

20MCA136 - NETWORKING & SYSTEM ADMINISTRATION LAB

Lab Report Submitted By

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In Partial fulfillment for the Award of the Degree Of

**MASTER OF COMPUTER APPLICATIONS (2 Year)
(MCA)**

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY



**AMAL JYOTHI COLLEGE OF ENGINEERING
KANJIRAPPALLY**

[Affiliated to APJ Abdul Kalam Technological University, Kerala. Approved by AICTE, Accredited by NAAC with 'A' grade. Koovappally, Kanjirappally, Kottayam, Kerala – 686518]

2021-2022

DEPARTMENT OF COMPUTER APPLICATIONS
AMAL JYOTHI COLLEGE OF ENGINEERING
KANJIRAPPALLY



CERTIFICATE

This is to certify that the Lab report, "**20MCA136 NETWORKING & SYSTEM ADMINISTRATION LAB**" is the bonafide work of **SREELAKSHMI R (Reg.No: AJC21MCA-2101)** in partial fulfillment of the requirements for the award of the Degree of Master of Computer Applications under APJ Abdul Kalam Technological University during the year 2021-22.

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NETWORKING & SYSTEM ADMINISTRATION LAB

Experiment No.: 1

Aim

Familiarization of Hardware Components in a Computer.

Procedure

Here are some common individual computer hardware components that you'll often find *inside* a modern computer. These parts are almost always found inside the computer case, so you won't see them unless you open the computer:

- Motherboard
- Central Processing Unit (CPU)
- Random Access Memory (RAM)
- Power Supply Unit (PSU)
- Video card
- Hard Disk Drive (HDD)
- Solid-State Drive (SSD)
- Optical disk drive (e.g., BD/DVD/CD drive)

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Date:6-04-2022



The motherboard serves to connect all of the parts of a computer together. The CPU, memory, hard drives, and other ports and expansion cards all connect to the motherboard directly or via cables.

Motherboard Definition

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.

Popular motherboard manufacturers include ASUS, AOpen, Intel, ABIT, MSI, Gigabyte, and Biostar.

2. Central Processing Unit (CPU)



All sorts of devices use a CPU, including desktop, laptop, and tablet computers, smartphones, even your flat-screen television set.

Intel and AMD are the two most popular CPU manufacturers for desktops, laptops, and servers, while Apple, NVIDIA, and Qualcomm are big smartphone and tablet CPU makers.

You may see many different names used to describe the CPU, including processor, computer processor, microprocessor, central processor, and "the brains of the computer."

Computer monitors or hard drives are sometimes *very incorrectly* referred to as the CPU, but those pieces of hardware serve entirely different purposes and are in no way the same thing as the CPU.

3. Random Access Memory (RAM)



Random Access Memory, or RAM (pronounced as *ramm*), is the physical hardware inside a computer that temporarily stores data, serving as the computer's "working" memory.

Additional RAM allows a computer to work with more information at the same time, which usually has a considerable effect on total system performance.

Some popular manufacturers of RAM include Kingston, PNY, Crucial, and CORSAIR.

4. Power Supply Unit (PSU)



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.

The power supply is a crucial piece because, without it, the rest of the internal hardware can't function. Motherboards, cases, and power supplies all come in different sizes called form factors. All three must be compatible to work properly together.

CoolMax, CORSAIR, and Ultra are the most popular PSU makers but most are included with a computer purchase, so you only deal manufacturers when you replace the PSU.

5. 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.

A video card is a piece of computer hardware that's rectangular in shape with numerous contacts on the bottom of the card and one or more ports on the side for connection to video displays and other devices.

The video card installs in an expansion slot on the motherboard. While most video cards are of the PCIe format, they come in other formats as well, including PCI and AGP. These additional formats are older standards and don't communicate with the CPU and other components as quickly as PCIe.

In a desktop, since the motherboard, case, and expansion cards are designed with compatibility in mind, the side of the video card fits just outside the back of the case when installed, making its ports (e.g., HDMI, DVI, or VGA) available for use.

6. Hard Disk Drive (HDD)



The hard disk drive is the main, and usually most substantial, data storage hardware device in a computer. The operating system, software titles, and most other files are stored in the hard disk drive.

The hard drive is sometimes referred to as the "C drive" because Microsoft Windows, by default, designates the "C" drive letter to the primary partition on the primary hard drive in a computer.

While this isn't a technically correct term to use, it is still prevalent. For example, some computers have multiple drive letters (e.g., C, D, and E) representing areas across one or more hard drives. The hard disk drive also goes by the name HDD (its abbreviation), hard drive, hard disk, magnetic hard drive, mechanical hard drive, fixed drive, fixed disk, and fixed disk drive.

Regardless of what it's called, the primary hard drive typically contains the root folder of the operating system used.

7. 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.

Most electronics today are built around semiconductors and chips. A solid state drive uses, as its primary storage medium, semiconductors rather than the magnetic platters of a conventional hard drive.

8. Optical disk drive



Optical drives retrieve and/or store data on optical discs like CDs, DVDs, and BDs (Blu-ray discs), any of which hold *much* more information than previously available portable media options like the floppy disk.

The optical drive normally goes by other names like a *disc drive*, *ODD* (abbreviation), *CD drive*, *DVD drive*, or *BD drive*.

Some popular optical disc drive makers include LG, ASUS, Memorex, and NEC. In fact, one of these companies probably manufactured your computer or other device's optical drive, even though you never see their name anywhere on the drive itself.

NETWORKING & SYSTEM ADMINISTRATION LAB

Experiment No.:2

Name: Sreelakshmi R

Roll No:41

Batch: MCA-R S2B

Date:21-03-2022

Aim

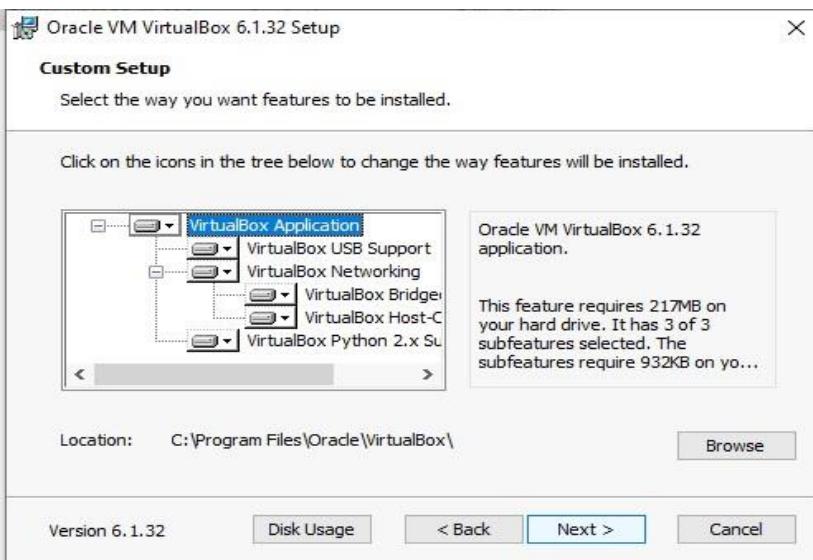
Install the latest version of Ubuntu on an Oracle VM VirtualBox.

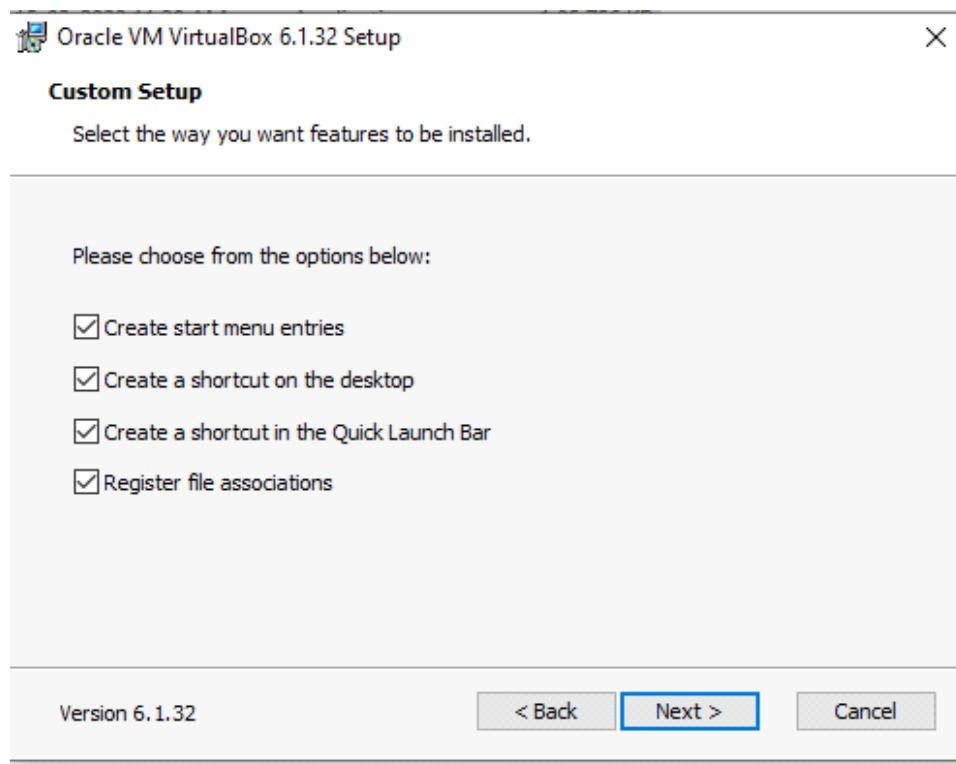
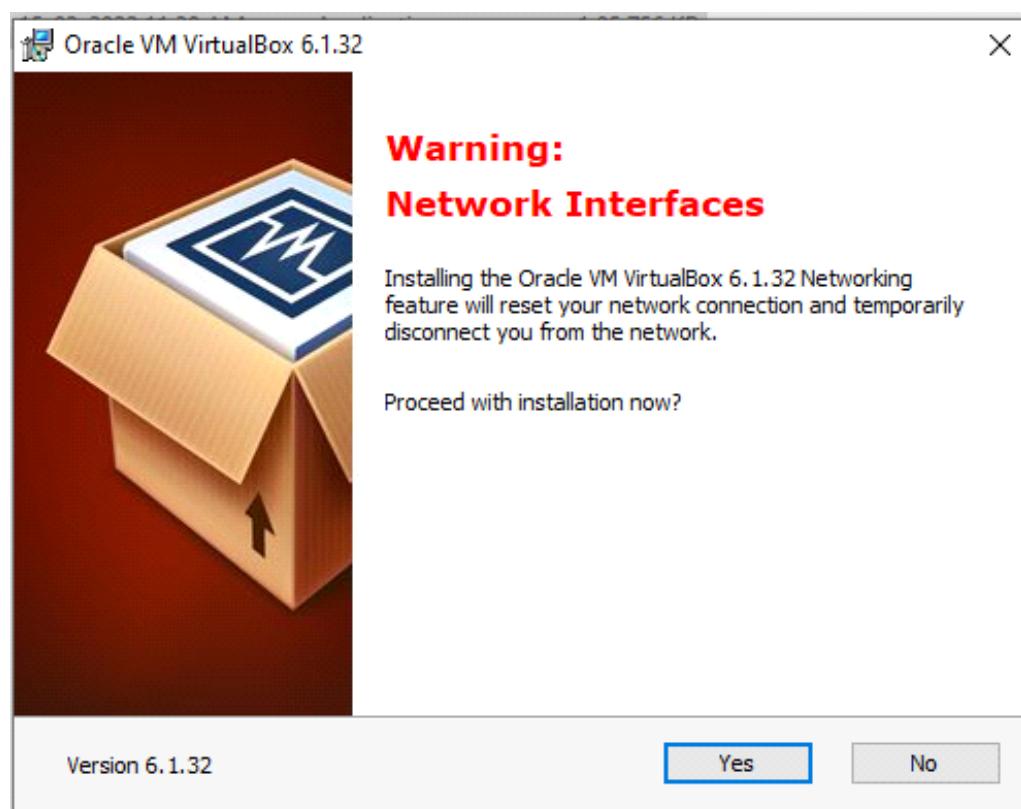
Procedure

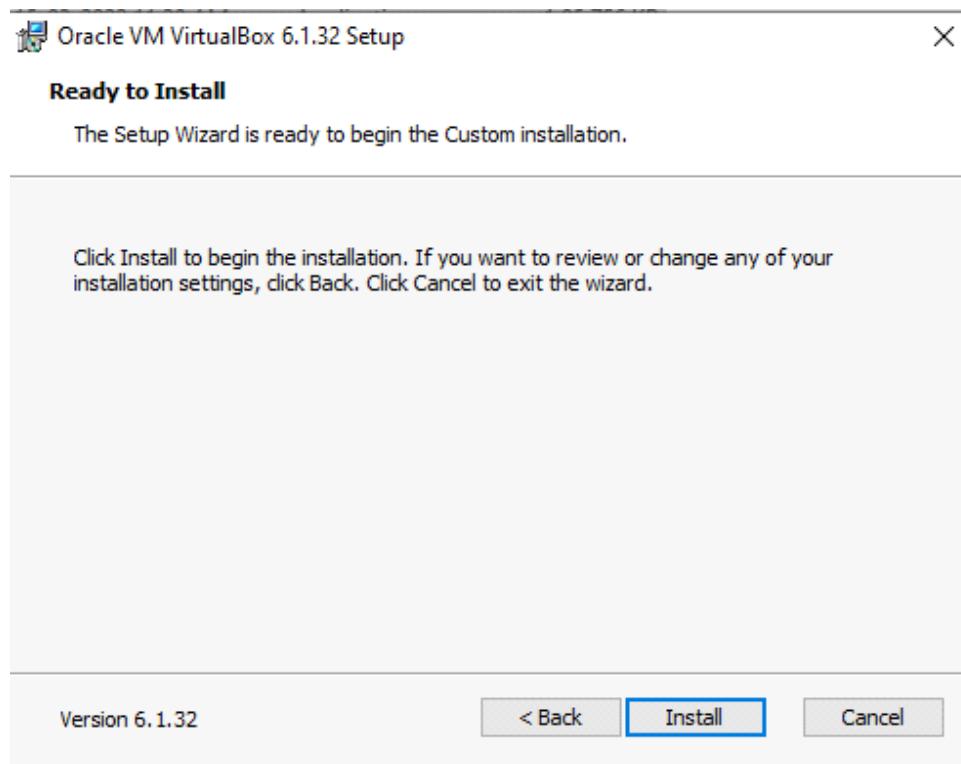
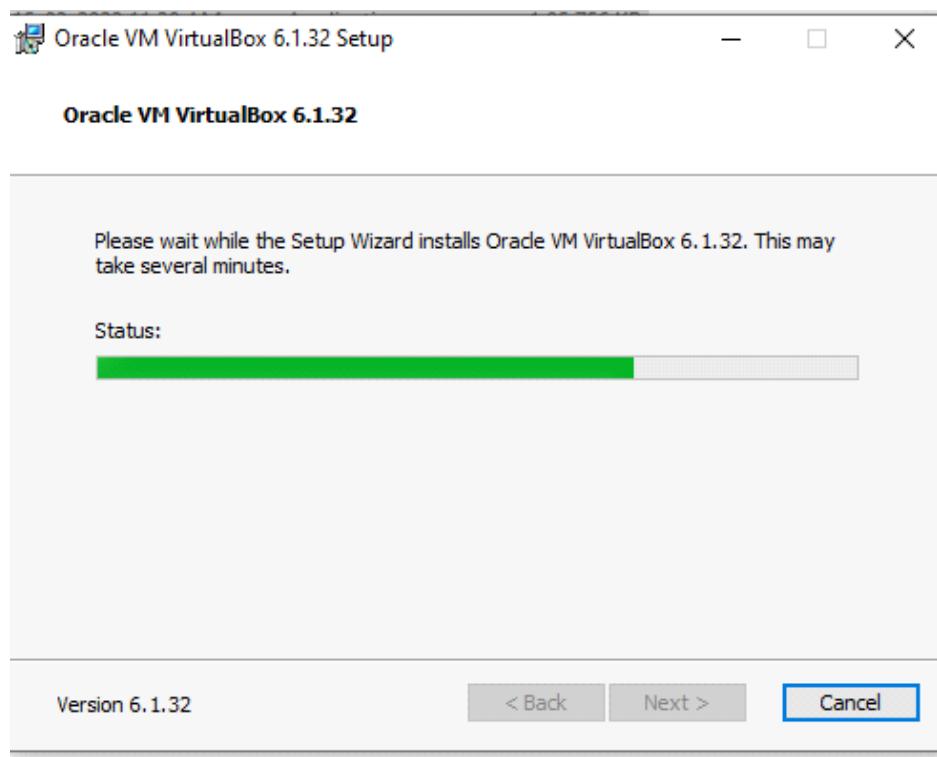
Step 1: Install VirtualBox, then click "Next".

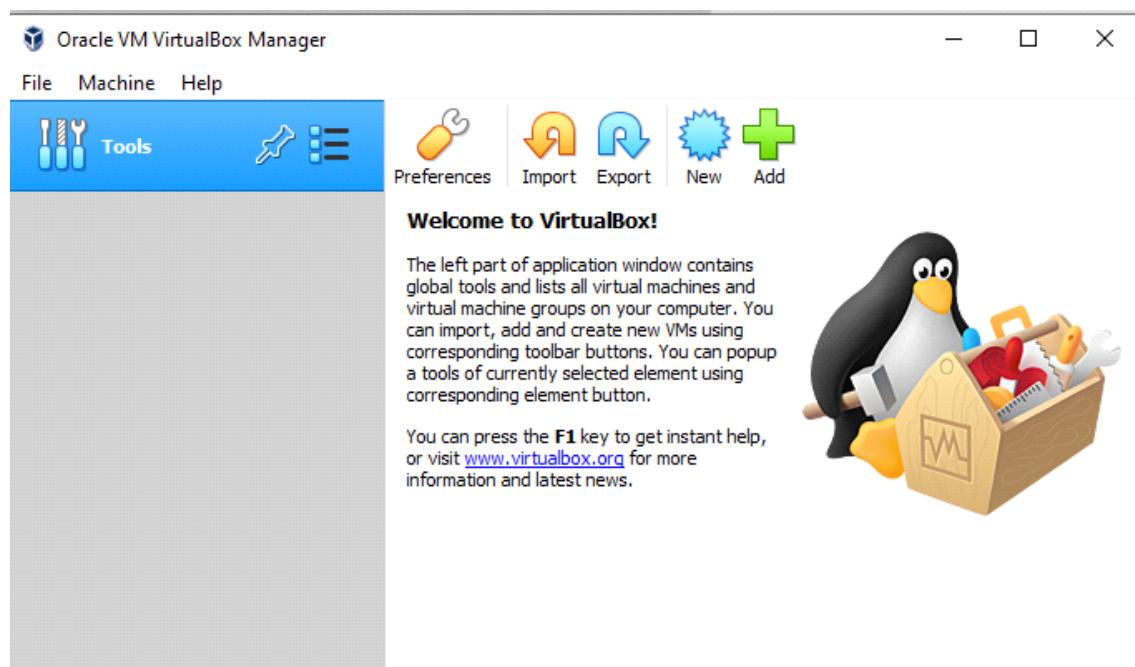


Step 2: Select features.

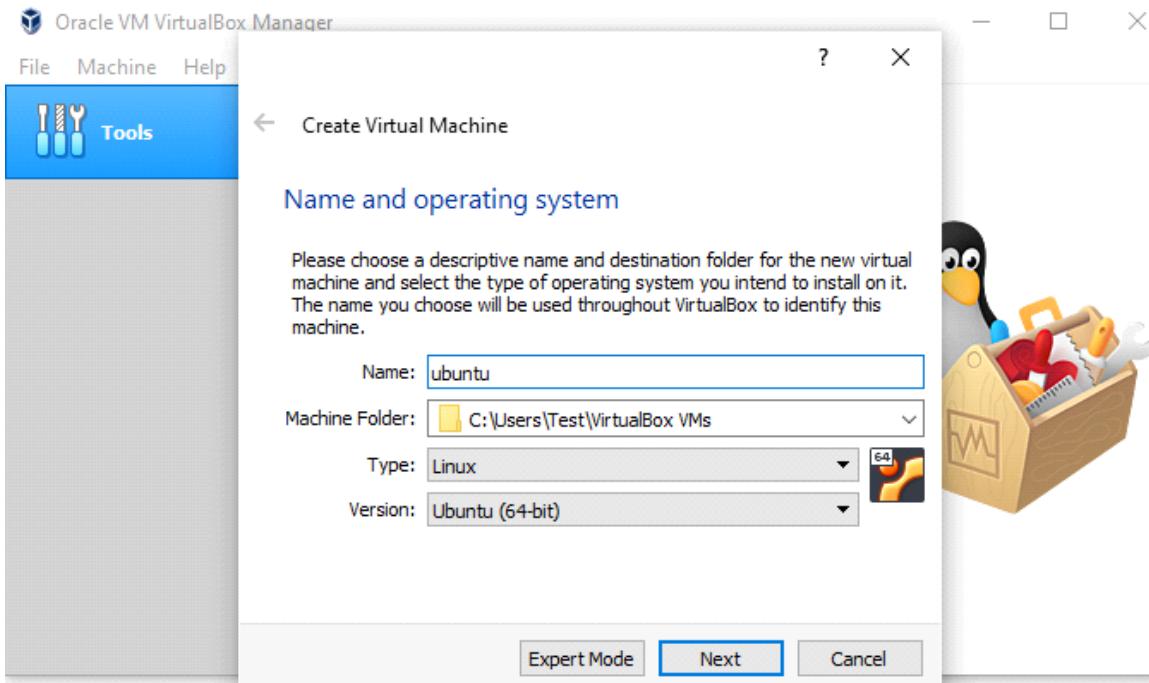


Step 3: Choose the options.**Step 4:** Proceeding installation.

