

FEDERAL INSTITUTE OF SCIENCE AND TECHNOLOGY

(FISAT)TM

HORMIS NAGAR, MOOKKANNOOR

ANGAMALY-683577



'FOCUS ON EXCELLENCE'

LABORATORY RECORD

Name : JUNED ANSAR P

Branch : MCA

Batch : B

Semester : SECOND

Roll No : 06

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Name : JUNED ANSAR P

Branch : COMPUTER APPLICATION

Semester : SECOND Roll No: 06

University Exam.Reg. No:

CERTIFICATE

*Certified that this is the Bonafide record of the Practical work done by
Mr/Msin the
.....Laboratory of the Federal Institute of
Science and Technology during the academic year*

Signature of Staff in Charge

Name :

Date :

Signature of H.O.D

Name:

Date of University practical examination

Signature of

Internal Examiner

Signature of

External Examiner

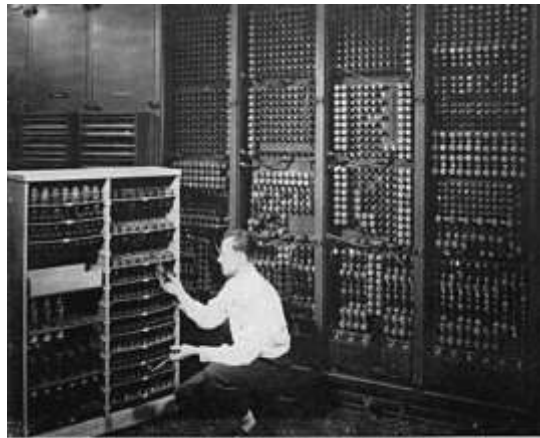
EXPERIMENT -1

1. BASIC INTRODUCTORY CONCEPT OF COMPUTER HARDWARE

1.1 What is Computer?

A computer is a programmable electronic device that accepts raw data as input and processes it with a set of instructions (a program) to produce the result as output. It renders output just after performing mathematical and logical operations and can save the output for future use. It can process numerical as well as non-numerical calculations.

1.2 History of Computers

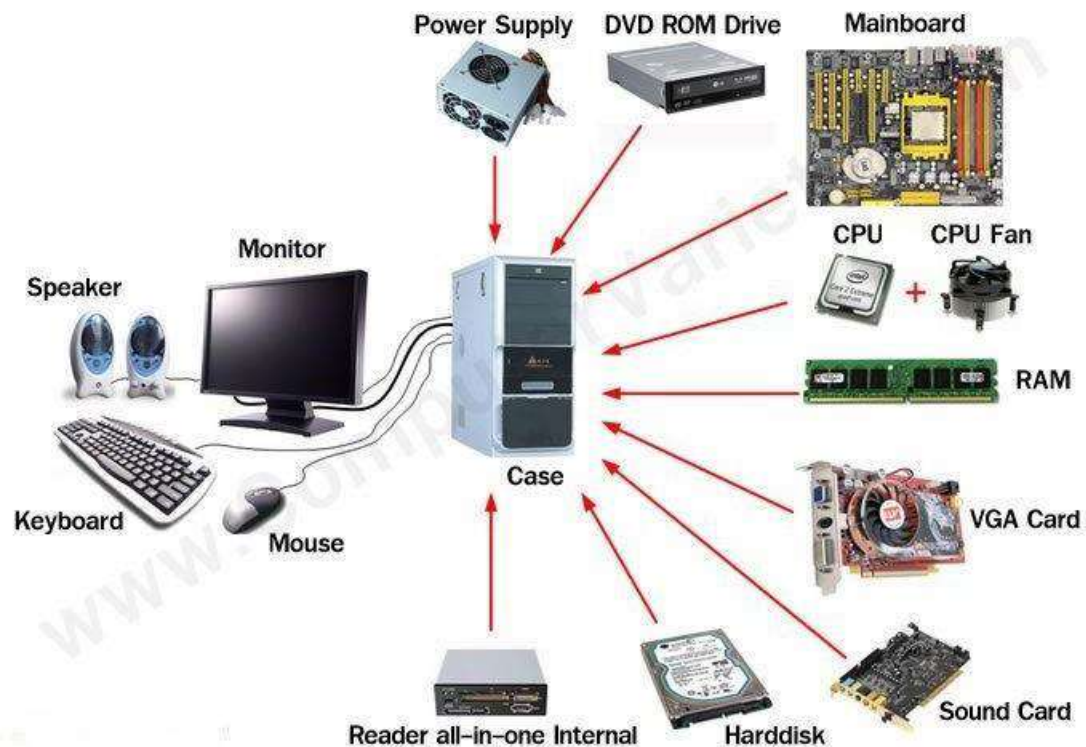


Replacing a bad tube mount checking among ENIAC's 19,000 possibilities.

Since the evolution of humans, devices have been used for calculations for thousands of years. One of the earliest and well-known devices was an abacus. Then in 1822, the father of computers, **Charles Babbage** began developing the first mechanical computer.

1.3 Computer Hardware

Computer hardware includes the physical parts of a computer, such as the case, central processing unit (CPU), monitor, mouse, keyboard, computer data storage, graphics card, sound card, speakers and motherboard. Hardware is typically directed by the software to execute any command or instruction. A combination of hardware and software forms a usable computing system, although other systems exist with only hardware.



1.4 The following are the basic components that will be detailed :-

1.4.1 Motherboard

1.4.2. RAM Modules

1.4.3. Daughter cards

1.4.4 Bus slots

1.4.5. SMPS

1.4.6. Internal Storage Devices

1.4.7. Interfacing Ports

1.4.1 MOTHERBOARD

A motherboard (also called mainboard, main circuit board, system board, baseboard, planar board, logic board or mobo) is the main printed circuit board (PCB) in general-purpose computers and other expandable systems. It holds and allows communication between many of the crucial electronic components of a system, such as the central processing unit (CPU) and memory, and provides connectors for other peripherals. Unlike a backplane, a motherboard usually contains significant sub-systems, such as the central processor, the chipset's input/output and memory controllers, interface connectors, and other components integrated for general use.



Motherboard means specifically a PCB with expansion capabilities. As the name suggests, this board is often referred to as the "mother" of all components attached to it, which often include peripherals, interface cards, and daughter cards: soundcards, video

cards, network cards, host bus adapters, TV tuner cards, IEEE 1394 cards; and a variety of other custom components.

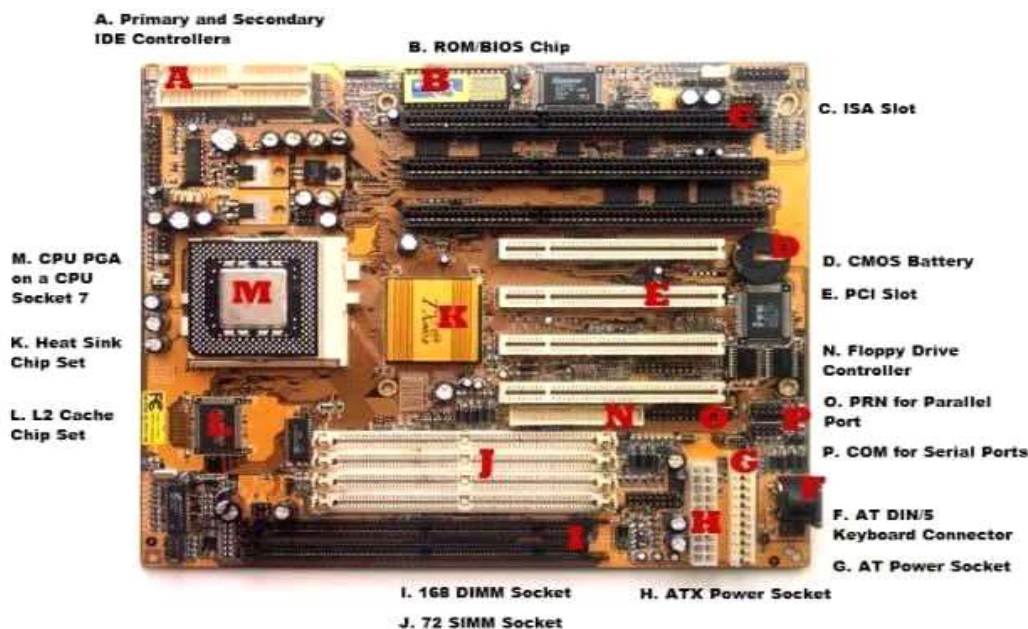
1.4.1.1 FEATURES OF MOTHERBOARD

- Motherboard varies greatly in supporting various types of components.
- Motherboard supports a single type of CPU and few types of memories.
- Video cards, hard disks, sound cards have to be compatible with the motherboard to function properly.
- Motherboards, cases, and power supplies must be compatible to work properly together.

1.4.1.2 TYPES OF MOTHERBOARD

1.4.1.2.1 AT Motherboard

These motherboards have bigger physical dimensions of hundreds of millimetres and hence they are not the right fit for the mini desktop category of computers.



1.4.1.2.2 ATX Motherboards

ATX denotes Advanced technology extended, It was developed by Intel during the 1990s and it was an improved version over an earlier version of AT motherboard. It is smaller in size when compared to AT and it provides interchangeability of the connected components.

1.4.1.2.3 BTX Motherboard

BTX denotes Balanced Technology Extended, intended to manage demands of new technologies in terms of more power requirements hence generation of more heat.

1.4.1.2.4 Pico BTX Motherboard

These boards are smaller in size and hence the word Pico. Two expansion slots are supported in spite of being sharing the top half of BTX. Half-height or riser cards are its unique features and it supports the demands of digital applications.

1.4.1.2.5 Mini ITX Motherboard

It's a miniature version of motherboard. Designed in the early 2000s and its dimension is 17 x 17 cm. Mainly used in small form factor (SFF) computer due to its lower power consumption and faster cooling ability.

1.4.1.3 MAIN COMPONENTS OF MOTHERBOARD

1.4.1.3.1 FLOPPY DISC CONTROLLER

A floppy disk controller (FDC) is an electronic chip controller used as an interface between a computer and a floppy disk drive. Modern computers have this chip embedded in the motherboard, whereas they were a separate component when they were originally introduced.

A floppy disk controller (FDC) is a specially designed chip that controls the reading and writing functionality of a floppy drive. An FDC can support up to four floppy disk drives at a time. The controller is connected to the system bus of the CPU and appears as a set of I/O ports to the computer. It is usually also linked to a serial bus of the direct memory access (DMA) controller. In an x86 computer, the floppy disk controller uses IRQ6, whereas interrupt schemes are used on other systems. Data transmission is often done by FDC while in DMA mode.



Floppy disk controller functions (FDC)

- Translate data bits into FM, MFM, M²FM, or GCR format to be able to record them
- Interpret and execute commands such as seek, read, write, format, etc.
- Error detection with check sums generation and verification, like CRC
- Synchronize data with phase-locked loop(PLL)

1.4.1.3.2 Serial Ports



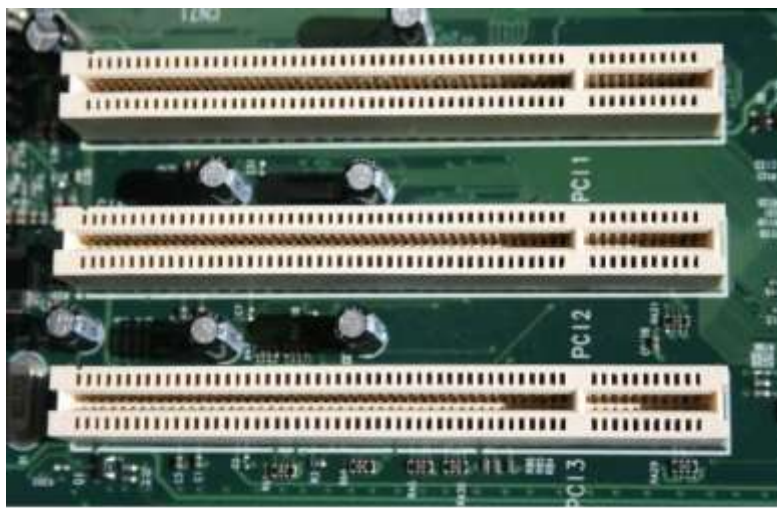
Serial Ports provide an interface to connect serial lines to prepare a serial communication. Serial ports are typically used in modem, mouse, security cameras etc. A Serial port uses DB-9 connector, a 9 pin D-Shaped Connector which connects to the transmission line. A serial port provides a serial communication using one line and thus have no dependency on other wire's speed and its length can be extended as per the need.

1.4.1.3.3 Parallel Ports



Parallel ports provide an interface to connect multiple lines to prepare a parallel communication to send large data at a time. Parallel ports are used in connecting printers, hard-drives, CD-drives etc. All lines speed should be same to avoid error and cross-talk issues. To avoid such issues, the wires are kept small in length. A parallel port uses D-25 connector, a 25 pin D- Shaped connector which connects to the transmission wires.

1.4.1.3.4 The Expansion Buses



An expansion bus is an input/output pathway from the CPU to peripheral devices and it is typically made up of a series of slots on the motherboard. Expansion boards(cards) plug into the bus. PCI is the most common expansion bus in a PC and other hardware platforms. PCI stands for Peripheral Component Interface; PCI slot allows you to insert expansion cards into your computer. Buses carry signals such as data, memory addresses, power, and control signals from component to component. Other types of buses include

ISA and EISA. Expansion buses enhance the PCs capabilities by allowing users to add missing features in their computers by slotting adapter cards into expansion slots.

1.4.1.3.5 The Computer Chip-sets



A chipset is a group of small circuits that coordinate the flow of data to and from a PC's key components. These key components include the CPU itself, the main memory, the secondary cache, and any devices situated on the buses. A chip set also controls data flow to and from hard disks and other devices connected to the IDE channels.

A computer has got two main chipsets:

- The North Bridge (also called the memory controller) is in charge of controlling transfers between the processor and the RAM, which is why it is located physically near the processor. It is sometimes called the GMCH, for Graphic and Memory Controller Hub.
- The South Bridge (also called the input/output controller or expansion controller) handles communications between slower peripheral devices. It is also called the ICH (I/O Controller Hub). The term "bridge" is generally used to designate a component which connects two buses.

Chipset manufacturers include SIS, VIA, ALI, and OPTI.

1.4.2. RANDOM ACCESS MEMORY

1.4.2.1. Introduction

RAM, which stands for Random Access Memory, is a hardware device generally located on the motherboard of a computer and acts as an internal memory of the CPU. It allows CPU store data, program, and program results when you switch on the computer. It is the read and write memory of a computer, which means the information can be written to it as well as read from it.



RAM comes in the form of a chip that is individually mounted on the motherboard or in the form of several chips on a small board connected to the motherboard. It is the main memory of a computer. It is faster to write to and read from as compared to other memories such as a hard disk drive (HDD), solid-state drive (SSD), optical drive, etc.

A computer's performance mainly depends on the size or storage capacity of the RAM. If it does not have sufficient RAM (random access memory) to run the OS and software programs, it will result in slower performance. So, the more RAM a computer has, the faster it will work. Information stored in RAM is accessed randomly, not in a sequence as on a CD or hard drive. So, its access time is much faster.

1.4.2.2. CHARACTERISTICS OF RAM

1.4.2.2.1. SDRAM AND DDR

Memory modules are labelled with either SDRAM (Synchronous Dynamic Random-Access Memory) or DDR (Double Data Rate). DDR RAM, as the "double data rate" name suggests, offers much faster speeds than SDRAM. Each generation of DDR, such as DDR2 and DDR3, offers performance improvements over the one preceding it.

1.4.2.2.2. SPEED

The two numbers often quoted first on memory module specifications -- for example, "DDRxxx/PCxxxx" -- indicate the maximum clock speed and maximum transfer rate the device can operate at -- and the higher the better. The stated clock speed is actually double the real figure, so a stick of RAM labelled DDR3-1333 PC3200 offers a clock speed of 666 MHz and a transfer rate of 3,200 MB/s.

1.4.2.2.3 PINS

Essentially, the number of pins a memory module has indicates the number of connections it has to the motherboard -- and thus which motherboards it's compatible with. More pins mean more data can be transferred at once, for faster operation overall, though performance is based on a variety of different factors, including CPU speed and the motherboard configuration.

1.4.2.2.4 VOLTS

The voltage rating associated with a memory module -- for example, 2.5 V -- indicates how much power it draws from the motherboard in order to operate properly. RAM sticks that can work at lower voltages use up less power and give off less heat, and are therefore more suitable for smaller systems such as laptops.

1.4.2.2.5 CAS LATENCY

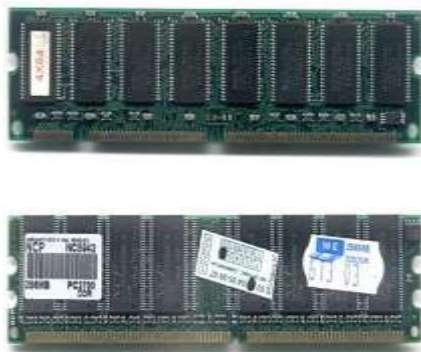
CAS (Column Address Strobe) Latency, sometimes abbreviated to just "CL," indicates the time it takes for a memory module to return data to the CPU. A lower CAS Latency indicates RAM that performs faster.

1.4.2.2.6 TIMING

Memory modules feature other timings besides CAS Latency, usually listed as a series of numbers after the other specifications. In order after CAS Latency, they are RAS (Row Address Strobe) to CAS delay, RAS Precharge, Active to Precharge delay and, optionally, command rate. These timings are only really of interest to advanced technical users, as the impact they have on performance is very small.

1.4.2.2.7 REDUNDANCY

The redundancy built into a memory module indicates its ability to recover from errors and to alert the operating system to a problem, rather than just allowing it to crash and lose your data. More expensive and critical server memory uses Error Checking and Correcting Redundancy, or ECC, in order to detect and correct errors wherever possible.

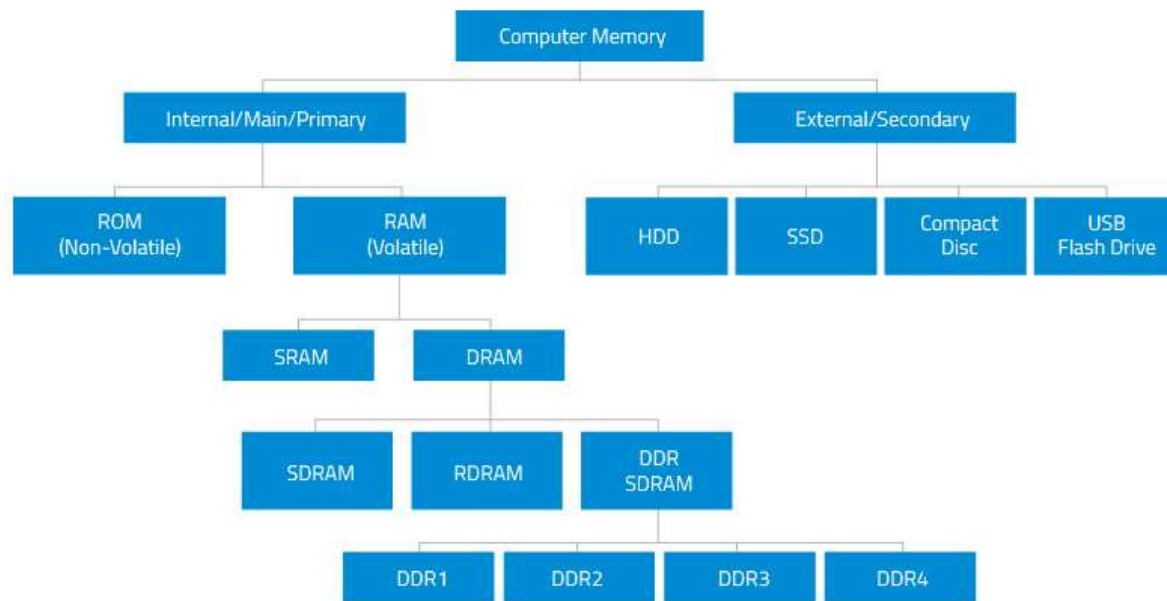


1.4.2.3. Different Types of RAM

RAM(Random Access Memory) is a part of computer's Main Memory which is directly accessible by CPU. RAM is used to Read and Write data into it which is accessed by CPU randomly. RAM is volatile in nature, it means if the power goes off, the stored information is lost. RAM is used to store the data that is currently processed by the CPU. Most of the programs and data that are modifiable are stored in RAM.

Integrated RAM chips are available in two form:

1. SRAM(Static RAM)
2. DRAM(Dynamic RAM)



1.4.2.3.1 SRAM

The SRAM memories consist of circuits capable of retaining the stored information as long as the power is applied. That means this type of memory requires constant power. SRAM memories are used to build Cache Memory.

1.4.2.3.2 DRAM

DRAM stores the binary information in the form of electric charges that applied to capacitors. The stored information on the capacitors tend to lose over a period of time and thus the capacitors must be periodically recharged to retain their usage. The main memory is generally made up of DRAM chips.

1.4.2.4. Functions

1.4.2.4.1. Reading Files

Hard drives can store vast numbers of files, but compared to other computer components, drives run very slowly. Accessing hard drive files -- especially when those files are scattered across the drive due to fragmentation -- requires the drive to move its mechanical read/write head back and forth and to wait for the spinning platters to spin into the correct position. Even though drives spin at thousands of rotations per minute, this process causes a noticeable delay when reading files. To lessen the slowdown,

computers store files in RAM after the files are first read from the drive. RAM has no moving parts, so the files can load very quickly during subsequent uses.

1.4.2.4.2 Temporary Storage

In addition to storing files read from the hard drive, RAM also stores data that programs are actively using but that doesn't need to be saved permanently. By keeping this data in RAM, programs can work with it quickly, improving speed and responsiveness.

1.4.2.4.3 RAM Size

If RAM works so much faster than the hard drive, why not load all of the computer's data into RAM? One major reason: computers have far less RAM than drive space. As of publication, hard drive sizes range from a few hundred gigabytes in laptops to 10TB in high-end enterprise systems. Most home computers have between 1 and 4TB of drive space.

1.4.3 DAUGHTER CARD

Referred to as a piggyback board and **daughter card**, a daughterboard is an expansion board that connects directly to the motherboard and gives added functionality.



Motherboard with daughter card

To disable a daughter board, the user must physically remove it from the motherboard. Daughter boards do not provide new functions to the circuit like an expansion but they extend the circuitry of the circuit in which they are plugged into.

1.4.3.1 Functionalities of daughter board:

- It is known as the piggyback board, riser card, daughtercard etcetera.
- A daughter board is smaller than a motherboard and may have some slots like the motherboard.
- A daughter board is a printed circuit board which is connected to the motherboard or expansion card.
- Unlike expansion card, daughter boards are directly connected to the motherboard by soldering.

- Daughter boards do not provide new functions to the circuit like an expansion but they extend the circuitry of the circuit in which they are plugged into.
- Daughter boards are released by the vendors as an update of motherboard or expansion card.

1.4.3.2 List of daughter cards

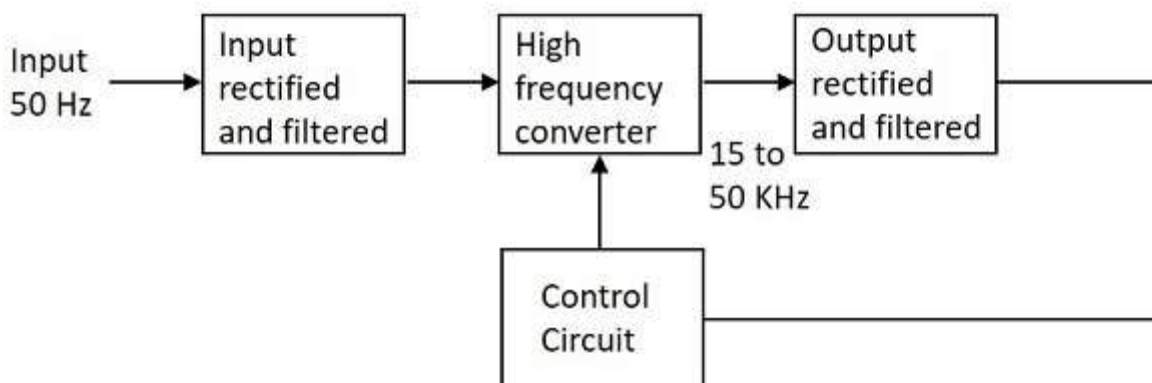
- Video Card: This is also referred to as the graphics adapter, display adapter or video adapter.
- Sound Card: To handle sound, to insert a microphone or connect a speaker this sound card is used.
- Network Interface Card: This is also referred as NIC. The computer can be connected to a network only with the use of this network interface card.
- Ethernet Card: Ethernet card is used to connect computers to computers. A cable is used to connect the Ethernet cards in each computer to make a network.

1.4.4. SWITCHED- MODE POWER SUPPLY

Switched-mode power supply Introduction A switched-mode power supply (switching-mode power supply, switch-mode power supply, switched power supply, SMPS, or switcher) is an electronic power supply that incorporates a switching regulator to convert electrical power efficiently. Its function is to convert a level of voltage to the voltage or current required by the client through different forms of architecture.



WORKING



The working of SMPS is simply understood by knowing that the transistor used in LPS is used to control the voltage drop while the transistor in SMPS is used as a controlled switch. The AC input supply signal 50 Hz is given directly to the rectifier and filter circuit combination without using any transformer. A fast switching device such as a Power transistor is employed in this section, which switches ON and OFF according to the variations and this output is given to the primary of the transformer. This is a regulated output voltage which is then given to the control circuit, which is a feedback circuit

1.4.5. INTERNAL STORAGE DEVICES

A storage device is any type of computing hardware that is used for storing, porting or extracting data files and objects. Storage devices can hold and store information both temporarily and permanently. They may be internal or external to a computer.

Some storage devices are classed as 'internal' which means they are inside the computer case. At the most basic level, internal storage is needed to hold the operating system so that the computer is able to access the input and output devices. It will also be used to store the applications software that you use and more than likely, the original copies of your data files.

Internal storage allows the data and applications to be loaded very rapidly into memory, ready for use. The data can be accessed much faster than data which is stored on an external storage device. This is because internal storage devices are connected directly to the motherboard and its data bus whereas external devices are connected through a hardware interface such as USB, which means they are considerably slower to access.

