Container

Now let's create a simple web page named **docker.html** inside the **/home/user/website** directory.

```
$ sudo gedit /home/user/website/docker.html
```

```
mca@U4:~$ sudo gedit /home/user/website/docker.html
** (gedit:6920): WARNING **: 14:43:12.189: Set document metadata failed: Setting attribute metadata::gedit-spell-language not supported
** (gedit:6920): WARNING **: 14:43:12.190: Set document metadata failed: Setting attribute metadata::gedit-encoding not supported
** (gedit:6920): WARNING **: 14:43:35.187: Set document metadata failed: Setting attribute metadata::gedit-position not supported
```

Add the following sample HTML content to the file.

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <title>Learn Docker at Tecmint.com</title>
</head>
<body>
  <h1>Learn Docker With Us</h1>
</body>
</html>
```

Next, point your browser to **c**

(where **Server-IP** is your host's public IP address). You should be presented with the page we created previously.



Check Apache Page

If you wish, you can now stop the container.

```
$ sudo docker stop tecmint-web
```

```
mca@U4:~$ sudo docker stop tecmint-web
tecmint-web

```

```
$ sudo docker rm tecmint-web
```

```
mca@U4:~$ sudo docker rm tecmint-web
tecmint-web
```

To finish cleaning up, you may want to delete the image that was used in the container (omit this step if you're planning on creating other **Apache 2.4** containers soon).

```
$ sudo docker image remove httpd:2.4
```

```
mca@U4:~$ 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
mca@U4:~$
```

Note that in all the above steps we never had to install the webserver on our host.

```
$ sudo docker run -dit --name tecmint-web -p 8080:80 -v
/home/user/website:/usr/local/apache2/htdocs/ httpd:2.4
```

```
mca@U4:~$ 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:c479bec894c5a7f8878b28e52d03cc95b1e784612ecd01ac7c7394fc5fa2e6e2
Status: Downloaded newer image for httpd:2.4
4574502a84e966bb1d6c8f59f7390b412ed6c99de75bf76397c6b39851ce48f4
```