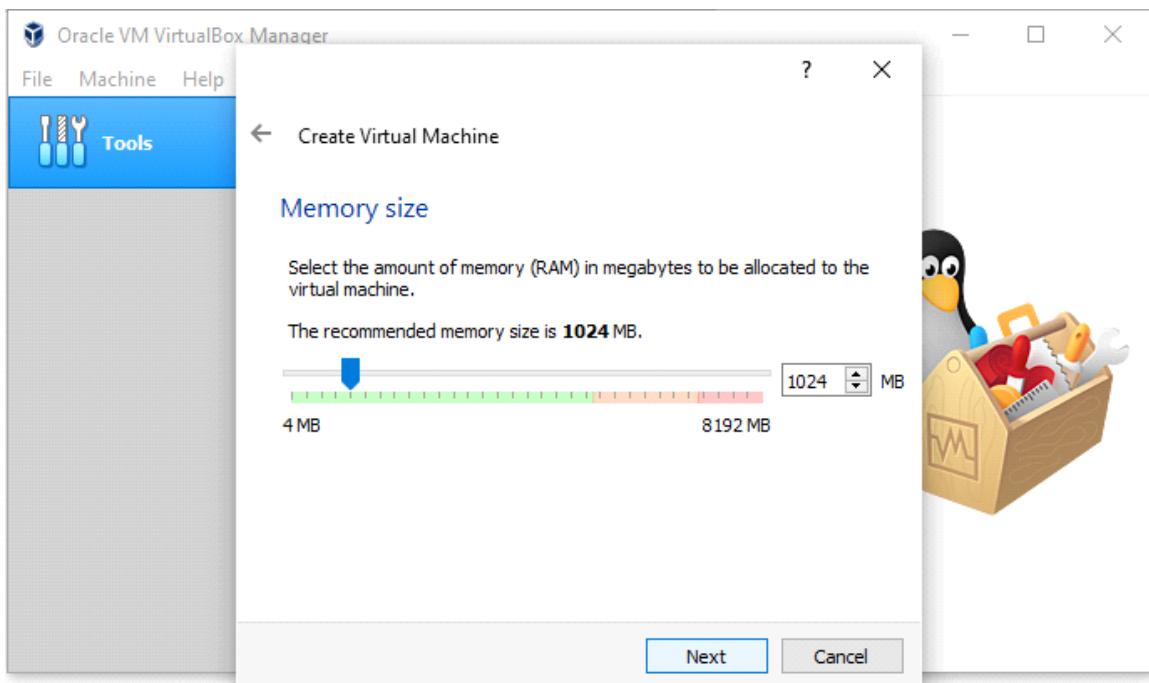
Step 5: Ready to install.**Step 6:** Installing the Oracle vm virtualBox.

Step 7: Installation finished.**Step 8:** Open VirtualBox, then click "New" to create a virtual machine.

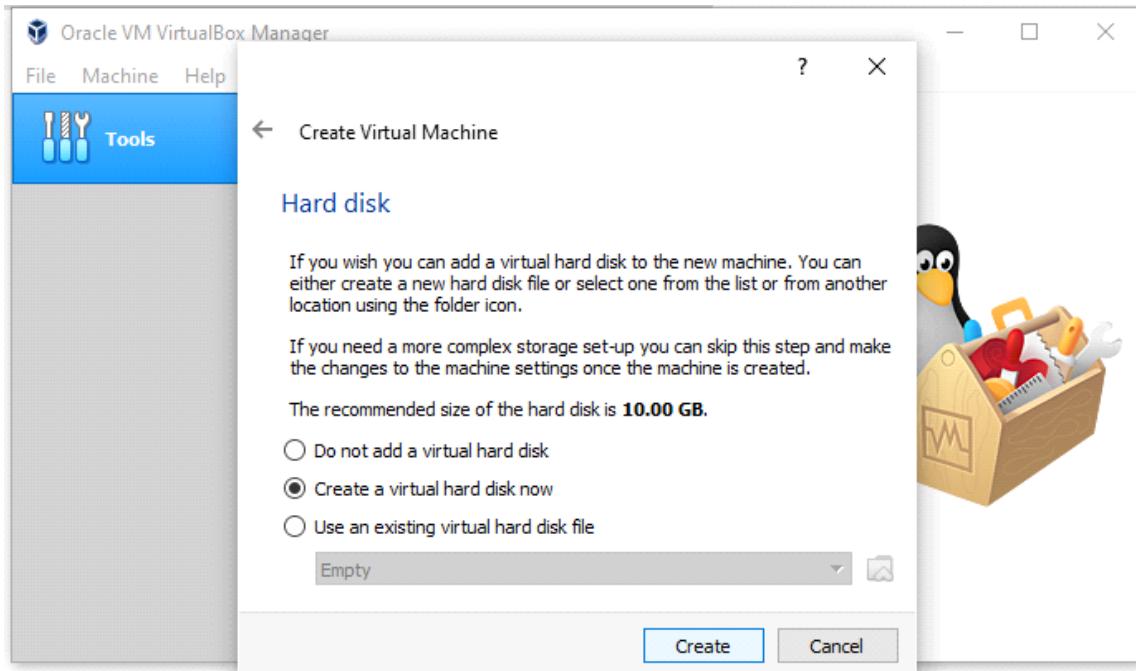
Step 9: Enter "Ubuntu" as the name, select "Linux" as the type, and select Ubuntu (64-bit) as the version. Select any amount of memory you wish, but don't add more than 50 percent of your total RAM.



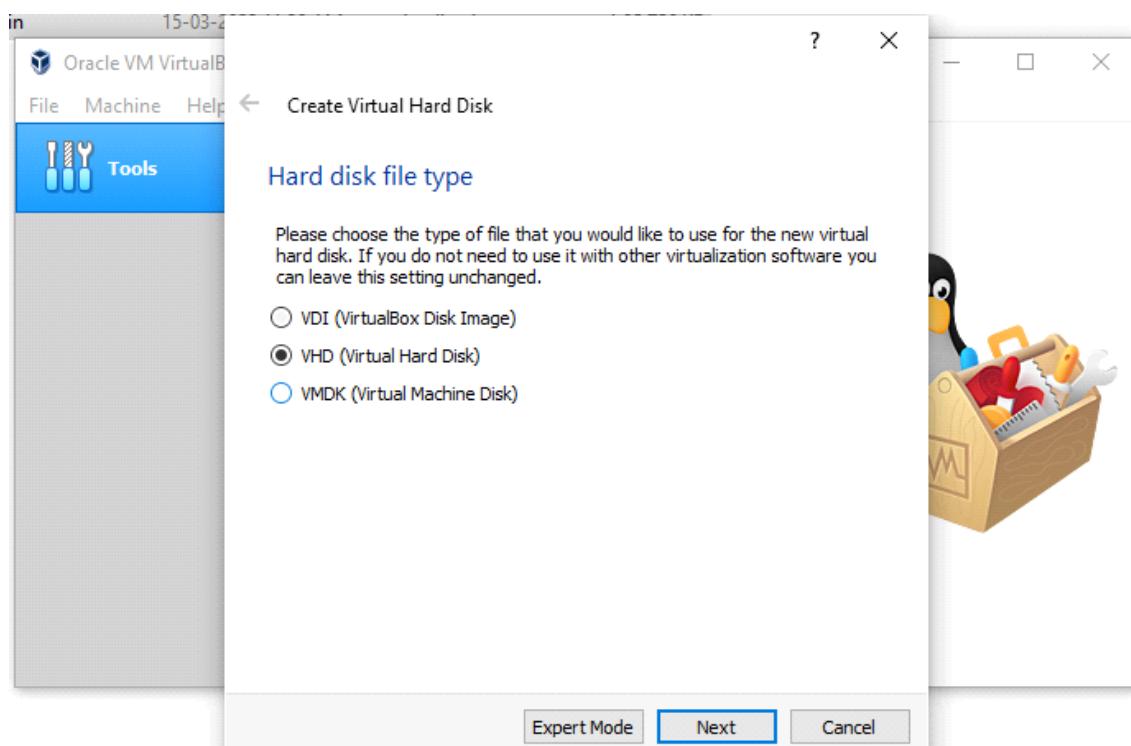
Step 10: We want to specify Memory size.



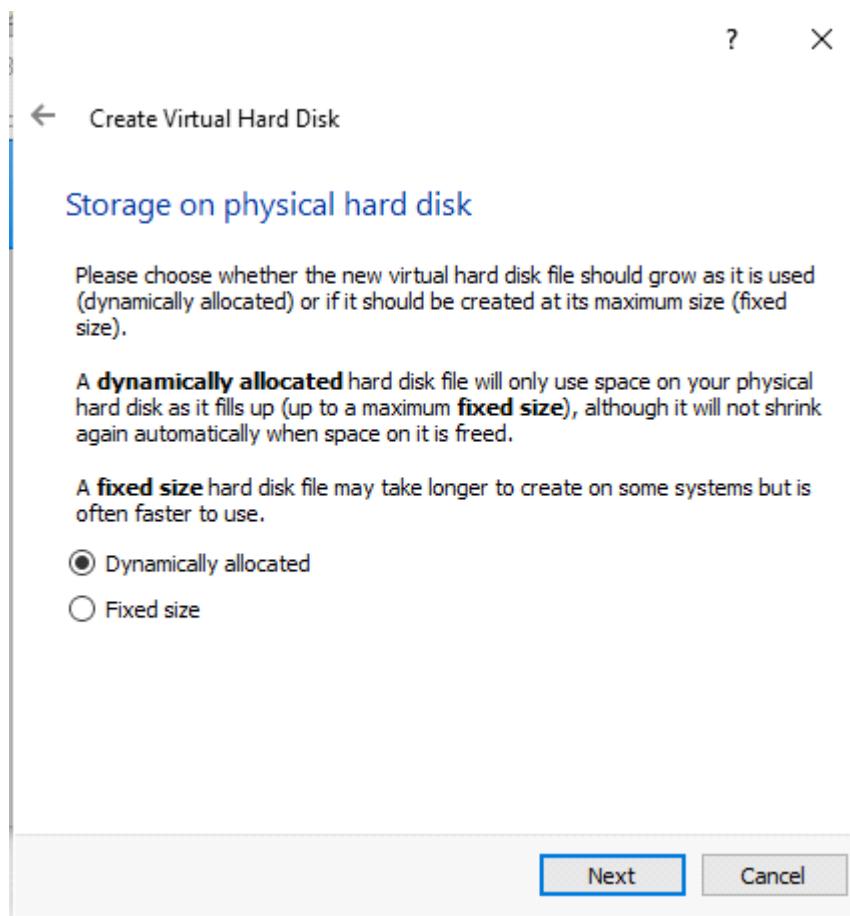
Step 11: Check the "Create a virtual hard disk now" option so we can later define our Ubuntu OS virtual hard disk size.



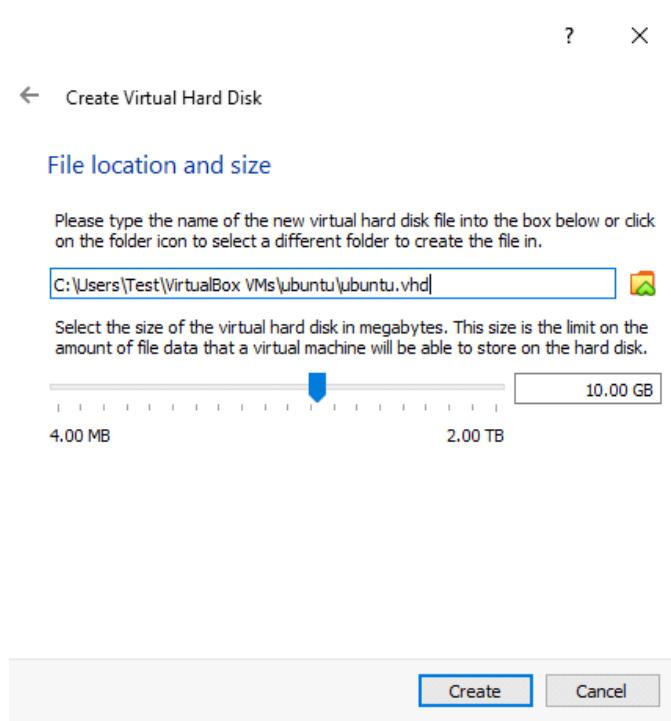
Step 12: Now, we want to select "VHD (Virtual Hard Disk)".



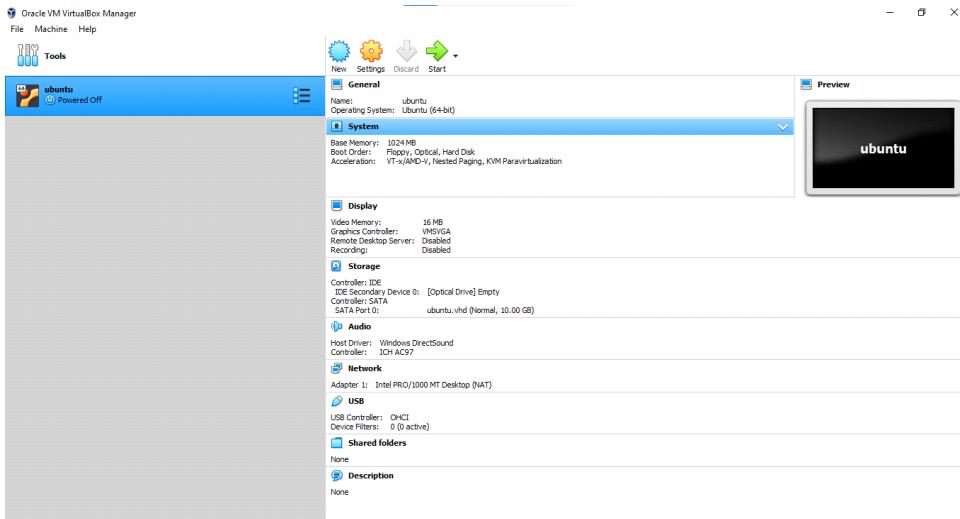
Step 13: Next, we'll dynamically allocate storage on our physical hard disk.



Step 14: We want to specify our Ubuntu OS's size. The recommended size is 10 GB, but you can increase the size if you wish.

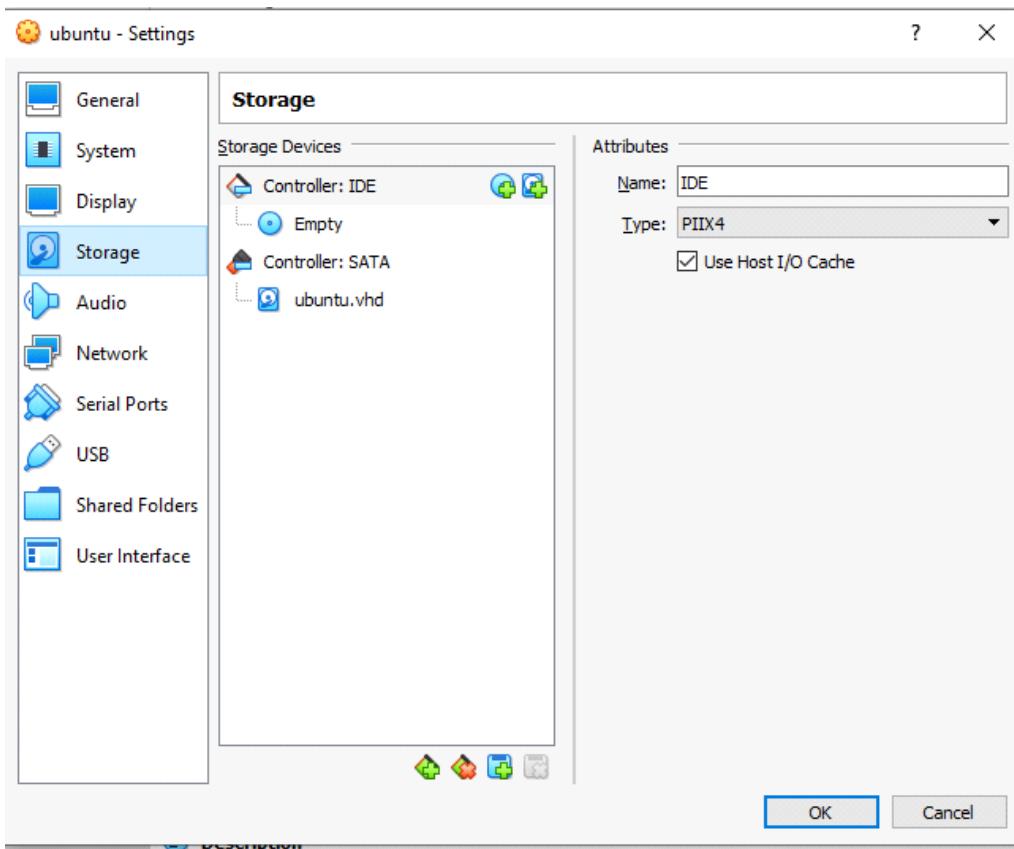


Step 15: After creating a virtual hard disk, you'll see Ubuntu in your dashboard.

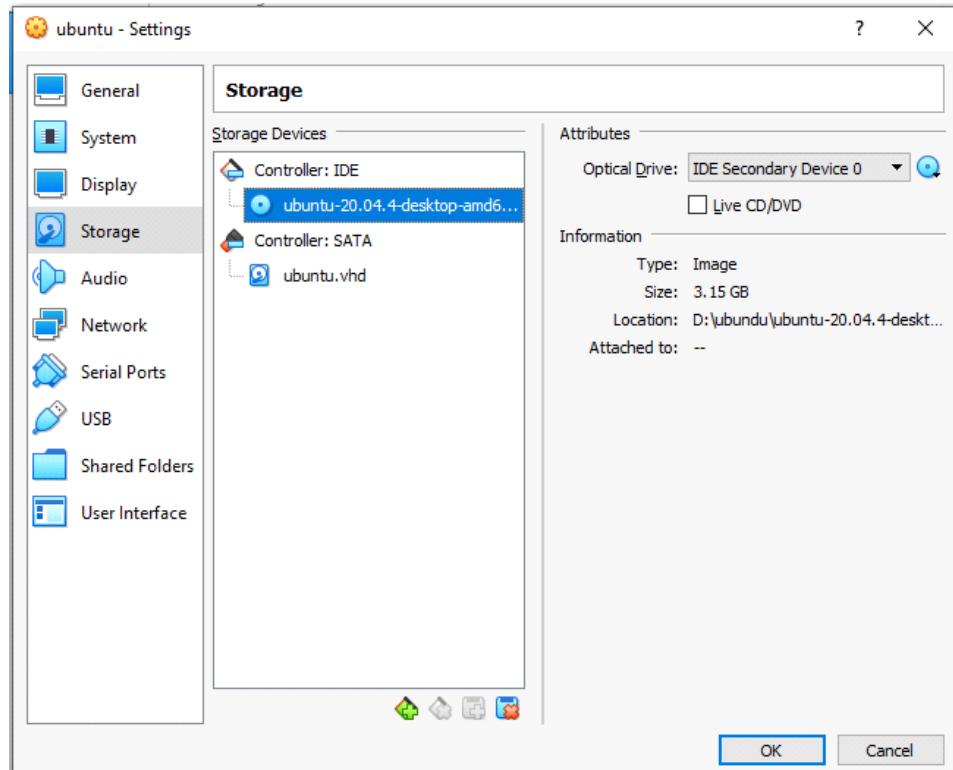


Step 16: Now, we have to set up the Ubuntu disk image file (.iso).

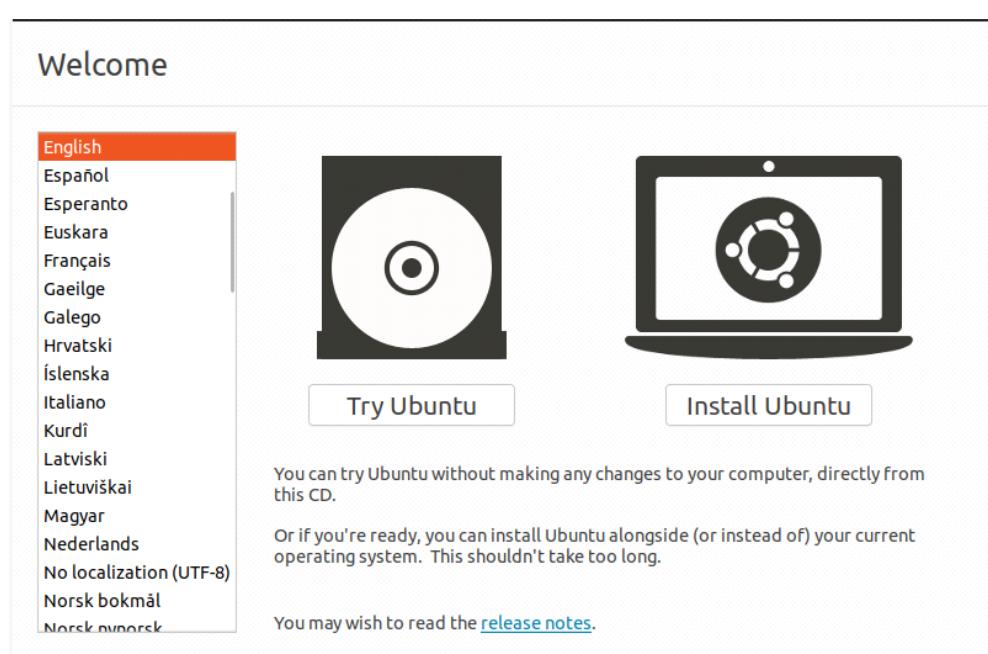
The Ubuntu disk image file can be downloaded here: [Ubuntu OS download](#)
To set up the Ubuntu disk image file, go to settings and follow these steps: Click "Storage".



Step 17: In storage devices, click "Empty", then click the disk image and "Choose Virtual Optical Disk File" and Select the Ubuntu disk image file and open it. Click OK. Your Ubuntu OS is ready to install in VirtualBox. Let's start!



Step 18: Click Install Ubuntu.



Step 19: Select your keyboard layout.

Keyboard layout

Choose your keyboard layout:

Dzongkha	English (UK)
English (Australian)	English (UK) - English (UK, Colemak)
English (Cameroon)	English (UK) - English (UK, Dvorak)
English (Ghana)	English (UK) - English (UK, Dvorak, with UK punctuation)
English (Nigeria)	English (UK) - English (UK, Macintosh)
English (South Africa)	English (UK) - English (UK, extended, with Win keys)
English (UK)	English (UK) - English (UK, intl., Macintosh)
English (US)	English (UK) - English (UK, intl., with dead keys)
Esperanto	English (UK) - Polish (British keyboard)
Estonian	
Faroese	
Filipino	
Finnish	

Type here to test your keyboard

Detect Keyboard Layout

Step 20: In the "Updates and other software" section, check "Normal installation" and continue.