The main disadvantage of internal storage is that when the hard disk fails (and it will), all the data and applications may be lost. This can be avoided to some extent by using more than one hard disk within the machine. Each hard disk has a copy of all the data, so if one fails the other can carry on. This is called a RAID array. An alternative is to use external drives for backup

1.4.5.1. Examples of Internal storage devices

- Hard Disk
- SSD
- RAM

1.4.5.1.1. HARD DISK

A **hard disk drive** (sometimes abbreviated as a **hard drive**, **HD**, or **HDD**) is a non-volatile data storage device. It is usually installed internally in a computer, attached directly to the disk controller of the computer's motherboard. It contains one or more platters, housed inside of an air-sealed casing. Data is written to the platters using a magnetic head, which moves rapidly over them as they spin.

Internal hard disks reside in a drive bay, connected to the motherboard using an ATA, SCSI, or SATA cable. They are powered by a connection to the computer's PSU (power supply unit).

Hard disk, Magnetic storage medium for a microcomputer. Hard disks are flat, circular plates made of aluminum or glass and coated with a magnetic material. Hard disks for personal computers can store up to several gigabytes (billions of bytes) of information. Data are stored on their surfaces in concentric tracks. A small electromagnet, called a magnetic head, writes a binary digit (1 or 0) by magnetizing tiny spots on the spinning disk in different directions and reads digits by detecting the magnetization direction of the spots. A computer's hard drive is a device consisting of several hard disks, read/write heads, a drive motor to spin the disks, and a small amount of circuitry, all sealed in a metal case to protect the disks from dust. In addition to referring to the disks themselves, the term hard disk is also used to refer to the whole hard drive.

Computers rely on hard disk drives (HDDs) to store data permanently. They are storage devices used to save and retrieve digital information that will be required for future reference.

Hard drives are non-volatile, meaning that they retain data even when they do not have power. The information stored remains safe and intact unless the hard drive is destroyed or interfered with. The information is stored or retrieved in a random-access manner as opposed to sequential access. This implies that blocks of data can be accessed at any time they are required without going through other data blocks.



1.4.5.1.2. SOLID STATE DRIVE

A solid-state drive (SSD) is a solid-state storage device that uses integrated circuit assemblies to store data persistently, typically using flash memory, and functioning as secondary storage in the hierarchy of computer storage. It is also sometimes called a **solid-state device** or a **solid-state disk**, even though SSDs lack the physical spinning disks and movable read–write heads used in hard disk drives (HDDs) and floppy disks.

Compared with electromechanical drives, SSDs are typically more resistant to physical shock, run silently, and have quicker access time and lower latency. SSDs store data in semiconductor cells. SSDs have a limited number of writes, and slow as they reach storage capacity.



1.4.5.1.3. RAM

RAM (Random Access Memory) is the internal memory of the CPU for storing data, program, and program result. It is a read/write memory which stores data until the machine is working. As soon as the machine is switched off, data is erased.

RAM is volatile, i.e. data stored in it is lost when we switch off the computer or if there is a power failure. RAM is small, both in terms of its physical size and in the amount of data it can hold.



RAM is of two types –

- Static RAM (SRAM)
- Dynamic RAM (DRAM)

1.4.5.2. Static RAM (SRAM)

The word **static** indicates that the memory retains its contents as long as power is being supplied. However, data is lost when the power gets down due to volatile nature. SRAM chips use a matrix of 6-transistors and no capacitors. Transistors do not require power to prevent leakage, so SRAM need not be refreshed on a regular basis.

1.4.5.3. Dynamic RAM (DRAM)

DRAM, unlike SRAM, must be continually **refreshed** in order to maintain the data. This is done by placing the memory on a refresh circuit that rewrites the data several hundred times per second. DRAM is used for most system memory as it is cheap and small

1.4.5.4 SOME OTHER STORAGE DEVICES

- Magnetic Storage Device
- Optical Storage Device
- Flash Memory Device
- Online and Cloud
- Paper Storage



1.4.6 . COMPUTER PORTS

1.4.6.1 WHAT IS MEANT BY A PORT?

A port in a computer network is a communication endpoint whereas, in an operating system, it is a logical construct, recognizes precise method otherwise a network service type. These endpoints recognize the combination of every protocol and its address through 16-bit unsigned numbers, called the port number. The protocols that use port numbers are the TCP (Transmission Control Protocol) and UDP (User Datagram Protocol). The port number in every computer networking uses an IP address of the type of protocol & the host

1.4.6.2 What is Port in Computer/Computer Port?

A computer port or a communication port is a connection point used as an interface between the computer & the peripherals like keyboard, mouse, printer, display unit, monitor, flash drive and speaker. The computer port transmits the data from any peripheral to the computer. In general, the communication ports are available in two type like Serial Ports as well as Parallel Ports.



1.4.6.3 Characteristics of Computer Ports

The characteristics of the computer port include the following.

- It is an interface between external devices as well as a computer.

- Ports on the motherboard can be connected using an external device cable by plugging in.
- The external devices which are connected through via ports are the keyboard, mouse, microphone, monitor, speakers, etc.

1.4.6.4 Types of Computer Ports

There are different types of ports available in a computer network. Some of them are:

- PS/02
- Serial Port
- Parallel Port
- Ethernet
- VGA Port
- USB Port
- DVI Port
- HDMI Port
- Display Port

1.4.6.4.1 PS/2 PORTS: PS/2 is a type of port used by older computers for connecting input devices such as keyboards and mice. The port was introduced with IBM's Personal System/2 computer in 1987 (which was abbreviated "PS/2"). The PS/2 port has six pins and is roughly circular in shape



1.4.6.4.2 SERIAL PORT: A serial port is an interface that allows a PC to transmit or receive data one bit at a time. It is one of the oldest types of interfaces commonly used to connect printers and external modems to a PC. Compared to a parallel port, the data transfer rate of a serial port is slower. Normally, a serial port is a male port, while a parallel port is a female port. The serial port standard is RS-232. This standard is used for transmitting serial communication between devices,



1.4.6.4.3 PARALLEL PORT: Parallel port is a type of interface found on computers (personal and otherwise) for connecting peripherals. Parallel ports send multiple bits of data at once (parallel communication), as opposed to serial communication, in which bits are sent one at a time. Parallel port is an interface between computer and peripheral devices like printers with parallel communication



1.4.6.4.4 ETHERNET: A Ethernet port is a jack or socket on a computer that allows the use of an Ethernet connector. These ports are essential in allowing the creation of local area networks (LANs). An Ethernet port is usually found on networking devices, including computers, routers, video game consoles, modems, and televisions. Ethernet is a communication system that allows multiple local devices to share information and work together.



1.4.6.4.5 VGA PORT: Abbreviated VGA, Video Graphics Array is a standard type of connection for video devices such as monitors and projectors. Generally, VGA refers to the types of cables, ports, and connectors used to connect monitors to video cards.



1.4.6.4.6 USB PORT: A USB port is a connection interface for personal computers and consumer electronics devices. USB stands for Universal Serial Bus, USB ports allow USB devices to be connected to each other with and transfer digital data over USB cables



1.4.6.4.7 HDMI PORT: Full form of HDMI is **High-Definition Multimedia Interface**.

HDMI is a proprietary audio/video interface for transmitting uncompressed video data and compressed or uncompressed digital audio data from an HDMI-compliant source device, such as a display controller, to a compatible computer monitor, video projector, digital television, or digital audio device..

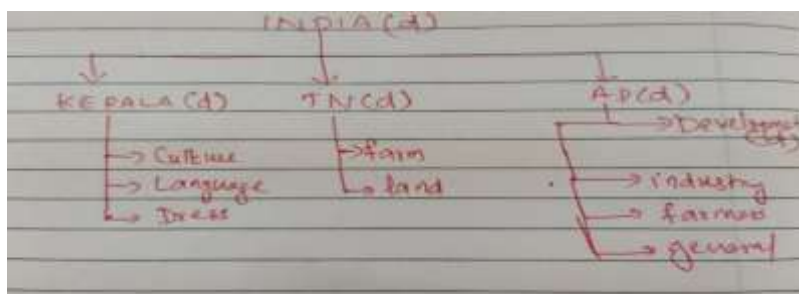


1.4.6.4.8 DISPLAY PORT: DisplayPort is a digital display interface developed by a consortium of PC and chip manufacturers and standardized by the Video Electronics Standards Association. Display Port is a digital display interface with optional multiple channel audio and other forms of data. Display Port is developed with an aim of replacing VGA and DVI ports as the main interface between a computer and monitor.



EXPERIMENT -2

2.1. Linux commands



Q1. Create the directories and files as given in the above directory structure. Directories are mentioned as (d). Files should be filled with necessary text data

```

hp@hp-HP-Laptop-15s-du0xxx:~$ mkdir india
hp@hp-HP-Laptop-15s-du0xxx:~$ cd india
hp@hp-HP-Laptop-15s-du0xxx:~/india$ mkdir kerala
hp@hp-HP-Laptop-15s-du0xxx:~/india$ mkdir TN
hp@hp-HP-Laptop-15s-du0xxx:~/india$ MKDIR AP
MKDIR: command not found
hp@hp-HP-Laptop-15s-du0xxx:~/india$ mkdir AP
  
```

```

hp@hp-HP-Laptop-15s-du0xxx:~/india/kerala$ cd ~
hp@hp-HP-Laptop-15s-du0xxx:~$ cd indai
bash: cd: indai: No such file or directory
hp@hp-HP-Laptop-15s-du0xxx:~$ cd india
hp@hp-HP-Laptop-15s-du0xxx:~/india$ cd TN
hp@hp-HP-Laptop-15s-du0xxx:~/india/TN$ vi farm.txt
hp@hp-HP-Laptop-15s-du0xxx:~/india/TN$ vi land.txt
hp@hp-HP-Laptop-15s-du0xxx:~/india/TN$ cat land.txt
tamil nadu is a state in southern india.its capital and largest city is chennai
:x

hp@hp-HP-Laptop-15s-du0xxx:~/india/TN$ cat farm.txt
in tamil nadu major plantation crops are cashew,cofee,tea,batel vine,rubber,arec
anut,coconet,bamboo and cocoa.

hp@hp-HP-Laptop-15s-du0xxx:~/india/TN$

```

```

hp@hp-HP-Laptop-15s-du0xxx:~/india/kerala$ echo this is about the culture of ker
ala >culture.txt
hp@hp-HP-Laptop-15s-du0xxx:~/india/kerala$ cat culture.txt
this is about the culture of kerala
hp@hp-HP-Laptop-15s-du0xxx:~/india/kerala$ vi language.txt
hp@hp-HP-Laptop-15s-du0xxx:~/india/kerala$ cat language.txt
the language of kerala is malayalam
hp@hp-HP-Laptop-15s-du0xxx:~/india/kerala$ vi dress.txt
hp@hp-HP-Laptop-15s-du0xxx:~/india/kerala$ cat dress.txt
saree
setmundu
kalli mundu
shirt
lungi
pnt
jubba
frock
skirt
churidar

hp@hp-HP-Laptop-15s-du0xxx:~/india/kerala$

```

```

hp@hp-HP-Laptop-15s-du0xxx:~/india/TN$ cd ..
hp@hp-HP-Laptop-15s-du0xxx:~/india$ cd AP
hp@hp-HP-Laptop-15s-du0xxx:~/india/AP$ mkdir DEVELOPMENT
hp@hp-HP-Laptop-15s-du0xxx:~/india/AP$ vi industry.txt
hp@hp-HP-Laptop-15s-du0xxx:~/india/AP$ cat industry.txt
automobile and auto components industry
textails and apparels
it industry
poltry farming are the main industry in ap

hp@hp-HP-Laptop-15s-du0xxx:~/india/AP$ vi general.txt
hp@hp-HP-Laptop-15s-du0xxx:~/india/AP$ cat general.txt
andrathesh is state in the south-eastern coastal region of india.it is the sev
enth largest state by area and the tenth most poppular state in indai

hp@hp-HP-Laptop-15s-du0xxx:~/india/AP$ vi farmest.txt
hp@hp-HP-Laptop-15s-du0xxx:~/india/AP$ cat farmest.txt
andra prathesh total poppulation approximatly 62% or 46 lask families are depend
ent on the agriculture and allied sector.
hp@hp-HP-Laptop-15s-du0xxx:~/india/AP$

```

Q2. List your present working directory


```
hp@hp-HP-Laptop-15s-du0xxx:~/india/AP$ ls
DEVELOPMENT  farmest.txt  general.txt  industry.txt
hp@hp-HP-Laptop-15s-du0xxx:~/india/AP$
```

Q3. Move to the root directory.

```
hp@hp-HP-Laptop-15s-du0xxx:~/india/AP$ cd ~
hp@hp-HP-Laptop-15s-du0xxx:~$
```

Q4. Copy the file 'Culture' to the folder AP

```
hp@hp-HP-Laptop-15s-du0xxx:~$ cd india
hp@hp-HP-Laptop-15s-du0xxx:~/india$ cp -r kerala/culture.txt AP
hp@hp-HP-Laptop-15s-du0xxx:~/india$ cd AP
hp@hp-HP-Laptop-15s-du0xxx:~/india/AP$ ls
culture.txt  DEVELOPMENT  farmest.txt  general.txt  industry.txt
hp@hp-HP-Laptop-15s-du0xxx:~/india/AP$
```

Q5. Display the content of the file 'general'

```
hp@hp-HP-Laptop-15s-du0xxx:~/india/AP$ cat general.txt
andrapathesh is state in the south-eastern coastal region of india.it is the sev
enth largest state by area and the tenth most poppular state in indai
hp@hp-HP-Laptop-15s-du0xxx:~/india/AP$
```

Q6. Move the file 'language' to the directory AP/Development

```
hp@hp-HP-Laptop-15s-du0xxx:~/india/AP$ cd ..
hp@hp-HP-Laptop-15s-du0xxx:~/india$ mv kerala/language.txt AP/DEVELOPMENT
hp@hp-HP-Laptop-15s-du0xxx:~/india$ cd AP
hp@hp-HP-Laptop-15s-du0xxx:~/india/AP$ cd DEVELOPMENT
hp@hp-HP-Laptop-15s-du0xxx:~/india/AP/DEVELOPMENT$ ls
language.txt
hp@hp-HP-Laptop-15s-du0xxx:~/india/AP/DEVELOPMENT$
```

Q7. List all the files in the folder AP

```
hp@hp-HP-Laptop-15s-du0xxx:~/india/AP/DEVELOPMENT$ cd ..
hp@hp-HP-Laptop-15s-du0xxx:~/india/AP$ ls
culture.txt  DEVELOPMENT  farmest.txt  general.txt  industry.txt
hp@hp-HP-Laptop-15s-du0xxx:~/india/AP$
```

Q8. List first 10 lines of the file 'Dress'

```
hp@hp-HP-Laptop-15s-du0xxx:~/india/AP$ cd ..
hp@hp-HP-Laptop-15s-du0xxx:~/india$ cd kerala
hp@hp-HP-Laptop-15s-du0xxx:~/india/kerala$ ls
culture.txt  dress.txt
hp@hp-HP-Laptop-15s-du0xxx:~/india/kerala$ head -n 10 dress.txt
saree
setmundu
kalli mundu
shirt
lungi
pnt
jubba
frock
skirt
churidar
hp@hp-HP-Laptop-15s-du0xxx:~/india/kerala$
```

Q9. List the last 10 lines of the file 'Dress'

```
hp@hp-HP-Laptop-15s-du0xxx:~/india/kerala$ tail -n 10 dress.txt
setmundu
kalli mundu
shirt
lungi
pnt
jubba
frock
skirt
churidar

hp@hp-HP-Laptop-15s-du0xxx:~/india/kerala$
```

Q10. List all the files in AP in long listing format

```
hp@hp-HP-Laptop-15s-du0xxx:~/india/kerala$ cd ..
hp@hp-HP-Laptop-15s-du0xxx:~/india$ cd AP
hp@hp-HP-Laptop-15s-du0xxx:~/india/AP$ ls -al
total 28
drwxr-xr-x 3 hp hp 4096 Aug 26 04:17 .
drwxr-xr-x 5 hp hp 4096 Aug 26 03:49 ..
-rw-r--r-- 1 hp hp 36 Aug 26 04:17 culture.txt
drwxr-xr-x 2 hp hp 4096 Aug 26 04:20 DEVELOPMENT
-rw-r--r-- 1 hp hp 121 Aug 26 04:13 farmest.txt
-rw-r--r-- 1 hp hp 151 Aug 26 04:11 general.txt
-rw-r--r-- 1 hp hp 118 Aug 26 04:09 industry.txt
hp@hp-HP-Laptop-15s-du0xxx:~/india/AP$
```

Q11. List the files in AP which begin with the character 'f'

```
hp@hp-HP-Laptop-15s-du0xxx:~/india/AP$ ls
culture.txt DEVELOPMENT farmest.txt general.txt industry.txt
hp@hp-HP-Laptop-15s-du0xxx:~/india/AP$ ls -d f*
farmest.txt
hp@hp-HP-Laptop-15s-du0xxx:~/india/AP$
```

Q12. List the files page by page

```
hp@hp-HP-Laptop-15s-du0xxx:~/india/AP$ ls -la | more
total 28
drwxr-xr-x 3 hp hp 4096 Aug 26 04:17 .
drwxr-xr-x 5 hp hp 4096 Aug 26 03:49 ..
-rw-r--r-- 1 hp hp 36 Aug 26 04:17 culture.txt
drwxr-xr-x 2 hp hp 4096 Aug 26 04:20 DEVELOPMENT
-rw-r--r-- 1 hp hp 121 Aug 26 04:13 farmest.txt
-rw-r--r-- 1 hp hp 151 Aug 26 04:11 general.txt
-rw-r--r-- 1 hp hp 118 Aug 26 04:09 industry.txt
hp@hp-HP-Laptop-15s-du0xxx:~/india/AP$
```

Q13. Remove the file 'general'

```
hp@hp-HP-Laptop-15s-du0xxx:~/india/AP$ ls
culture.txt DEVELOPMENT farmest.txt general.txt industry.txt
hp@hp-HP-Laptop-15s-du0xxx:~/india/AP$ rm -i general.txt
rm: remove regular file 'general.txt'? y
hp@hp-HP-Laptop-15s-du0xxx:~/india/AP$ ls
culture.txt DEVELOPMENT farmest.txt industry.txt
hp@hp-HP-Laptop-15s-du0xxx:~/india/AP$
```

Q14. Change the permission of the file 'Culture' as only read permission to all


```

hp@hp-HP-Laptop-15s-du0xxx:~/india/AP$ cd ..
hp@hp-HP-Laptop-15s-du0xxx:~/india$ cd kerala
hp@hp-HP-Laptop-15s-du0xxx:~/india/kerala$ ls
culture.txt  dress.txt
hp@hp-HP-Laptop-15s-du0xxx:~/india/kerala$ ls -l culture.txt
-rw-r--r-- 1 hp hp 36 Aug 26 03:52 culture.txt
hp@hp-HP-Laptop-15s-du0xxx:~/india/kerala$ chmod g-wx culture.txt
hp@hp-HP-Laptop-15s-du0xxx:~/india/kerala$ ls -l culture.txt
-rw-r--r-- 1 hp hp 36 Aug 26 03:52 culture.txt
hp@hp-HP-Laptop-15s-du0xxx:~/india/kerala$

```

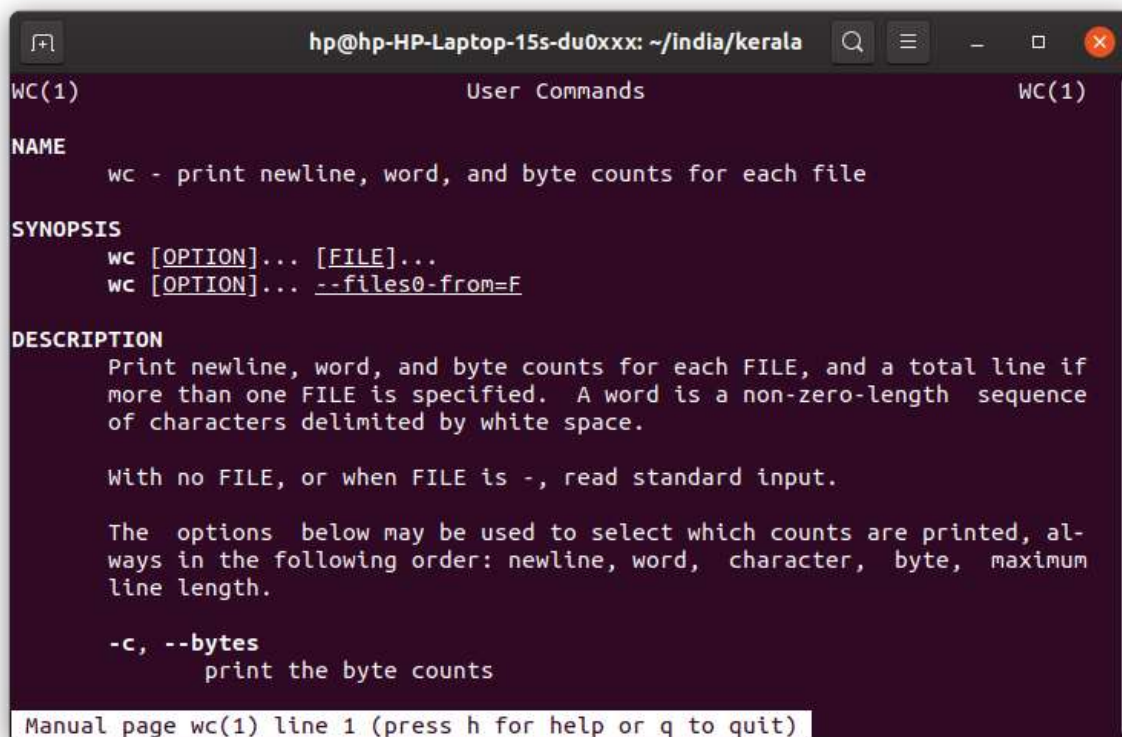
Q15. List the lines of the file which contains a string 'Saree'

```

hp@hp-HP-Laptop-15s-du0xxx:~/india/kerala$ grep 'saree' dress.txt
saree
hp@hp-HP-Laptop-15s-du0xxx:~/india/kerala$

```

Q16. Use man command to get the syntax of `wc` command



```

hp@hp-HP-Laptop-15s-du0xxx: ~/india/kerala
WC(1)                                User Commands                                WC(1)

NAME
    wc - print newline, word, and byte counts for each file

SYNOPSIS
    wc [OPTION]... [FILE]...
    wc [OPTION]... --files0-from=F

DESCRIPTION
    Print newline, word, and byte counts for each FILE, and a total line if
    more than one FILE is specified.  A word is a non-zero-length sequence
    of characters delimited by white space.

    With no FILE, or when FILE is -, read standard input.

    The options below may be used to select which counts are printed, al-
    ways in the following order: newline, word, character, byte, maximum
    line length.

    -c, --bytes
        print the byte counts

Manual page wc(1) line 1 (press h for help or q to quit)

```

Q17. Count the number of characters, words, lines in the directory listing

```

hp@hp-HP-Laptop-15s-du0xxx:~/india/kerala$ ls
culture.txt  dress.txt
hp@hp-HP-Laptop-15s-du0xxx:~/india/kerala$ wc dress.txt
11 11 71 dress.txt
hp@hp-HP-Laptop-15s-du0xxx:~/india/kerala$

```

Q18. Put a listing of the files in your directory into a file called *filelist*.

```
hp@hp-HP-Laptop-15s-du0xxx:~/Indira/Kerala$ cd ~
hp@hp-HP-Laptop-15s-du0xxx:~$ ls -l >>filelist.txt
hp@hp-HP-Laptop-15s-du0xxx:~$ cat filelist.txt
total 84
drwxr-xr-x  2 hp  hp  4096 Aug 25 23:16 ansar
drwxr-xr-x  2 hp  hp  4096 Aug 26 02:13 ansar23
drwxr-xr-x  3 hp  hp  4096 Mar 12  2020 Desktop
drwxr-xr-x  3 hp  hp  4096 Aug 16 15:03 dev
drwxr-xr-x  2 hp  hp  4096 Feb  4  2020 Documents
drwxr-xr-x  2 hp  hp  4096 Feb  4  2020 Downloads
-rw-r--r--  1 hp  hp    5 Aug 16 16:13 file1
-rw-r--r--  1 hp  hp   51 Aug 16 16:16 fileA
-rw-r--r--  1 hp  hp   24 Aug 16 16:16 fileB
-rw-r--r--  1 hp  hp    0 Aug 26 04:35 filelist.txt
drwxr-xr-x  3 hp  hp  4096 Aug 16 15:43 home
drwxr-xr-x  5 hp  hp  4096 Aug 26 03:49 india
drwxr-xr-x  3 hp  hp  4096 Aug 16 15:49 jane
drwxr-xr-x  5 hp  hp  4096 Aug 16 16:21 library
drwxr-xr-x  2 hp  hp  4096 Feb  4  2020 Music
-rw-r--r--  1 hp  hp    0 Aug 16 15:33 newfile
drwxr-xr-x  2 hp  hp  4096 Aug 26 04:34 Pictures
drwxr-xr-x  2 hp  hp  4096 Feb  4  2020 Public
drwxr-xr-x 21 hp  hp  4096 Feb  3  2020 rtlwifi_new
drwxr-xr-x  2 hp  hp  4096 Mar  2 04:54 shrishti
drwxr-xr-x  2 hp  hp  4096 Feb  4  2020 Templates
drwxr-xr-x  3 hp  hp  4096 Aug 16 15:49 tmp
-rw-r--r--  1 hp  hp    0 Mar 12  2020 up.sh
drwxr-xr-x  2 hp  hp  4096 Feb  4  2020 Videos
hp@hp-HP-Laptop-15s-du0xxx:~$
```

Q19. List the status of all process running in your system

```
hp@hp-HP-Laptop-15s-du0xxx:~/ansar$ ps
  PID TTY          TIME CMD
 1593 pts/0    00:00:00 bash
 3017 pts/0    00:00:00 ps
hp@hp-HP-Laptop-15s-du0xxx:~/ansar$
```

[illegible]