Updates and other software

What apps would you like to install to start with?

Normal installation
Web browser, utilities, office software, games, and media players.

Minimal installation
Web browser and basic utilities.

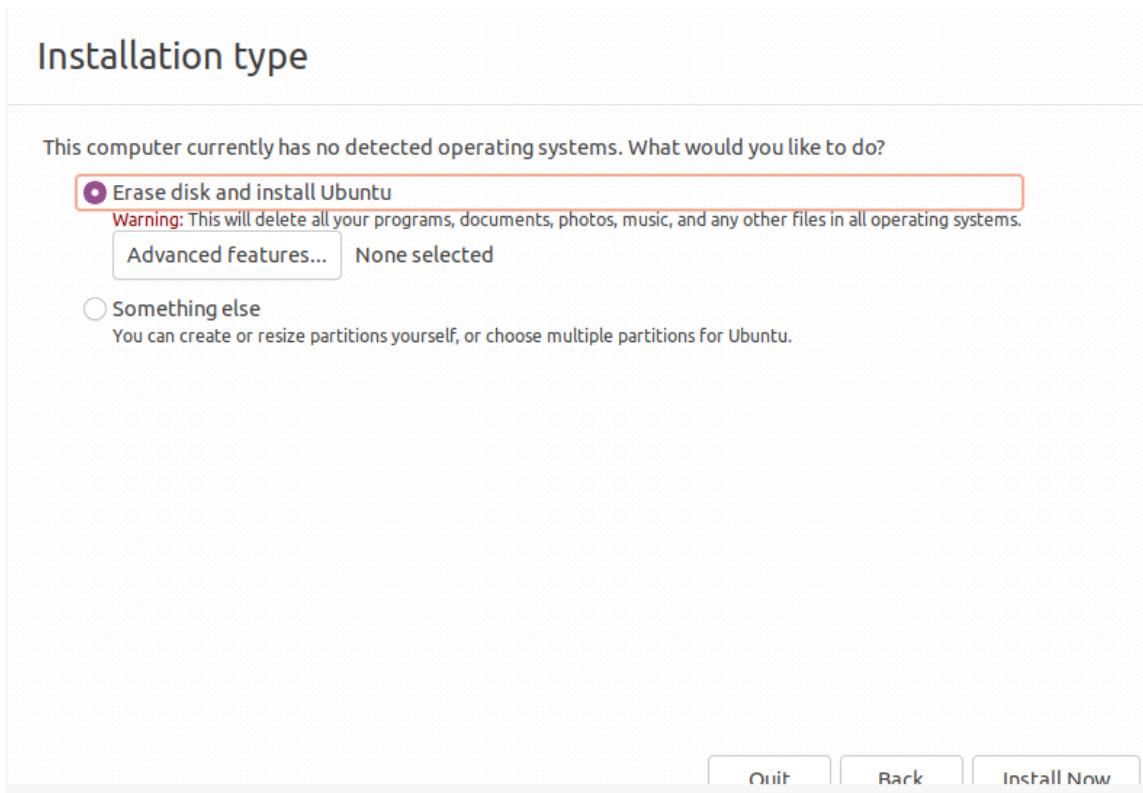
Other options

Download updates while installing Ubuntu
This saves time after installation.

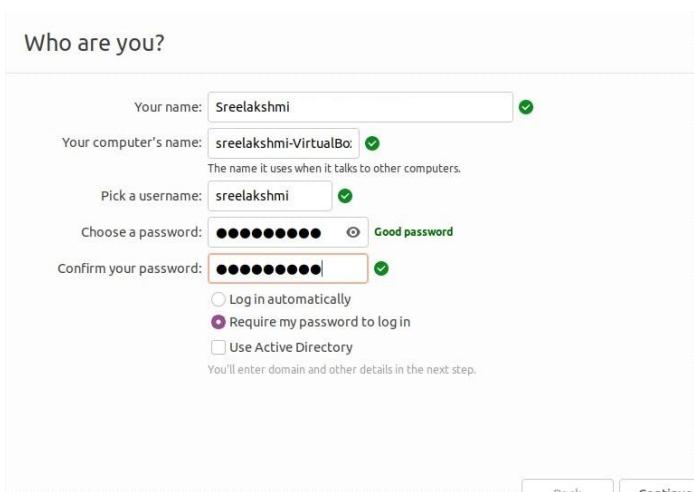
Install third-party software for graphics and Wi-Fi hardware and additional media formats
This software is subject to license terms included with its documentation. Some is proprietary.

Quit **Back** **Continue**

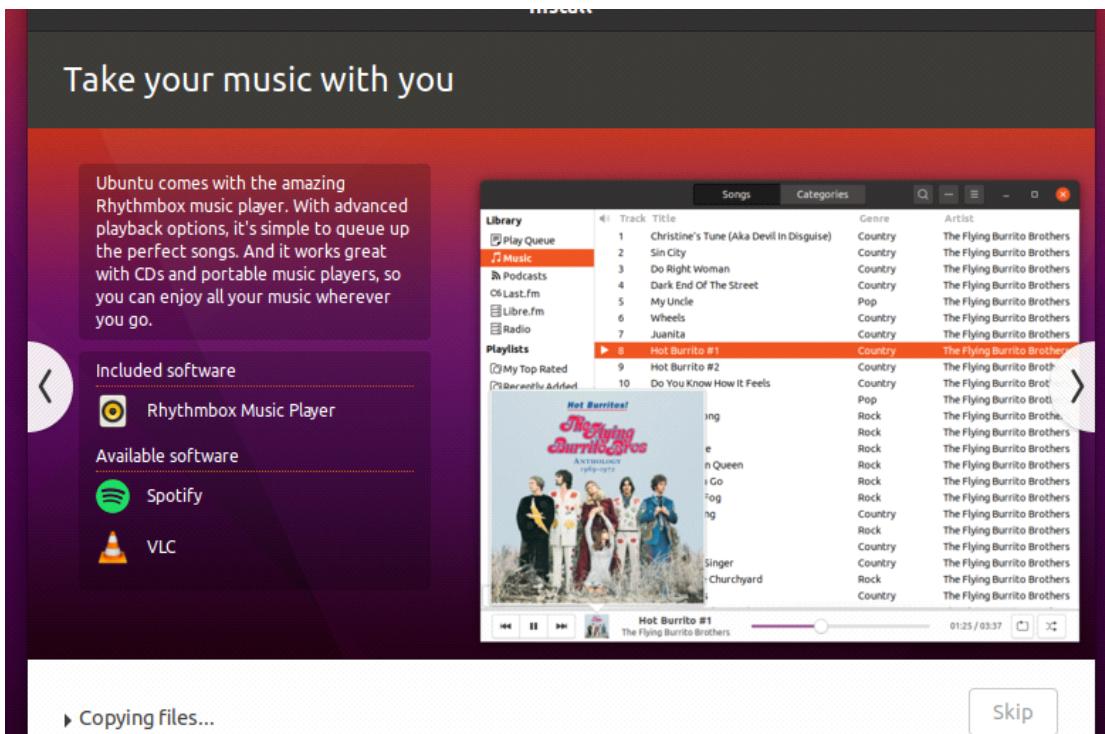
Step 21: In "Installation type", check "Erase disk and install Ubuntu" and Click "Continue".



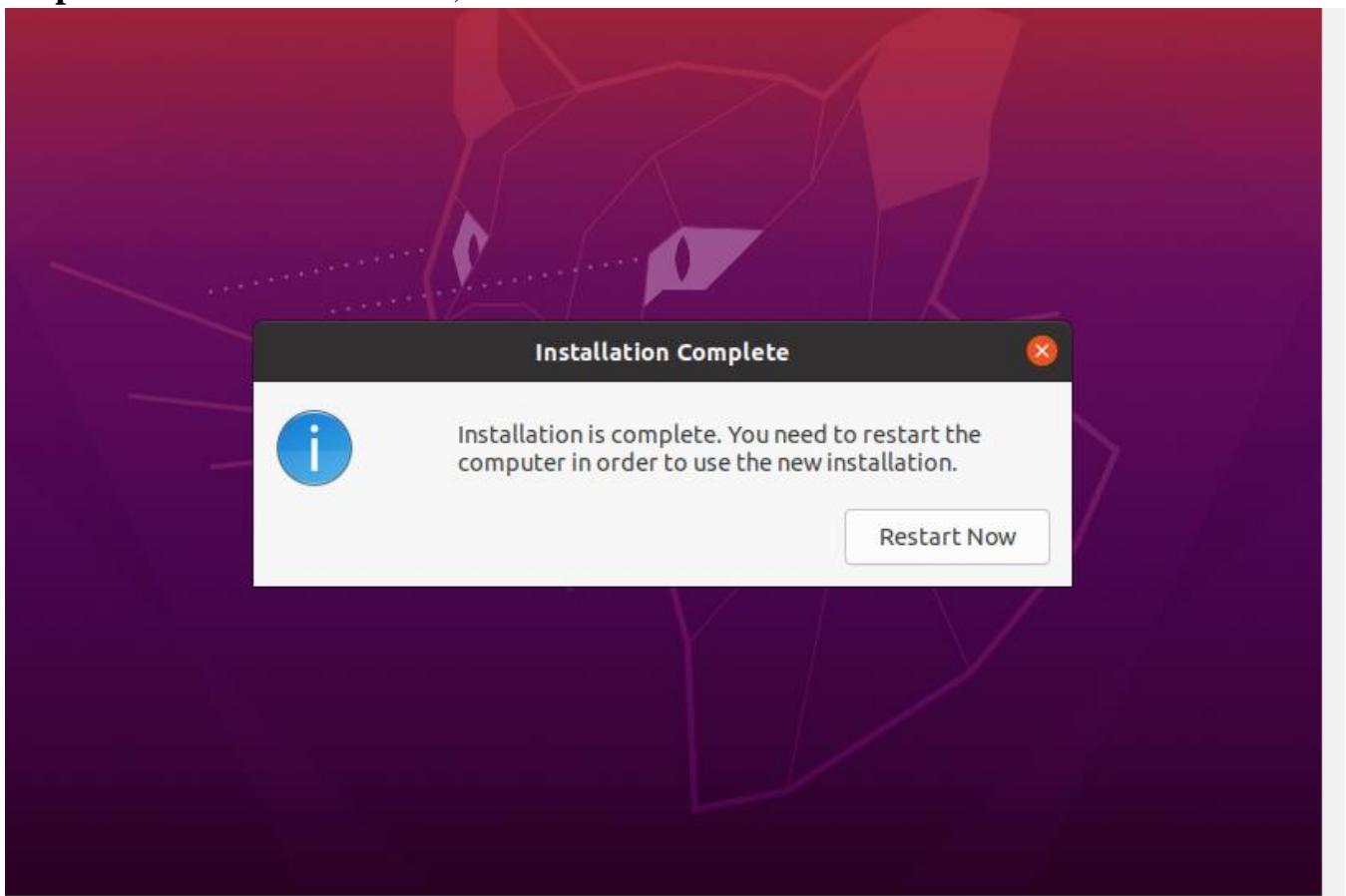
Step 22: Now, set up your profile.



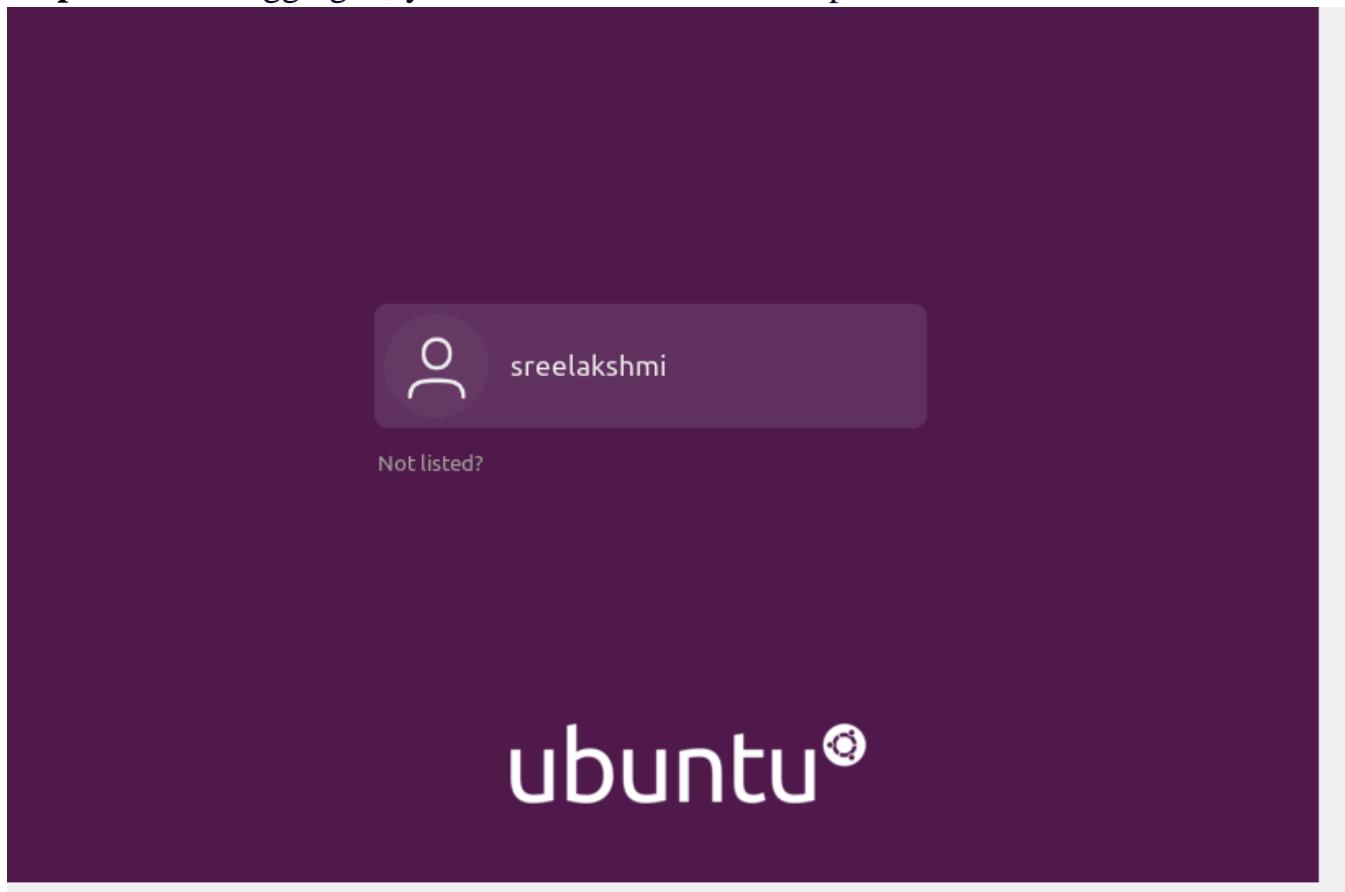
Step 23: You'll see Ubuntu installing.



Step 24: After the installation, restart it.



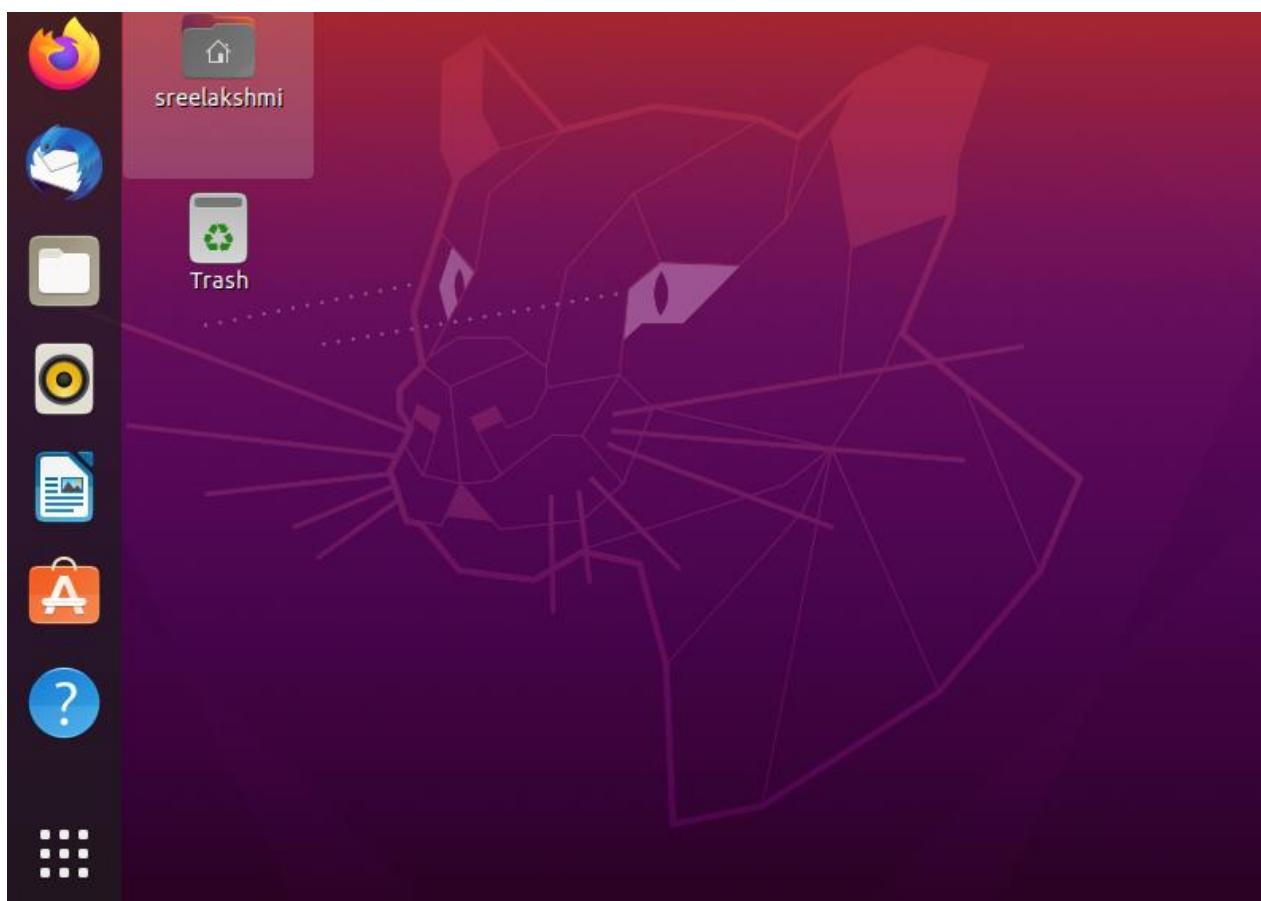
Step 25: After logging in, you'll see the Ubuntu desktop.



Step 26:

We have successfully installed Ubuntu in VirtualBox. It's ready to use for your future development projects.

Output Screenshot



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

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

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Roll No:41

Batch:MCA-R S2B

Date:24-03-2022

1. man
2. ls, echo, read
3. more, less, cat,
4. cd, mkdir, pwd, find
5. mv, cp, rm ,tar
6. wc, cut, paste
7. head, tail, grep, expr
- 8 chmod, chown
9. Redirections & Piping
10. useradd, usermod, userdel, passwd
11. df,top, ps
12. ssh, scp, ssh-keygen, ssh-copy-id

Procedure

1. Pwd - Print the Current working directory path, starting from the root.

```
$pwd
```

Output Screenshot

The screenshot shows a terminal window with a dark theme. At the top, there is a menu bar with options: File, Edit, View, Search, Terminal, Help. The title bar on the right says "student@S41: ~/sree". The main area of the terminal shows the command "student@S41:~\$ pwd" followed by the output "/home/student".

```
student@S41: ~$ pwd
/home/student
```

2. Mkdir - Allow users to create or make a new directories.

```
$mkdir sree
$pwd
```

Output Screenshot

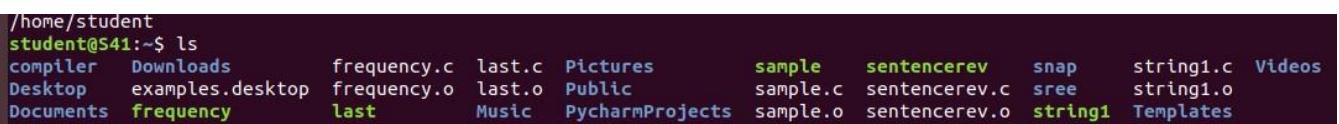


```
student@s41:~$ mkdir sree
student@s41:~$ pwd
/home/student
```

3. ls - The command used to list files or directories in linux based operating system.

```
$ls
```

Output Screenshot

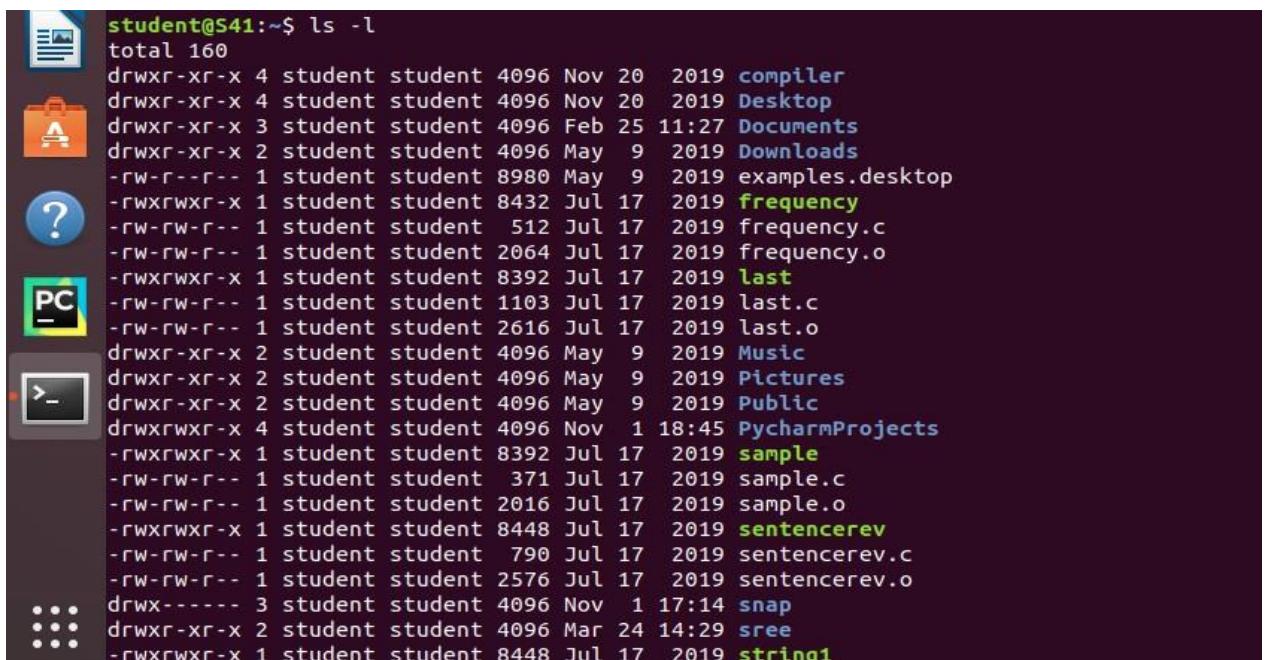


```
/home/student
student@s41:~$ ls
compiler  Downloads      frequency.c  last.c  Pictures       sample  sentencerev  snap    string1.c  Videos
Desktop   examples.desktop frequency.o  last.o  Public        sample.c sentencerev.c sree   string1.o
Documents  frequency     last         Music   PycharmProjects sample.o sentencerev.o string1  Templates
```

3.1 ls -l - It is used to list information about files and directories with in the file system.

```
$ls -l
```

Output Screenshot



```
student@s41:~$ ls -l
total 160
drwxr-xr-x 4 student student 4096 Nov 20 2019 compiler
drwxr-xr-x 4 student student 4096 Nov 20 2019 Desktop
drwxr-xr-x 3 student student 4096 Feb 25 11:27 Documents
drwxr-xr-x 2 student student 4096 May  9 2019 Downloads
-rw-r--r-- 1 student student 8980 May  9 2019 examples.desktop
-rwxrwxr-x 1 student student 8432 Jul 17 2019 frequency
-rw-rw-r-- 1 student student 512 Jul 17 2019 frequency.c
-rw-rw-r-- 1 student student 2064 Jul 17 2019 frequency.o
-rwxrwxr-x 1 student student 8392 Jul 17 2019 last
-rw-rw-r-- 1 student student 1103 Jul 17 2019 last.c
-rw-rw-r-- 1 student student 2616 Jul 17 2019 last.o
drwxr-xr-x 2 student student 4096 May  9 2019 Music
drwxr-xr-x 2 student student 4096 May  9 2019 Pictures
drwxr-xr-x 2 student student 4096 May  9 2019 Public
drwxrwxr-x 4 student student 4096 Nov  1 18:45 PycharmProjects
-rwxrwxr-x 1 student student 8392 Jul 17 2019 sample
-rw-rw-r-- 1 student student 371 Jul 17 2019 sample.c
-rw-rw-r-- 1 student student 2016 Jul 17 2019 sample.o
-rwxrwxr-x 1 student student 8448 Jul 17 2019 sentencerev
-rw-rw-r-- 1 student student 790 Jul 17 2019 sentencerev.c
-rw-rw-r-- 1 student student 2576 Jul 17 2019 sentencerev.o
drwx----- 3 student student 4096 Nov  1 17:14 snap
drwxr-xr-x 2 student student 4096 Mar 24 14:29 sree
-rwxrwxr-x 1 student student 8448 Jul 17 2019 string1
```

3.2 ls -R - The ls command list the files inside a folder.

\$ls -R

Output Screenshot

```
student@S41:~$ ls -R
.:
compiler  Downloads      frequency.c  last.c  Pictures      sample    sentencerev   snap    string1.c  Videos
Desktop   examples.desktop frequency.o  last.o  Public       sample.o  sentencerev.c  sree   string1.o
Documents  frequency      last        Music   PycharmProjects sample.o  sentencerev.o  string1  Templates

./compiler:
avg  avg.c  avg.o  bin  compiler.cbp  compiler.depend  compiler.layout  obj  recog.c  spcount.c  'struct node.c'  Untitled2

./compiler/bin:
Debug

./compiler/bin/Debug:
compiler

./compiler/obj:
Debug

./compiler/obj/Debug:
recog.o  spcount.o

./Desktop:
exam  princy

./Desktop/exam:
count.c  newsum  newsum.c  newsum.o  q1.py  quadrant  quadrant.c  quadrant.o  sum  sum.c  sum.o

./Desktop/princy:
matrix  matrix.c  matrix.o
```

3.3 ls -a - The command will enlist the whole list of the current directory including the hidden files.

\$ls -a

Output Screenshot

```
student@S41:~$ ls -a
.          compiler  examples.desktop  .ICEauthority  last.o  .profile      sample.c    snap    string1.o
..         .config   frequency        .idlerc     .local    Public       sample.o    sree   Templates
.bash_logout  Desktop  frequency.c   .java      .mozilla  .PyCharmCE2019.2  sentencerev  .ssh   .thunderbird
.bashrc      Documents frequency.o   last       Music    PycharmProjects  sentencerev.c  string1  Videos
.cache       Downloads .gnupg        last.c     Pictures  sample    sentencerev.o  String1.c
```

3.4 ls -al - Is used on linux operating systems to list information about files.

\$ls -al

Output Screenshot

```
student@s41:~$ ls -al
total 224
drwxr-xr-x 24 student student 4096 Mar 24 14:29 .
drwxr-xr-x  7 root    root   4096 Jan 13 14:39 ..
-rw-r--r--  1 student student 220 May  9 2019 .bash_logout
-rw-r--r--  1 student student 3771 May  9 2019 .bashrc
drwx----- 15 student student 4096 May 10 2019 .cache
drwxr-xr-x  4 student student 4096 Nov 20 2019 compiler
drwxr-xr-x  16 student student 4096 Jul 17 2019 .config
drwxr-xr-x  4 student student 4096 Nov 20 2019 Desktop
drwxr-xr-x  3 student student 4096 Feb 25 11:27 Documents
drwxr-xr-x  2 student student 4096 May  9 2019 Downloads
-rw-r--r--  1 student student 8980 May  9 2019 examples.desktop
-rwxrwxr-x  1 student student 8432 Jul 17 2019 frequency
-rw-rw-r--  1 student student 512 Jul 17 2019 frequency.c
-rw-rw-r--  1 student student 2064 Jul 17 2019 frequency.o
drwx-----  3 student student 4096 May 10 2019 .gnupg
-rw-----  1 student student 3366 Mar 24 2022 .ICEauthority
drwxrwxr-x  2 student student 4096 May 10 2019 .idlerc
drwxrwxr-x  4 student student 4096 Nov  1 17:15 .java
-rwxrwxr-x  1 student student 8392 Jul 17 2019 last
-rw-rw-r--  1 student student 1103 Jul 17 2019 last.c
-rw-rw-r--  1 student student 2616 Jul 17 2019 last.o
drwx-----  3 student student 4096 May  9 2019 .local
drwx-----  5 student student 4096 May 10 2019 .mozilla
drwxr-xr-x  2 student student 4096 May  9 2019 Music
drwxr-xr-x  2 student student 4096 May  9 2019 Pictures
-rw-r--r--  1 student student  807 May  9 2019 .profile
drwxr-xr-x  2 student student 4096 May  9 2019 Public
```

3.5 ls -t - It sorts the file by modification time, showing the last edited file first.

\$ls -t

Output Screenshot

```
student@s41:~$ ls -t
drwx-----  2 student student 4096 May  9 2019 Templates
drwxr-xr-x  4 student student 4096 May 10 2019 .thunderbird
drwxr-xr-x  2 student student 4096 May  9 2019 Videos
student@s41:~$ ls -t
sree      snap     last.c  sentencerev  sample    sample.c  string1  Downloads  Public   examples.desktop
Documents  compiler  last   sentencerev.o sample.o  frequency  string1.o  Music    Templates
PycharmProjects Desktop last.o  sentencerev.c frequency.c frequency.o string1.c Pictures  Videos
```

4.cd -Change the current working directory.

\$cd sree

Output Screenshot

```
student@s41:~$ cd sree
student@s41:~/sree$ cd ..
```

5.cd.. -Move to the previous directory.

```
$cd..
```

Output Screenshot

```
student@s41:~$ cd sree  
student@s41:~/sree$ cd ..  
student@s41:~$
```

6.cd- - Traverse the previous directory.

```
$cd-
```

Output Screenshot

```
student@s41:~$ cd -  
/home/student/sree
```

7.cat -Create a new file and add content to the file.

```
$cat > a.txt
```

Output Screenshot

```
/home/student/sree$  
student@s41:~/sree$ cat > a.txt  
network system administration  
^Z  
[1]+  stopped                  cat > a.txt
```

8.cat filename -for viewing the file

```
$cat a.txt
```

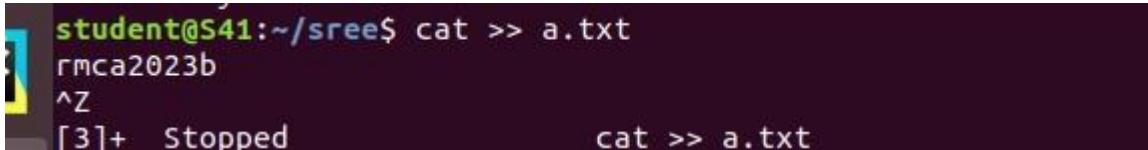
Output Screenshot

```
student@s41:~/sree$ cat a.txt  
network system administration  
student@s41:~/sree$ cat >> a.txt
```

9.cat >> filename- For adding additional information to that file.

```
$cat >> a.txt
```

Output Screenshot



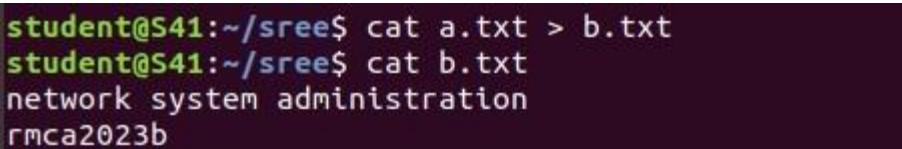
```
student@s41:~/sree$ cat >> a.txt
rmca2023b
^Z
[3]+  Stopped                  cat >> a.txt
```

10.cat file1 > file2 - To copy file content of one file to another file.

```
$cat a.txt > b.txt
```

11. \$cat b.txt - To put the line numbers.

Output Screenshot



```
student@s41:~/sree$ cat a.txt > b.txt
student@s41:~/sree$ cat b.txt
network system administration
rmca2023b
```

NETWORKING & SYSTEM ADMINISTRATION LAB

Procedure

1. Cat > filename - Create a new file and add content to that file.

```
$cat > b1.txt
```

Name: Sreelakshmi.R

Roll No:41

Batch:MCA S2B

Date:30-3-2022

Output Screenshot

```
File Edit View Search Terminal Help
student@s41:~$ mkdir sree
student@s41:~$ cd sree
student@s41:~/sree$ cat > b1.txt
Familirisation of Linux commands
Cat having different options
new file
adding content
^Z
[1]+  Stopped                  cat > b1.txt
```

2. Cat >> filename - For additional information to that file.

```
$cat >> b1.txt
```

Output Screenshot

```
student@s41:~/sree$ cat>>b1.txt
append some contents
^Z
[2]+  Stopped                  cat >> b1.txt
```

3. Cat filename- To put the line numbers.

```
$cat b1.txt
```

Output Screenshot

```
student@s41:~/sree$ cat b1.txt
Familirisation of Linux commands
Cat having different options
new file
adding content
append some contents
```

4. Cat file1 > file2 - To copy file content of one file to another file.

```
$cat b1.txt > b2.txt  
$cat b2.txt
```

Output Screenshot

```
student@s41:~/sree$ cat b1.txt>b2.txt  
student@s41:~/sree$ cat b2.txt  
Familirisation of Linux commands  
Cat having different options  
new file  
adding content  
append some contents
```

5. Cat –n filename - Content with line number.

```
$cat -n b1.txt
```

Output Screenshot

```
student@s41:~/sree$ cat -n b1.txt  
1 Familirisation of Linux commands  
2 Cat having different options  
3 new file  
4 adding content  
5 append some contents
```

6. Cat –b filename - Removing empty file and reordering the line number.

```
$cat -b b1.txt
```

Output Screenshot

```
student@s41:~/sree$ cat -b b1.txt  
1 Familirisation of Linux commands  
2 Cat having different options  
3 new file  
4 adding content  
5 append some contents
```

7. Touch - Is used to create an empty file.

```
$touch b3.txt
```

Output Screenshot



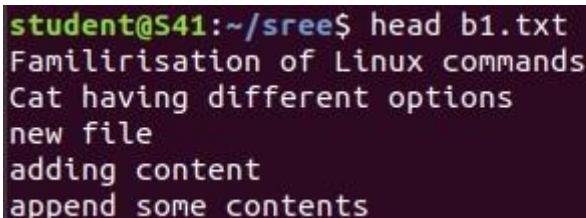
```
student@s41:~/sree$ touch b3.txt
student@s41:~/sree$ remove empty files

student@s41:~/sree$ echo hai this is a demo of touch command >>b3.txt
student@s41:~/sree$ cat b3.txt
hai this is a demo of touch command
```

8. head filename - Display first 10 commands on the file.

```
$head b1.txt
```

Output Screenshot

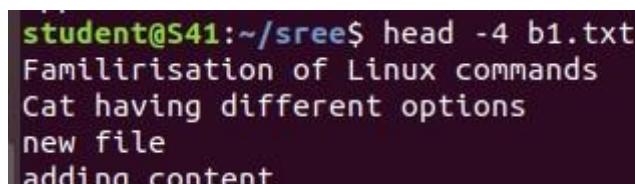


```
student@s41:~/sree$ head b1.txt
Familirisation of Linux commands
Cat having different options
new file
adding content
append some contents
```

9. head -4 filename - Display first 4 commands on the file.

```
$head -4 b1.txt
```

Output Screenshot

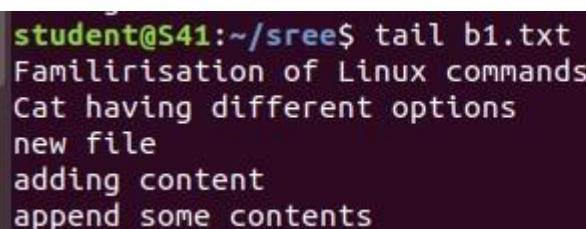


```
student@s41:~/sree$ head -4 b1.txt
Familirisation of Linux commands
Cat having different options
new file
adding content
```

10. tail filename - Display last 10 commands of the file.

```
$tail b1.txt
```

Output Screenshot



```
student@s41:~/sree$ tail b1.txt
Familirisation of Linux commands
Cat having different options
new file
adding content
append some contents
```

11. tail -3 filename - Last 3 lines are displayed.

```
$tail -3 b1.txt
```

Output Screenshot

```
student@s41:~/sree$ tail -3 b1.txt
new file
adding content
append some contents
```

12. Cat > filename - Create a new file and add content to that file.

```
$cat > b5.txt
```

Output Screenshot

```
student@s41:~/sree$ cat > b6.txt
english-45
maths-67
hindi-90
^Z
[4]+  Stopped                  cat > b6.txt
```

13. Cut - Cutting sections from each line of a file.

```
$cut -d- -f2 b5.txt
```

Output Screenshot

```
student@s41:~/sree$ cut -d- -f2 b6.txt
45
67
90
```

```
$cut -d- -f1 b5.txt
```

Output Screenshot

```
student@s41:~/sree$ cut -d- -f1 b6.txt
english
maths
hindi
```

14. Cat > filename - Create a new file and add content to that file.

```
$cat > marvel1
```

Output Screenshot

```
student@S41:~/sree$ cat > marvel1
captain america
hulk
thanos
groot
alladin
^Z
[5]+ Stopped                  cat > marvel1
```

15.Cat > filename - Create a new file and add content to that file.

```
$cat > marvel2
```

Output Screenshot

```
[5]+ Stopped                  cat > marvel2
student@S41:~/sree$ cat > marvel2
anna
gamora
nibulla
^Z
[6]+ Stopped                  cat > marvel2
```

16.Paste- join files horizontally by outputting lines consisting of lines from each file Specified, separated by tab as delimiter, to the standard output.

```
$paste marvel1 marvel2
```

Output Screenshot

```
student@S41:~/sree$ paste marvel1 marvel2
captain america anna
hulk      gamora
thanos   nibulla
groot
alladin
```

17. \$paste marvel1 marvel2 > marvel3

```
$cat marvel3
```

Output Screenshot

```
student@S41:~/sree$ paste marvel1 marvel2 > marvel3
student@S41:~/sree$ cat marvel3
captain america anna
hulk      gamora
thanos   nibulla
groot
alladin
```

```
18.$paste -d '-' marvell marvel2
```

Output Screenshot

```
student@s41:~/sree$ paste -d '-' marvel1 marvel2
captain america-anna
hulk-gamora
thanos-nibulla
groot-
alladin -
```

```
19.$paste -d '%' marvell1 marvel2 marvel3
```

Output Screenshot

```
student@s41:~/sree$ paste -d '%' marvel1 marvel2 marvel3
captain america%anna|captain america      anna
hulk%gamora|hulk          gamora
thanos%nibulla|thanos    nibulla
groot%|groot
alladin %|alladin
```

20.\$paste -s marvell1 marvel2

Output Screenshot

```
student@s41:~/sree$ paste -s marvel1 marvel2  
captain america hulk thanos groot alladin  
anna gamora nibulla
```

21. Cat > demo2

Output Screenshot

22. More demo2

Output Screenshot

23. More -3 demo2

Output Screenshot

Another application of more is to use it with some other command after a pipe. When the output is large, we can use more command to see output one by one.

```
student@S41:~/sree$ more -3 demo2
more command is used to view the text files in the command prompt, displaying one screen at a time in case the file is large (For example log files). The more command also allows the user do scroll up and down through the page. The syntax along with options and command is as follows.
[8]+ Stopped                  more -3 demo2
--More--(10%)
```

24. More +3 demo2

Output Screenshot

can execute queries, retrieve data, insert or delete records, create tables or stored procedures in a database, and so on. SQL is the most adaptable niche in the market. Switching the job once you enter in IT industry is not a big deal. The hardest part is in the beginning. But most of the students who are going to begin their career in the database using SQL must be looking for top high paying jobs in database or SQL related profiles. Read on to know about the various profiles associated with SQL or database.

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25.More –s demo2

Output Screenshot

NETWORKING & SYSTEM ADMINISTRATION LAB

Name: SREELAKSHMI R

Roll No: 41

Batch: RMCA S2B

Date: 04/04/2022

Procedure

1. **cp** cp means copy. 'cp' command is used to copy a file or a directory.

Syntax :- \$ cp filename1 filenme2

Output :-

```
student@S41:~/sreelakshmi$ cat marvel3
Thor spiderman
Spider man groot
Hulk moana
Iron man
Captain america
student@S41:~/sreelakshmi$ cp marvel3 marvel4
student@S41:~/sreelakshmi$ cat marvel4
Thor spiderman
Spider man groot
Hulk moana
Iron man
Captain America
```

2. cp -r

This command is used to copy a directory along with its sub directories..

Syntax :- \$ cp -r directory1 directory2

Output :-

```
student@S41:~$ cd sample
bash: cd: sample: Not a directory
student@S41:~$ cd sree
student@S41:~/sree$ ls
a.txt b.txt Sree
student@S41:~/sree$ cd ..
student@S41:~$ cp -r sample sree
student@S41:~$ cd sree
student@S41:~/sree$ ls
a.txt b.txt sample Sree
student@S41:~/sree$ cd ..
student@S41:~$ ls
A Desktop frequency last marvel marvel4 Public sample.o snap string1.c
a.txt Documents frequency.c last.c marvel1 marvel1 PycharmProjects sentencerev sree string1.o
compiler Downloads frequency.o last.o marvel2 Music sample sentencerev.c sreelakshmi Templates sentencerev.o string1 Videos
demo examples.desktop Image mark1 marvel3 Pictures sample.c
```

3. cp -i

This command asks for confirmation.

Syntax :- \$ cp -i filename1 directory1

Output :-

```
student@S41:~$ cp dd.txt sreelakshmi
student@S41:~$ cat dd.txt
cp command
student@S41:~$ cat>doc1
hai linux
^Z
[3]+  Stopped                  cat > doc1
student@S41:~$ cp doc1 sreelakshmi
student@S41:~$ cat doc1
hai linux
student@S41:~$ cp -i doc1 sreelakshmi
cp: overwrite 'sreelakshmi/doc1'?
```

4. mv

This command is used to move existing file or directory from one location to another. It is also used to rename a file or directory.

Syntax :- \$ mv filenamdirectory_name

Output :-

```
student@S46:~$ cd stardust
student@S46:~/stardust$ ls
a.txt b.txt new.txt y.txt z1.txt z.txt
student@S46:~/stardust$ cd ..
student@S46:~$ ls
46.Navya b Desktop examples.desktop mark.txt Pictures PycharmProjects snap star2.txt starnew.txt swetha text.txt
a b.txt Documents h.txt Music popo Sapphire space.txt star3.txt star.txt swethap Travel
a.pdf c.txt Downloads leapyear.py new.txt Public Sapphire.txt star1.txt stardust s.txt Templates Videos
student@S46:~$ mv space.txt stardust
student@S46:~$ ls
46.Navya b Desktop examples.desktop mark.txt Pictures PycharmProjects snap star3.txt star.txt swethap Travel
a b.txt Documents h.txt Music popo Sapphire star1.txt stardust s.txt Templates Videos
a.pdf c.txt Downloads leapyear.py new.txt Public Sapphire.txt star2.txt starnew.txt swetha text.txt
student@S46:~$ cd stardust
student@S46:~/stardust$ ls
a.txt b.txt new.txt space.txt y.txt z1.txt z.txt
```

5. mv overwriting

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 filename directory_name

Output :-

```
student@S46:~$ cd stardust
student@S46:~/stardust$ cat z1.txt
Hello World
student@S46:~/stardust$ cd ..
student@S46:~$ cat z1.txt
welcome
good morning
student@S46:~$ mv z1.txt stardust
student@S46:~$ cd stardust
student@S46:~/stardust$ cat z1.txt
welcome
good morning
```

NETWORKING & SYSTEM ADMINISTRATION LAB

Procedure

1. **\$read:** : This command is used to read the content of a line of a variable

Output:

```
student@S41:~$ read name
My name is Sreelakshmi R
student@S41:~$ echo $name
My name is Sreelakshmi R
```

2. **\$locate:** This command is used to locate a particular file or directory

Output:

```
student@S41:~$ locate b1.txt
/home/student/sree/b1.txt
student@S41:~$ locate b2.txt
/home/student/sree/b2.txt
/usr/share/doc/qemu-system-common/usb2.txt.gz
```

3. **\$find :** This command is used to search and locate the list of files in the current directory.
4. **\$locate -i filename:** This command is used to perform case insensitive search.