Q20. List the disk partitions in your harddisk.

```
hp@hp-HP-Laptop-15s-du0xxx: ~  
hp@hp-HP-Laptop-15s-du0xxx:~$ lsblk  
NAME            MAJ:MIN RM   SIZE RO TYPE MOUNTPOINT  
loop0            7:0      0    99M  1 loop /snap/core/11081  
loop1            7:1      0   89.1M  1 loop /snap/core/8268  
loop2            7:2      0   55.4M  1 loop /snap/core18/2066  
loop3            7:3      0  156.7M  1 loop /snap/gnome-3-28-1804/110  
loop4            7:4      0   54.7M  1 loop /snap/core18/1650  
loop5            7:5      0   276K   1 loop /snap/gnome-characters/708  
loop6            7:6      0  162.9M  1 loop /snap/gnome-3-28-1804/145  
loop7            7:7      0    4.2M  1 loop /snap/gnome-calculator/544  
loop8            7:8      0   14.8M  1 loop /snap/gnome-characters/375  
loop9            7:9      0   65.1M  1 loop /snap/gtk-common-themes/1515  
loop10           7:10     0   956K   1 loop /snap/gnome-logs/81  
loop11           7:11     0   44.9M  1 loop /snap/gtk-common-themes/1440  
sda              8:0      0  931.5G  0 disk  
└─sda1            8:1      0  931.5G  0 part  
nvme0n1          259:0     0  238.5G  0 disk  
├─nvme0n1p1       259:1     0   260M  0 part /boot/efi  
├─nvme0n1p2       259:2     0    16M  0 part  
├─nvme0n1p3       259:3     0  137.2G  0 part  
├─nvme0n1p4       259:4     0   561M  0 part  
└─nvme0n1p5       259:5     0   100G  0 part /  
hp@hp-HP-Laptop-15s-du0xxx:~$
```


Q21. Redirect the output of the **top** program to a file called 'errors'.

```
hp@hp-HP-Laptop-15s-du0xxx:~$ top>>error.txt
hp@hp-HP-Laptop-15s-du0xxx:~$ cat error.txt

top - 04:38:19 up 51 min, 1 user, load average: 0.08, 0.18, 0.17
Tasks: 212 total, 1 running, 211 sleeping, 0 stopped, 0 zombie
%Cpu(s): 0.8/0.2 1I
MiB Mem : 3847.2 total, 2425.8 free, 657.4 used, 763.9 buff/cache
MiB Swap: 2048.0 total, 2048.0 free, 0.0 used. 2819.1 avail Mem


```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
4068	hp	20	0	442600	28176	15600	S	2.0	0.7	0:00.52	/usr/l+
1432	hp	39	19	519084	24540	16300	S	0.7	0.6	0:00.80	/usr/l+
4120	hp	39	19	1287992	34316	23856	S	0.7	0.9	0:00.25	/usr/l+
932	hp	20	0	8876	6120	3940	S	0.3	0.2	0:01.53	/usr/b+
4117	hp	20	0	20588	3788	3148	R	0.3	0.1	0:00.20	top
1	root	20	0	166956	11344	8164	S	0.0	0.3	0:03.68	/sbin/+
2	root	20	0	0	0	0	S	0.0	0.0	0:00.00	[kthre+
3	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	[rcu_g+
4	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	[rcu_p+
6	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	[kwork+
9	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	[mm_pe+
10	root	20	0	0	0	0	S	0.0	0.0	0:00.05	[ksoft+
11	root	20	0	0	0	0	I	0.0	0.0	0:00.71	[rcu_s+
12	root	rt	0	0	0	0	S	0.0	0.0	0:00.01	[mtgra+
13	root	-51	0	0	0	0	S	0.0	0.0	0:00.00	[idle_+
14	root	20	0	0	0	0	S	0.0	0.0	0:00.00	[cpuhp+

```
top - 04:39:47 up 52 min, 1 user, load average: 0.02, 0.13, 0.16
Tasks: 207 total, 1 running, 206 sleeping, 0 stopped, 0 zombie
%Cpu(s): 0.2/0.4 1I
MiB Mem : 3847.2 total, 2446.8 free, 633.3 used, 767.1 buff/cache
MiB Swap: 2048.0 total, 2048.0 free, 0.0 used. 2840.1 avail Mem


```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
-----	------	----	----	------	-----	-----	---	------	------	-------	---------

```

4 root 0-20 0 0 0 2 0.0 0.0 0:00.00 [rcu_gp
4 root 0-20 0 0 0 2 0.0 0.0 0:00.00 [rcu_gp
8 root 0-20 0 0 0 0 0.0 0.0 0:00.00 [rcu_gp
10 root 20 0 0 0 0 0.0 0.0 0:00.00 [rcu_gp
11 root 20 0 0 0 0 2 0.0 0.0 0:00.71 [rcu_gp
12 root 20 0 0 0 0 0 0.0 0.0 0:00.01 [migrat
13 root 51 0 0 0 0 2 0.0 0.0 0:00.00 [idle_s
14 root 20 0 0 0 0 0 0.0 0.0 0:00.00 [csmksp
top - 04:10:10 on 32 mhz, 1 user, load average: 0.92, 0.13, 0.10
tasks: 287 total, 3 running, 286 sleeping, 0 stopped, 0 zombie
%cpu(s): 0.2/0.4 /-
pid Mem : 3887.2 total, 2446.0 free, 453.2 used, 787.5 buff/cache
pid swap: 2948.0 total, 2048.0 free, 0.0 used, 2848.0 avail Mem

# PID USER PR NI VIRT RES SHR S CPU% MEM% TIME+ COMMAND
157 root 20 0 238936 18188 23888 0 0.3 0.5 0.0 0:01.16 [kmemd
4084 bp 20 0 237920 18188 23888 0 0.4 0.4 0:01.30 [kmemd
767 root 20 0 138002 84828 7669 0 0.4 0.2 0:04.40 [idle_s
1168 bp 20 0 2776208 218828 20226 0 0.3 1.4 1:21.42 [rcu_gp
1044 bp 20 0 972400 14852 3014 0 0.2 1.4 0:24.72 [rcu_gp
2048 root 20 0 0 0 0 0 2 0.2 0.0 0:01.61 [kmemd
231 root 21 0 0 0 0 0 0 0.0 0.0 0:00.32 [rcu_gp
606 systemd 20 0 21208 23888 6012 0 0.0 0.3 0:01.30 [idle_s
607 systemd 20 0 80006 812 3424 0 0.0 0.2 0:01.50 [idle_s
1311 bp 20 0 207360 10192 8730 0 0.0 0.3 0:12.30 [idle_s
1 root 20 0 160936 11344 8164 0 0.0 0.3 0:03.71 [kmemd
1432 bp 20 0 11096 2448 16360 0 0.0 0.6 0:00.03 [rcu_gp
1536 bp 20 0 278320 8396 7712 0 0.0 0.2 0:04.35 [rcu_gp
11 root 20 0 0 0 0 0 0 0.0 0.0 0:00.72 [rcu_gp
13 root 27 0 0 0 0 0 0 0.0 0.0 0:00.48 [migrat
44 root 20 0 0 0 0 0 0 0.0 0.0 0:00.41 [kmemd

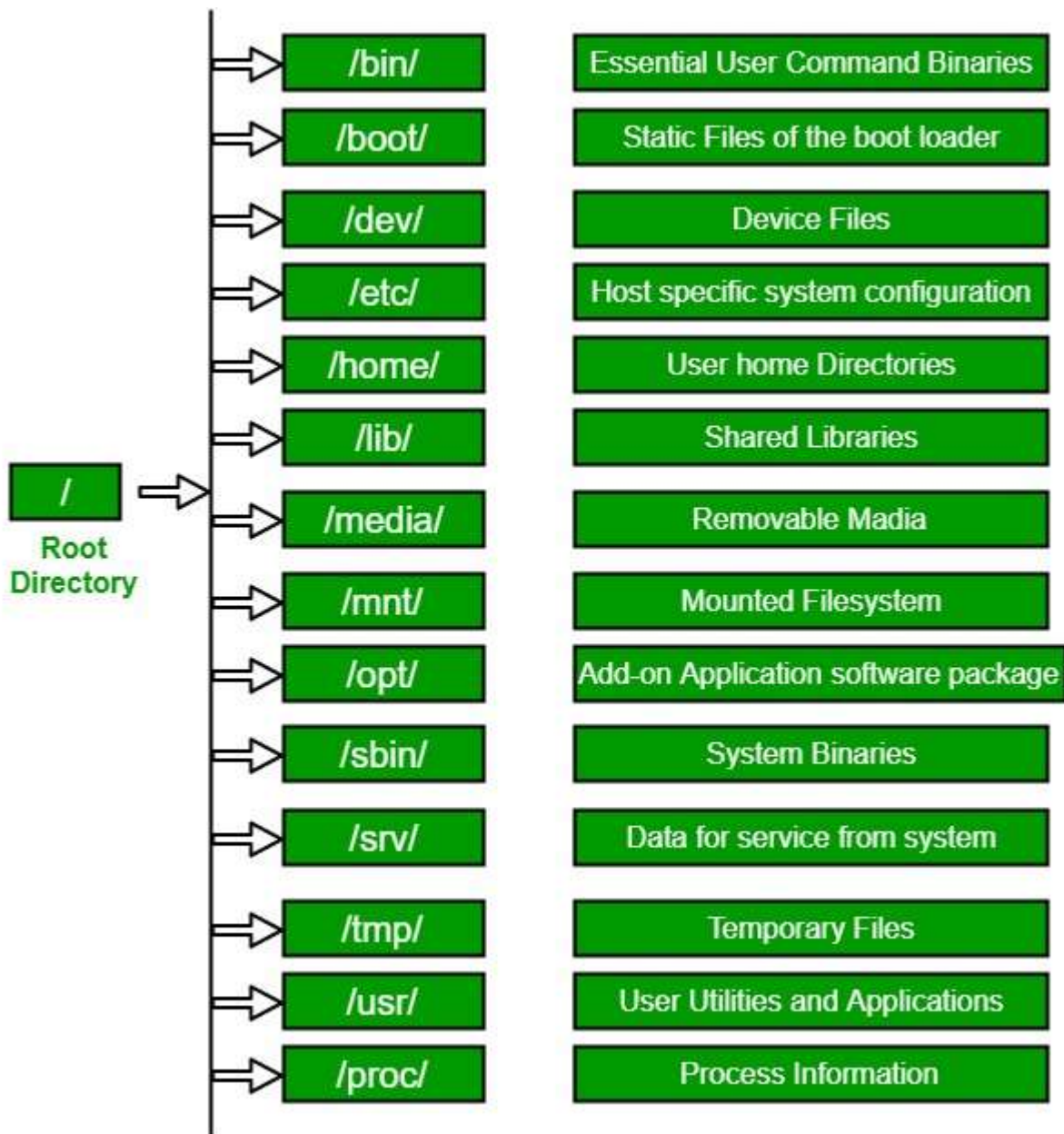
top - 04:13:58 on 32 mhz, 1 user, load average: 0.81, 0.13, 0.13
tasks: 287 total, 3 running, 286 sleeping, 0 stopped, 0 zombie
%cpu(s): 0.2/0.4 /-
pid Mem : 3887.2 total, 2424.0 free, 468.2 used, 784.5 buff/cache
pid swap: 2948.0 total, 2048.0 free, 0.0 used, 2824.0 avail Mem

# PID USER PR NI VIRT RES SHR S CPU% MEM% TIME+ COMMAND
624 bp 20 0 202220 17856 20400 0 0.3 1.0 1:01.51 [kmemd
1168 bp 20 0 2776208 218828 20226 0 0.3 1.0 1:21.52 [rcu_gp
1425 bp 20 0 138120 84828 7669 0 0.3 0.6 0:04.42 [idle_s
1044 bp 20 0 972400 14852 3014 0 0.3 1.4 0:24.82 [rcu_gp
4030 bp 20 0 204616 3820 8176 0 0.3 0.1 0:00.02 [top
1 root 20 0 160936 11344 8164 0 0.0 0.3 0:03.71 [kmemd
2 root 20 0 0 0 0 0 0 0.0 0.0 0:00.00 [kmemd
3 root 0-20 0 0 0 0 2 0.0 0.0 0:00.00 [rcu_gp
4 root 0-20 0 0 0 0 2 0.0 0.0 0:00.00 [rcu_gp
8 root 0-20 0 0 0 0 0 0.0 0.0 0:00.00 [rcu_gp
9 root 0-20 0 0 0 0 2 0.0 0.0 0:00.00 [rcu_gp
10 root 20 0 0 0 0 0 0 0.0 0.0 0:00.60 [kmemd
11 root 20 0 0 0 0 0 0 0.0 0.0 0:00.72 [rcu_gp
12 root 27 0 0 0 0 0 0 0.0 0.0 0:00.01 [migrat
15 root 51 0 0 0 0 0 0 0.0 0.0 0:00.00 [idle_s
16 root 20 0 0 0 0 0 0 0.0 0.0 0:00.00 [cpubg/p

```

Experiment 3

3.1. Linux File System Hierarchy Structure:



The Linux File System Hierarchy defines the directory structure and directory contents in Unix-like operating systems. It is maintained by the Linux Foundation.

- The all files and directories appear under the root directory /, even if they are stored on different physical or virtual devices.
- Most of these directories exist in all UNIX operating systems and are generally used in much the same way; however, the descriptions here are those used

specifically for the FHS and are not considered authoritative for platforms other than Linux.

- Most Linux distributions follow the Filesystem Hierarchy Standard and declare it their own policy to maintain FHS compliance.
- Some distributions generally follow the standard but deviate from it in some areas. The FHS is a "trailing standard", and so documents common practices at a point in time.

3.2. The tree intallation process:

- Install tree using the following command:
\$ sudo apt install tree

```
hp@hp-HP-Laptop-15s-du0xxx:~$ sudo apt install tree
Reading package lists... Done
Building dependency tree
Reading state information... Done

The following packages were automatically installed and are no longer required:
acl app-color-data enchant geop-database gnome-control-center-faces gnome-online-accounts gsfonts hplip-data libbind9-161 libboost-filesystem
libcolorhug2 libdns-export1107 libdns1107 libdns1109 libenchant1c2a libexiv2-14 libfprint0 libgeoip1 libgsound0 libgspell-1-1 libgssdp-1.2-0
libgutenprint-common libgutenprint9 libieee1284-3 libinanequato libiptc0 libirs161 libisc-export1104 libisc1104 libisc1105 libisc1106 libisc1107 libisc1108 libisc1109 libisc1110 libisc1111 libisc1112 libisc1113 libisc1114 libisc1115 libisc1116 libisc1117 libisc1118 libisc1119 libisc1120 libisc1121 libisc1122 libisc1123 libisc1124 libisc1125 libisc1126 libisc1127 libisc1128 libisc1129 libisc1130 libisc1131 libisc1132 libisc1133 libisc1134 libisc1135 libisc1136 libisc1137 libisc1138 libisc1139 libisc1140 libisc1141 libisc1142 libisc1143 libisc1144 libisc1145 libisc1146 libisc1147 libisc1148 libisc1149 libisc1150 libisc1151 libisc1152 libisc1153 libisc1154 libisc1155 libisc1156 libisc1157 libisc1158 libisc1159 libisc1160 libisc1161 libisc1162 libisc1163 libisc1164 libisc1165 libisc1166 libisc1167 libisc1168 libisc1169 libisc1170 libisc1171 libisc1172 libisc1173 libisc1174 libisc1175 libisc1176 libisc1177 libisc1178 libisc1179 libisc1180 libisc1181 libisc1182 libisc1183 libisc1184 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libisc1458 libisc1459 libisc1460 libisc1461 libisc1462 libisc1463 libisc1464 libisc1465 libisc1466 libisc1467 libisc1468 libisc1469 libisc1470 libisc1471 libisc1472 libisc1473 libisc1474 libisc1475 libisc1476 libisc1477 libisc1478 libisc1479 libisc1480 libisc1481 libisc1482 libisc1483 libisc1484 libisc1485 libisc1486 libisc1487 libisc1488 libisc1489 libisc1490 libisc1491 libisc1492 libisc1493 libisc1494 libisc1495 libisc1496 libisc1497 libisc1498 libisc1499 libisc1500 libisc1501 libisc1502 libisc1503 libisc1504 libisc1505 libisc1506 libisc1507 libisc1508 libisc1509 libisc1510 libisc1511 libisc1512 libisc1513 libisc1514 libisc1515 libisc1516 libisc1517 libisc1518 libisc1519 libisc1520 libisc1521 libisc1522 libisc1523 libisc1524 libisc1525 libisc1526 libisc1527 libisc1528 libisc1529 libisc1530 libisc1531 libisc1532 libisc1533 libisc1534 libisc1535 libisc1536 libisc1537 libisc1538 libisc1539 libisc1540 libisc1541 libisc1542 libisc1543 libisc1544 libisc1545 libisc1546 libisc1547 libisc1548 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libisc1731 libisc1732 libisc1733 libisc1734 libisc1735 libisc1736 libisc1737 libisc1738 libisc1739 libisc1740 libisc1741 libisc1742 libisc1743 libisc1744 libisc1745 libisc1746 libisc1747 libisc1748 libisc1749 libisc1750 libisc1751 libisc1752 libisc1753
```

```
hp@hp-HP-Laptop-15s-du0xxx:~$ tree -L 1 /
```

```
/
├── bin -> usr/bin
├── boot
├── cdrom
├── dev
├── etc
├── home
├── lib -> usr/lib
├── lib32 -> usr/lib32
├── lib64 -> usr/lib64
├── libx32 -> usr/libx32
├── lost+found
├── media
├── mnt
├── opt
├── proc
├── root
├── run
├── sbin -> usr/sbin
├── snap
├── srv
├── swapfile
├── sys
├── tmp
├── usr
└── var
```

```
24 directories, 1 file
```

```
hp@hp-HP-Laptop-15s-du0xxx:~$
```


- Explore various directories and files using the command cd, ls etc in linux and provide its screenshots



3.3. The detailed explanation of directories in Linux

1. / (Root): Primary hierarchy root and root directory of the entire file system hierarchy.

- Every single file and directory starts from the root directory
- The only root user has the right to write under this directory

- /root is the root user's home directory, which is not the same as /

2. /bin : Essential command binaries that need to be available in single-user mode; for all users, e.g., cat, ls, cp.

- Contains binary executables
- Common linux commands you need to use in single-user modes are located under this directory.
- Commands used by all the users of the system are located here e.g. ps, ls, ping, grep, cp

3. /boot : Boot loader files, e.g., kernels, initrd.

- Kernel initrd, vmlinux, grub files are located under /boot
- Example: initrd.img-2.6.32-24-generic, vmlinuz-2.6.32-24-generic

4. /dev : Essential device files, e.g., /dev/null.

- These include terminal devices, usb, or any device attached to the system.
- And also know the connected devices.

5. /etc : Host-specific system-wide configuration files.

- Contains configuration files required by all programs.
- This also contains startup and shutdown shell scripts used to start/stop individual programs.
- Example: /etc/resolv.conf, /etc/logrotate.conf.
- The old format is et cetera

6. /home : Users' home directories, containing saved files, personal settings, etc.

- Home directories for all users to store their personal files.

7. /lib : Libraries essential for the binaries in /bin/ and /sbin/.

- Library filenames are either ld* or lib*.so.*
- Eg wifi, printer etc

8. /media : Mount points for removable media such as CD-ROMs (appeared in FHS-2.3).

- Temporary mount directory for removable devices.
- Examples, /media/cdrom for CD-ROM; /media/floppy for floppy drives; /media/cdrecorder for CD writer

9. /mnt : Temporarily mounted filesystems.

- Temporary mount directory where sysadmins can mount filesystems.

10. /opt : Optional application software packages.

- Contains add-on applications from individual vendors.
- Add-on applications should be installed under either /opt/ or /opt/ sub-directory.

11. /sbin : Essential system binaries, e.g., fsck, init, route.

- Just like /bin, /sbin also contains binary executables.
- The linux commands located under this directory are used typically by system administrator, for system maintenance purpose.
- Example: iptables, reboot, fdisk, ifconfig, swapon

12. /srv : Site-specific data served by this system, such as data and scripts for web servers, data offered by FTP servers, and repositories for version control systems.

- srv stands for service.
- Contains server specific services related data.
- Example, /srv/cvs contains CVS related data.

13. /tmp : Temporary files. Often not preserved between system reboots, and may be severely size restricted.

- Directory that contains temporary files created by system and users.
- Files under this directory

14. /usr : Secondary hierarchy for read-only user data; contains the majority of (multi-)user utilities and applications.

- Contains binaries, libraries, documentation, and source-code for second level programs.
- /usr/bin contains binary files for user programs. If you can't find a user binary under /bin, look under /usr/bin. For example: at, awk, cc, less, scp
- /usr/sbin contains binary files for system administrators. If you can't find a system binary under /sbin, look under /usr/sbin. For example: atd, cron, sshd, useradd, userdel
- /usr/lib contains libraries for /usr/bin and /usr/sbin
- /usr/local contains users programs that you install from source. For example, when you install apache from source, it goes under /usr/local/apache2
- /usr/src holds the Linux kernel sources, header-files and documentation.

15. /proc : Virtual filesystem providing process and kernel information as files. In Linux, corresponds to a procfs mount. Generally automatically generated and populated by the system, on the fly.

- Contains information about system process.
- This is a pseudo filesystem contains information about running process. For example: /proc/{pid} directory contains information about the process with that particular pid.
- This is a virtual filesystem with text information about system resources. For example: /proc/uptime

16. /var – Variable Data Files

The /var directory is the writable counterpart to the /usr directory, which must be read-only in normal operation. Log files and everything else that would normally be written to /usr during normal operation are written to the /var directory. For example, you'll find log files in /var/log.

17./srv – Service Data

The /srv directory contains “data for services provided by the system.” If you were using the Apache HTTP server to serve a website, you’d likely store your website’s files in a directory inside the /srv directory.

18./run — Application State Files

The /run directory is fairly new, and gives applications a standard place to store transient files they require like sockets and process IDs. These files can’t be stored in /tmp because files in /tmp may be deleted.

EXPERIMENT-04

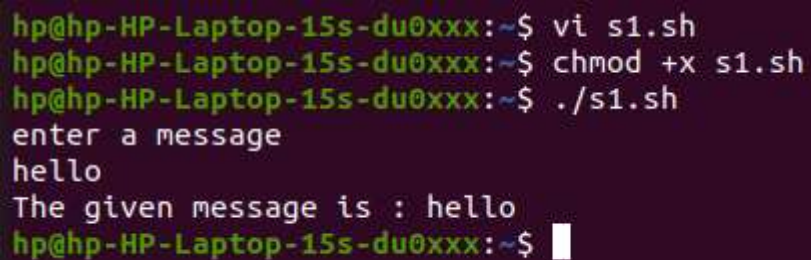
4.1. Shell Script

1. Write a Shell program to display a given message

Shell code:

```
echo "Enter a message"
read msg
echo "The given message is :$msg"
```

Output :



```
hp@hp-HP-Laptop-15s-du0xxx:~$ vi s1.sh
hp@hp-HP-Laptop-15s-du0xxx:~$ chmod +x s1.sh
hp@hp-HP-Laptop-15s-du0xxx:~$ ./s1.sh
enter a message
hello
The given message is : hello
hp@hp-HP-Laptop-15s-du0xxx:~$
```

Result:

The program execute successfully

2. Write a shell script to evaluate arithmetic operations.

Shell code:

```
echo "enter two integer number"
read a
read b
c=`expr $a + $b`
echo "sum of two numbers=$c"
c=`expr $a - $b`
echo "Differents of two numbers=$c"
c=`expr $a / $b`
echo "division of two numbers=$c"
c=`expr $a \* $b`
echo "multiplication of two numbers=$c"
c=`expr $a % $b`
echo "remainder=$c"
```

Output:

```

bash: cd: ansar: No such file or directory
hp@hp-HP-Laptop-15s-du0xxx:~/Desktop$ cd ansar
hp@hp-HP-Laptop-15s-du0xxx:~/Desktop/ansar$ chmod +x sh1.sh
hp@hp-HP-Laptop-15s-du0xxx:~/Desktop/ansar$ ./sh1.sh
"enter two integer number"
12
10
"sum of two numbers=22"
"Different of two numbers=2"
"division of two numbers=1"
"multiplication of two numbers=120"
hp@hp-HP-Laptop-15s-du0xxx:~/Desktop/ansar$

```

Result:

The program execute successfully

3. Write a shell Script to determine largest among three integer number

Shell code:

```

echo "enter three integer number"
read a
read b
read c
if [ $a -gt $b ] && [ $a -gt $c ]
then
echo "$a is largest number"
elif [ $b -gt $a ] && [ $b -gt $c ]
then
echo "$b is largest number"
else
echo "$c is largest number"
fi

```

Output:

```

hp@hp-HP-Laptop-15s-du0xxx:~/Desktop/ansar$ chmod +x sh2.sh
hp@hp-HP-Laptop-15s-du0xxx:~/Desktop/ansar$ ./sh2.sh
"enter three integer number"
90
85
45
"90 is largest number"
hp@hp-HP-Laptop-15s-du0xxx:~/Desktop/ansar$

```

Result:

The program execute successfully

4. Write a shell script to compare two string

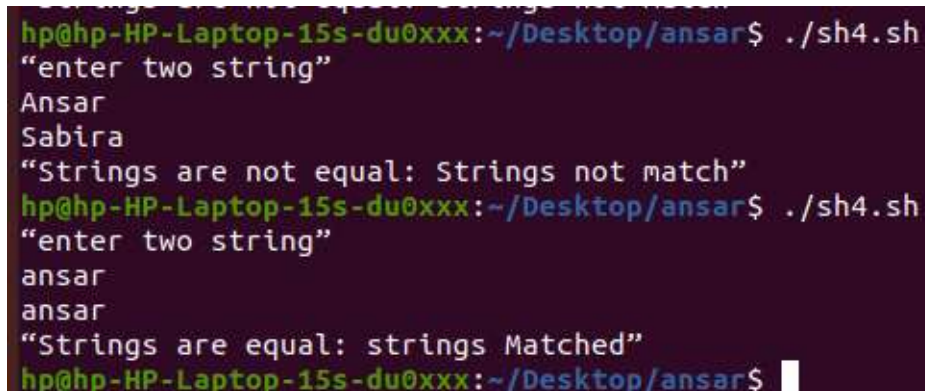
Shell code:

```

echo "enter two string"
read a
read b
if [ -z $a ]
then
echo " First String is empty: Null String"
fi
if [ -z $b ]
then
echo " First String is empty: Null String"
fi
if [ $a = $b ]
then
echo "Strings are equal: strings Matched"
else
echo "Strings are not equal: Strings not match"
fi

```

Output:



```

hp@hp-HP-Laptop-15s-du0xxx:~/Desktop/ansar$ ./sh4.sh
"enter two string"
Ansar
Sabira
"Strings are not equal: Strings not match"
hp@hp-HP-Laptop-15s-du0xxx:~/Desktop/ansar$ ./sh4.sh
"enter two string"
ansar
ansar
"Strings are equal: strings Matched"
hp@hp-HP-Laptop-15s-du0xxx:~/Desktop/ansar$

```

Result:

The program execute successfully

5. Write a shell script to read and check the directory exists or not, if not make directory

Shell code:

```

echo "enter name of directory"
read dir
if [ -d $dir ]
then
echo "Directory $dir Exits!"
else
mkdir $dir
fi

```

Output:

```
hp@hp-HP-Laptop-15s-du0xxx:~/Desktop/ansar$ chmod +x sh5.sh
hp@hp-HP-Laptop-15s-du0xxx:~/Desktop/ansar$ ./sh5.sh
"enter name of directory"
ab
hp@hp-HP-Laptop-15s-du0xxx:~/Desktop/ansar$ chmod +x sh6.sh
```

Result:

The program execute successfully

6. Write a shell script to read and check the file exists or not, if not make file.

Shell code:

```
echo "enter name of file"
read filename
if [ -f $filename ]
then
echo "File $filename Exits!"
else
touch $filename
fi
```

Output:

```
hp@hp-HP-Laptop-15s-du0xxx:~/Desktop/ansar$ chmod +x sh6.sh
hp@hp-HP-Laptop-15s-du0xxx:~/Desktop/ansar$ ./sh6.sh
"enter name of file"
sh1.sh
"File sh1.sh Exits!"
hp@hp-HP-Laptop-15s-du0xxx:~/Desktop/ansar$
```

Result:

The program execute successfully

7. Write a shell script to implement menu driven program to perform all arithmetic operation using case statement.

Shell code:

```
echo "enter two integer values"
read a
read b
echo " Menu"
echo "1->Addition"
echo "2->Substraction"
echo "3->Multiplication"
echo "4->Division"
echo "5->Remainder "
echo "enter choice"
read ch
case $ch in
1) echo "Sum=$(expr $a + $b)";;
2) echo "Substraction=$(expr $a - $b)";;
```



```

3) echo "Multiplication=$(expr $a \* $b)";;
4) echo "Division=$(expr $a / $b)";;
5) echo "Remainder=$(expr $a % $b)";;
6) echo "invalid Choice:Try Again!"
Esac

```

Output:

```

hp@hp-HP-Laptop-15s-du0xxx:~/Desktop/ansar$ chmod +x sh7.sh
hp@hp-HP-Laptop-15s-du0xxx:~/Desktop/ansar$ ./sh7.sh
"enter two integer values"
45
12
Menu
1->Addition
2->Substraction
3->Multiplication
4->Division
5->Remainder
"enter choice"
3
"Multiplication=540"

```

Result:

The program excute succesfully

8. Write a shell script to do:

- a. display list of directory contents
- b. Name of current directory
- c. Who is logged on
- d. Long listing of directory contents according to choose of user.