Output:

```
student@S41:~$ locate -i b2.txt
/home/student/sree/b2.txt
/usr/share/doc/qemu-system-common/usb2.txt.gz
```

5. **\$grep:** This command will let you search through all the text in a file.

Output:

```
student@S41:~$ grep -A1 using s2.txt
By default, grep displays the entire line which has the matched string. We can make the grep to display only the matched string by using the -o option. unix is great os. unix is opensource. unix is free os.
learn operating system.
```

Name: SREELAKSHMI R

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Date:21-04-2022

6. **\$grep -i:** This command filter output in a case insensitive way.

Output:

```
student@S40:~$ grep -i THOR marvel1
thor
```

7. **\$grep -v:** This command displays lines not matching to the specified word.

Output:

```
student@S41:~$ grep -v operating s2.txt
By default, grep displays the entire line which has the matched string. We can make the grep to display only the matched string by using the -o option. unix is great os. unix is opensource. unix is free os.
Unix linux which one you choose.
```

8. **\$grep -A1:** This command is used to display line after result

Output:

```
student@S41:~$ grep -A1 using s2.txt
By default, grep displays the entire line which has the matched string. We can make the grep to display only the matched string by using the -o option. unix is great os. unix is opensource. unix is free os.
learn operating system.
```

9. **\$grep -B1:** This command is used to display the line before the result.

Output:

```
student@S41:~$ grep -B1 using s2.txt
By default, grep displays the entire line which has the matched string. We can make the grep to display only the matched string by using the -o option. unix is great os. unix is opensource. unix is free os.
student@S41:~$ grep -v operating
^Z
[10]+ Stopped grep --color=auto -v operating
```

10. **\$grep -C1:** This command is used to display the line before and after the result

11. \$df: This command is used to show the amount of free disk space available and to understand the filesystems that have been mounted.

Output:

```
student@541:~$ df
Filesystem      1K-blocks    Used Available Use% Mounted on
udev             3988608       0  3988608  0% /dev
tmpfs            803776   1828  801948  1% /run
/dev/sda6        595171040 36200644 533582344 7% /
tmpfs            4018872 29096  3989776  1% /dev/shm
tmpfs             5120       4   5116  1% /run/lock
tmpfs            4018872       0  4018872  0% /sys/fs/cgroup
/dev/loop5          256      256  0 100% /snap/gtk2-common-themes/5
/dev/loop6         144128 144128  0 100% /snap/gnome-3-26-1664/98
/dev/loop8         419328 419328  0 100% /snap/gimp/227
/dev/loop17        261440 261440  0 100% /snap/gnome-system-monitor/111
/dev/loop19        3040      3040  0 100% /snap/gnome-system-monitor/111
/dev/loop22        56960 56960  0 100% /snap/core18/2284
/dev/loop24        45312 45312  0 100% /snap/gtk-common-themes/1353
/dev/loop3          2560 2560  0 100% /snap/gnome-calculator/884
/dev/loop29        1024 1024  0 100% /snap/gnome-logs/81
/dev/loop4          113280 113280  0 100% /snap/core/12834
/dev/loop31        15104 15104  0 100% /snap/gnome-characters/367
/dev/loop7          400768 400768  0 100% /snap/gimp/383
/dev/loop9          2688 2688  0 100% /snap/gnome-calculator/920
/dev/loop13         168832 168832  0 100% /snap/gnome-3-28-1804/161
/dev/loop14         302848 302848  0 100% /snap/vlc/2344
/dev/loop22        56960 56960  0 100% /snap/core18/2344
/dev/loop23        253952 253952  0 100% /snap/gnome-3-38-2004/87
/dev/loop21        63488 63488  0 100% /snap/core20/1405
/dev/loop20          768 768  0 100% /snap/gnome-characters/741
/dev/loop25          640 640  0 100% /snap/gnome-logs/106
/dev/loop35        144128 144128  0 100% /snap/gtk2-common-themes/104
/dev/loop28          256 256  0 100% /snap/gtk2-common-themes/13
/dev/loop30        66816 66816  0 100% /snap/gtk-common-themes/1519
/dev/loop15        540928 540928  0 100% /snap/pycharm-community/274
/dev/loop27          128 128  0 100% /snap/bare/5
/dev/loop11          2688 2688  0 100% /snap/gnome-system-monitor/174
/dev/loop16        63488 63488  0 100% /snap/core20/1376
/dev/loop12        254848 254848  0 100% /snap/gnome-3-38-2004/99
/dev/loop1          113408 113408  0 100% /snap/core/12821

student@541:~$ df -m
Filesystem      1M-blocks    Used Available Use% Mounted on
udev             3896       0  3896  0% /dev
tmpfs            785       2   784  1% /run
/dev/sda6        581222 35353 521077 7% /
tmpfs             3925      29  3897  1% /dev/shm
tmpfs              5       1   5  1% /run/lock
tmpfs            3925       0  3925  0% /sys/fs/cgroup
/dev/loop5           1       1  0 100% /snap/gtk2-common-themes/5
/dev/loop6          141     141  0 100% /snap/gnome-3-26-1664/98
/dev/loop8          410     410  0 100% /snap/gimp/227
/dev/loop17          203     203  0 100% /snap/vlc/1049
/dev/loop19           4       4  0 100% /snap/gnome-system-monitor/111
/dev/loop2          56      56  0 100% /snap/core18/2284
/dev/loop24          45      45  0 100% /snap/gtk-common-themes/1353
/dev/loop3          3       3  0 100% /snap/gnome-calculator/884
/dev/loop29           1       1  0 100% /snap/gnome-logs/81
/dev/loop4          111     111  0 100% /snap/core/12834
/dev/loop31          15      15  0 100% /snap/gnome-characters/367
/dev/loop7          392     392  0 100% /snap/gimp/383
/dev/loop9           3       3  0 100% /snap/gnome-calculator/920
/dev/loop13          165     165  0 100% /snap/gnome-3-28-1804/161
/dev/loop14          296     296  0 100% /snap/vlc/2344
/dev/loop??          56      56  0 100% /snap/core18/2344
```

12. \$du: The du command is used to gain disk usage information quickly. It is applied to current working directory.

Output:

```
student@541:~$ du
4      ./cache
8      ./cache/.trash
4      ./java/.userPrefs/jetbrains/_!{!!cg!"p!{}!}0"j!(k!w"w!"8!b!"p!"!e@=
16     ./java/.userPrefs/jetbrains
24     ./java/.userPrefs
40     ./java/fonts/11.0.4
44     ./java/fonts
72     ./java
12     ./cache/fontconfig
88     ./cache/thumbnails/normal
788    ./cache/thumbnails/large
880    ./cache/thumbnails
308    ./cache/.fr-MNsKjo
4      ./cache/thunderbird/2gddhb7x.default/cache2/entries
4      ./cache/thunderbird/2gddhb7x.default/cache2/doomed
12     ./cache/thunderbird/2gddhb7x.default/cache2
4      ./cache/thunderbird/2gddhb7x.default/safebrowsing
792    ./cache/thunderbird/2gddhb7x.default/startupCache
812    ./cache/thunderbird/2gddhb7x.default
816    ./cache/thunderbird
4      ./cache/ibus-table
872    ./cache/gnome-software/fwupd/remotes.d/lvfs
876    ./cache/gnome-software/fwupd/remotes.d
880    ./cache/gnome-software/fwupd
716    ./cache/gnome-software/shell-extensions
572    ./cache/gnome-software/cssresource
716    ./cache/gnome-software/ticons
2888   ./cache/gnome-software
216    ./cache/wallpaper
4      ./cache/gnome-screenshot
20     ./cache/ibus/bus
24     ./cache/ibus
340    ./cache/gstreamer-1.0
4      ./cache/evolution/memos/trash
8      ./cache/evolution/memos
4      ./cache/evolution/calendar/trash
8      ./cache/evolution/calendar
4      ./cache/evolution/addrbook/trash
2      ./cache/evolution/addrbook
```

13. \$wc: This command is used counting purpose. It is used to find the number of lines ,the number of words ,number of characters and number of bytes.

14. \$wc -l: Count number of lines

Output:

```
student@S41:~$ wc -l s2.txt
3 s2.txt
```

15. \$wc -w:Count number of words

Output:

```
student@S41:~$ wc -w s2.txt
48 s2.txt
```

16. \$wc -c:Count number of characters

Output:

```
student@S41:~$ wc -c s2.txt
264 s2.txt
```

17. \$wc-m:Count number of lines.

Output:

```
student@S41:~$ df -m
Filesystem      1M-blocks  Used  Available Use% Mounted on
udev              3896     0    3896   0% /dev
tmpfs             785     2     784   1% /run
/dev/sda6      581222 35353  521077  7% /
tmpfs             3925    29    3897   1% /dev/shm
tmpfs               5     1      5   1% /run/lock
tmpfs             3925     0    3925   0% /sys/fs/cgroup
/dev/loop5                1     1      0 100% /snap/gtk2-common-themes/5
/dev/loop6               141   141      0 100% /snap/gnome-3-26-1604/98
/dev/loop8               410   410      0 100% /snap/gimp/227
/dev/loop17              203   203      0 100% /snap/vlc/1049
/dev/loop19              4     4      0 100% /snap/gnome-system-monitor/111
/dev/loop2                56    56      0 100% /snap/core18/2284
/dev/loop24              45     45      0 100% /snap/gtk-common-themes/1353
/dev/loop3                3     3      0 100% /snap/gnome-calculator/884
/dev/loop29              1     1      0 100% /snap/gnome-logs/81
/dev/loop4               111   111      0 100% /snap/core/12834
/dev/loop31              15    15      0 100% /snap/gnome-characters/367
/dev/loop7               392   392      0 100% /snap/gimp/383
/dev/loop9                3     3      0 100% /snap/gnome-calculator/920
/dev/loop13              165   165      0 100% /snap/gnome-3-28-1804/161
/dev/loop14              296   296      0 100% /snap/vlc/2344
/dev/loop22                56    56      0 100% /snap/core18/2344
```

NETWORKING & SYSTEM ADMINISTRATION LAB**Procedure:**

1.sudo useradd username = To add a new user “Sreelakshmi”.

Syntax:

\$sudo useradd Sreelakshmi

Name: SREELAKSHMI R

Roll No: 41

Batch: MCA

Date: 25/04/2022

Output:

```
mca@s41:~$ sudo useradd Sreelakshmi
[sudo] password for mca:
```

2.sudo passwd username = To add a password to the newly added user “Sreelakshmi”.

Syntax: \$sudo passwd Sreelakshmi Output:

```
mca@s41:~$ sudo passwd Sreelakshmi
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
```

3.sudo groupadd -g id groupname = To add a new group “reg” with id “13335”.

Syntax: \$sudo groupadd -g 13335 reg**Output:**

```
mca@s41:~$ sudo groupadd -g 13335 reg
```

4.sudo usermod -G groupname username = To add a new user “Sreelakshmi” to a particular group “reg”.

Syntax: \$sudo usermod -G reg Sreelakshmi Output:

```
mca@s41:~$ sudo usermod -G reg Sreelakshmi
[sudo] password for mca:
```

5.id username =to find out user names and numeric ID's of the current user.

Syntax: \$id Sreelakshmi Output:

```
mca@s41:~$ id Sreelakshmi
uid=1005(Sreelakshmi) gid=1006(Sreelakshmi) groups=1006(Sreelakshmi),13335(reg)
```

6.compgen -g = To view a list of group in the system.

Syntax: \$compgen -g

Output:

```
mca@s41:~$ compgen -g
root
daemon
bin
sys
adm
tty
disk
lp
mail
news
uucp
man
proxy
kmem
dialout
fax
voice
cdrom
floppy
tape
sudo
audio
dip
www-data
backup
operator
list
irc
src
gnats
shadow
utmp
video
sasl
plugdev
staff
```



```
mca
sambashare
mysql
android
mongodb
kvm
rdma
hadoop
student
exam
Sreelakshmi
reg
RMCA
S2
S3
```

7.compgen -g groupname = To view a list of group with specified starting mentioned in the system.

Syntax: compgen -g RMCA

Output:

```
mca@s41:~$ compgen -g RMCA
RMCA
```

8.sudo userdel username = To delete a user from the system.

Syntax:

sudo userdel Sreelakshmi

9.sudo groupdel groupname = To delete a group from the system.

Syntax: sudo groupdel S3 Output:

```
mca@S41:~$ sudo userdel S3
```

10.chmod = used to manage file system access permissions.

- (i) **Syntax: chmod -rwx a.txt**

Output:

```
mca@S41:~$ chmod -wx a.txt
mca@S41:~$ cat >> a.txt
bash: a.txt: Permission denied
```

- (ii) **Syntax: chmod +rwx a.txt**

Output:

```
mca@S41:~$ chmod +rwx a.txt
```

11.sudo chown username textname = to change the owner of file system files, directories.

Syntax:

sudo chown Sreelakshmi b.txt

Output:

```
mca@S41:~$ sudo chown Sreelakshmi b.txt
mca@S41:~$ ls -l b.txt
-rw-r--r-- 1 Sreelakshmi mca 12 Apr 25 15:06 b.txt
```

12.if config -a = used to get the ip address of the corresponding system.

Syntax: if config -a

Output:

```
mca@S41:~$ ifconfig -a
enp3s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
        inet 192.168.6.41 netmask 255.255.255.0 broadcast 192.168.6.255
        inet6 fe80::163f:4f23:1512:6689 prefixlen 64 scopeid 0x20<link>
          ether 08:62:66:48:38:39 txqueuelen 1000 (Ethernet)
            RX packets 110743 bytes 55863220 (55.8 MB)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 25132 bytes 7461614 (7.4 MB)
            TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
        inet 127.0.0.1 netmask 255.0.0.0
        inet6 ::1 prefixlen 128 scopeid 0x10<host>
          loop txqueuelen 1000 (Local Loopback)
            RX packets 3930 bytes 322881 (322.8 KB)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 3930 bytes 322881 (322.8 KB)
            TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

13.ssh mca@(ip_address_of_the_other_computer) = enables secure remote connections between two systems.

Syntax: ssh [mca@192.168.6.43](https://192.168.6.43) Output:

```
mca@S41:~$ ssh mca@192.168.6.43
The authenticity of host '192.168.6.43' (192.168.6.43)' can't be established.
ECDSA key fingerprint is SHA256:OHfmkiK7Ny+SEmIxVc7tp2LmN3VPmGsUeu5wwBnGfdA.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.6.43' (ECDSA) to the list of known hosts.
mca@192.168.6.43's password:
Welcome to Ubuntu 18.04.1 LTS (GNU/Linux 4.15.0-33-generic x86_64)

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

* Canonical Livepatch is available for installation.
- Reduce system reboots and improve kernel security. Activate at:
  https://ubuntu.com/livepatch

0 packages can be updated.
0 updates are security updates.

Last login: Mon Apr 25 15:42:01 2022 from 192.168.6.51
```

NETWORKING & SYSTEM ADMINISTRATION LAB

Experiment No.: 4

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.

Name:Sreelakshmi R

Roll No: 41

Batch: MCA-B

Date:12-05-2022

Program :1

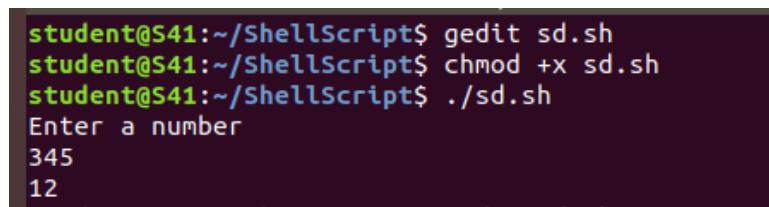
Aim

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

Procedure

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

Output Screenshot



```
student@S41:~/ShellScript$ gedit sd.sh
student@S41:~/ShellScript$ chmod +x sd.sh
student@S41:~/ShellScript$ ./sd.sh
Enter a number
345
12
```

NETWORKING & SYSTEM ADMINISTRATION LAB

Program :2

Aim

Write a shellscript program to find the average of numbers in command line

Name: Sreelakshmi R

Roll No: 41

Batch:MCA-B

Date:12-05-2022

Procedure

```
#!/bin/bash
echo "Enter the size(a)"
read a
i=1
sum=0
echo "Enter the numbers"
while [ $i -le $a ]
do
read b
sum=$((sum + b))
i=$((i + 1))
done
average=$(echo $sum / $a | bc -l)
echo $average
```

Output Screenshot



```
student@S41:~/ShellScript$ gedit avg.sh
student@S41:~/ShellScript$ ./avg.sh
Enter the size(a)
3
Enter the numbers
1
2
5
2.666666666666666666666666
student@S41:~/ShellScript$
```

NETWORKING & SYSTEM ADMINISTRATION LAB

Program : 3

Aim

Write a shellscript program to do mathematical calculations using switch case

Name: Sreelakshmi R

Roll No: 41

Batch: MCA-B

Date:12-05-2022

Procedure

```
#!/bin/bash
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
    res=`echo $a + $b | bc` ;;
    res=`echo $a - $b | bc` ;;
    res=`echo $a \* $b | bc`;;
    res=`echo "scale=2; $a / $b" | bc`;;
esac
echo "Result : $res"
```

Output Screenshot

```
student@S41:~/ShellScript$ gedit add.sh
student@S41:~/ShellScript$ ./add.sh
Enter Two numbers :
3
4
Enter Choice :
1. Addition
2. Subtraction
3. Multiplication
4. Division
3
Result : 12
student@S41:~/ShellScript$
```

NETWORKING & SYSTEM ADMINISTRATION LAB

Program :4

Aim

Write a shell script program to display current date and calnder

Name: Sreelakshmi R

Roll No:41

Batch:RMCA S2 B

Date:09/05/2022

Procedure

```
#!/bin/bash
echo "Today is" $(date)
echo ""
echo "calender:"
cal
echo $(who | wc -l )
```

Output

```
student@S41:~/ShellScripting$ gedit calender.sh
student@S41:~/ShellScripting$ ./calender.sh
Today is Mon May  9 14:33:19 IST 2022:

Calender
      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
```

NETWORKING & SYSTEM ADMINISTRATION LAB

Program :5

Aim

Write a shell script program to find whether number is greater than or less than or equal to another number

Name: Sreelakshmi R

Roll No:41

Batch:RMCA S2 B

Date:09/05/2022

Procedure

```
#!/bin/bash
echo "Enter the number A:"
read A

echo "Enter the number B:"
read B

if [ $A -gt $B ]
then
echo "$A is greater than $B"
elif [ $A -lt $B ]
then
echo "$A is less than $B"
elif [ $A -eq $B ]
then
echo "$A equals to $B"
else
echo "Invalid"
fi
```

Output

```
student@S41:~/ShellScripting$ gedit GLEofnumber.sh
student@S41:~/ShellScripting$ ./GLEofnumber.sh
Enter the number A:
8
Enter the number B:
4
8 is greater than 4
student@S41:~/ShellScripting$ ./GLEofnumber.sh
Enter the number A:
3
Enter the number B:
7
3 is less than 7
student@S41:~/ShellScripting$ ./GLEofnumber.sh
Enter the number A:
3
Enter the number B:
3
3 equals to 3
```

NETWORKING & SYSTEM ADMINISTRATION LAB

Program : 6

Aim

Write a shell script program to print sum of first 10 natural numbers

Name: Sreelakshmi R

Roll No:41

Batch:RMCA S2 B

Date:09/05/2022

Procedure

```
echo "Enter Limit :"
read a
i=1
while [ $i -lt $a ]
do
sum=$((sum+i))
i=$((i+1))
done
echo "The sum of first $a numbers is: "$sum
```

Output

```
student@S41:~/ShellScripting$ ./f10.sh
enter limit :
8
The sum of first 8 numbers is: 28
student@S41:~/ShellScripting$ gedit f10.sh
student@S41:~/ShellScripting$ ./f10.sh
Enter Limit :
8
The sum of first 8 numbers is: 28
student@S41:~/ShellScripting$ █
```

NETWORKING & SYSTEM ADMINISTRATION LAB

Program : 7

Aim

Write a shell script program to find sum, product, average of 4 integers.

Name: Sreelakshmi R

Roll No:41

Batch:RMCA S2 B

Date:09/05/2022

Procedure

```
#!/bin/bash
echo "enter four integers"
read i
read j
read k
read l
sum=$(echo "$i + $j + $k + $l" | bc -l)
average=$(echo "$sum / 4" | bc -l)
product=$(echo "$i * $j * $k * $l" | bc -l)
echo "sum = $sum"
echo "Average = $average"
echo "Product = $product"
```

Output

```
student@S41:~/ShellScripting$ gedit savpd.sh
student@S41:~/ShellScripting$ ./savpd.sh
enter four integers
5
7
8
3
sum = 23
Average = 5.750000000000000000000000000000
Product = 840
student@S41:~/ShellScripting$
```

NETWORKING & SYSTEM ADMINISTRATION LAB

Program : 8

Aim

Write a shell script program to factorial of given number.

Name: Sreelakshmi R

Roll No:41

Batch:RMCA S2 B

Date:09/05/2022

Procedure

```
#!/bin/bash
echo "Enter a number"
read a
fact=1
for((i=2;i<=a;i++))
{
fact=$((fact * i)) #fact=fact*i
}
echo "factorial of $a is $fact "
```

Output

```
student@S41:~/ShellScripting$ gedit factorial.sh
student@S41:~/ShellScripting$ ./factorial.sh
Enter a number
4
factorial of 4 is 24
student@S41:~/ShellScripting$ █
```

NETWORKING & SYSTEM ADMINISTRATION LAB

Program :9

Aim

Write a shell script program to find whether a number is palindrome or not.

Name: Sreelakshmi R

Roll No:41

Batch:RMCA S2 B

Date:09/05/2022

Procedure

```
echo "Enter the number"
read n
function pal
{
number=$n
reverse=0
while [ $n -gt 0 ]
do
a=`expr $n % 10 `
n=`expr $n / 10 `
reverse=`expr $reverse \* 10 + $a`
done
echo $reverse
if [ $number -eq $reverse ]
then
    echo "Number is palindrome"
else
    echo "Number is not palindrome"
fi
}
r=`pal $n`
echo "$r"
```

Output

```
student@S41:~/ShellScripting$ gedit palindrome.sh
[3]+  Killed                  gedit palindrome.sh
student@S41:~/ShellScripting$ ./palindrome.sh
Enter the number
18945
54981
Number is not palindrome
```

```
student@S41:~/ShellScripting$ ./palindrome.sh
Enter the number
1551
1551
Number is palindrome
student@S41:~/ShellScripting$
```

NETWORKING & SYSTEM ADMINISTRATION LAB

Program :10

Aim

Write a shell script program to find whether a year is leap or not.

Name: Sreeelakshmi R

Roll No:41

Batch:RMCA S2 B

Date:09/05/2022

Procedure

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

```
echo "Enter the Year :"  
read A  
a=`expr $A % 4`  
b=`expr $A % 100`  
c=`expr $A % 400`  
if [ $a -eq 0 -a $b -ne 0 -o $c -eq 0 ]  
then  
echo "$A is Leap Year"  
else  
echo "$A is Not Leap Year"  
fi
```

Output

```
student@S41:~/ShellScripting$ gedit leapyr.sh  
student@S41:~/ShellScripting$ ./leapyr.sh  
Enter the Year :  
2020  
2020 is Leap Year  
student@S41:~/ShellScripting$ ./leapyr.sh  
Enter the Year :  
2022  
2022 is Not Leap Year  
student@S41:~/ShellScripting$ █
```

NETWORKING & SYSTEM ADMINISTRATION LAB**Program: 11****Aim**

Familiarity with systemd

Name: Sreelakshmi R

Roll No: 41

Batch: B

Date: 09/05/2022

Procedure**Step 1 : Create a Shell Script**

```
mca@U41:~$ sudo gedit /usr/bin/script4.sh
[sudo] password for mca:
** (gedit:5074): WARNING **: 15:23:28.483: Set document metadata failed: Setting attribute metadata::gedit-spell-language not supported
** (gedit:5074): WARNING **: 15:23:28.484: Set document metadata failed: Setting attribute metadata::gedit-encoding not supported
** (gedit:5074): WARNING **: 15:23:29.835: Set document metadata failed: Setting attribute metadata::gedit-position not supported
```

Add the following sample script.