Shell code:

```

echo " Menu"
echo " 1-> listing directory content"
echo " 2-> print name of current directory"
echo " 3-> Show who is logged on "
echo " 4-> Show directory content using long listing format "
echo "enter your choice "
read ch
case $ch in
1) ls;;
2) pwd;;
3) who;;
4) ls -l;;
*) echo "Invalid Choice: Try Again!!"
esac

```

Output:

```
hp@hp-HP-Laptop-15s-du0xxx:~/Desktop/ansar$ chmod +x sh8.sh
hp@hp-HP-Laptop-15s-du0xxx:~/Desktop/ansar$ ./sh8.sh
Menu
1-> listing directory content
2-> print name of current directory
3-> Show who is logged on
4-> Show directory content using long listing format
enter your choice
1
ab      midhu  sh2.sh  sh5.sh  sh7.sh  sh8.sh
ansar  sh1.sh  sh4.sh  sh6.sh  sh8a.sh
hp@hp-HP-Laptop-15s-du0xxx:~/Desktop/ansar$
```

Result:

The program execute successfully

9. Write a shell script to getting input details like name, roll number and marks and print them using command line arguments.cat

shell code:

```
echo "Name of the student: $1"
echo "Roll Number of the student: $2"
echo "Marks of the student: $3"
```

Output:

```
MARKS OF THE STUDENT:
hp@hp-HP-Laptop-15s-du0xxx:~/Desktop/ansar$ chmod +x studentDetails
hp@hp-HP-Laptop-15s-du0xxx:~/Desktop/ansar$ ./studentDetails Ansar 6 54
Name of the student: Ansar
Roll Number of the student: 6
Marks of the student: 54
hp@hp-HP-Laptop-15s-du0xxx:~/Desktop/ansar$
```

Result:

The program execute successfully

10. Understand the differences between Echo statement using single quote , double quote and without quotes.

Shell code:

```
a=12
echo $a
echo "$a"
echo '$a'
```

Output:

```
hp@hp-HP-Laptop-15s-du0xxx:~/Desktop/ansar$ chmod +x file1.sh
hp@hp-HP-Laptop-15s-du0xxx:~/Desktop/ansar$ ./file1.sh
12
12
$a
hp@hp-HP-Laptop-15s-du0xxx:~/Desktop/ansar$
```

Result:

The program execute successfully

11. To check whether there is any entry in the month of May in the system log.

Shell code:

```
if [[ -e /var/log/syslog ]]
then
cat /var/log/syslog | grep "^May"
else
echo "File not found"
fi
```

Output:

```
./sh11.sh: line 28: syntax error: unexpected end of file
hp@hp-HP-Laptop-15s-du0xxx:~/Desktop/ansar$ chmod +x sh11.sh
hp@hp-HP-Laptop-15s-du0xxx:~/Desktop/ansar$ ./sh11.sh
Binary file (standard input) matches
hp@hp-HP-Laptop-15s-du0xxx:~/Desktop/ansar$ dir
```

Result:

The program execute successfully

12. Implement arithmetic calculator using Functions

Shell code:

```
add()
{
i=$1
j=$2
k=$((i+j))
echo "Sum is $k"
}
sub()
{
i=$1
j=$2
k=$((i-j))
echo "different is $k"
}
mul()
```

```

{
i=$1
j=$2
((k=i*j))
echo "product is $k"
}
echo "Enter your option: 1: Add, 2:Subtract, 3: Multiply"
read i
case $i in
1) add 11 2;;
2) sub 10 5;;
3) mul 1 2;;
esac

```

Output:

```

hp@hp-HP-Laptop-15s-du0xxx:~/Desktop/ansar$ chmod +x sh12.sh
hp@hp-HP-Laptop-15s-du0xxx:~/Desktop/ansar$ ./sh12.sh
Enter your option: 1: Add, 2:Subtract, 3: Multiply
1
Sum is 3

```

Result:

The program execute successfully

13. To find the sum of n natural numbers.

a. Using for loop

shell code:

```

sum=0
for ((i=0;i<10;i++))
do
((sum=sum+i))
done
echo $sum

```

b. Using While loop

shell code:

```

i=0
sum=0
while ((i<10));do
((sum=sum+i))
((i=i+1))
done
echo $sum

```

Output:

```
hp@hp-HP-Laptop-15s-du0xxx:~/Desktop/ansar$ chmod +x sh13a.sh
hp@hp-HP-Laptop-15s-du0xxx:~/Desktop/ansar$ ./sh13a.sh
45
hp@hp-HP-Laptop-15s-du0xxx:~/Desktop/ansar$ chmod +x sh13b.sh
hp@hp-HP-Laptop-15s-du0xxx:~/Desktop/ansar$ ./sh13b.sh
45
hp@hp-HP-Laptop-15s-du0xxx:~/Desktop/ansar$
```

Result:

The program execute successfully

EXPERIMENT-05

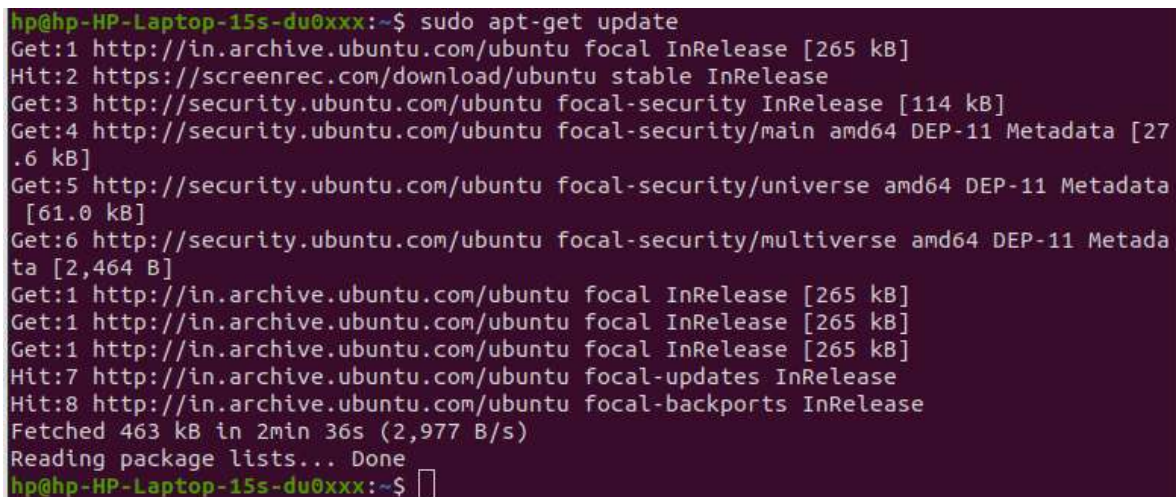
5.1 Installing LAMP on Ubuntu

Step 1: Update Package Repository Cache

Before you begin:

1. Open the terminal either by using the **CTRL+ALT+T** keyboard shortcut or by searching for the word *terminal* in **Ubuntu**
2. Make sure to update the package repository cache to ensure it installs the latest versions of the software. To do so, type in the following command:

```
sudo apt-get update
```



```
hp@hp-HP-Laptop-15s-du0xxx:~$ sudo apt-get update
Get:1 http://in.archive.ubuntu.com/ubuntu focal InRelease [265 kB]
Hit:2 https://screenrec.com/download/ubuntu stable InRelease
Get:3 http://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Get:4 http://security.ubuntu.com/ubuntu focal-security/main amd64 DEP-11 Metadata [27.6 kB]
Get:5 http://security.ubuntu.com/ubuntu focal-security/universe amd64 DEP-11 Metadata [61.0 kB]
Get:6 http://security.ubuntu.com/ubuntu focal-security/multiverse amd64 DEP-11 Metadata [2,464 B]
Get:1 http://in.archive.ubuntu.com/ubuntu focal InRelease [265 kB]
Get:1 http://in.archive.ubuntu.com/ubuntu focal InRelease [265 kB]
Get:1 http://in.archive.ubuntu.com/ubuntu focal InRelease [265 kB]
Hit:7 http://in.archive.ubuntu.com/ubuntu focal-updates InRelease
Hit:8 http://in.archive.ubuntu.com/ubuntu focal-backports InRelease
Fetched 463 kB in 2min 36s (2,977 B/s)
Reading package lists... Done
hp@hp-HP-Laptop-15s-du0xxx:~$
```

Step 2: Install Apache

1. To install Apache, run the following command in the terminal:

```
sudo apt-get install apache2
```



```

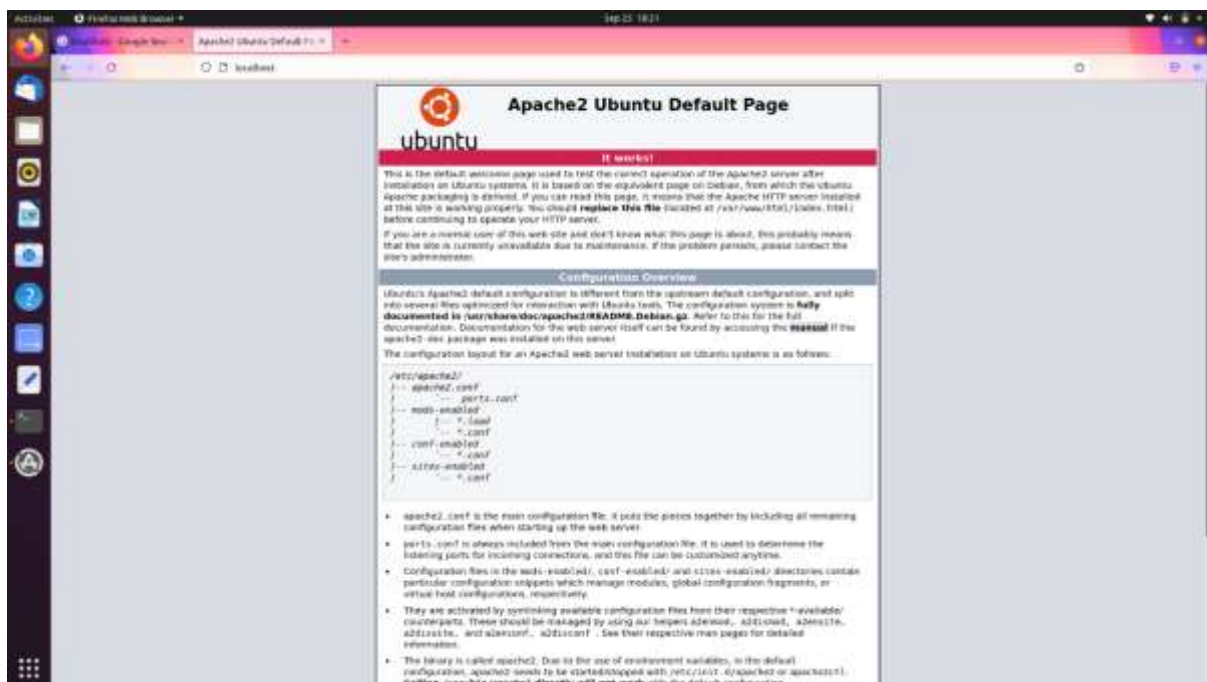
Reading package lists... Done
hp@hp-HP-Laptop-15s-du0xxx:~$ sudo apt-get install apache2
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  enchant geotp-database libbind9-161 libboost-filesystem1.67.0
  libboost-iostreams1.67.0 libdns-export1107 libdns1107 libdns1109 libenchantic2a
  libexiv2-14 libfprint0 libgeop1 libgspell-1-1 libgutenprint-common
  libgutenprint9 libiptc0 liblrs161 libisc-export1104 libisc1104 libisc1105
  libisccc161 libiscfg163 libllvm9 liblwres161 libnfs12 liboauth0
  printer-driver-gutenprint python3-asn1crypto shin ubuntu-software
  ubuntu-system-service
Use 'sudo apt autoremove' to remove them.
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 66 not upgraded.
Need to get 1,819 kB of archives.
After this operation, 7,938 kB of additional disk space will be used.
Do you want to continue? [Y/n]

```

Press **y** (yes) and hit **ENTER** to permit the installation.

2. To ensure Apache is running, enter the Localhost of your server in the address bar and press **ENTER**.

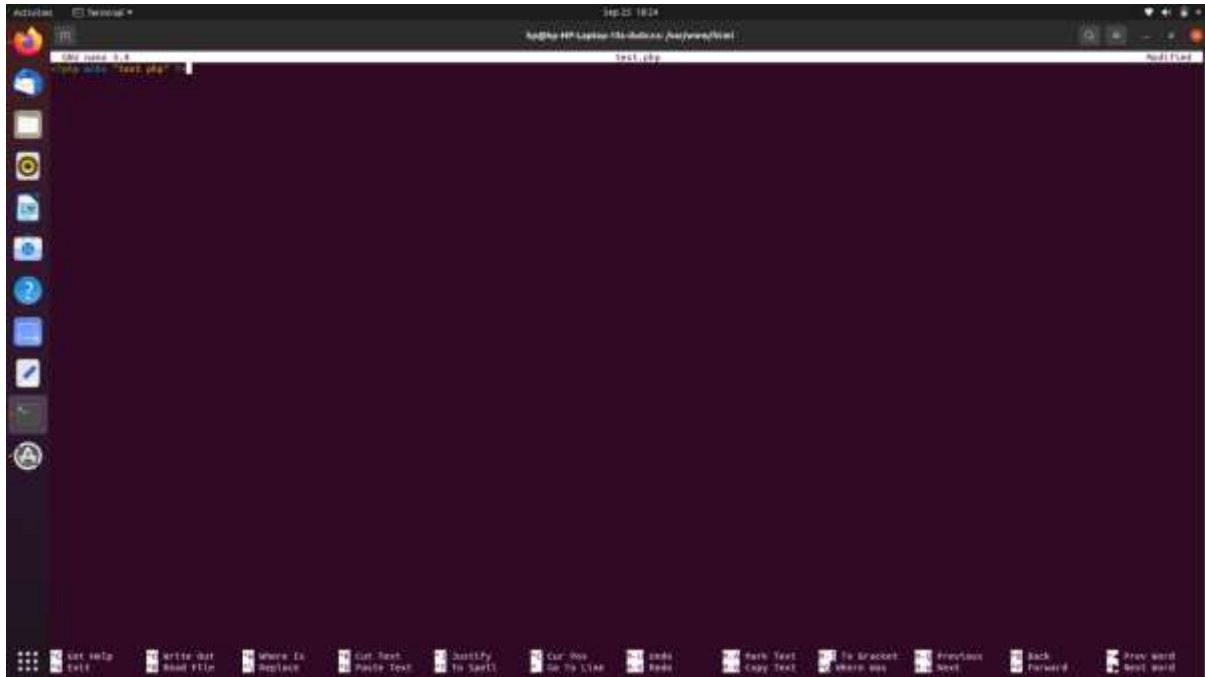
The test Apache web server page should display as below.



This command opens the **bank file**.

2. Inside the file, type in the valid PHP code:

```
<?php
    Echo " test php ";
?>
```



3. Press **CTRL + X** to save and close the file. Press **y** and **ENTER** to confirm.

4. Then check the code are run currently in php.open the browser enter the
Ip address (localhost/test.php).

It show the below image



Step 6: Install Mysql server

1. To install Mysql server, run the following command:

\$ sudo apt-get install mysql-server

```
Other options.
hp@hp-HP-Laptop-15s-du0xxx:~$ sudo apt-get install mysql-server
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  enchant geoip-database libbind9-161 libboost-filesystem1.67.0
  libboost-iostreams1.67.0 libdns-export1107 libdns1107 libdns1109
  libenchantic2a libexiv2-14 libfprint0 libgeoip1 libgspell-1-1
  libgutenprint-common libgutenprint9 libiptc0 libirs161 libisc-export1104
  libisc1104 libisc1105 libisccc161 libisccfg163 libllvm9 liblwres161 libnfs12
  liboauth0 printer-driver-gutenprint python3-asn1crypto shim ubuntu-software
  ubuntu-system-service
Use 'sudo apt autoremove' to remove them.
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:
```

2. Then it's asking us for a root password . enter the password . Again we get to repeat it

Step 7: Check the Mysql server

1. To check Mysql server, run the following command

\$ mysql -u root -p

- Enter the root password and press enter

```
hp@hp-HP-Laptop-15s-du0xxx:~$ mysql -u root -p
Enter password:
ERROR 1045 (28000): Access denied for user 'root'@'localhost' (using password: YES)
hp@hp-HP-Laptop-15s-du0xxx:~$ mysql -u root -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 19
Server version: 8.0.26-0ubuntu0.20.04.2 (Ubuntu)

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

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

mysql> create database testdb;
Query OK, 1 row affected (0.01 sec)

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

mysql>
```

2 . Create a database testdb and show it

- Enter the command
Create database testdb;
Show databases;
- So mysql is working then exit the mysql prompt just enter **exit;**

Step 8: Install PHP Myadmin

1. To install PHP Myadmin, run the following command:

\$ sudo apt-get install phpmyadmin


```

$ sudo apt-get install phpmyadmin
[sudo] password for hp:
Reading package lists... Done
Building dependency tree
Reading state information... Done

The following packages were automatically installed and are no longer required:
  acl egg-color-data enchant geop-database gnome-control-center-faces gnome-online-accounts gsfonts hplip-data libbind9-161 libboost-filesystem4.7.0 libboost-iostreams1.67.0 libcolor-gtk1
  libcolorhug2 libdms-expert1187 libdms1187 libdms1188 libdmscharc16 libdms1188 libdms1189 libdms1190 libdms1191 libdms1192 libdms1193 libdms1194 libdms1195 libdms1196 libdms1197 libdms1198
  libdms1199 libdms1200 libdms1201 libdms1202 libdms1203 libdms1204 libdms1205 libdms1206 libdms1207 libdms1208 libdms1209 libdms1210 libdms1211 libdms1212 libdms1213 libdms1214
  libdms1215 libdms1216 libdms1217 libdms1218 libdms1219 libdms1220 libdms1221 libdms1222 libdms1223 libdms1224 libdms1225 libdms1226 libdms1227 libdms1228 libdms1229 libdms1230 libdms1231
  libdms1232 libdms1233 libdms1234 libdms1235 libdms1236 libdms1237 libdms1238 libdms1239 libdms1240 libdms1241 libdms1242 libdms1243 libdms1244 libdms1245 libdms1246 libdms1247 libdms1248
  libdms1249 libdms1250 libdms1251 libdms1252 libdms1253 libdms1254 libdms1255 libdms1256 libdms1257 libdms1258 libdms1259 libdms1260 libdms1261 libdms1262 libdms1263 libdms1264 libdms1265
  libdms1266 libdms1267 libdms1268 libdms1269 libdms1270 libdms1271 libdms1272 libdms1273 libdms1274 libdms1275 libdms1276 libdms1277 libdms1278 libdms1279 libdms1280 libdms1281 libdms1282
  libdms1283 libdms1284 libdms1285 libdms1286 libdms1287 libdms1288 libdms1289 libdms1290 libdms1291 libdms1292 libdms1293 libdms1294 libdms1295 libdms1296 libdms1297 libdms1298 libdms1299
  libdms1300 libdms1301 libdms1302 libdms1303 libdms1304 libdms1305 libdms1306 libdms1307 libdms1308 libdms1309 libdms1310 libdms1311 libdms1312 libdms1313 libdms1314 libdms1315 libdms1316
  libdms1317 libdms1318 libdms1319 libdms1320 libdms1321 libdms1322 libdms1323 libdms1324 libdms1325 libdms1326 libdms1327 libdms1328 libdms1329 libdms1330 libdms1331 libdms1332 libdms1333
  libdms1334 libdms1335 libdms1336 libdms1337 libdms1338 libdms1339 libdms1340 libdms1341 libdms1342 libdms1343 libdms1344 libdms1345 libdms1346 libdms1347 libdms1348 libdms1349 libdms1350
  libdms1351 libdms1352 libdms1353 libdms1354 libdms1355 libdms1356 libdms1357 libdms1358 libdms1359 libdms1360 libdms1361 libdms1362 libdms1363 libdms1364 libdms1365 libdms1366 libdms1367
  libdms1368 libdms1369 libdms1370 libdms1371 libdms1372 libdms1373 libdms1374 libdms1375 libdms1376 libdms1377 libdms1378 libdms1379 libdms1380 libdms1381 libdms1382 libdms1383 libdms1384
  libdms1385 libdms1386 libdms1387 libdms1388 libdms1389 libdms1390 libdms1391 libdms1392 libdms1393 libdms1394 libdms1395 libdms1396 libdms1397 libdms1398 libdms1399 libdms1400 libdms1401
  libdms1402 libdms1403 libdms1404 libdms1405 libdms1406 libdms1407 libdms1408 libdms1409 libdms1410 libdms1411 libdms1412 libdms1413 libdms1414 libdms1415 libdms1416 libdms1417 libdms1418
  libdms1419 libdms1420 libdms1421 libdms1422 libdms1423 libdms1424 libdms1425 libdms1426 libdms1427 libdms1428 libdms1429 libdms1430 libdms1431 libdms1432 libdms1433 libdms1434 libdms1435
  libdms1436 libdms1437 libdms1438 libdms1439 libdms1440 libdms1441 libdms1442 libdms1443 libdms1444 libdms1445 libdms1446 libdms1447 libdms1448 libdms1449 libdms1450 libdms1451 libdms1452
  libdms1453 libdms1454 libdms1455 libdms1456 libdms1457 libdms1458 libdms1459 libdms1460 libdms1461 libdms1462 libdms1463 libdms1464 libdms1465 libdms1466 libdms1467 libdms1468 libdms1469
  libdms1470 libdms1471 libdms1472 libdms1473 libdms1474 libdms1475 libdms1476 libdms1477 libdms1478 libdms1479 libdms1480 libdms1481 libdms1482 libdms1483 libdms1484 libdms1485 libdms1486
  libdms1487 libdms1488 libdms1489 libdms1490 libdms1491 libdms1492 libdms1493 libdms1494 libdms1495 libdms1496 libdms1497 libdms1498 libdms1499 libdms1500 libdms1501 libdms1502 libdms1503
  libdms1504 libdms1505 libdms1506 libdms1507 libdms1508 libdms1509 libdms1510 libdms1511 libdms1512 libdms1513 libdms1514 libdms1515 libdms1516 libdms1517 libdms1518 libdms1519 libdms1520
  libdms1521 libdms1522 libdms1523 libdms1524 libdms1525 libdms1526 libdms1527 libdms1528 libdms1529 libdms1530 libdms1531 libdms1532 libdms1533 libdms1534 libdms1535 libdms1536 libdms1537
  libdms1538 libdms1539 libdms1540 libdms1541 libdms1542 libdms1543 libdms1544 libdms1545 libdms1546 libdms1547 libdms1548 libdms1549 libdms1550 libdms1551 libdms1552 libdms1553 libdms1554
  libdms1555 libdms1556 libdms1557 libdms1558 libdms1559 libdms1560 libdms1561 libdms1562 libdms1563 libdms1564 libdms1565 libdms1566 libdms1567 libdms1568 libdms1569 libdms1570 libdms1571
  libdms1572 libdms1573 libdms1574 libdms1575 libdms1576 libdms1577 libdms1578 libdms1579 libdms1580 libdms1581 libdms1582 libdms1583 libdms1584 libdms1585 libdms1586 libdms1587 libdms1588
  libdms1589 libdms1590 libdms1591 libdms1592 libdms1593 libdms1594 libdms1595 libdms1596 libdms1597 libdms1598 libdms1599 libdms1600 libdms1601 libdms1602 libdms1603 libdms1604 libdms1605
  libdms1606 libdms1607 libdms1608 libdms1609 libdms1610 libdms1611 libdms1612 libdms1613 libdms1614 libdms1615 libdms1616 libdms1617 libdms1618 libdms1619 libdms1620 libdms1621 libdms1622
  libdms1623 libdms1624 libdms1625 libdms1626 libdms1627 libdms1628 libdms1629 libdms1630 libdms1631 libdms1632 libdms1633 libdms1634 libdms1635 libdms1636 libdms1637 libdms1638 libdms1639
  libdms1640 libdms1641 libdms1642 libdms1643 libdms1644 libdms1645 libdms1646 libdms1647 libdms1648 libdms1649 libdms1650 libdms1651 libdms1652 libdms1653 libdms1654 libdms1655 libdms1656
  libdms1657 libdms1658 libdms1659 libdms1660 libdms1661 libdms1662 libdms1663 libdms1664 libdms1665 libdms1666 libdms1667 libdms1668 libdms1669 libdms1670 libdms1671 libdms1672 libdms1673
  libdms1674 libdms1675 libdms1676 libdms1677 libdms1678 libdms1679 libdms1680 libdms1681 libdms1682 libdms1683 libdms1684 libdms1685 libdms1686 libdms1687 libdms1688 libdms1689 libdms1690
  libdms1691 libdms1692 libdms1693 libdms1694 libdms1695 libdms1696 libdms1697 libdms1698 libdms1699 libdms1700 libdms1701 libdms1702 libdms1703 libdms1704 libdms1705 libdms1706 libdms1707
  libdms1708 libdms1709 libdms1710 libdms1711 libdms1712 libdms1713 libdms1714 libdms1715 libdms1716 libdms1717 libdms1718 libdms1719 libdms1720 libdms1721 libdms1722 libdms1723 libdms1724
  libdms1725 libdms1726 libdms1727 libdms1728 libdms1729 libdms1730 libdms1731 libdms1732 libdms1733 libdms1734 libdms1735 libdms1736 libdms1737 libdms1738 libdms1739 libdms1740 libdms1741
  libdms1742
```

Press **y** and **ENTER** to allow the installation

2. Then it asks what type of server we have. Apache2 is set by default, that's what we want. Then press **ok**.
3. Then a configuration prompt is open. Here we're going to just choose **yes** and then it asks the input password for **phpmyadmin**.
4. Then check it's correct. Go to `localhost/phpmyadmin`. Here we can not find it so we have to actually edit the file. **php** is located in the **Apache2** folder.
5. Enter the following command to edit the file:
`$ sudo nano/etc/php7.4/apache2.php.ini`
6. Then we need to uncomment an **`extension=mysql.so`**. Find it in the file, just remove the Semicolon.
7. Then enter **`ctrl+x`** to save.

Step 9: Restart Apache

After the php installation you must restart the Apache service.

Enter the command:

```
$ sudo /etc/init.d/apache2 restart
```

Step 9.1: Include phpmyadmin in apache configuration

1. Enter the command:

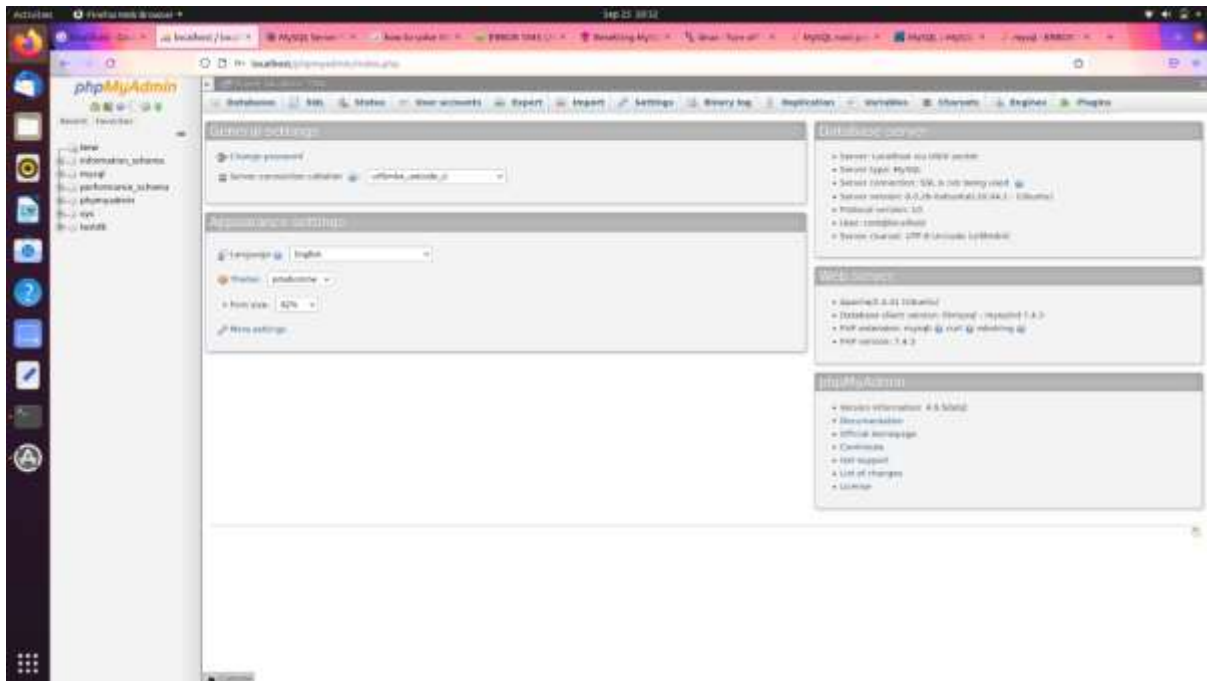
```
$ sudo nano/etc/apache2/apache2.conf
```

2. Type the following command to the nano editor

Include /etc/phpmyadmin/apache.conf

3. Then enter `ctrl+x` to save

4. Then again restart the apache



EXPERIMENT-06

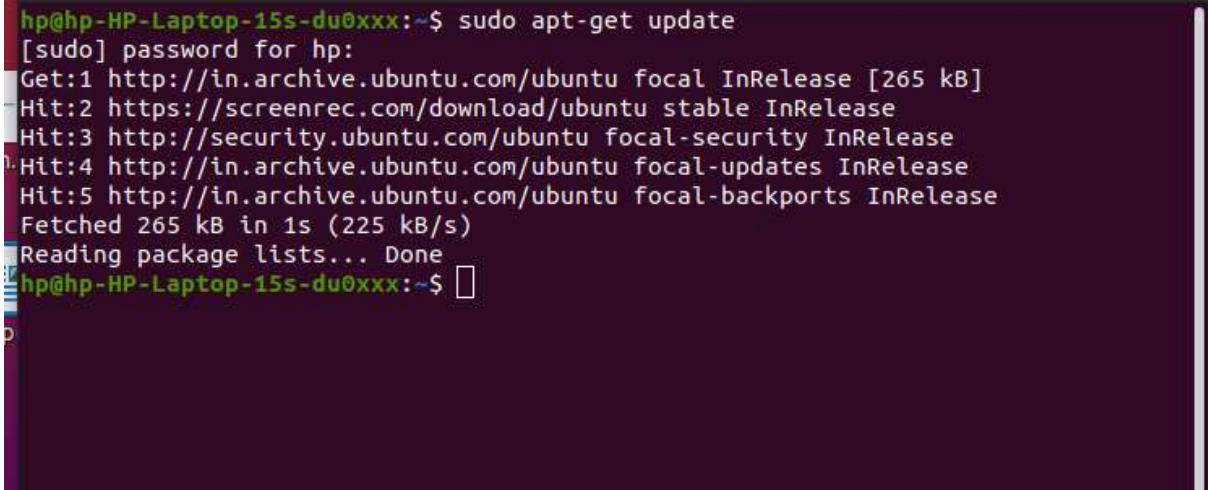
6.1.Laravel installation On Ubuntu with Apache

Step 1: Update Package Repository Cache

Before you begin:

1. Open the terminal either by using the **CTRL+ALT+T** keyboard shortcut or by searching for the word *terminal* in **Ubuntu**
2. Make sure to update the package repository cache to ensure it installs the latest versions of the software. To do so, type in the following command:

```
sudo apt-get update
```



```
hp@hp-HP-Laptop-15s-du0xxx:~$ sudo apt-get update
[sudo] password for hp:
Get:1 http://in.archive.ubuntu.com/ubuntu focal InRelease [265 kB]
Hit:2 https://screenrec.com/download/ubuntu stable InRelease
Hit:3 http://security.ubuntu.com/ubuntu focal-security InRelease
Hit:4 http://in.archive.ubuntu.com/ubuntu focal-updates InRelease
Hit:5 http://in.archive.ubuntu.com/ubuntu focal-backports InRelease
Fetched 265 kB in 1s (225 kB/s)
Reading package lists... Done
hp@hp-HP-Laptop-15s-du0xxx:~$
```

Step 2: Install Apache

1. To install Apache, run the following command in the terminal:

```
sudo apt-get install apache2
```



```

hp@hp-HP-Laptop-15s-du0xxx: /etc/php/7.4/apache2
GNU nano 4.8      php.ini      Modified
; every request. PHP's default behavior is to disable this feature.
;cgi.nph = 1

; if cgi.force_redirect is turned on, and you are not running under Apache or N>
; (iPlanet) web servers, you MAY need to set an environment variable name that >
; will look for to know it is OK to continue execution.  Setting this variable >
; cause security issues, KNOW WHAT YOU ARE DOING FIRST.
; http://php.net/cgi.redirect-status-env
;cgi.redirect_status_env =

; cgi.fix_pathinfo provides *real* PATH_INFO/PATH_TRANSLATED support for CGI. >
; previous behaviour was to set PATH_TRANSLATED to SCRIPT_FILENAME, and to not >
; what PATH_INFO is.  For more information on PATH_INFO, see the cgi specs. Se>
; this to 1 will cause PHP CGI to fix its paths to conform to the spec.  A sett>
; of zero causes PHP to behave as before.  Default is 1.  You should fix your s>
; to use SCRIPT_FILENAME rather than PATH_TRANSLATED.
; http://php.net/cgi.fix-pathinfo
cgi.fix_pathinfo=0

; if cgi.discard_path is enabled, the PHP CGI binary can safely be placed outsi>

^G Get Help  ^O Write Out  ^W Where Is   ^K Cut Text   ^J Justify    ^C Cur Pos
^X Exit      ^R Read File  ^\ Replace    ^U Paste Text ^T To Spell   ^_ Go To Line

```

- Then restart the apache server using the following command

\$ systemctl restart apache

4. Install Composer

Composer is a PHP dependency manager that facilitates the download of PHP libraries in our projects. Composer both works great with and makes it much easier to install Laravel.

1. Install composer using the following command

\$ Curl -sS <https://getcomposer.org/installer> | php

2. In this time your system not insdtaaled the curl file .then install it using the following command

\$ Sudo apt install curl

```

root@HP-Laptop-15s-dubxxx:~# curl -s http://getcomposer.org/Installer.php
Command 'curl' not found, but can be installed with:

sudo snap install curl # version 7.78.0, or
sudo apt install curl # version 7.68.0-1ubuntu2.7

See 'snap info curl' for additional versions.

root@HP-Laptop-15s-dubxxx:~# curl -s http://getcomposer.org/Installer.php
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
acl aptg color-data enchant geopip database gnome-control-center-faces
gnome-online-accounts gsf fonts hplip-data libbind9-161
libboost-fsystem1.67.0 libboost-iostreams1.67.0 libcolor-gtk1
libcolor-hug2 libdns-export1107 libdns1107 libdns1109 libenchant1c2a
libexiv2-14 libfprint0 libgeopip libgsound0 libgspell-1-1 libgssdp-1.2-0
libgupnp-1.2-0 libgupnp-av-1.0-2 libgupnp-dlna-2.0-3 libgutenprint-common
libgutenprint5 libieee1284-3 libinanequant0 libiptc0 libirs161
libisc-export1104 libisc1104 libisc1105 libisc1109 libisc1110 libisc1111
libisc1112 libisc1113 libisc1114 libisc1115 libisc1116 libisc1117
libisc1118 libisc1119 libisc1120 libisc1121 libisc1122 libisc1123
libisc1124 libisc1125 libisc1126 libisc1127 libisc1128 libisc1129
libisc1130 libisc1131 libisc1132 libisc1133 libisc1134 libisc1135
libisc1136 libisc1137 libisc1138 libisc1139 libisc1140 libisc1141
libisc1142 libisc1143 libisc1144 libisc1145 libisc1146 libisc1147
libisc1148 libisc1149 libisc1150 libisc1151 libisc1152 libisc1153
libisc1154 libisc1155 libisc1156 libisc1157 libisc1158 libisc1159
libisc1160 libisc1161 libisc1162 libisc1163 libisc1164 libisc1165
libisc1166 libisc1167 libisc1168 libisc1169 libisc1170 libisc1171
libisc1172 libisc1173 libisc1174 libisc1175 libisc1176 libisc1177
libisc1178 libisc1179 libisc1180 libisc1181 libisc1182 libisc1183
libisc1184 libisc1185 libisc1186 libisc1187 libisc1188 libisc1189
libisc1190 libisc1191 libisc1192 libisc1193 libisc1194 libisc1195
libisc1196 libisc1197 libisc1198 libisc1199 libisc1200 libisc1201
libisc1202 libisc1203 libisc1204 libisc1205 libisc1206 libisc1207
libisc1208 libisc1209 libisc1210 libisc1211 libisc1212 libisc1213
libisc1214 libisc1215 libisc1216 libisc1217 libisc1218 libisc1219
libisc1220 libisc1221 libisc1222 libisc1223 libisc1224 libisc1225
libisc1226 libisc1227 libisc1228 libisc1229 libisc1230 libisc1231
libisc1232 libisc1233 libisc1234 libisc1235 libisc1236 libisc1237
libisc1238 libisc1239 libisc1240 libisc1241 libisc1242 libisc1243
libisc1244 libisc1245 libisc1246 libisc1247 libisc1248 libisc1249
libisc1250 libisc1251 libisc1252 libisc1253 libisc1254 libisc1255
libisc1256 libisc1257 libisc1258 libisc1259 libisc1260 libisc1261
libisc1262 libisc1263 libisc1264 libisc1265 libisc1266 libisc1267
libisc1268 libisc1269 libisc1270 libisc1271 libisc1272 libisc1273
libisc1274 libisc1275 libisc1276 libisc1277 libisc1278 libisc1279
libisc1280 libisc1281 libisc1282 libisc1283 libisc1284 libisc1285
libisc1286 libisc1287 libisc1288 libisc1289 libisc1290 libisc1291
libisc1292 libisc1293 libisc1294 libisc1295 libisc1296 libisc1297
libisc1298 libisc1299 libisc1300 libisc1301 libisc1302 libisc1303
libisc1304 libisc1305 libisc1306 libisc1307 libisc1308 libisc1309
libisc1310 libisc1311 libisc1312 libisc1313 libisc1314 libisc1315
libisc1316 libisc1317 libisc1318 libisc1319 libisc1320 libisc1321
libisc1322 libisc1323 libisc1324 libisc1325 libisc1326 libisc1327
libisc1328 libisc1329 libisc1330 libisc1331 libisc1332 libisc1333
libisc1334 libisc1335 libisc1336 libisc1337 libisc1338 libisc1339
libisc1340 libisc1341 libisc1342 libisc1343 libisc1344 libisc1345
libisc1346 libisc1347 libisc1348 libisc1349 libisc1350 libisc1351
libisc1352 libisc1353 libisc1354 libisc1355 libisc1356 libisc1357
libisc1358 libisc1359 libisc1360 libisc1361 libisc1362 libisc1363
libisc1364 libisc1365 libisc1366 libisc1367 libisc1368 libisc1369
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libisc1376 libisc1377 libisc1378 libisc1379 libisc1380 libisc1381
libisc1382 libisc1383 libisc1384 libisc1385 libisc1386 libisc1387
libisc1388 libisc1389 libisc1390 libisc1391 libisc1392 libisc1393
libisc1394 libisc1395 libisc1396 libisc1397 libisc1398 libisc1399
libisc1400 libisc1401 libisc1402 libisc1403 libisc1404 libisc1405
libisc1406 libisc1407 libisc1408 libisc1409 libisc1410 libisc1411
libisc1412 libisc1413 libisc1414 libisc1415 libisc1416 libisc1417
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libisc1472 libisc1473 libisc1474 libisc1475 libisc1476 libisc1477
libisc1478 libisc1479 libisc1480 libisc1481 libisc1482 libisc1483
libisc1484 libisc1485 libisc1486 libisc1487 libisc1488 libisc1489
libisc1490 libisc1491 libisc1492 libisc1493 libisc1494 libisc1495
libisc1496 libisc1497 libisc1498 libisc1499 libisc1500 libisc1501
libisc1502 libisc1503 libisc1504 libisc1505 libisc1506 libisc1507
libisc1508 libisc1509 libisc1510 libisc1511 libisc1512 libisc1513
libisc1514 libisc1515 libisc1516 libisc1517 libisc1518 libisc1519
libisc1520 libisc1521 libisc1522 libisc1523 libisc1524 libisc1525
libisc1526 libisc1527 libisc1528 libisc1529 libisc1530 libisc1531
libisc1532 libisc1533 libisc1534 libisc1535 libisc1536 libisc1537
libisc1538 libisc1539 libisc1540 libisc1541 libisc1542 libisc1543
libisc1544 libisc1545 libisc1546 libisc1547 libisc1548 libisc1549
libisc1550 libisc1551 libisc1552 libisc1553 libisc1554 libisc1555
libisc1556 libisc1557 libisc1558 libisc1559 libisc1560 libisc1561
libisc1562 libisc1563 libisc1564 libisc1565 libisc1566 libisc1567
libisc1568 libisc1569 libisc1570 libisc1571 libisc1572 libisc1573
libisc1574 libisc1575 libisc1576 libisc1577 libisc1578 libisc1579
libisc1580 libisc1581 libisc1582 libisc1583 libisc1584 libisc1585
libisc1586 libisc1587 libisc1588 libisc1589 libisc1590 libisc1591
libisc1592 libisc1593 libisc1594 libisc1595 libisc1596 libisc1597
libisc1598 libisc1599 libisc1600 libisc1601 libisc1602 libisc1603
libisc1604 libisc1605 libisc1606 libisc1607 libisc1608 libisc1609
libisc1610 libisc1611 libisc1612 libisc1613 libisc1614 libisc1615
libisc1616 libisc1617 libisc1618 libisc1619 libisc1620 libisc1621
libisc1622 libisc1623 libisc1624 libisc1625 libisc1626 libisc1627
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libisc1640 libisc1641 libisc1642 libisc1643 libisc1644 libisc1645
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libisc1652 libisc1653 libisc1654 libisc1655 libisc1656 libisc1657
libisc1658 libisc1659 libisc1660 libisc1661 libisc1662 libisc1663
libisc1664 libisc1665 libisc1666 libisc1667 libisc1668 libisc1669
libisc1670 libisc1671 libisc1672 libisc1673 libisc1674 libisc1675
libisc1676 libisc1677 libisc1678 libisc1679 libisc1680 libisc1681
libisc1682 libisc1683 libisc1684 libisc1685 libisc1686 libisc1687
libisc1688 libisc1689 libisc1690 libisc1691 libisc1692 libisc1693
libisc1694 libisc1695 libisc1696 libisc1697 libisc1698 libisc1699
libisc1700 libisc1701 libisc1702 libisc1703 libisc1704 libisc1705
libisc1706 libisc1707 libisc1708 libisc1709 libisc1710 libisc1711
libisc1712 libisc1713 lib
```

3. Move the file using the following command

```
$ sudo mv composer.phar /usr/local/bin/composer
```

```
Use it: php composer.phar

h@php-WP-Laptop-15s-dubuntu:~$ sudo mv composer.phar /usr/local/bin/composer
h@php-WP-Laptop-15s-dubuntu:~$ composer --version
Composer version 2.1.8 2021-09-15 11:55:14
h@php-WP-Laptop-15s-dubuntu:~$ composer global require laravel/installer
Changed current directory to /home/hp/.config/composer

[OutliveSession]
```

Step 5 – Install Laravel 8.x on Ubuntu 20.04

Now install Laravel Framework using composer, just type `composer global require Laravel/installer`
It will take a while to complete download its dependencies

1. Lavalral install with following command

\$ composer global require laravel/installer


```

hp@hp-HP-Laptop-15s-dubxxx:~$ composer global require laravel/installer
Changed current directory to /home/hp/.config/composer
https://repo.packagist.org could not be fully loaded (curl error 28 while downloading https://repo.packagist.org/pa
d from the local cache and may be out of date
Using version ^4.2 for laravel/installer
./composer.json has been updated
Running composer update laravel/installer
Loading composer repositories with package information
Updating dependencies
Lock file operations: 13 installs, 0 updates, 0 removals
- Locking laravel/installer (v4.2.0)
- Locking psr/container (1.1.1)
- Locking symfony/console (v5.3.7)
- Locking symfony/deprecation-contracts (v2.4.0)
- Locking symfony/polyfill-ctype (v1.23.0)
- Locking symfony/polyfill-intl-grapheme (v1.23.1)
- Locking symfony/polyfill-intl-normalizer (v1.23.0)
- Locking symfony/polyfill-mbstring (v1.23.1)
- Locking symfony/polyfill-php73 (v1.23.0)
- Locking symfony/polyfill-php80 (v1.23.1)
- Locking symfony/process (v5.3.7)
- Locking symfony/service-contracts (v2.4.0)
- Locking symfony/string (v5.3.7)

```

Next add bin directory to path environment through the `~/.bashrc` configuration .so edit the `~/.bashrc` configuration using nano command. The command are follow

```
$ nano ~/.bashrc
```

2.It open the file and add the following line at the end of the file.

```
export PATH="$HOME/.config/composer/vendor/bin:$PATH"
```

```

# Add an "alert" alias for long running commands. Use like so:
# sleep 10; alert
alias alert='notify-send --urgency=low -i "${[ $? = 0 ]} && echo terminal ||'

# Alias definitions.
# You may want to put all your additions into a separate file like
# ~/.bash_aliases, instead of adding them here directly.
# See /usr/share/doc/bash-doc/examples in the bash-doc package.

if [ -f ~/.bash_aliases ]; then
    . ~/.bash_aliases
fi

# enable programmable completion features (you don't need to enable
# this, if it's already enabled in /etc/bash.bashrc and /etc/profile
# sources /etc/bash.bashrc).
if ! shopt -oq posix; then
    if [ -f /usr/share/bash-completion/bash_completion ]; then
        . /usr/share/bash-completion/bash_completion
    elif [ -f /etc/bash_completion ]; then
        . /etc/bash_completion
    fi
fi
export PATH="$HOME/.config/composer/vendor/bin:$PATH"

```

3.Then reload your bashrc configuration using the source command.

```
$ source ~/.bashrc
```

4.Then echo \$PATH. It will return your “Bin” directory path for the Composer package.

```
$ echo $PATH
```

```
hp@hp-HP-Laptop-15s-du0xxx:~$ sudo nano ~/.bashrc
[sudo] password for hp:
hp@hp-HP-Laptop-15s-du0xxx:~$ source ~/.bashrc
hp@hp-HP-Laptop-15s-du0xxx:~$ echo $PATH
/home/hp/.config/composer/vendor/bin:/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/usr/games:/usr/local/games:/snap/bin
hp@hp-HP-Laptop-15s-du0xxx:~$
```