```
#!/bin/bash

while true
do

sleep 10
done
```

Save script and set execute permission.

```
mca@U41:~$ sudo chmod +x /usr/bin/script4.sh
```

Step 2: Create A SystemD File, and add the following content and update the script filename and location. You can also change the description of the service.



```
[Unit]
Description=My Shell Script

[Service]
ExecStart=/usr/bin/script4.sh

[Install]
WantBy=multi-user.target
```

Step 3: Enable New Service

```
mca@U41:~$ sudo gedit /usr/bin/script4.sh
** (gedit:5575): WARNING **: 15:37:49.300: Set document metadata failed: Setting attribute metadata::gedit-position not supported
mca@U41:~$ sudo systemctl start shellscript.service
Failed to start shellscript.service: Unit shellscript.service is not loaded properly: Invalid argument.
See system logs and 'systemctl status shellscript.service' for details.
mca@U41:~$ sudo gedit /lib/systemd/system/shellscrip.service

** (gedit:5647): WARNING **: 15:38:32.750: Set document metadata failed: Setting attribute metadata::gedit-position not supported
mca@U41:~$ sudo systemctl start shellscript.service
Failed to start shellscript.service: Unit shellscript.service is not loaded properly: Invalid argument.
See system logs and 'systemctl status shellscript.service' for details.
mca@U41:~$ sudo gedit /lib/systemd/system/shellscrip.service

** (gedit:5713): WARNING **: 15:40:51.665: Set document metadata failed: Setting attribute metadata::gedit-spell-language not supported
** (gedit:5713): WARNING **: 15:40:51.665: Set document metadata failed: Setting attribute metadata::gedit-encoding not supported
** (gedit:5713): WARNING **: 15:40:52.631: Set document metadata failed: Setting attribute metadata::gedit-position not supported
mca@U41:~$ sudo gedit /usr/bin/script4.sh

** (gedit:5726): WARNING **: 15:41:09.171: Set document metadata failed: Setting attribute metadata::gedit-spell-language not supported
** (gedit:5726): WARNING **: 15:41:09.171: Set document metadata failed: Setting attribute metadata::gedit-encoding not supported
** (gedit:5726): WARNING **: 15:41:10.894: Set document metadata failed: Setting attribute metadata::gedit-position not supported
mca@U41:~$ sudo systemctl start shellscript.service
mca@U41:~$ sudo systemctl daemon-reload
mca@U41:~$ sudo systemctl start shellscript.service
mca@U41:~$ sudo systemctl status shellscript.service
● shellscript.service - My Shell Script
   Loaded: loaded (/lib/systemd/system/shellscrip.service; disabled; vendor preset: enabled)
     Active: active (running) since Thu 2022-06-16 15:41:23 IST; 34s ago
       Main PID: 5737 (script4.sh)
          Tasks: 2 (limit: 4915)
         CGroup: /system.slice/shellscrip.service
                 └─5737 /bin/bash /usr/bin/script4.sh
                   ├─5777 sleep 10

Jun 16 15:41:23 U41 systemd[1]: Started My Shell Script.
mca@U41:~$
```

NETWORKING & SYSTEM ADMINISTRATION LAB

Experiment No.:5

Aim

Install Linux, Apache, MySQL, PHP (LAMP) stack on Ubuntu 18.04

Name: Sreelakshmi R

Roll No: 41

Batch: B

Date: 13/06/2022

Procedure

INSTALLING APACHE

Step 1 : Installing Apache and Updating the Firewall

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

First, make sure your apt cache is updated with:

Syntax: \$ sudo apt update

Output:

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

Step 2 : Install Apache 2

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

Syntax: \$ sudo apt update

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

Output:

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

Step 3 : Adjust the Firewall to Allow Web Traffic

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

Output:

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

Step 4 : Check Apache Full

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

`sudo ufw app info "Apache Full"` **Output:**

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

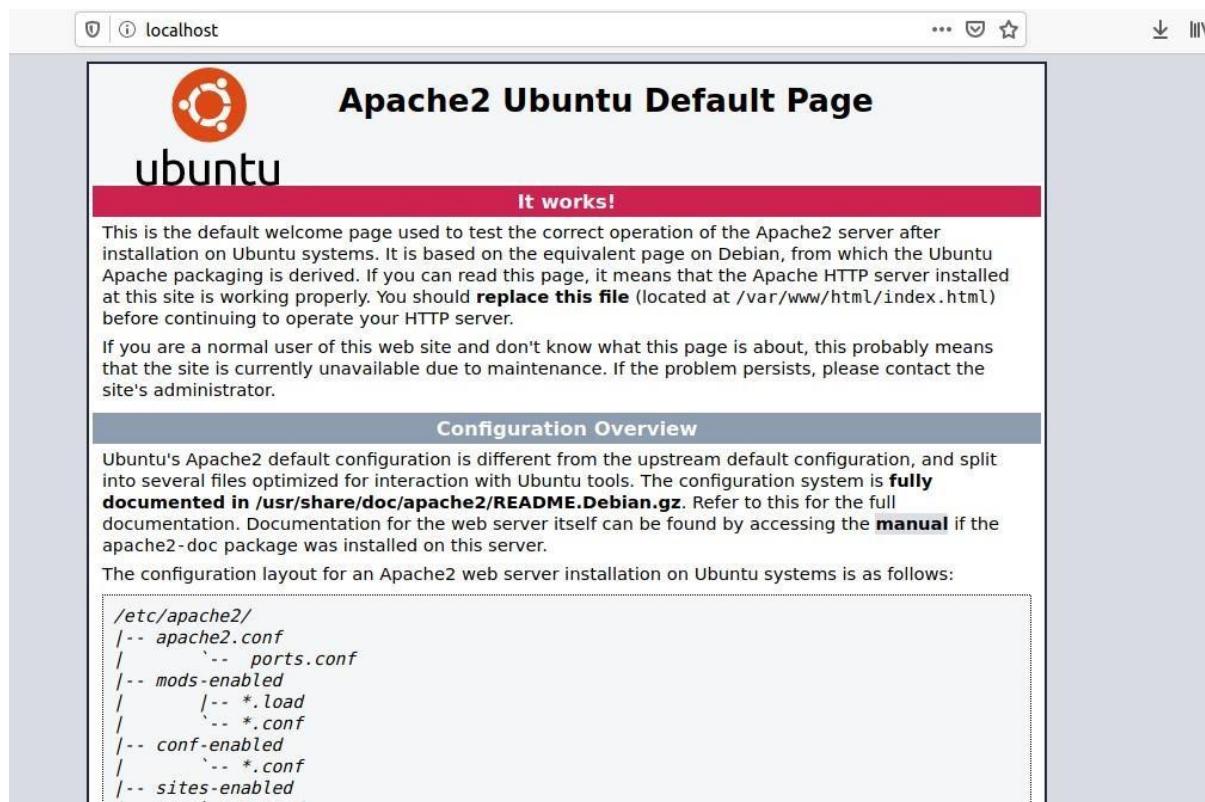
Ports:
  80,443/tcp
```

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

Syntax: `sudo ufw allow "Apache Full"`

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

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



Installing MySQL

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

Syntax: \$ sudo apt install mysql-server

```
mca@ajce:~$ sudo apt install mysql-server
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
libaio1 libcgi-fast-perl libcgi-pm-perl libevent-core-2.1-7
libevent-pthreads-2.1-7 libfcgi-perl libhtml-template-perl libmecab2
mecab-ipadic mecab-ipadic-utf8 mecab-utils mysql-client-8.0
mysql-client-core-8.0 mysql-server-8.0 mysql-server-core-8.0
Suggested packages:
libipc-sharedcache-perl mailx tinyca
The following NEW packages will be installed:
libaio1 libcgi-fast-perl libcgi-pm-perl libevent-core-2.1-7
libevent-pthreads-2.1-7 libfcgi-perl libhtml-template-perl libmecab2
mecab-ipadic mecab-ipadic-utf8 mecab-utils mysql-client-8.0
mysql-client-core-8.0 mysql-server mysql-server-8.0 mysql-server-core-8.0
0 upgraded, 16 newly installed, 0 to remove and 602 not upgraded.
Need to get 31.2 MB of archives.
After this operation, 261 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 mysql-client-core-8.0 amd64 8.0.29-0ubuntu0.20.04.3 [4,416 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 mysql-client-8.0 amd64 8.0.29-0ubuntu0.20.04.3 [22.0 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu focal/main amd64 libaio1 amd64 0.3.112-5 [7,184 B]
Get:4 http://in.archive.ubuntu.com/ubuntu focal/main amd64 libevent-core-2.1-7 amd64 2.1.11-stable-1 [89.1 kB]
Get:5 http://in.archive.ubuntu.com/ubuntu focal/main amd64 libevent-pthreads-2.1-7 amd64 2.1.11-stable-1 [7,372 B]
Get:6 http://in.archive.ubuntu.com/ubuntu focal/main amd64 libmecab2 amd64 0.996-10build1 [233 kB]
Get:7 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 mysql-server-core-8.0 amd64 8.0.29-0ubuntu0.20.04.3 [18.1 MB]
```

Step 2 :

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

Syntax: \$

`sudo mysql`

Output:

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

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owners.

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

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

mysql> exit
Bye
```

Installing PHP

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

Step 1 : Installation

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

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

Step 2 : Restart

Syntax: sudo systemctl restart apache2 **Output:**

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

Step 3 : Testing PHP Processing on your Web Server **Output:**

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

PHP Version 7.4.3	
System	Linux ajce 5.4.0-26-generic #30-Ubuntu SMP Mon Apr 20 16:58:30 UTC 2020 x86_64
Build Date	Mar 2 2022 15:36:52
Server API	Apache 2.0 Handler
Virtual Directory Support	disabled
Configuration File (php.ini) Path	/etc/php/7.4/apache2
Loaded Configuration File	/etc/php/7.4/apache2/php.ini
Scan this dir for additional .ini files	/etc/php/7.4/apache2/conf.d
Additional .ini files parsed	/etc/php/7.4/apache2/conf.d/10-mysqld.ini, /etc/php/7.4/apache2/conf.d/10-opcache.ini, /etc/php/7.4/apache2/conf.d/20-pdo.ini, /etc/php/7.4/apache2/conf.d/20-calendar.ini, /etc/php/7.4/apache2/conf.d/20-ctype.ini, /etc/php/7.4/apache2/conf.d/20-exif.ini, /etc/php/7.4/apache2/conf.d/20-fil.ini, /etc/php/7.4/apache2/conf.d/20-fileinfo.ini, /etc/php/7.4/apache2/conf.d/20-ftp.ini, /etc/php/7.4/apache2/conf.d/20-gettext.ini, /etc/php/7.4/apache2/conf.d/20-iconv.ini, /etc/php/7.4/apache2/conf.d/20-json.ini, /etc/php/7.4/apache2/conf.d/20-phar.ini, /etc/php/7.4/apache2/conf.d/20-posix.ini, /etc/php/7.4/apache2/conf.d/20-readline.ini, /etc/php/7.4/apache2/conf.d/20-shmop.ini, /etc/php/7.4/apache2/conf.d/20-sockets.ini, /etc/php/7.4/apache2/conf.d/20-sysvmsg.ini, /etc/php/7.4/apache2/conf.d/20-sysvsem.ini, /etc/php/7.4/apache2/conf.d/20-sysvshm.ini, /etc/php/7.4/apache2/conf.d/20-tokenizer.ini
PHP API	20190902
PHP Extension	20190902
Zend Extension	320190902
Zend Extension Build	API320190902.NTS
PHP Extension Build	API20190902.NTS
Debug Build	no
Thread Safety	disabled
Zend Signal Handling	zend_signal

Install WordPress with LAMP on Ubuntu 18.04

Step 1 : Download WordPress

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

Output:

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

latest.tar.gz          100%[=====] 2.08M/s
```

```
mca@ajce:~$ 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/
```

Step 2 : Creating a MySQL Database and User for WordPress

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

Syntax: \$ sudo mysql

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

Syntax: \$ mysql -u root -p **Output:**

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

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owners.

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

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

Step 3 : Create the database for WordPress **Output:**

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

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owners.

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

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

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

mysql> exit;
Bye
```



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

Step 2 :

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

Syntax: sudo mv wp-config-sample.php wp-config.php

sudo rm -rf index.html **Output:**

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

Step 3 :

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

Syntax:

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

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

Output:

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

Save and close the file when you are finished.

Step 4: Restart the web server and mysql service

Syntax: \$sudo systemctl restart apache2.service

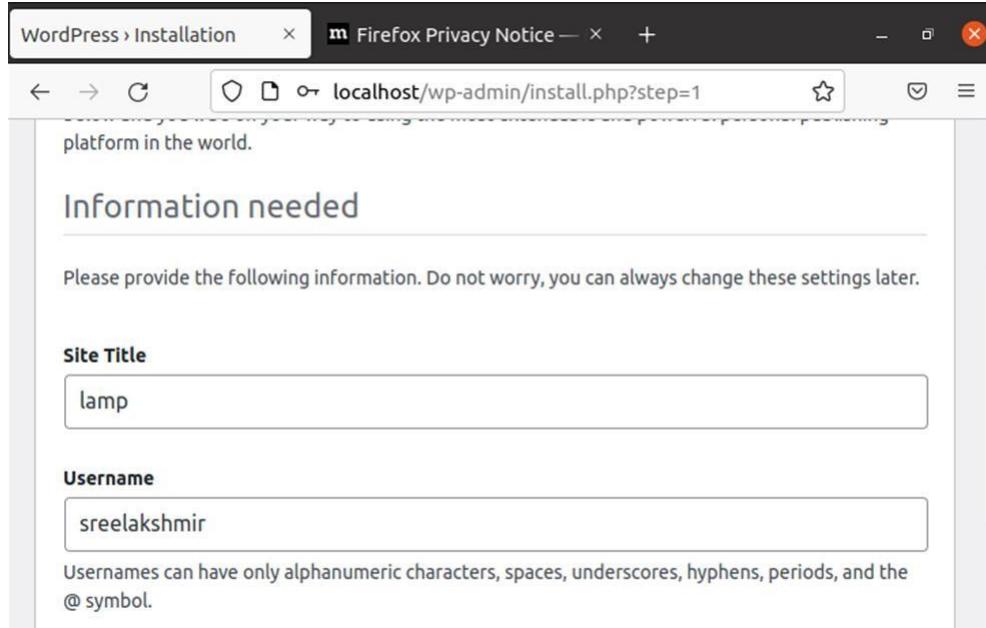
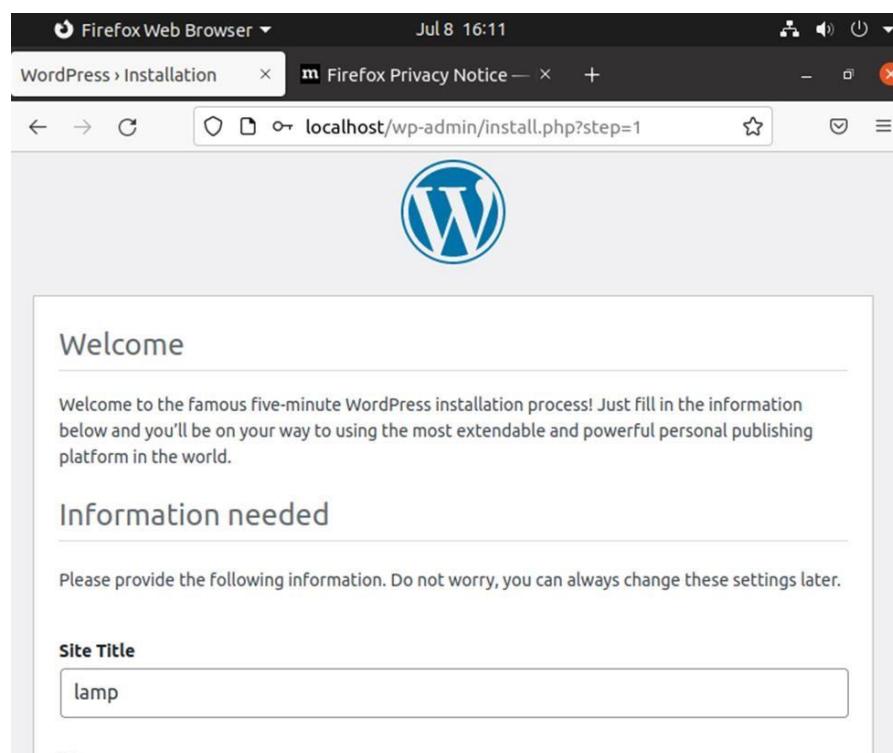
\$ sudo systemctl restart mysql.service **Output:**

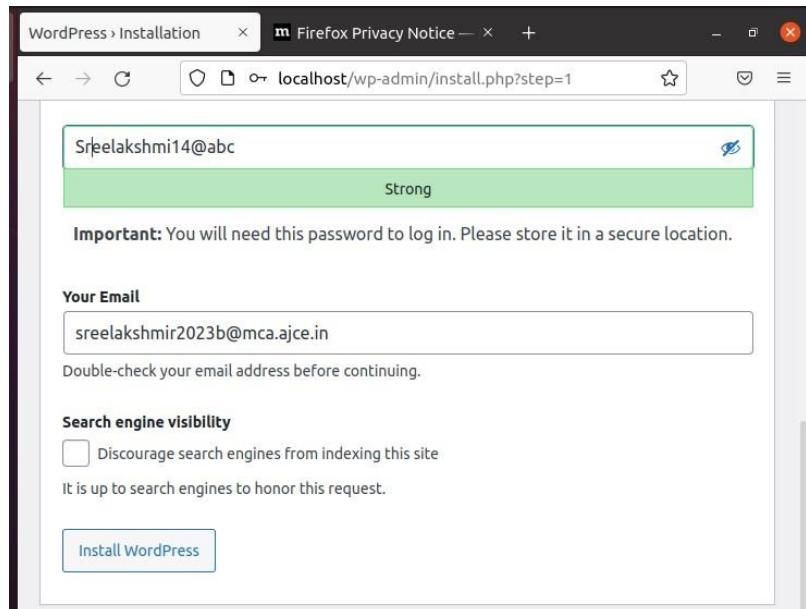
```
a@ajce:/var/www/html$ sudo systemctl restart apache2.service
a@ajce:/var/www/html$ sudo systemctl restart mysql.service
a@ajce:/var/www/html$
```

Step 5: Completing the Installation Through the Web Interface

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







The screenshot shows the WordPress Dashboard. The main header says 'Dashboard' and features a large 'Welcome to WordPress!' message with a link to 'Learn more about the 6.0 version.' To the right is a large '6.0' logo with a 'Dismiss' button. Below the welcome message are three circular icons with text: 'Author rich content with blocks and patterns' (with a link to 'Add a new page'), 'Customize your entire site with block themes' (with a link to 'Open site editor'), and 'Switch up your site's look & feel with Styles' (with a link to 'Edit styles'). At the bottom left is a 'PHP Update Recommended' notification box stating: 'Your site is running an insecure version of PHP (7.2.3-1ubuntu1), which should be updated.' It includes links to 'What is PHP and how does it affect my site?' and 'PHP is the programming language used to build and maintain WordPress. Newer versions of PHP...'. On the right is a 'Quick Draft' box with fields for 'Title' and 'Content'.

NETWORKING & SYSTEM ADMINISTRATION LAB**Experiment No.: 6****Aim**

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

Procedure

- Sudo apt install cmake g++ make :** To install cmake , g++ and make using the apt command.