5. then create a new project in laravel with the following command

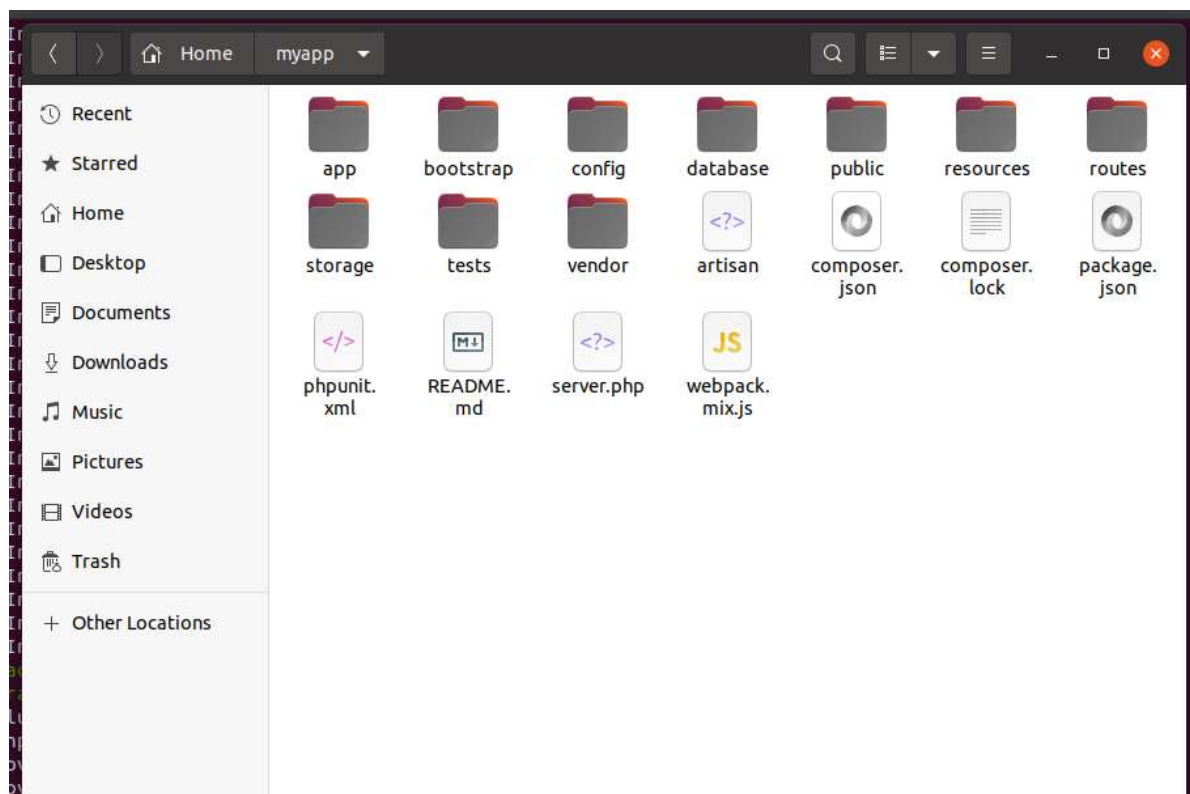
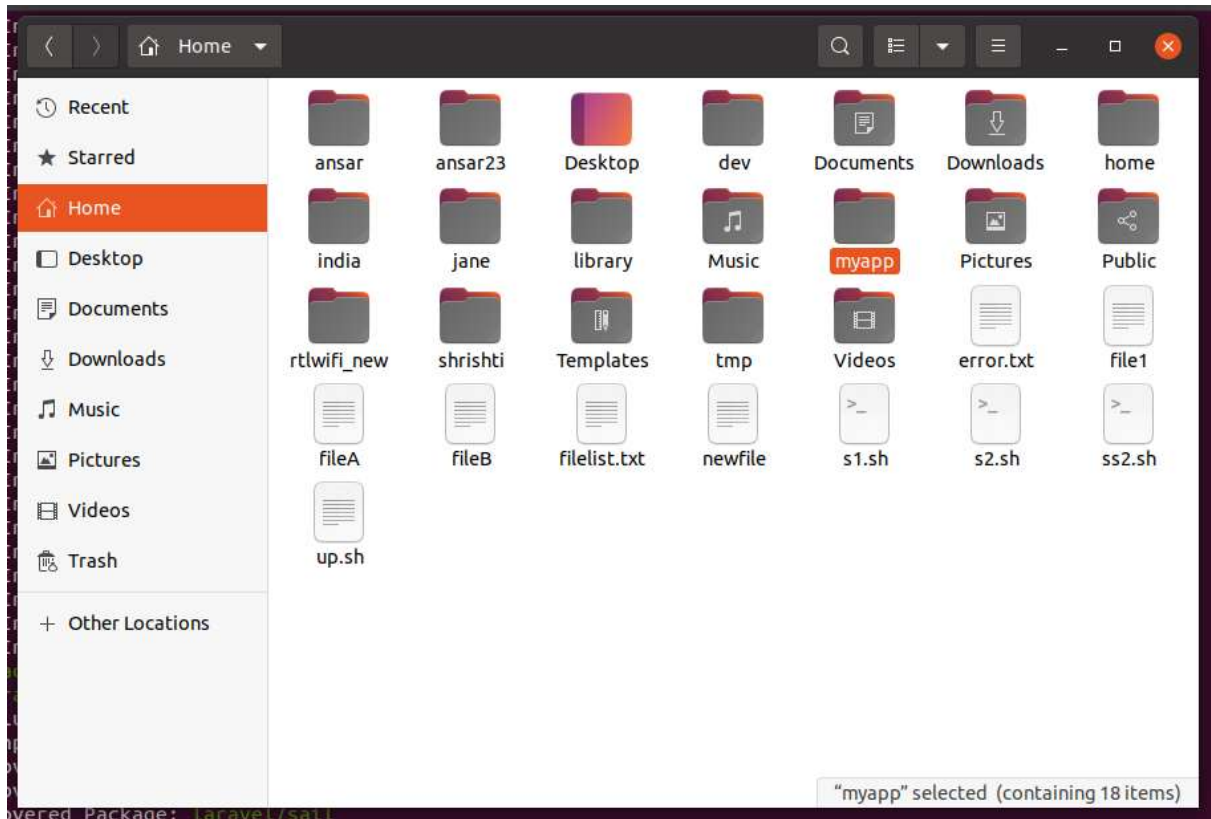
```
$ laravel new myapp1
```

```
/home/hp/.config/composer/vendor/bin:/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/usr/games:/usr/local/games:/snap/bin
hp@hp-HP-Laptop-15s-du0xxx:~$ laravel new myapp

Laravel

Creating a "laravel/laravel" project at "./myapp"
Installing laravel/laravel (v8.6.2)
- Downloading laravel/laravel (v8.6.2)
- Installing laravel/laravel (v8.6.2): Extracting archive
Created project in /home/hp/myapp
> @php -r "file_exists('.env') || copy('.env.example', '.env');"
Loading composer repositories with package information
Updating dependencies
Lock file operations: 111 installs, 0 updates, 0 removals
- Locking asm89/stack-cors (v2.0.3)
- Locking brick/math (0.9.3)
- Locking dflydev/dot-access-data (v3.0.1)
- Locking doctrine/inflector (2.0.3)
- Locking doctrine/instantiator (1.4.0)
- Locking doctrine/lexer (1.2.1)
- Locking dragonmantank/cron-expression (v3.1.0)
- Locking egulias/email-validator (2.1.25)
- Locking facade/flare-client-php (1.9.1)
- Locking facade/ignition (2.13.1)
- Locking facade/ignition-contracts (1.0.2)
```

Here you can see the installation of my new project myapp1 finished. You can also see inside my home directory a new directory has been created with my project name.



Step 6– Finally Configure Apache for Laravel and test it

1. First, add your project directory to www-data group use the following command

```
$ sudo chgrp -R www-data /home/hp/myapp
```

- Then you need to change access permission 775 of the storage directory under your project. use the following command.


```

$ sudo chmod -R 775 /home/hp/myapp/storage
hp@hp-HP-Laptop-15s-du0xxx:~$ sudo chgrp -R www-data /home/hp/myapp
hp@hp-HP-Laptop-15s-du0xxx:~$ sudo chmod -R 775 /home/hp/myapp/storage
hp@hp-HP-Laptop-15s-du0xxx:~$ cd /etc/apache2/sites-available/
hp@hp-HP-Laptop-15s-du0xxx:/etc/apache2/sites-available$ ls
000-default.conf default-ssl.conf
hp@hp-HP-Laptop-15s-du0xxx:/etc/apache2/sites-available$

```

6. Then create an apache vhost configuration go to the following directory and create a vhost config file using nano file editor.

```

$ cd /etc/apache2/sites-available/
$ sudo nano myapp1.com.conf

```

And paste the following line inside the file.

```

<VirtualHost *:80>
    ServerName myapp.com

    ServerAdmin admin@myapp.com
    DocumentRoot /home/hp/myapp/public

    <Directory /home/hp/myapp>
        Options Indexes MultiViews
        AllowOverride None
        Require all granted
    </Directory>

    ErrorLog ${APACHE_LOG_DIR}/error.log
    CustomLog ${APACHE_LOG_DIR}/access.log combined
</VirtualHost>

```

```

chgrp: cannot access '/home/myapp': No such file or directory
hp@hp-HP-Laptop-15s-du0xxx:~$ sudo chgrp -R www-data /home/hp/myapp
hp@hp-HP-Laptop-15s-du0xxx:~$ sudo chmod -R 775 /home/hp/myapp/storage
hp@hp-HP-Laptop-15s-du0xxx:~$ cd /etc/apache2/sites-available/
hp@hp-HP-Laptop-15s-du0xxx:/etc/apache2/sites-available$ ls
000-default.conf default-ssl.conf
hp@hp-HP-Laptop-15s-du0xxx:/etc/apache2/sites-available$ sudo nano myapp.com.conf
hp@hp-HP-Laptop-15s-du0xxx:/etc/apache2/sites-available$ sudo nano myapp.com.conf
hp@hp-HP-Laptop-15s-du0xxx:/etc/apache2/sites-available$ sudo a2enmod rewrite
Enabling module rewrite.
To activate the new configuration, you need to run:
    systemctl restart apache2
hp@hp-HP-Laptop-15s-du0xxx:/etc/apache2/sites-available$ sudo a2ensitemyapp.com.conf
sudo: a2ensitemyapp.com.conf: command not found
hp@hp-HP-Laptop-15s-du0xxx:/etc/apache2/sites-available$ sudo a2ensite myapp.com.conf
Enabling site myapp.com.
To activate the new configuration, you need to run:
    systemctl reload apache2

```

7. Now enable mod rewrite for apache2 just type

```

$ sudo a2enmod rewrite

```

Then enable your site, just type

```
$ sudo a2ensite myapp1.com.conf
```

Finally, Restart the apache service, type

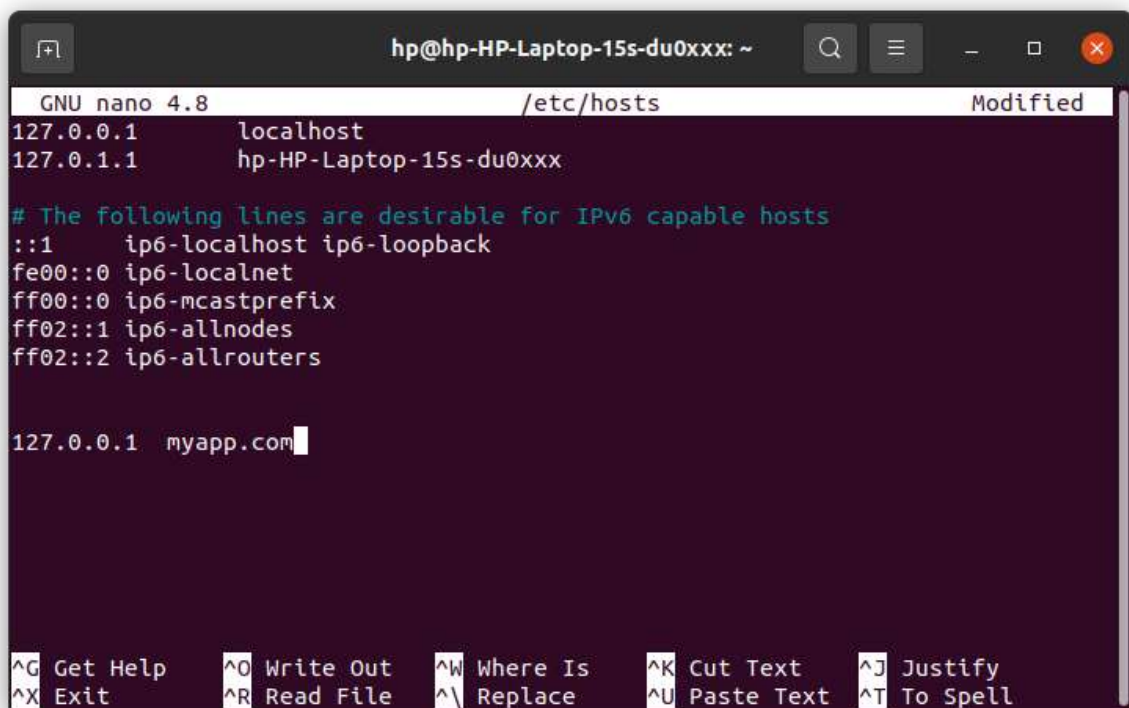
```
$ systemctl restart apache2
```

8. As you are in a local environment you need a local dns resolver for your site. Go ahead and edit /etc/hosts file, add a dns record for your site then save the file.

```
$ sudo nano /etc/hosts
```

Inside the file add the below line

```
127.0.0.1 myapp.com
```



```

GNU nano 4.8 /etc/hosts Modified
127.0.0.1 localhost
127.0.1.1 hp-HP-Laptop-15s-du0xxx

# The following lines are desirable for IPv6 capable hosts
::1 ip6-localhost ip6-loopback
fe00::0 ip6-localnet
ff00::0 ip6-mcastprefix
ff02::1 ip6-allnodes
ff02::2 ip6-allrouters

127.0.0.1 myapp.com
  
```

Terminal window showing the nano editor editing /etc/hosts. The file contains the following content:

```

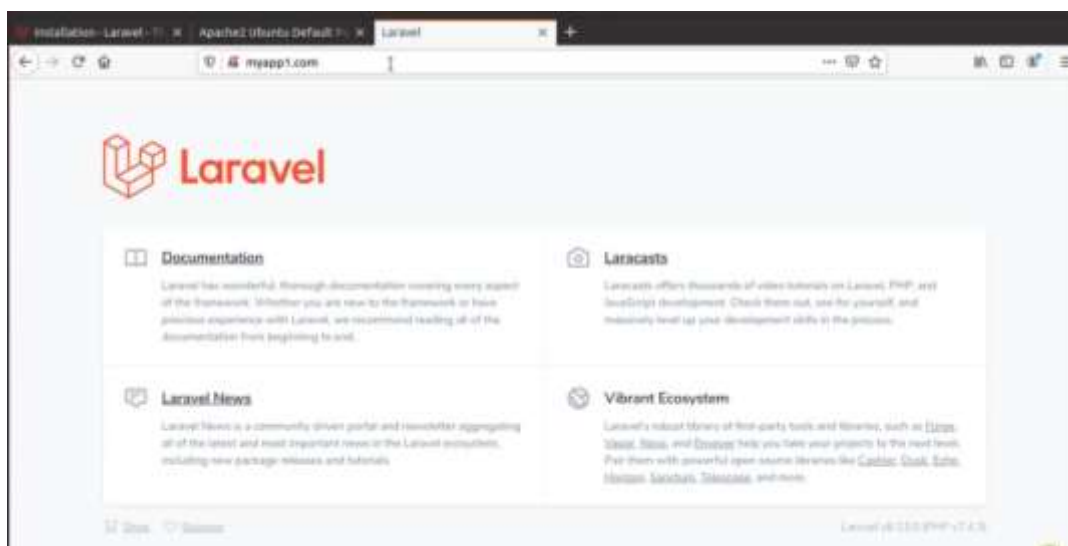
127.0.0.1 localhost
127.0.1.1 hp-HP-Laptop-15s-du0xxx

# The following lines are desirable for IPv6 capable hosts
::1 ip6-localhost ip6-loopback
fe00::0 ip6-localnet
ff00::0 ip6-mcastprefix
ff02::1 ip6-allnodes
ff02::2 ip6-allrouters

127.0.0.1 myapp.com
  
```

The terminal window title is "hp@hp-HP-Laptop-15s-du0xxx: ~". The nano editor status bar at the bottom shows various shortcuts: ^G Get Help, ^O Write Out, ^W Where Is, ^K Cut Text, ^J Justify, ^X Exit, ^R Read File, ^\ Replace, ^U Paste Text, ^T To Spell.

Now get back to the web browser and open a tab then type your project hostname.



And here it is it's working. Here you can see the Laravel version and PHP version.

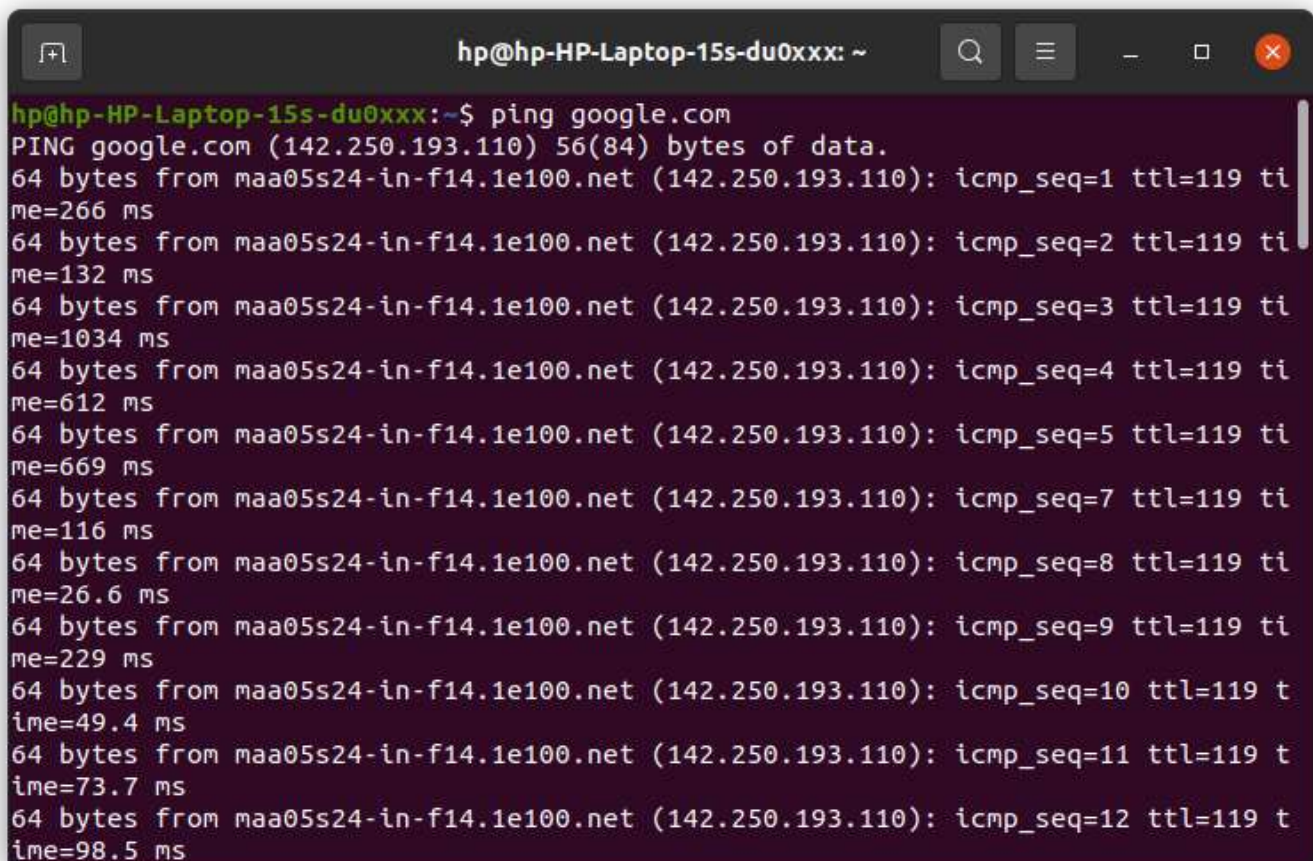
EXPERIMENT-07

7.1. Networking commands

7.1.1. PING COMMAND

PING (Packet Internet Groper) command is used to check the network connectivity between host and server/host. This command takes as input the IP address or the URL and sends a data packet to the specified address with the message "PING" and get a response from the server/host this time is recorded which is called latency. Fast ping low latency means faster connection. Ping uses **ICMP(Internet Control Message Protocol)** to send an **ICMP echo message** to the specified host if that host is available then it sends **ICMP reply message**. Ping is generally measured in millisecond every modern operating system has this ping pre-installed.

Syntax: ping [OPTIONS] DESTINATION



```
hp@hp-HP-Laptop-15s-du0xxx: ~  
hp@hp-HP-Laptop-15s-du0xxx:~$ ping google.com  
PING google.com (142.250.193.110) 56(84) bytes of data.  
64 bytes from maa05s24-in-f14.1e100.net (142.250.193.110): icmp_seq=1 ttl=119 time=266 ms  
64 bytes from maa05s24-in-f14.1e100.net (142.250.193.110): icmp_seq=2 ttl=119 time=132 ms  
64 bytes from maa05s24-in-f14.1e100.net (142.250.193.110): icmp_seq=3 ttl=119 time=1034 ms  
64 bytes from maa05s24-in-f14.1e100.net (142.250.193.110): icmp_seq=4 ttl=119 time=612 ms  
64 bytes from maa05s24-in-f14.1e100.net (142.250.193.110): icmp_seq=5 ttl=119 time=669 ms  
64 bytes from maa05s24-in-f14.1e100.net (142.250.193.110): icmp_seq=7 ttl=119 time=116 ms  
64 bytes from maa05s24-in-f14.1e100.net (142.250.193.110): icmp_seq=8 ttl=119 time=26.6 ms  
64 bytes from maa05s24-in-f14.1e100.net (142.250.193.110): icmp_seq=9 ttl=119 time=229 ms  
64 bytes from maa05s24-in-f14.1e100.net (142.250.193.110): icmp_seq=10 ttl=119 time=49.4 ms  
64 bytes from maa05s24-in-f14.1e100.net (142.250.193.110): icmp_seq=11 ttl=119 time=73.7 ms  
64 bytes from maa05s24-in-f14.1e100.net (142.250.193.110): icmp_seq=12 ttl=119 time=98.5 ms
```

7.1.2. TRACEROUTE COMMAND

Traceroute command in Linux prints the route that a packet takes to reach the host. This command is useful when you want to know about the route and about all the hops that a packet takes. Below image depicts how traceroute command is used to reach the Google (172.217.26.206) host from the local machine and it also prints detail about all the hops that it visits in between.

Syntax: `traceroute [options] host_Address [pathlength]`

```
Processing triggers for Man-db (2.9.1-1) ...
hp@hp-HP-Laptop-15s-du0xxx:~$ traceroute google.com
traceroute to google.com (142.250.183.238), 30 hops max, 60 byte packets
 1  _gateway (10.10.10.101)  6.253 ms  6.221 ms  6.188 ms
 2  * * *
 3  130.230.88.202.asianet.co.in (202.88.230.130)  28.619 ms  28.577 ms  30.782
ms
 4  77.252.88.202.asianet.co.in (202.88.252.77)  24.119 ms  30.677 ms  24.078 ms
 5  * * *
 6  108.170.253.97 (108.170.253.97)  28.104 ms  21.323 ms  142.251.55.236 (142.25
1.55.236)  21.177 ms
 7  209.85.253.85 (209.85.253.85)  19.985 ms  108.170.253.122 (108.170.253.122)
19.868 ms  108.170.253.121 (108.170.253.121)  20.976 ms
 8  maa05s23-in-f14.1e100.net (142.250.183.238)  20.919 ms  74.125.242.129 (74.12
5.242.129)  20.905 ms  20.871 ms
```

7.1.3. ROUTE COMMAND

route command in Linux is used when you want to work with the IP/kernel routing table. It is mainly used to set up static routes to specific hosts or networks via an interface. It is used for showing or update the IP/kernel routing table.

Syntax: `route`

```
Processing triggers for Man-db (2.9.1-1) ...
hp@hp-HP-Laptop-15s-du0xxx:~$ route
Kernel IP routing table
Destination    Gateway         Genmask         Flags Metric Ref    Use Iface
default        _gateway       0.0.0.0         UG    600    0      0 wlo1
10.0.0.0       0.0.0.0        255.0.0.0       U     600    0      0 wlo1
link-local     0.0.0.0        255.255.0.0     U     1000   0      0 wlo1
hp@hp-HP-Laptop-15s-du0xxx:~$
```

7.1.4.NSLOOKUP COMMAND

nslookup (stands for “Name Server Lookup”) is a useful command for getting information from DNS server. It is a network administration tool for querying the Domain Name System (DNS) to obtain domain name or IP address mapping or any other specific DNS record. It is also used to troubleshoot DNS related problems.

Syntax: nslookup [option]

```
hp@hp-HP-Laptop-15s-du0xxx:~$ nslookup google.com
Server:          127.0.0.53
Address:         127.0.0.53#53

Non-authoritative answer:
Name:   google.com
Address: 142.250.193.110
Name:   google.com
Address: 2404:6800:4007:814::200e

hp@hp-HP-Laptop-15s-du0xxx:~$
```


7.1.5. IFCONFIG COMMAND

ifconfig(interface configuration) command is used to configure the kernel-resident network interfaces. It is used at the boot time to set up the interfaces as necessary. After that, it is usually used when needed during debugging or when you need system tuning. Also, this command is used to assign the IP address and netmask to an interface or to enable or disable a given interface.

Syntax: ifconfig [...OPTIONS] [INTERFACE]

```
hp@hp-HP-Laptop-15s-du0xxx:~$ ifconfig
eno1: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
    ether 04:0e:3c:55:83:79 txqueuelen 1000 (Ethernet)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    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 336 bytes 30114 (30.1 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 336 bytes 30114 (30.1 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

wlo1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 10.100.14.89 netmask 255.0.0.0 broadcast 10.255.255.255
    inet6 fe80::31ac:769e:94b8:b395 prefixlen 64 scopeid 0x20<link>
    ether 80:91:33:c5:85:37 txqueuelen 1000 (Ethernet)
    RX packets 44379 bytes 40810941 (40.8 MB)
    RX errors 0 dropped 3308 overruns 0 frame 0
    TX packets 14891 bytes 1567676 (1.5 MB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

hp@hp-HP-Laptop-15s-du0xxx:~$
```

EXPERIMENT-08

8.1 WIRESHARK installation

Wireshark is a free and open source packet analyser used for network troubleshooting and analysis.

8.1.2. Downloading steps

1. Open a web browser.
2. Navigate to <http://www.wireshark.org>.
3. Select Download Wireshark.
4. Select the Wireshark Windows Installer matching your system type. Save the program in the Downloads folder.
5. Close the web browser.

8.1.3. Installation process

1. Double-click on the file to open it.
2. If you see a User Account Control dialog box, select Yes to allow the program to make changes to this computer.
3. Select Next > to start the Setup Wizard.
4. Review the license agreement. If you agree, select I Agree to continue.
5. Select Next > to accept the default components.
6. Select the shortcuts you would like to have created. Leave the file extensions selected. Select Next > to continue.
7. Select Next > to accept the default install location.
8. Select Install to begin installation.
9. Select Next > to install WinPcap.
10. Select Next > to start the Setup Wizard.
11. Review the license agreement. If you agree, select I Agree to continue.

12. Select Install to begin installation.
13. Select Finish to complete the installation of WinPcap.
14. Select Next > to continue with the installation of Wireshark.
15. Select Finish to complete the installation of Wireshark.

1.8.4. Demonstrate the process to filtering SMTP packets.

1)) Capturing SMTP packets

1. Start a Wireshark capture.
2. Open a command prompt.
3. Type telnet gmail-smtp-in.l.google.com 25 and press Enter. If this does not work, your ISP may be blocking outbound traffic on port 25. You can try telnet smtp.gmail.com 587 instead to generate SMTP traffic and then filter on port 587 in the next activity.
4. Observe the server response.
5. Type helo and press Enter.
6. Observe the server response. Note that at this point you could enter mail, rcpt and data to send an SMTP message, but this only works on servers configured to allow clear text relay without authentication.
7. Type quit and press Enter to close the connection.
8. Observe the server response.
9. Close the command prompt.
10. Stop the Wireshark capture.

9. 2))Select destination Traffic

1. Observe the traffic captured in the top Wireshark packet list pane. To view only SMTP traffic, type smtp (lower case) in the Filter box and press Enter.
2. Select the first SMTP packet labelled 220
3. Observe the destination IP address.
4. To view all related traffic for this connection, change the filter to ip.addr == <destination>, where <destination> is the destination address of the SMTP

packet.

10. 3))Analysing TCP connection traffic

1. Observe the traffic captured in the top Wireshark packet list pane. The first three packets (TCP SYN, TCP SYN/ACK, TCP ACK) are the TCP three way handshake. Select the first packet.
2. Observe the packet details in the middle Wireshark packet details pane. Notice that it is an Ethernet II / Internet Protocol Version 4 / Transmission Control Protocol frame.
3. Expand Ethernet II to view Ethernet details.
4. Observe the Destination and Source fields. The destination should be your default gateway's MAC address and the source should be your MAC address. You can use ipconfig /all and arp -a to confirm.
5. Expand Internet Protocol Version 4 to view IP details.
6. Observe the Source address. Notice that the source address is your IP address.
7. Observe the Destination address. Notice that the destination address is the IP address of the SMTP server.
8. Expand Transmission Control Protocol to view TCP details.
9. Observe the Source port. Notice that it is a dynamic port selected for this HTTP connection.
10. Observe the Destination port. Notice that it is smtp (25). Note that all of the packets for this connection will have matching MAC addresses, IP addresses, and port numbers.

11.)Analyse SMTP Service Ready Traffic

1. Observe the traffic captured in the top Wireshark packet list pane.
2. Select the fourth packet, which is the first SMTP packet and labeled 220
3. Observe the packet details in the middle Wireshark packet details pane. Notice that it is an Ethernet II / Internet Protocol Version 4 / Transmission Control Protocol / Hypertext Transfer Protocol frame. Also notice that the Ethernet II, Internet Protocol Version 4, and Transmission Control Protocol values are consistent with the TCP connection analysed in Activity 3.
4. Expand Simple Mail Transfer Protocol and Response to view SMTP details.
5. Observe the Response code and Response parameter.

6. Observe the traffic captured in the top Wireshark packet list pane.

7. Select the fifth packet, labelled TCP ACK. This is the client TCP acknowledgement of receiving the Service Ready message.

12. 5))Analyse SMTP HELO Traffic

1. Observe the traffic captured in the top Wireshark packet list pane.

2. Select the following TCP segments and acknowledgements. If you observe the packet details in the bottom Wireshark packet bytes pane carefully, you will see that the segments spell out the helo message. The sequence ends with a Wireshark-combined SMTP client helo message, followed by a server TCP acknowledgement.

13. 6)) Analyse SMTP Completed Traffic

1. Observe the traffic captured in the top Wireshark packet list pane.

2. Select the following SMTP packet, labeled 250 ...

3. Observe the packet details in the middle Wireshark packet details pane.

4. Expand Simple Mail Transfer Protocol and Response to view SMTP details.

5. Observe the Response code and Response parameter.

14. 7))Analyse SMTP QUIT Traffic

1. Observe the traffic captured in the top Wireshark packet list pane.

2. Select the following TCP segments and acknowledgements. If you observe the packet details in the bottom Wireshark packet bytes pane carefully, you will see that the segments spell out the quit message. The sequence ends with a Wireshark-combined SMTP client quit message, followed by a server TCP acknowledgement.

15. 8))Analyse SMTP Closing Traffic

1. Observe the traffic captured in the top Wireshark packet list pane.

2. Select the following SMTP packet, labelled 221 ...

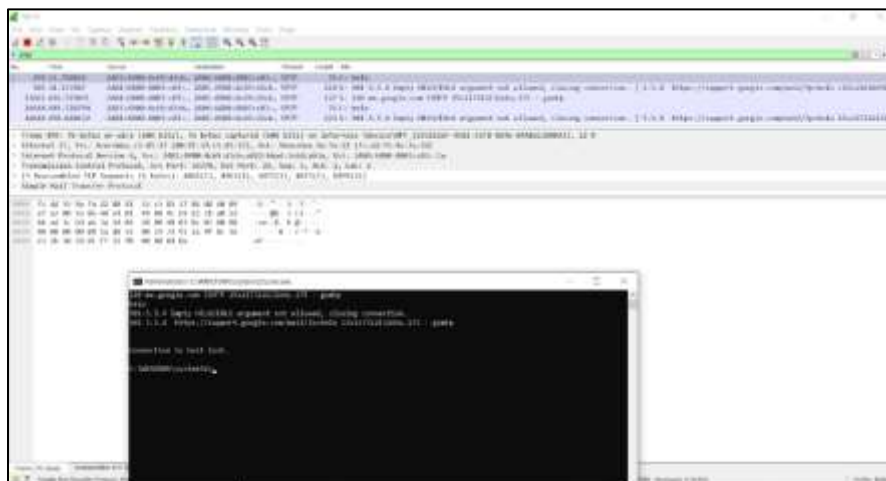
3. Observe the packet details in the middle Wireshark packet details pane.

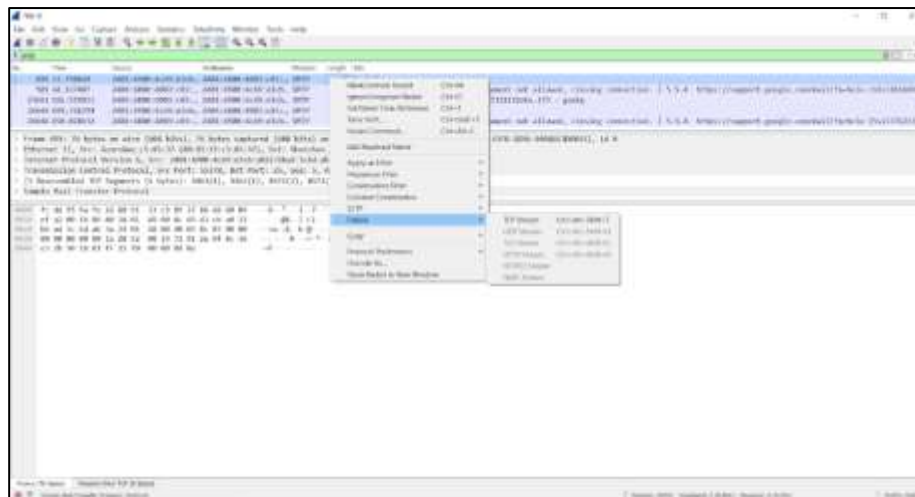
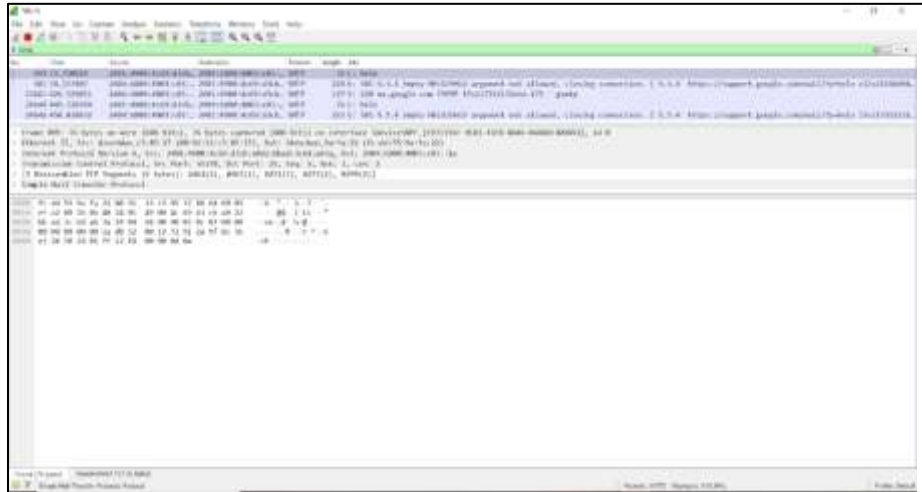
4. Expand Simple Mail Transfer Protocol and Response to view SMTP details.

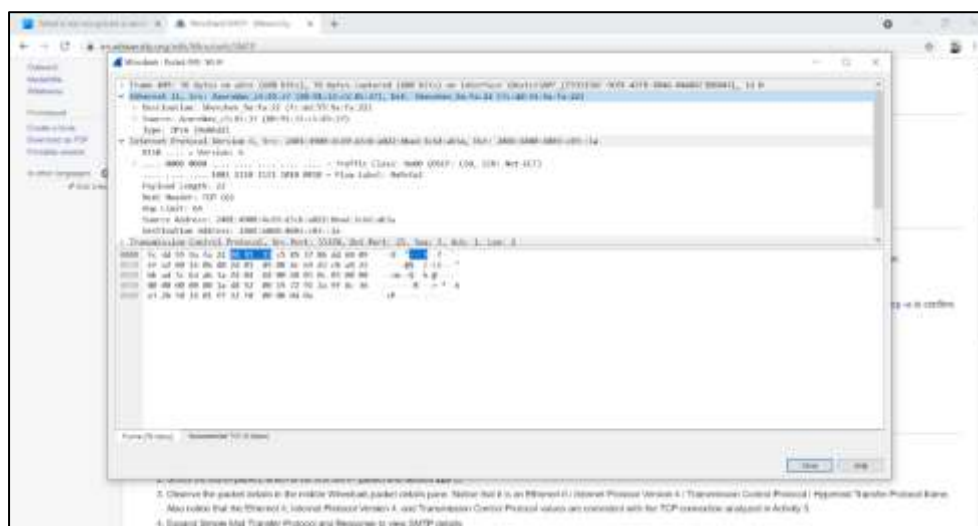
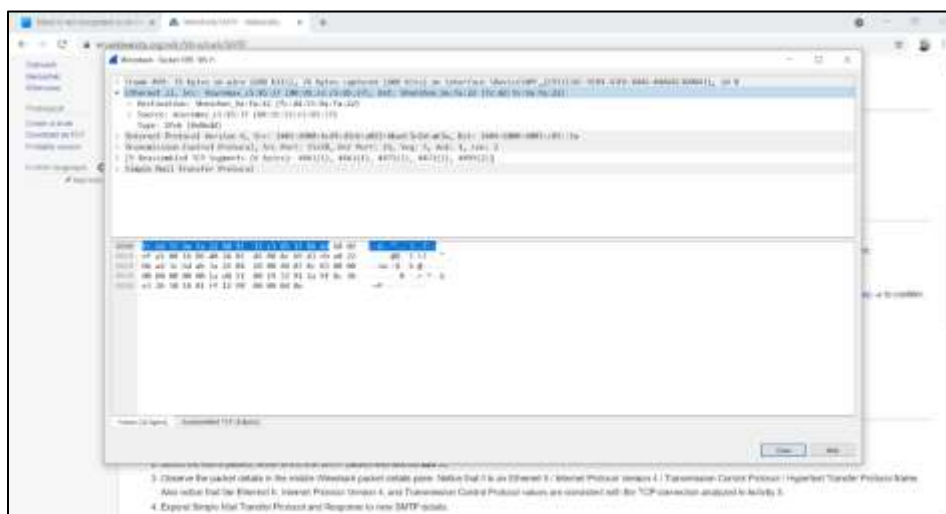
5. Observe the Response code and Response parameter.

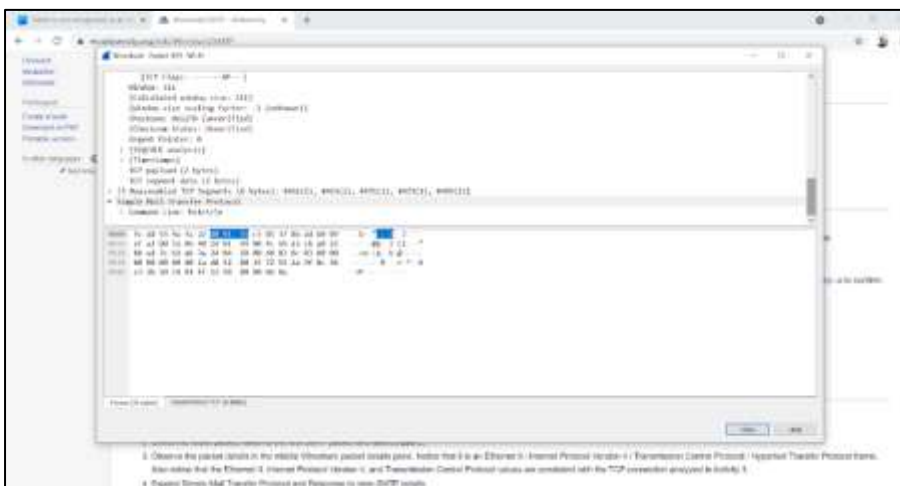
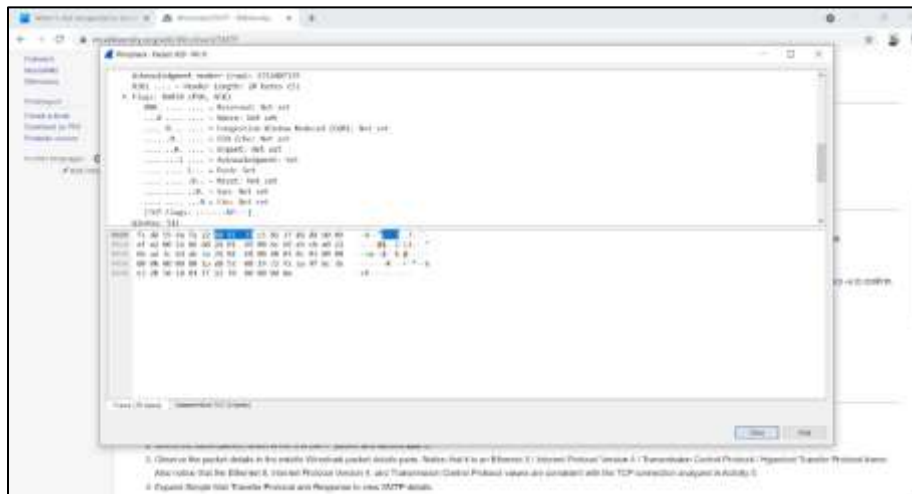
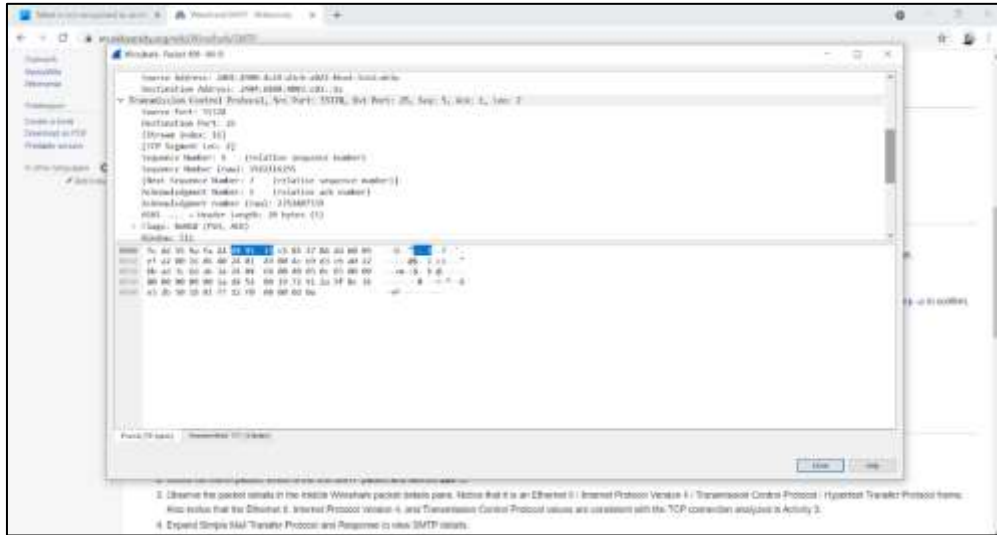
6. Close Wireshark to complete this activity. Quit without Saving to discard the captured traffic.

8.1.5. SMTP Process









EXPERIMENT-09

9.1. Introduction to Virtual Machine and installation

9.1.2. Creating a Virtual Machine

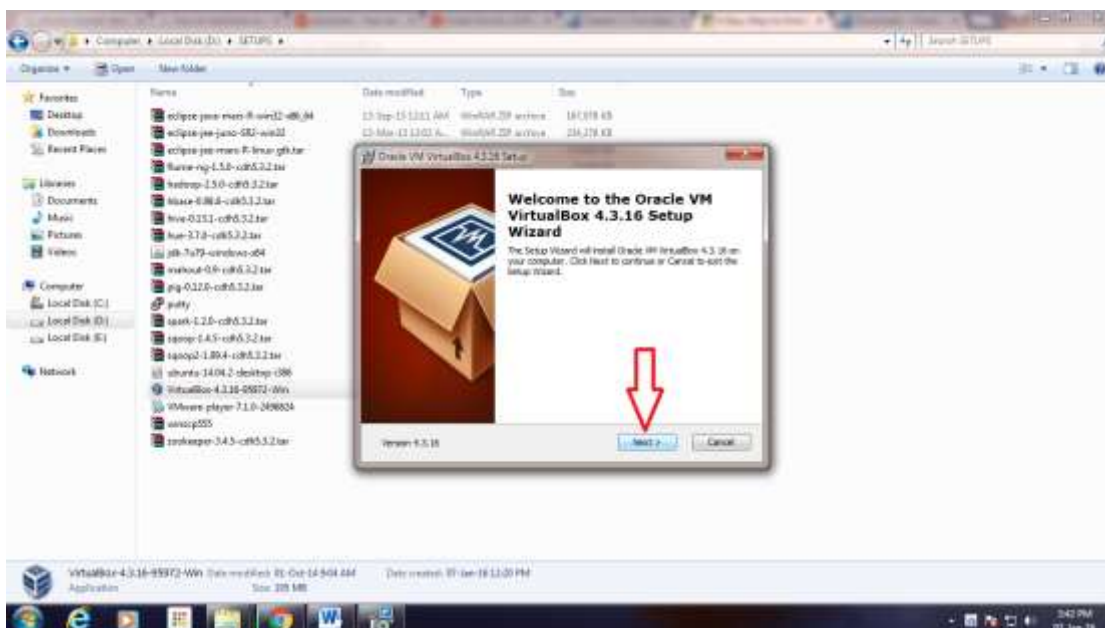
9.1.2.1 Install VirtualBox .

If you don't already have VirtualBox installed on your Windows or Mac computer, you'll need to install it before proceeding.

Following are the steps required to install VirtualBox(Oracle VM VirtualBox):

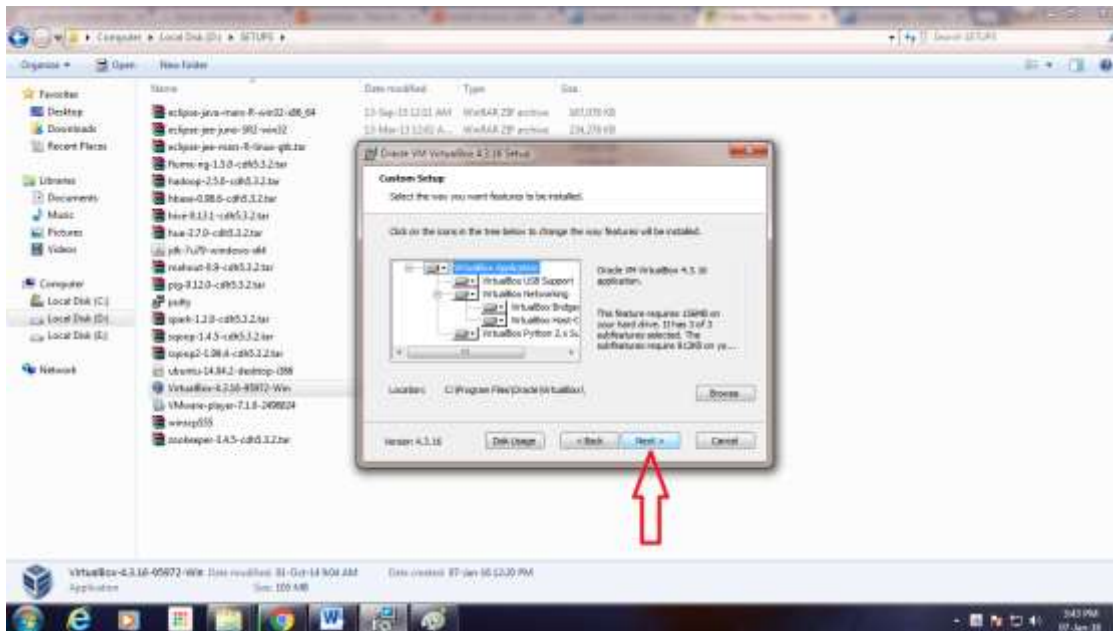
You can download the latest version of VirtualBox from the Virtual Box website: <https://www.virtualbox.org/wiki/Downloads> according to the version of your operating system Windows, Mac or Linux.

- Click Next



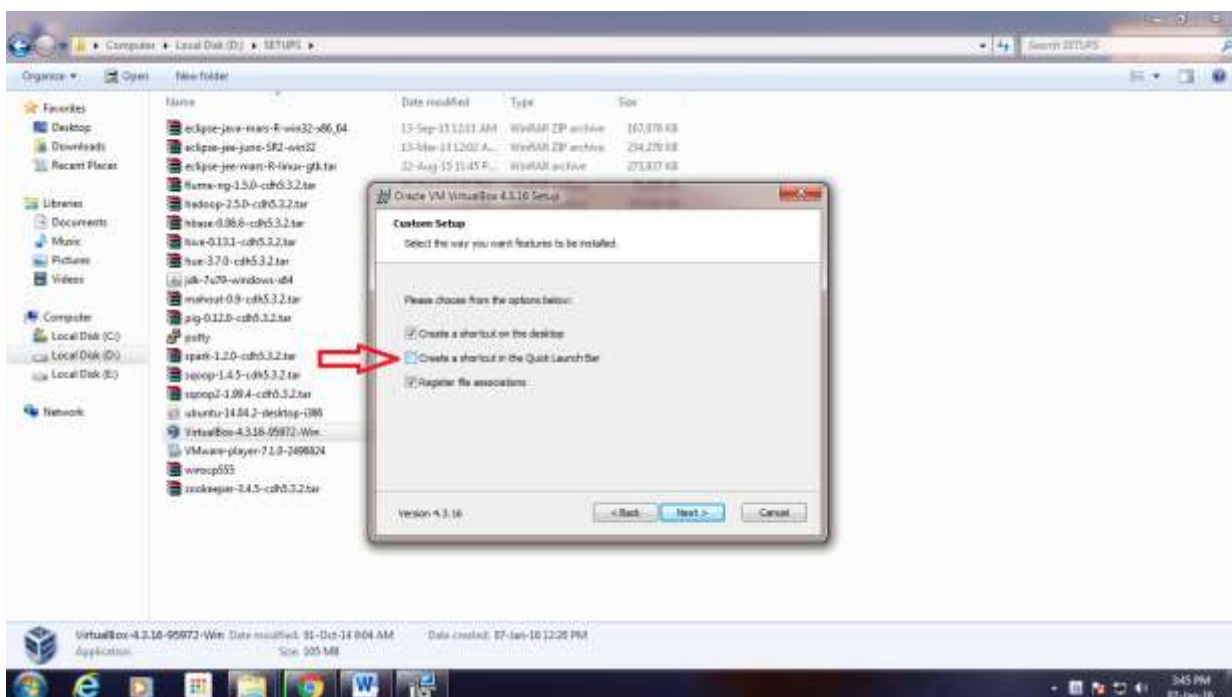
To Install VirtualBox – Setup Wizard

- Click Next



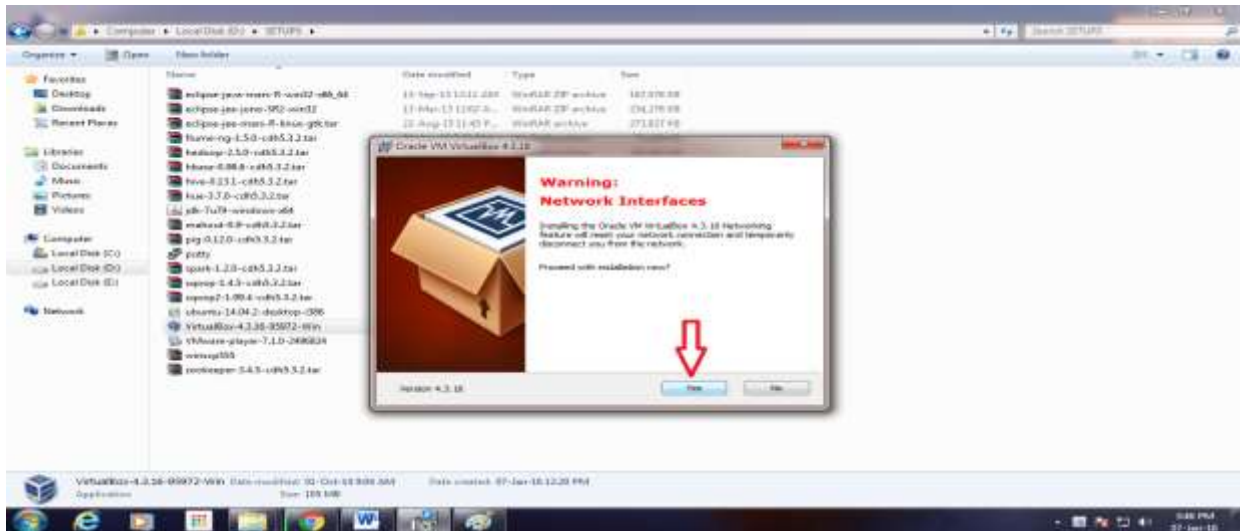
To Install VirtualBox – Custom Setup

- Uncheck “Create a shortcut in the Quick Launch Bar” and click “Next”



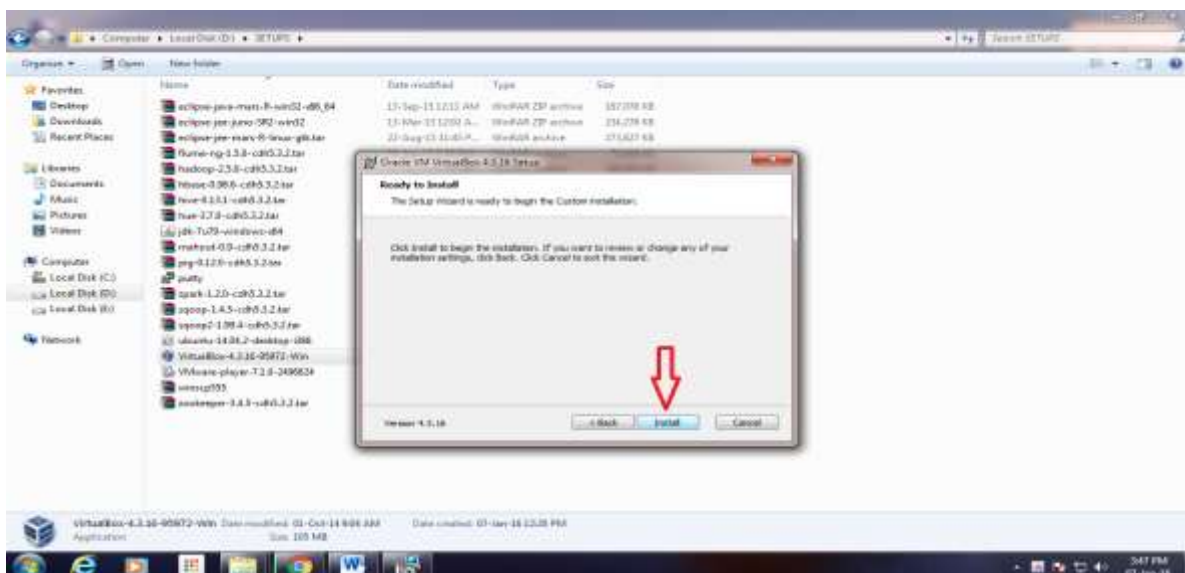
To Install VirtualBox – Features Selection