```
mca@S41:~/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 packages were automatically installed and are no longer required:
  debhelper dh-autoreconf dh-strip-nondeterminism libarchive-cpio-perl libfile-stripnondeterminism-perl libmail-sendmail-perl libpcre16-3
  libpcre3-dev libpcre32-3 libpcrecpp0v5 libssl-dev libssl-doc libsys-hostname-long-perl php-common php-pear php-xml php7.2-cli
  php7.2-common php7.2-json php7.2-opcache php7.2-readline php7.2-xml pkg-php-tools po-debconf shtool
Use 'sudo apt autoremove' to remove them.
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 5 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
Ign:1 http://archive.ubuntu.com/ubuntu bionic/main amd64 cmake-data all 3.10.2-1ubuntu2
Err:2 http://archive.ubuntu.com/ubuntu bionic/main amd64 libcurl4 amd64 7.58.0-2ubuntu3
  Cannot initiate the connection to archive.ubuntu.com:80 (2001:67c:1562::15). - connect (101: Network is unreachable) Cannot initiate the con
```

- mkdir myproject :** creating a different directory for our project using the mkdir and cd commands.

```
mca@S41:~/Documents/cmake$ mkdir myproject
mca@S41:~/Documents/cmake$ cd myproject
```

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

```
mca@S41:~/Documents/cmake/myproject$ gedit hello_world.cpp
```

```
1 #include <iostream>
2
3 int main() {
4     std::cout << "Hello World!" << std::endl;
5     return 0 ;
6 }
```

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

```
mca@S41:~/Documents/cmake/myproject$ gedit hellomakelist.txt
```

The CMakeLists.txt file for this project will only contain these three lines:

```
cmake_minimum_required(VERSION 3.18)
project(MyProject VERSION 0.0.1)

add_executable(hello hello_world.cpp)
```

- 4.** Build directory for executables :

```
mca@S41:~/Documents/cmake/myproject$ mkdir build
```

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

```
mca@S41:~/Documents/cmake/myproject$ cd build
mca@S41:~/Documents/cmake/myproject/build$ cmake ..

Command 'cmake' not found, but can be installed with:

sudo snap install cmake # version 3.23.1, or
sudo apt install cmake

See 'snap info cmake' for additional versions.
```

7.cmake –build : To generate the executable simply by typing:

```
mca@S41:~/Documents/CMake/myproject/build$ cmake --build .
Scanning dependencies of target hello
[ 50%] Building CXX object CMakeFiles/hello.dir/helloworld.cpp.o
[100%] Linking CXX executable hello
[100%] Built target hello
```

8. ./hello : Run the executable by typing:

```
mca@S41:~/Documents/CMake/myproject/build$ ./hello
Hello World!
mca@S41:~/Documents/CMake/myproject/build$
```

NETWORKING & SYSTEM ADMINISTRATION LAB**Experiment No.: 7****Aim**

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

Name: Sreelakshmi R

Roll No: 41

Batch: MCA B

Date: 02-06-2022

Procedure**1. ipconfig**

This command 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 4:

  Connection-specific DNS Suffix  . :
  Link-local IPv6 Address . . . . . : fe80::142f:9783:684f:a27d%7
  IPv4 Address. . . . . : 192.168.6.46
  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::60c6:9871:f4d0:b304%3
  IPv4 Address. . . . . : 192.168.56.1
  Subnet Mask . . . . . : 255.255.255.0
  Default Gateway . . . . . :

Tunnel adapter Teredo Tunneling Pseudo-Interface:

  Connection-specific DNS Suffix  . :
  IPv6 Address. . . . . : 2001:0:2851:fcb0:d3:14b6:8a3e:b01e
  Link-local IPv6 Address . . . . . : fe80::d3:14b6:8a3e:b01e%12
  Default Gateway . . . . . : ::
```

2. ipconfig/all

To see the the network information in detail. It is an extension of ipconfig command

Syntax :- ipconfig/all

Output :-

```
C:\Users\Student>ipconfig/all

Windows IP Configuration

Host Name . . . . . : S46
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 4:

Connection-specific DNS Suffix . . . . . :
Description . . . . . : Realtek PCIe GBE Family Controller #2
Physical Address. . . . . : 78-24-AF-BA-C2-13
DHCP Enabled. . . . . : No
Autoconfiguration Enabled . . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::142f:9783:684f:a27d%7(Preferred)
IPv4 Address. . . . . : 192.168.6.46(Preferred)
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 192.168.6.100
DHCPv6 IAID . . . . . : 410526895
DHCPv6 Client DUID. . . . . : 00-01-00-01-22-BD-FA-08-F0-79-59-8F-00-CC
DNS Servers . . . . . : 192.168.6.254
8.8.8.8
NetBIOS over Tcpip. . . . . : Enabled

Ethernet adapter VirtualBox Host-Only Network:

Connection-specific DNS Suffix . . . . . :
Description . . . . . : VirtualBox Host-Only Ethernet Adapter
Physical Address. . . . . : 0A-00-27-00-00-03
DHCP Enabled. . . . . : No
Autoconfiguration Enabled . . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::60c6:9871:f4d0:b304%3(Preferred)
IPv4 Address. . . . . : 192.168.56.1(Preferred)
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . :
DHCPv6 IAID . . . . . : 470417447
DHCPv6 Client DUID. . . . . : 00-01-00-01-22-BD-FA-08-F0-79-59-8F-00-CC
DNS Servers . . . . . : fec0:0:0:ffff::1%1
fec0:0:0:ffff::2%1
fec0:0:0:ffff::3%1

NetBIOS over Tcpip. . . . . : Enabled

Tunnel adapter Teredo Tunneling Pseudo-Interface:

Connection-specific DNS Suffix . . . . . :
Description . . . . . : Microsoft Teredo Tunneling Adapter
Physical Address. . . . . : 00-00-00-00-00-00-E0
DHCP Enabled. . . . . : No
Autoconfiguration Enabled . . . . . : Yes
IPv6 Address. . . . . : 2001:0:2851:fcb0:d3:14b6:8a3e:b01e(Preferred)
Link-local IPv6 Address . . . . . : fe80::d3:14b6:8a3e:b01e%12(Preferred)
Default Gateway . . . . . : ::
DHCPv6 IAID . . . . . : 167772160
DHCPv6 Client DUID. . . . . : 00-01-00-01-22-BD-FA-08-F0-79-59-8F-00-CC
NetBIOS over Tcpip. . . . . : Disabled
```

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 :-**

```
C:\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 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

C:\Users\Student>

C:\Users\Student>ping 2404:6800:4007:826::2004
Pinging 2404:6800:4007:826::2004 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 2404:6800:4007:826::2004:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

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

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

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
 7...78 24 af ba c2 13 .....Realtek PCIe GBE Family Controller #2
 3...0a 00 27 00 03 .....VirtualBox Host-Only Ethernet Adapter
 1........................Software Loopback Interface 1
 12...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  192.168.6.46    281
 127.0.0.0        255.0.0.0        On-link      127.0.0.1    331
 127.0.0.1        255.255.255.255  On-link      127.0.0.1    331
127.255.255.255  255.255.255.255  On-link      127.0.0.1    331
 192.168.6.0      255.255.255.0        On-link      192.168.6.46    281
 192.168.6.46      255.255.255.255  On-link      192.168.6.46    281
 192.168.6.255    255.255.255.255  On-link      192.168.6.46    281
 192.168.56.0      255.255.255.0        On-link      192.168.56.1    281
 192.168.56.1      255.255.255.255  On-link      192.168.56.1    281
192.168.56.255    255.255.255.255  On-link      192.168.56.1    281
 224.0.0.0         240.0.0.0        On-link      127.0.0.1    331
 224.0.0.0         240.0.0.0        On-link      192.168.56.1    281
 224.0.0.0         240.0.0.0        On-link      192.168.6.46    281
 255.255.255.255  255.255.255.255  On-link      127.0.0.1    331
 255.255.255.255  255.255.255.255  On-link      192.168.56.1    281
 255.255.255.255  255.255.255.255  On-link      192.168.6.46    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
12   331 fe80::/64                 On-link
7    281 fe80::/64                 On-link
12   331 fe80::/64                 On-link
12   331 fe80::d3:14b6:8a3e:b01e/128
7    281 fe80::142f:9783:684f:a27d/128
3    281 fe80:::60c6:9871:f4d0:b304/128
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    192.168.6.46:2754    20.198.162.76:https  ESTABLISHED
  TCP    192.168.6.46:2795    a104-104-60-83:https CLOSE_WAIT
  TCP    192.168.6.46:2829    117.18.237.29:http   CLOSE_WAIT
  TCP    192.168.6.46:2941    maa03s37-in-f3:https TIME_WAIT
  TCP    192.168.6.46:2942    maa05s20-in-f5:https TIME_WAIT
  TCP    192.168.6.46:2943    maa05s15-in-f10:https TIME_WAIT
  TCP    192.168.6.46:2944    maa03s47-in-f14:https TIME_WAIT
  TCP    192.168.6.46:2945    maa03s34-in-f1:https  TIME_WAIT
  TCP    192.168.6.46:2946    maa03s45-in-f3:https  TIME_WAIT
  TCP    192.168.6.46:2947    maa03s43-in-f10:https TIME_WAIT
  TCP    192.168.6.46:2948    maa03s38-in-f14:https TIME_WAIT
  TCP    192.168.6.46:2949    maa05s22-in-f14:https TIME_WAIT
  TCP    192.168.6.46:2950    maa03s47-in-f14:https TIME_WAIT
  TCP    192.168.6.46:2951    maa03s34-in-f1:https  TIME_WAIT
  TCP    192.168.6.46:2952    maa03s47-in-f14:https ESTABLISHED
  TCP    192.168.6.46:2953    maa03s34-in-f1:https  ESTABLISHED
  TCP    192.168.6.46:2954    maa05s24-in-f13:https ESTABLISHED
  TCP    192.168.6.46:2955    123:http                ESTABLISHED
  TCP    192.168.6.46:2956    maa05s19-in-f14:https ESTABLISHED
  TCP    192.168.6.46:2957    maa05s19-in-f14:https ESTABLISHED
  TCP    192.168.6.46:2960    maa05s16-in-f10:https ESTABLISHED
  TCP    192.168.6.46:2961    maa05s20-in-f5:https  ESTABLISHED
  TCP    192.168.6.46:2962    maa03s40-in-f11:https ESTABLISHED
  TCP    192.168.6.46:2963    maa05s10-in-f10:https ESTABLISHED
  TCP    192.168.6.46:2964    maa03s41-in-f4:https  ESTABLISHED
  TCP    192.168.6.46:2965    si-in-f188:5228     ESTABLISHED
  TCP    192.168.6.46:2966    maa03s37-in-f3:https  ESTABLISHED
  TCP    192.168.6.46:2967    sf-in-f139:https    ESTABLISHED
  TCP    192.168.6.46:2968    maa05s12-in-f10:https ESTABLISHED
  TCP    192.168.6.46:2969    maa05s22-in-f14:https ESTABLISHED
  TCP    192.168.6.46:2973    maa05s24-in-f3:https ESTABLISHED
  TCP    192.168.6.46:2977    maa03s38-in-f14:https ESTABLISHED
  TCP    192.168.6.46:2978    maa03s46-in-f10:https ESTABLISHED
  TCP    192.168.6.46:2982    maa05s10-in-f3:https  ESTABLISHED
  TCP    192.168.6.46:2986    maa05s19-in-f14:https ESTABLISHED
  TCP    192.168.6.46:2987    maa05s21-in-f14:https ESTABLISHED
  TCP    192.168.6.46:2988    maa05s12-in-f14:https ESTABLISHED
  TCP    192.168.6.46:2989    maa05s12-in-f14:https ESTABLISHED
```

NETWORKING & SYSTEM ADMINISTRATION LAB

Experiment No.: 8

Aim

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

Procedure

TCPDUMP

1. **sudo apt update && apt install tcpdump :** Update and install tcpdump on system.

```
mca@T70:~$ sudo apt update && apt install tcpdump
[sudo] password for mca:
Hit:1 http://in.archive.ubuntu.com/ubuntu bionic InRelease
Hit:2 https://dl.google.com/linux/chrome/deb stable InRelease
Ign:3 https://repo.mongodb.org/apt/ubuntu trusty/mongodb-org/3.6 InRelease
Hit:4 http://ppa.launchpad.net/codeblocks-devs/release/ubuntu bionic InRelease
Get:5 https://repo.mongodb.org/apt/ubuntu trusty/mongodb-org/3.6 Release [2,495 B]
Err:6 http://ppa.launchpad.net/jonathonf/python-3.6/ubuntu bionic InRelease
   403 Forbidden [IP: 185.125.190.52 80]
Get:7 https://repo.mongodb.org/apt/ubuntu trusty/mongodb-org/3.6 Release.gpg [801 B]
Err:7 https://repo.mongodb.org/apt/ubuntu trusty/mongodb-org/3.6 Release.gpg
  The following signatures were invalid: EXPKEYSIG 58712A2291FA4ADS MongoDB 3.6 Release Signing Key <packaging@mongodb.com>
Hit:8 http://ppa.launchpad.net/webupd8team/java/ubuntu bionic InRelease
Reading package lists... Done
E: Failed to fetch http://ppa.launchpad.net/jonathonf/python-3.6/ubuntu/dists/bionic/InRelease  403 Forbidden [IP: 185.125.190.52 80]
E: The repository 'http://ppa.launchpad.net/jonathonf/python-3.6/ubuntu bionic InRelease' is 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.
W: An error occurred during the signature verification. The repository is not updated and the previous index files will be used. GPG error: ht
tps://repo.mongodb.org/apt/ubuntu trusty/mongodb-org/3.6 Release: The following signatures were invalid: EXPKEYSIG 58712A2291FA4ADS MongoDB 3.
6 Release Signing Key <packaging@mongodb.com>
```

2. **sudo tcpdump -D :** To display all available interfaces

```
mca@T70:~$ sudo tcpdump -D
1.eth0 [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)
```

3. **sudo tcpdump -i enp5s0 :**

```
mca@T70:~$ sudo tcpdump -i enp5s0
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp5s0, link-type EN10MB (Ethernet), capture size 262144 bytes
16:47:00.746408 IP 192.168.6.87.63808 > 239.255.255.1900: UDP, length 175
16:47:00.748367 IP T70.45785 > dns.google.domain: 37887+ [1au] PTR? 256.255.255.239.in-addr.arpa. (57)
16:47:00.764189 IP dns.google.domain > T70.45785: 37887 NXDomain 0/1 (14)
16:47:00.765949 IP T70.44735 > dns.google.domain: 20520+ [1au] PTR? 87.6.168.192.in-addr.arpa. (54)
16:47:00.782239 IP dns.google.domain > T70.44735: 20520 NXDomain 0/0/1 (54)
16:47:00.783516 IP T70.34911 > dns.google.domain: 33511+ [1au] PTR? 8.8.8.8.in-addr.arpa. (49)
16:47:00.799527 IP dns.google.domain > T70.34911: 33511 1/0/1 PTR dns.google. (73)
16:47:00.800463 IP T70.37834 > dns.google.domain: 1663+ [1au] PTR? 177.6.168.192.in-addr.arpa. (55)
16:47:00.842231 ARP, Request who-has 192.168.6.198 tell _gateway, length 46
16:47:00.842907 IP T70.50530 > dns.google.domain: 17879+ [1au] PTR? 198.6.168.192.in-addr.arpa. (55)
16:47:00.858257 IP dns.google.domain > T70.50530: 17879 NXDomain 0/0/1 (55)
16:47:00.859646 IP T70.55684 > dns.google.domain: 47964+ [1au] PTR? 100.6.168.192.in-addr.arpa. (55)
16:47:00.874560 ARP, Request who-has 192.168.6.208 tell 192.168.6.209, length 46
16:47:00.875145 ARP, Request who-has 192.168.6.198 tell 192.168.6.209, length 46
16:47:00.878181 IP dns.google.domain > T70.55684: 47964 NXDomain 0/0/1 (55)
16:47:00.879369 IP T70.60970 > dns.google.domain: 60769+ [1au] PTR? 206.6.168.192.in-addr.arpa. (55)
16:47:00.885326 IP dns.google.domain > T70.60970: 60769 NXDomain 0/0/1 (55)
16:47:00.896667 IP T70.35486 > dns.google.domain: 52110+ [1au] PTR? 209.6.168.192.in-addr.arpa. (55)
16:47:00.912476 IP dns.google.domain > T70.35486: 52110 NXDomain 0/0/1 (55)
16:47:00.940834 ARP, Request who-has 192.168.6.72 tell _gateway, length 46
16:47:00.941497 IP T70.59760 > dns.google.domain: 36981+ [1au] PTR? 72.6.168.192.in-addr.arpa. (54)
16:47:00.957451 IP dns.google.domain > T70.59760: 36981 NXDomain 0/0/1 (54)
16:47:01.191390 ARP, Request who-has 192.168.6.208 tell 192.168.6.203, length 46
16:47:01.192096 IP T70.34026 > dns.google.domain: 1701+ [1au] PTR? 208.6.168.192.in-addr.arpa. (55)
16:47:01.208653 IP dns.google.domain > T70.34026: 1701 NXDomain 0/0/1 (55)
```

Name: Sreelakshmi R

Roll No: 41

Batch: S2B RMCA

Date: 02/06/22

- 4. sudo tcpdump -c 4 -i enp5s0 :** 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@T70:~$ sudo tcpdump -c 4 -i enp5s0
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp5s0, link-type EN10MB (Ethernet), capture size 262144 bytes
16:47:47.129533 ARP, Request who-has 192.168.6.207 tell _gateway, length 46
16:47:47.130922 IP T70.47690 > dns.google.domain: 25496+ [1au] PTR? 207.6.168.192.in-addr.arpa. (55)
16:47:47.145069 IP 192.168.6.80.netbios-ns > 192.168.6.255.netbios-ns: NBT UDP PACKET(137): QUERY; REQUEST; BROADCAST
16:47:47.145488 IP 192.168.6.80.mdns > 224.0.0.251.mdns: 0 AAAA (QM)? t.local. (25)
4 packets captured
22 packets received by filter
12 packets dropped by kernel
```

- 5.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@S48:~$ sudo tcpdump -c 4 -XX -i enp3s0
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp3s0, link-type EN10MB (Ethernet), capture size 262144 bytes
15:00:49.952999 IP 192.168.6.80.netbios-ns > 192.168.6.255.netbios-ns: NBT UDP PACKET(137): QUERY; REQUEST; BROADCAST
 0x0000: ffff ffff ffff 7824 afba c490 0800 4500 ....x$.....E.
 0x0010: 004e 044f 0000 8011 a7b0 c0a8 0650 c0a8 .N.O.....P..
 0x0020: 06ff 0089 003a 66e5 cf7b 0110 0001 .....:f...{....
 0x0030: 0000 0000 0000 2046 4543 4143 4143 .....FECACACAC
 0x0040: 4143 4143 4143 4143 4143 4143 ACACACACACACAC
 0x0050: 4143 4143 4141 4100 0020 0001 ACACAAA.....
15:00:49.954419 IP S48.43685 > dns.google.domain: 13814+ [1au] PTR? 255.6.168.192.in-addr.arpa. (55)
 0x0000: 001a 8c6b 54cf 7824 afba c571 0800 4500 ...kT.x$..q..E.
 0x0010: 0053 ff74 4000 4011 643d c0a8 0630 0808 .S.t@.d=...0..
 0x0020: 0808 aaa5 0035 003f 5af0 35f6 0100 0001 .....5.?Z.5.....
 0x0030: 0000 0000 0001 0332 3535 0136 0331 3638 .....255.6.168
 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 .
15:00:49.969688 IP dns.google.domain > S48.43685: 13814 NXDomain 0/0/1 (55)
 0x0000: 7824 afba c571 001a 8c6b 54cf 0800 4580 x$...q...kT....E.
 0x0010: 0053 b980 0000 7c11 adb1 0808 0808 c0a8 .S....|.....
 0x0020: 0630 0035 aaa5 003f da79 35f6 8183 0001 .0.5.?..y5.....
 0x0030: 0000 0000 0001 0332 3535 0136 0331 3638 .....255.6.168
 0x0040: 0331 3932 0769 6e2d 6164 6472 0461 7270 .192.in-addr.arp
```

- 6.sudo tcpdump -i enp5s0 -c5 port 80 :** To filter packets based on the desired service or port, use the port filter.

```
mca@T70:~$ sudo tcpdump -i enp5s0 -c5 port 80
tcpdump: verbose output suppressed, use -v or -vv for full protocol decode
listening on enp5s0, link-type EN10MB (Ethernet), capture size 262144 bytes
16:48:51.171912 IP T70.46188 > a23-214-85-113.deploy.static.akamaitechnologies.com.http: Flags [.], ack 42964396, win 251, options [nop,nop,TS val 2537200316 ecr 1554826396], length 0
16:48:51.214152 IP a23-214-85-113.deploy.static.akamaitechnologies.com.http > T70.46188: Flags [.], ack 1, win 235, options [nop,nop,TS val 15
54836636 ecr 2537159632], length 0
16:49:01.411901 IP T70.46188 > a23-214-85-113.deploy.static.akamaitechnologies.com.http: Flags [.], ack 1, win 251, options [nop,nop,TS val 25
37210556 ecr 1554836636], length 0
16:49:01.454171 IP a23-214-85-113.deploy.static.akamaitechnologies.com.http > T70.46188: Flags [.], ack 1, win 235, options [nop,nop,TS val 15
54846876 ecr 2537159632], length 0
16:49:11.651895 IP T70.46188 > a23-214-85-113.deploy.static.akamaitechnologies.com.http: Flags [.], ack 1, win 251, options [nop,nop,TS val 25
37220796 ecr 1554846876], length 0
5 packets captured
5 packets received by filter
0 packets dropped by kernel
```

- 7.sudo tcpdump -i enp5s0 -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@T70:~$ sudo tcpdump -i enp5s0 -c 10 -w icmp.pcap
tcpdump: listening on enp5s0, link-type EN10MB (Ethernet), capture size 262144 bytes
10 packets captured
14 packets received by filter
0 packets dropped by kernel
```

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

```
mca@T70:~$ sudo tcpdump -r icmp.pcap
reading from file icmp.pcap, link-type EN10MB (Ethernet)
16:50:48.722902 IP 192.168.6.82.51555 > 239.255.255.250.1900: UDP, length 175
16:50:48.730551 ARP, Request who-has 192.168.6.180 tell _gateway, length 46
16:50:48.768638 ARP, Request who-has 192.168.6.196 tell _gateway, length 46
16:50:48.926029 IP 192.168.6.80.netbios-ns > 192.168.6.255.netbios-ns: NBT UDP PACKET(137): QUERY; REQUEST; BROADCAST
16:50:48.937309 IP 192.168.6.215.50063 > 239.255.255.250.1900: UDP, length 137
16:50:49.062055 ARP, Request who-has 192.168.6.199 tell _gateway, length 46
16:50:49.104204 IP 0.0.0.0.bootpc > 255.255.255.255.bootps: BOOTP/DHCP, Request from 04:09:73:99:e3:b0 (oui Unknown), length 261
16:50:49.213653 IP 0.0.0.0.bootpc > 255.255.255.255.bootps: BOOTP/DHCP, Request from 04:09:73:99:63:ac (oui Unknown), length 261
16:50:49.383771 STP 802.1s, Rapid STP, CIST Flags [Learn, Forward, Agreement], length 102
16:50:49.483018 IP 192.168.6.84.7765 > 255.255.255.255.7765: UDP, length 100
mca@T70:~$
```

NETWORKING & SYSTEM ADMINISTRATION LAB

Wireshark

Procedure

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

```
mca@s41:~$ sudo apt install wireshark
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  debhelper dh-autoreconf dh-strip-nondeterminism libarchive-cpio-perl libfile-stripnondeterminism-perl libmail-sendmail-perl libpcre16-3
  libpcre3-dev libpcrecpp0v5 libssl-dev libssl-doc libssns-hostname-long-perl php-common php-pear php-xml php7.2-cli
  php7.2-common php7.2-json php7.2-opcache php7.2-readline php7.2-xml pkg-php-tools po-debconf shtool
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  geoip-database-extra javascript-common libc-ares2 libjs-openlayers libqt5multimedia5 libsmi2ldbl libsnappy1v5 libspandsp2 libssh-gcrypt-4
  libwireless-data libwireshark10 libwretap7 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 libqt5multimedia5 libsmi2ldbl libsnappy1v5 libspandsp2 libssh-gcrypt-4
  libwireless-data libwireshark10 libwretap7 libwscodecs1 libwsutil8 wireshark wireshark-common wireshark-qt
0 upgraded, 17 newly installed, 0 to remove and 5 not upgraded.
Need to get 31.1 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://archive.ubuntu.com/ubuntu bionic/universe amd64 geoip-database-extra all 20180315-1 [11.1 MB]
Get:2 http://archive.ubuntu.com/ubuntu bionic/main amd64 javascript-common all 11 [6,066 B]
Get:3 http://archive.ubuntu.com/ubuntu bionic/universe amd64 libqt5multimedia5 amd64 5.9.5-0ubuntu1 [293 kB]
```

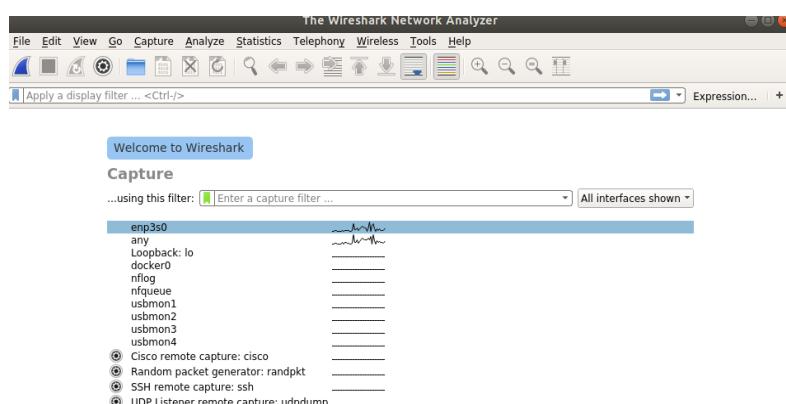
2.sudo adduser \$USER wireshark :

```
mca@s41:~$ sudo adduser $mca wireshark
adduser: The group `wireshark' already exists.
```

3.sudo wireshark : To start wireshark application.

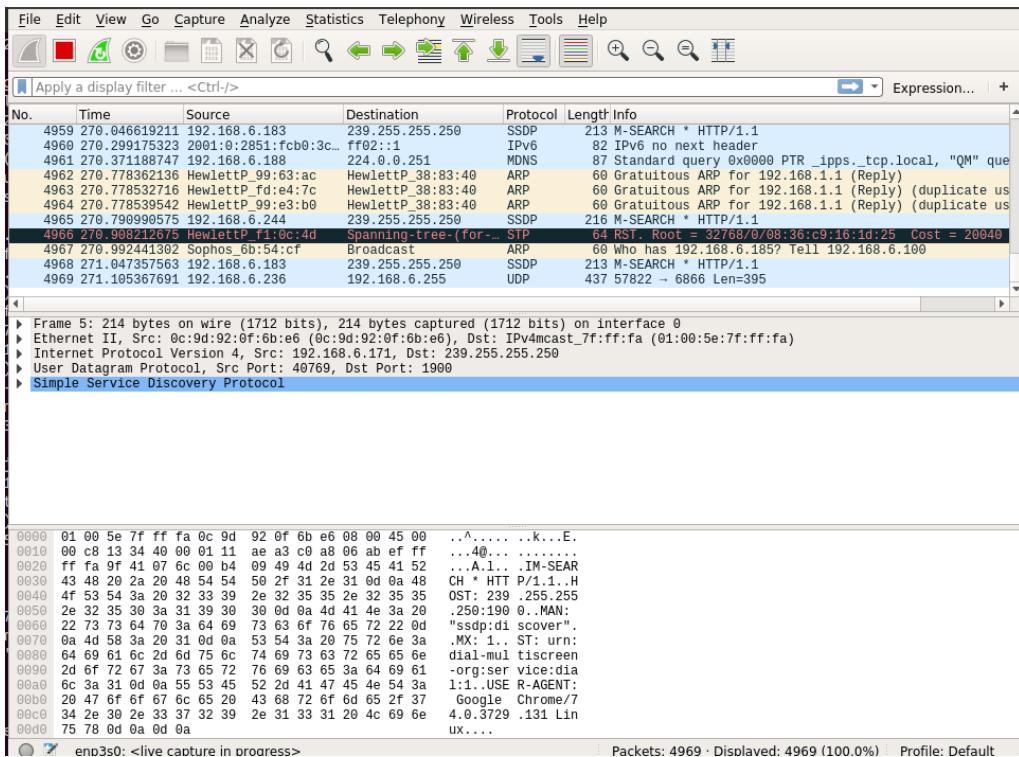
```
mca@s41:~$ sudo wireshark
QStandardPaths: XDG_RUNTIME_DIR not set, defaulting to '/tmp/runtime-root'
mca@s41:~$
```

4.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:



Name: Sreelakshmi R
Roll No: 41
Batch: S2B RMCA
Date: 06/06/22

Many packets were captured:



5.sudo apt -get install netcat : Installing netcat.

```
mca@s48:~$ sudo apt -get install netcat
[sudo] password for mca:
E: Command line option 'g' [from -get] is not understood in combination with the other options.
```

6.sudo nc -l -p 443 : 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@s41:~$ sudo nc -l -p 443
network
wireshark
netcat
```

7.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@s41:~$ sudo nc 192.168.6.41 443
[sudo] password for mca:
network
wireshark
netcat
```

NETWORKING & SYSTEM ADMINISTRATION LAB

Experiment No.: 9

Aim

KVM Installation.

Name: Sreelakshmi R

Roll No: 41

Batch: B

Date: 23/05/2022

Procedure

Step 1: Update the repositories

```
mca@U41:~$ sudo apt update
[sudo] password for mca:
Get:1 http://packages.microsoft.com/repos/code stable InRelease [10.4 kB]
Get:2 https://dl.google.com/linux/chrome/deb stable InRelease [1,811 B]
Hit:3 http://archive.ubuntu.com/ubuntu bionic InRelease
Get:4 http://packages.microsoft.com/repos/code/stable/main armhf Packages [90.1 kB]
Get:5 http://packages.microsoft.com/repos/code/stable/main arm64 Packages [90.3 kB]
Get:6 http://packages.microsoft.com/repos/code/stable/main amd64 Packages [89.3 kB]
Get:7 https://dl.google.com/linux/chrome/deb stable/main amd64 Packages [1,101 B]
Hit:8 http://ppa.launchpad.net/codeblocks-devs/release/ubuntu bionic InRelease
Err:9 http://ppa.launchpad.net/jonathonf/python-3.6/ubuntu bionic InRelease
  403 Forbidden [IP: 185.125.190.52 80]
Hit:10 http://ppa.launchpad.net/pasgui/ppa/ubuntu bionic InRelease
Hit:11 https://ppa.launchpad.net/lubuntu-team/java/ubuntu bionic InRelease
```

Step 2: Install essential KVM packages

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

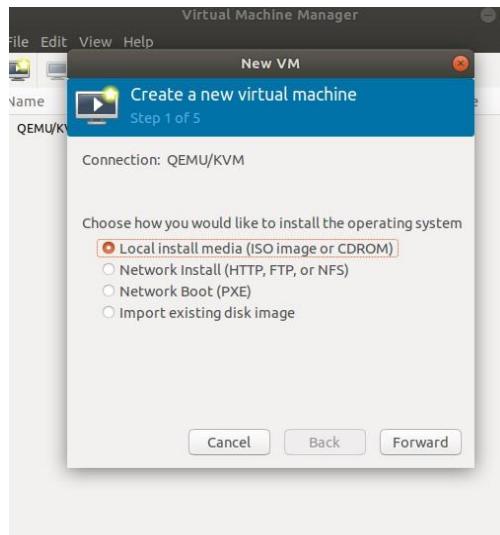
```
mca@U40:~$ sudo apt install qemu-kvm libvirt-daemon-system libvirt-clients bridge-utils virt-manager
Reading package lists... Done
Building dependency tree
Reading state information... Done
qemu-kvm is already the newest version (1:2.11+dfsg-1ubuntu7.4).
The following additional packages will be installed:
  augeas-lenses dmeventd ebtables gir1.2-appindicator3-0.1 gir1.2-gtk-vnc-2.0
  gir1.2-libosinfo-1.0 gir1.2-libvirt-glib-1.0 gir1.2-spiceclientglib-2.0
  gir1.2-spiceclientgtk-3.0 libaugeas0 libdevmapper-event1.02.1
  libgovirt-common libgovirt2 libgtk-vnc-2.0.0 libgvnc-1.0.0 liblvm2app2.2
  liblvm2cmd2.02 libnetcf1 libosinfo1.0.0 libphodav-2.0.0
  libphodav-2.0.0-common libspice-client-glib-2.0.8 libspice-client-gtk-3.0.5
  libusbredirhost1 libvirt-daemon libvirt-daemon-driver-storage-rbd
  libvirt-glib-1.0.0 libvirt0 libxml2-utils lvm2 osinfo-db python-asn1crypto
  python-certifi python-cffi-backend python-chardet python-cryptography
  python-dbus python-enum34 python-gi python-gi-cairo python-idna
  python-ipaddr python-ipaddress python-libvirt python-libxml2 python-openssl
  python-pkg-resources python-requests python-six python-urllib3
  spice-client-glib-usb-acl-helper virt-viewer virtinst
Suggested packages:
  augeas-doc augeas-tools libosinfo-l10n gstreamer1.0-plugins-bad
  gstreamer1.0-libav libvirt-daemon-driver-storage-gluster
  libvirt-daemon-driver-storage-sheepdog libvirt-daemon-driver-storage-zfs
```

Step 3: Start virt-manager with

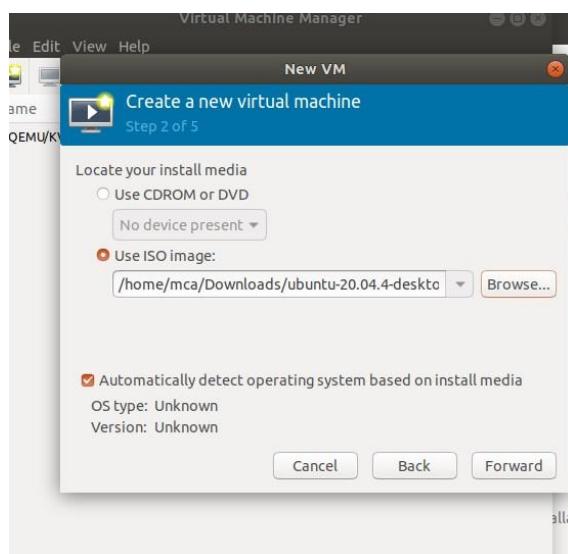
```
mca@U41:~$ sudo virt-manager
mca@U41:~$ █
```

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

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



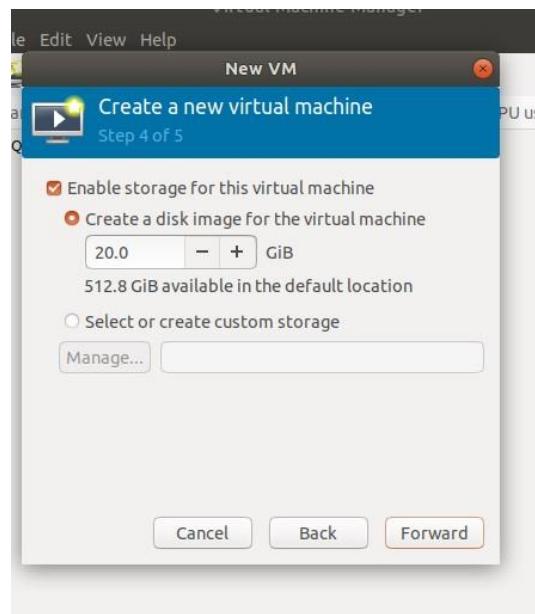
Step 5: Choose ISO, click Forward



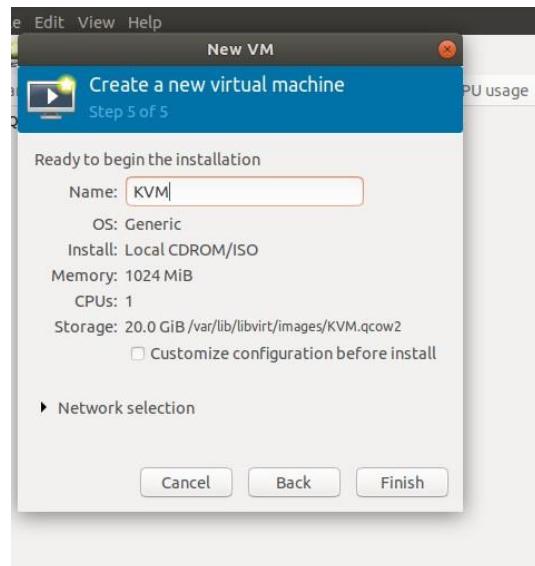
Step 6: Enter the amount of RAM and the number of CPUs you wish to allocate to the VM and proceed to the next step.



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



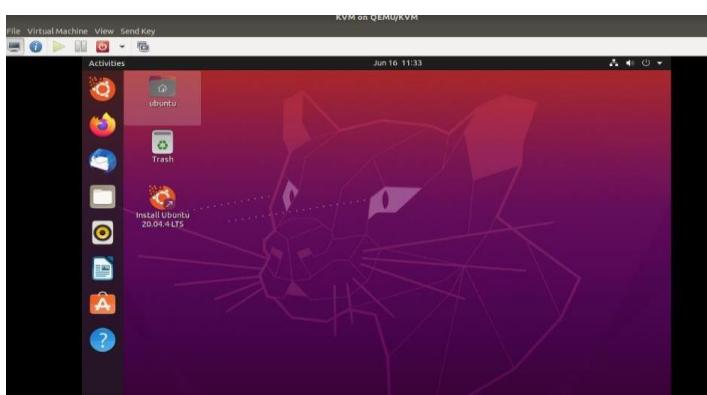
Step 8: Specify the name for your VM and click **Finish** to complete the setup.



Step 9: Select language



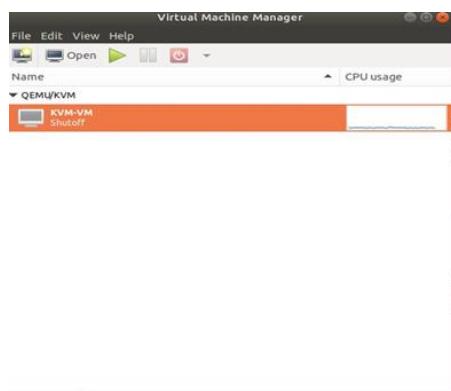
Step 10: The VM starts automatically, prompting you to start installing the OS that's on the ISO file.



Step 11: Check the state of KVM

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

mca@U40:~$
```



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

NETWORKING&SYSTEM ADMINISTRATION LAB

Experiment No: 10

Aim

Introduction to Containers: Docker installation and deployment.

Name: Sreelakshmi R

Roll No:41

Batch:S2 MCA

Date:23/05/22

Procedure:

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

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

```
mca@S41:~$ 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
The following packages were automatically installed and are no longer required:
  debhelper dh-autoreconf dh-strip-nondeterminism libarchive-cpio-perl
  libfile-stripnondeterminism-perl libmail-sendmail-perl libpcre16-3
  libpcre3-dev libpcre32-3 libpcrecpp0v5 libssl-dev libssl-doc
  libsys-hostname-long-perl php-common php-pecl php-xml php7.2-cli
  php7.2-common php7.2-json php7.2-opcache php7.2-readline php7.2-xml
  pkg-php-tools po-debconf shtool
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 5 not upgraded.
```

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

\$ sudo apt-get update

```
mca@S41:~$ sudo apt-get update
Err:1 http://ppa.launchpad.net/jonathonf/python-3.6/ubuntu bionic InRelease
  403 Forbidden [IP: 185.125.190.52 80]
Hit:2 http://archive.ubuntu.com/ubuntu bionic InRelease
Hit:3 http://ppa.launchpad.net/pasgui/ppa/ubuntu bionic InRelease
Get:4 http://ppa.launchpad.net/webupd8team/java/ubuntu bionic InRelease [15.4 kB]
Reading package lists... Done
E: Failed to fetch http://ppa.launchpad.net/jonathonf/python-3.6/ubuntu/dists/bionic/InRelease  403 Forbidden [IP: 185.125.190.52 80]
E: The repository 'http://ppa.launchpad.net/jonathonf/python-3.6/ubuntu bionic InRelease' is no longer signed.
N: Updating from such a repository can't be done securely, and is therefore disabled by default.
N: See apt-secure(8) manpage for repository creation and user configuration details.
E: Repository 'http://ppa.launchpad.net/webupd8team/java/ubuntu bionic InRelease' changed its 'Label' value from 'Oracle Java (JDK) 8 / 9 Installer PPA' to 'Oracle Java (JDK) 8 Installer PPA (DISCONTINUED)'
N: This must be accepted explicitly before updates for this repository can be applied. See apt-secure(8) manpage for details.
```

4. Install Docker using the following command.

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

\$ sudo apt install docker.io

```
mca@S41:~$ sudo apt install docker.io
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  debhelper dh-autoreconf dh-strip-nondeterminism libarchive-cpio-perl libfile-stripnondeterminism-perl libmail-sendmail-perl libpcre16-3
  libpcre3-dev libpcrecpp0v5 libssl-dev libssl-doc libsys-hostname-long-perl php-common php-pear php-xml php7.2-cli
  php7.2-common php7.2-json php7.2-opcache php7.2-readline php7.2-xml pkg-php-tools po-debconf shtool
Use 'sudo apt autoremove' to remove them.
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 5 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://archive.ubuntu.com/ubuntu bionic/main amd64 bridge-utils amd64 1.5-15ubuntu1 [30.1 kB]
Get:2 http://archive.ubuntu.com/ubuntu bionic/universe amd64 cgroupfs-mount all 1.4 [6,320 B]
Get:3 http://archive.ubuntu.com/ubuntu bionic/universe amd64 docker.io amd64 17.12.1-0ubuntu1 [30.1 MB]
Get:4 http://archive.ubuntu.com/ubuntu bionic/main amd64 ubuntu-fan all 0.12.10 [34.7 kB]
Fetched 30.1 MB in 3s (8,659 kB/s)
Preconfiguring packages ...
Selecting previously unselected package bridge-utils.
(Reading database ... 177730 files and directories currently installed.)
Preparing to unpack .../bridge-utils_1.5-15ubuntu1_amd64.deb ...
Unpacking bridge-utils (1.5-15ubuntu1) ...
Selecting previously unselected package cgroupfs-mount.
Preparing to unpack .../cgrounfsmount_1.4_all.deb ...
Unpacking cgroupfs-mount (1.4) ...
Selecting previously unselected package docker.io.
Preparing to unpack .../docker.io_17.12.1-0ubuntu1_amd64.deb ...
Unpacking docker.io (17.12.1-0ubuntu1) ...
```

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

\$ sudo snap install docker

```
mca@S41:~$ sudo snap install docker
docker 20.10.14 from Canonical* installed
```

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

\$ docker --version

```
mca@S41:~$ docker --version
Docker version 17.12.1-ce, build 7390fc6
```

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

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

\$ sudo docker run hello-world

```
mca@S41:~$ sudo docker run hello-world
Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
2db29710123e: Pull complete
Digest: sha256:80f31daac7b312ba29d65080fddf797dd76acfb870e677f390d5acba9741b17
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.

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

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

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

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
4fdef57be18a	hello-world	"/hello"	About a minute ago	Exited (0) About a minute ago		dreamy_fe

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

\$ sudo docker ps

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES

You've just successfully installed Docker on Ubuntu.