- Click “Yes”



To Install VirtualBox – Network Interfaces Warning

- Click “Install”



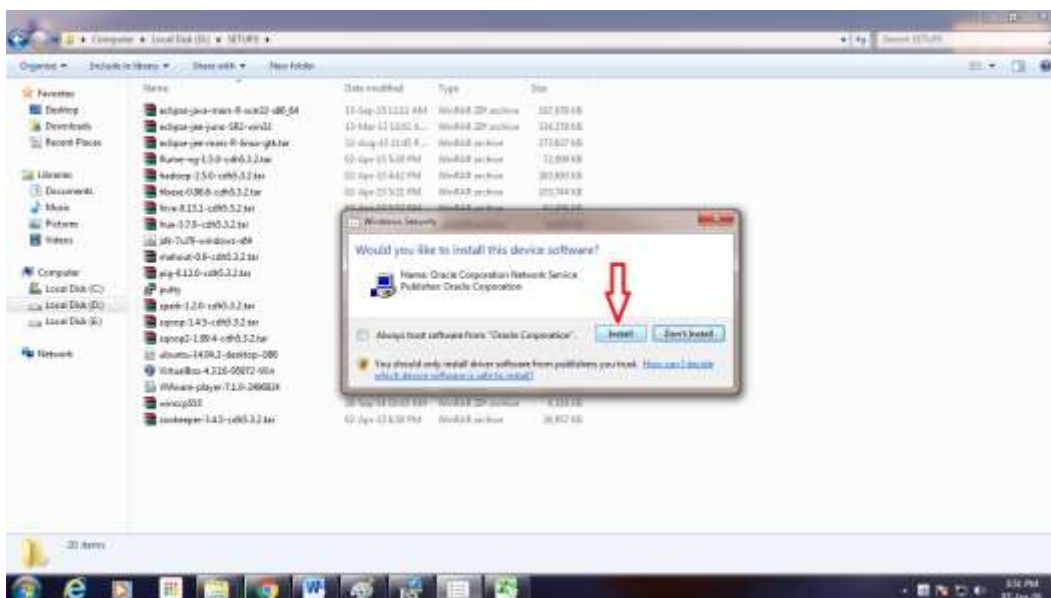
Installation of Oracle VM VirtualBox – Ready to Install

- Click “Install”



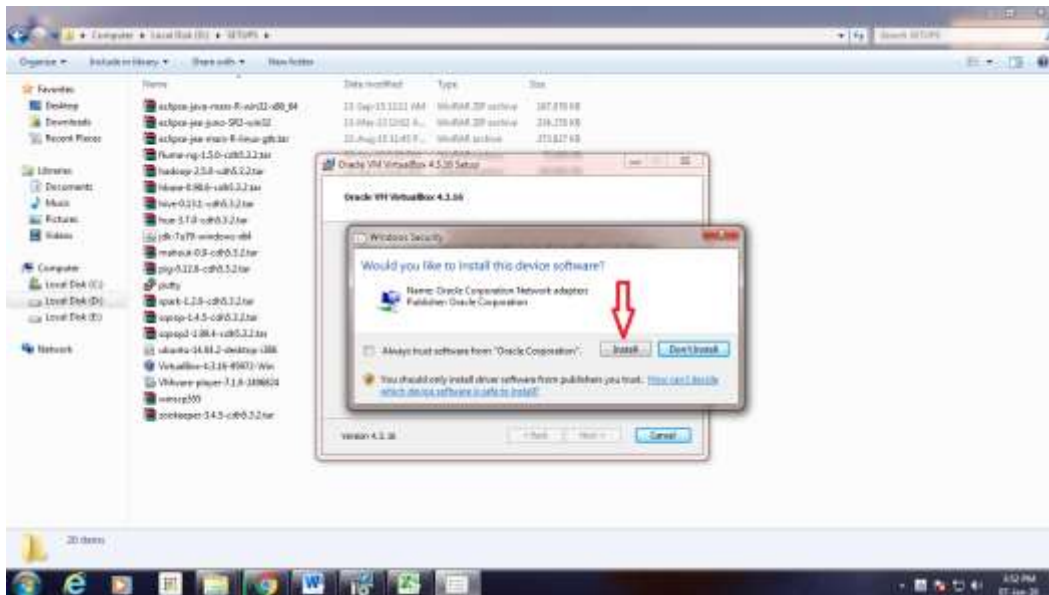
Installation of Oracle VM VirtualBox- Serial Bus Software Installation

- . Click “Install”



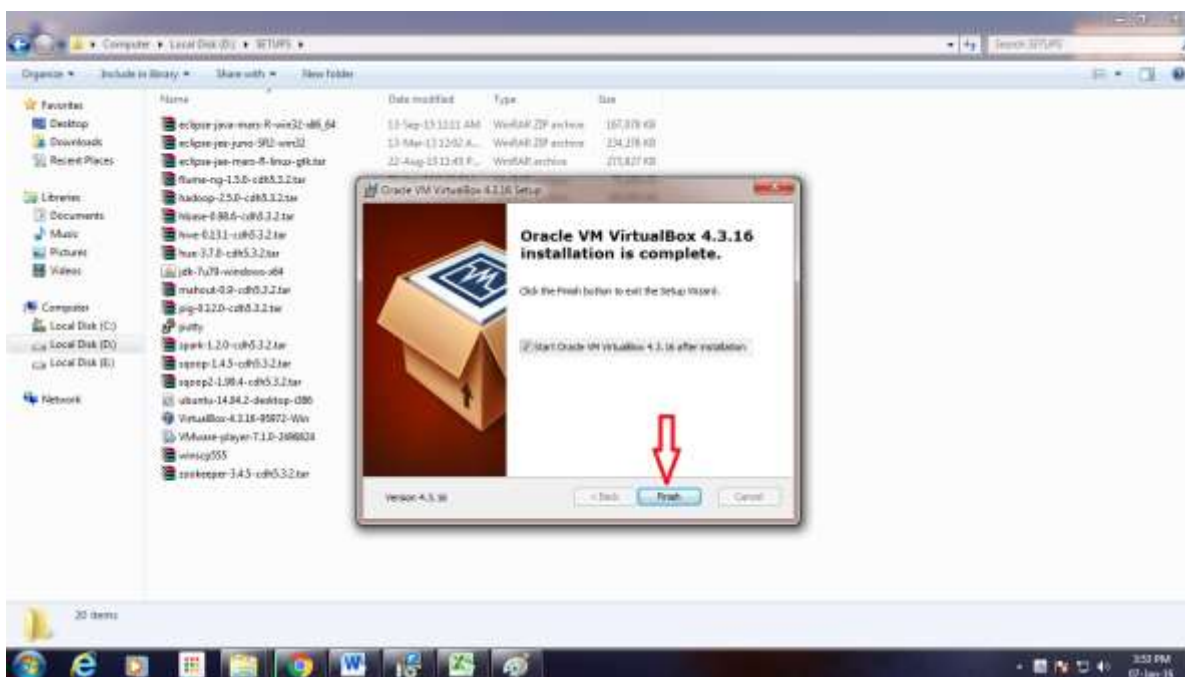
Installation of Oracle VM VirtualBox – Network Service Installation

- Click “Install”



Installation of Oracle VM VirtualBox – Network Adapters Installation

- Click “Finish”



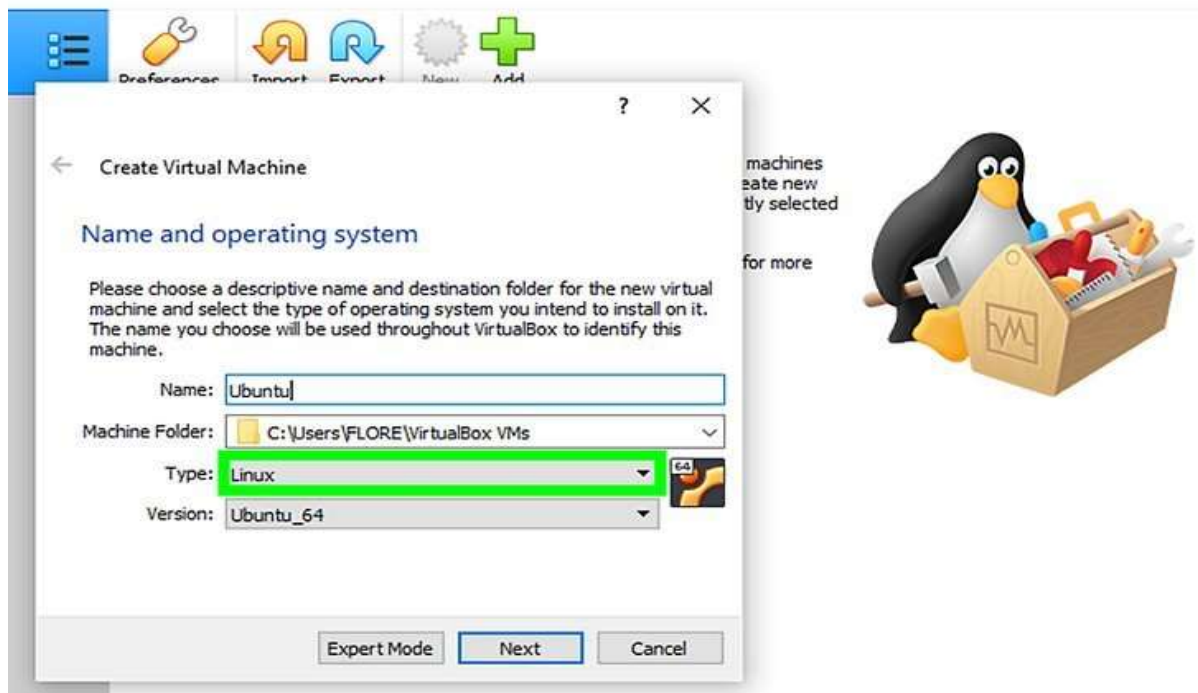
9.1.2.2. Open VirtualBox. Double-click (or click once on a Mac) the VirtualBox app icon.



Click New. It's a blue badge in the upper-left corner of the VirtualBox window. Doing so opens a pop-up menu.



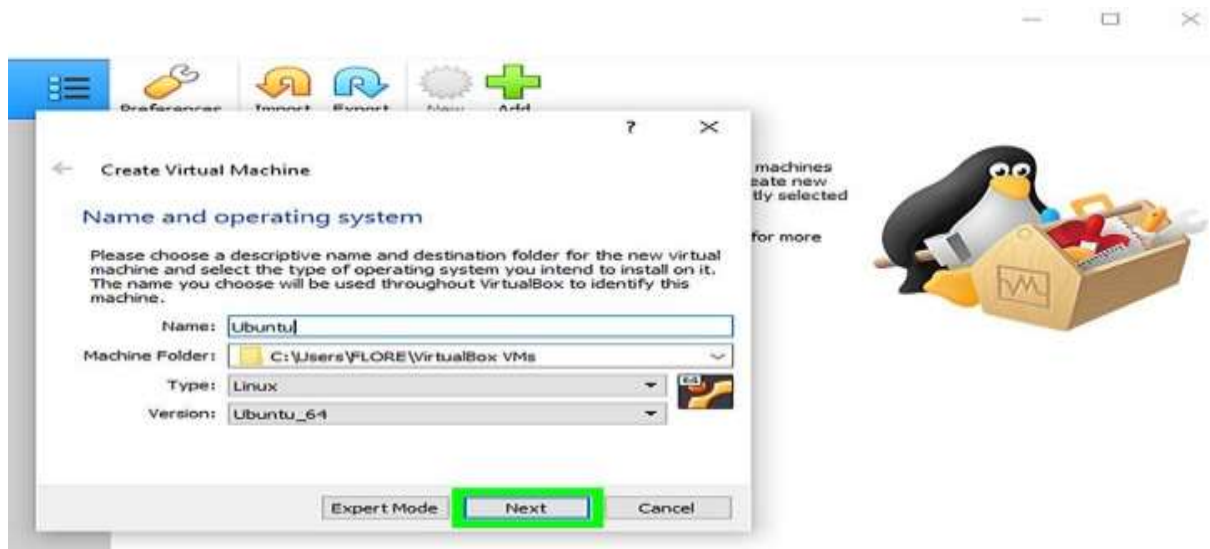
Enter a name for your virtual machine. Type whatever you want to name your virtual machine (e.g., Ubuntu) into the "Name" text field that's near the top of the pop-up menu.



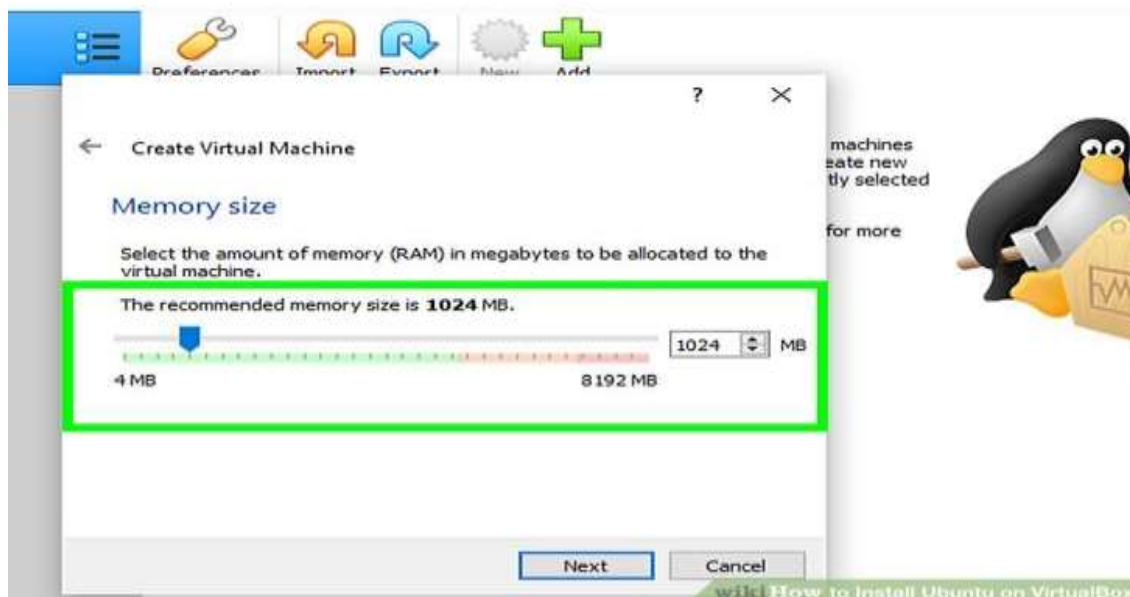
For **Operating System Type**, select the OS that you want to install.



Select the **version** of the operating system.



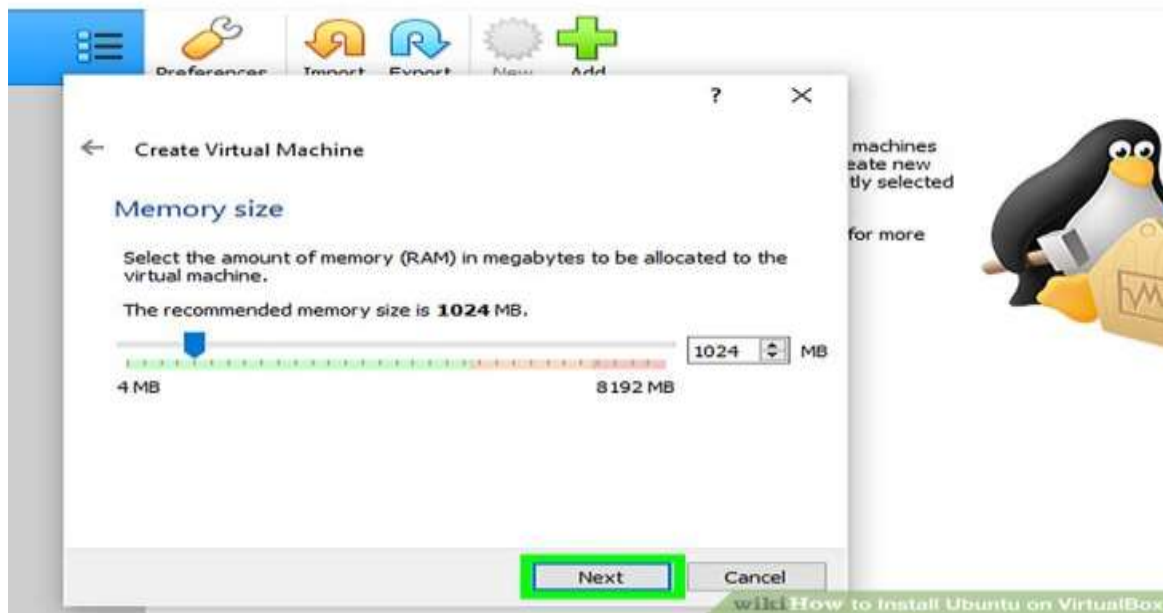
Click **Next**. It's at the bottom of the menu.



Select an amount of RAM to use. Click and drag the slider left or right to decrease or increase the amount of RAM that VirtualBox will have available for your virtual machine.

The ideal amount of RAM will automatically be selected when you get to this page.

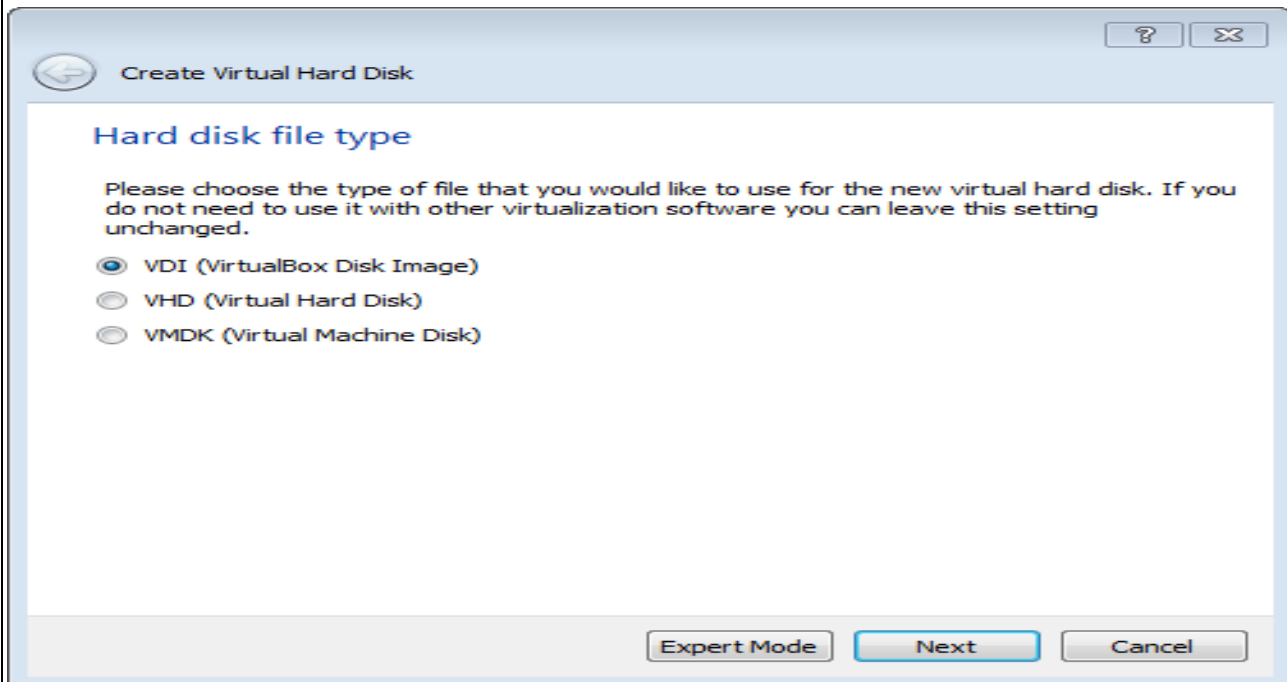
Make sure not to increase the RAM into the red section of the slider; try to keep the slider in the green.



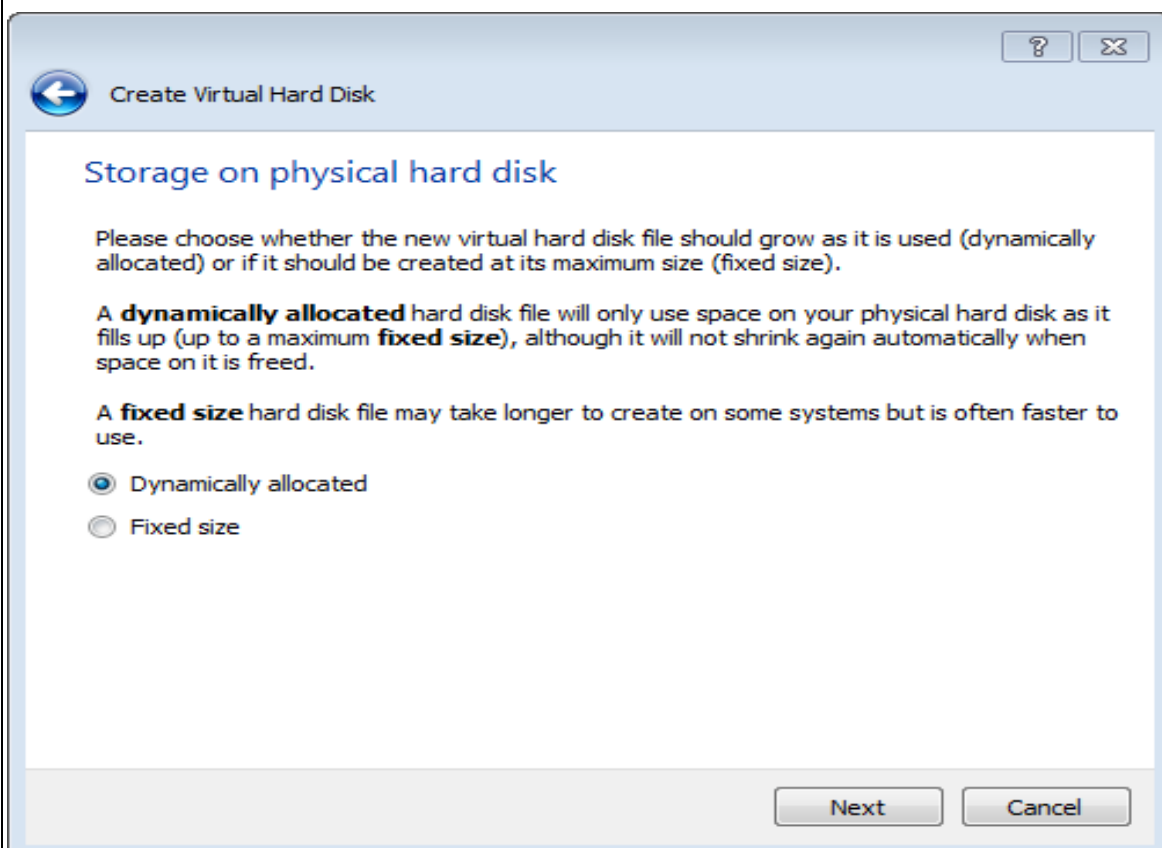
Click **Next**. It's at the bottom of the menu.



Create your virtual machine's virtual hard drive. The virtual hard drive is a section of your computer's hard drive space which will be used to store your virtual machine's files and programs:

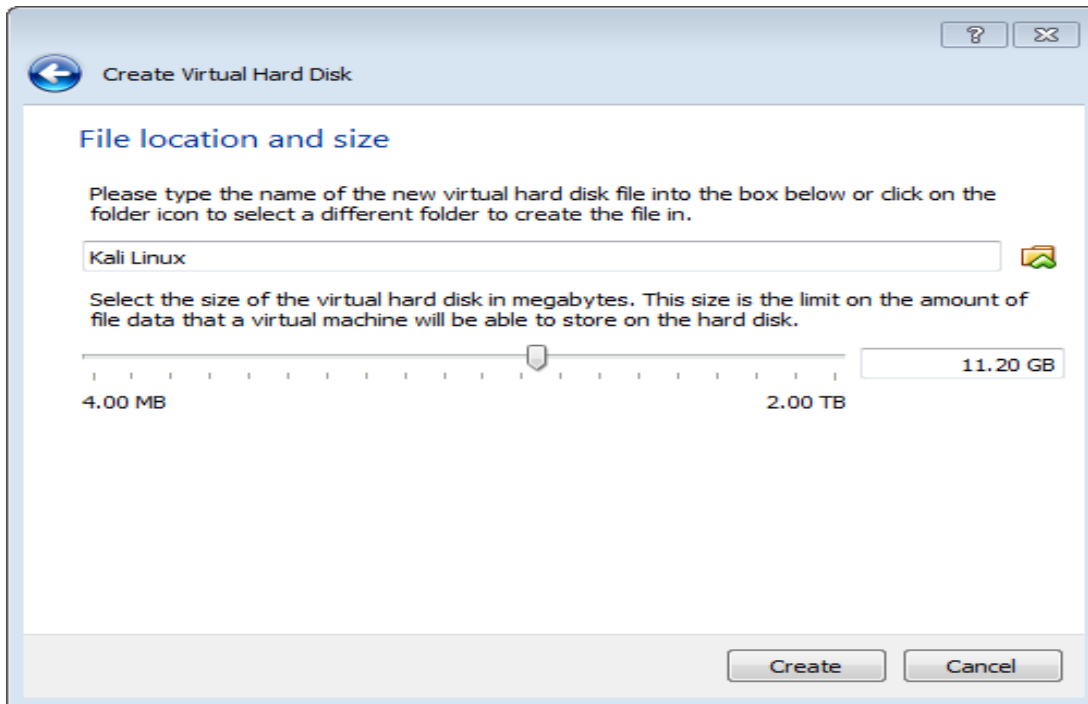


Use “VDI” to create a virtual hard disk



Choose “Dynamically allocated”

Allocate at Minimum 8 GB (recommended 10 or more).



Click **Create**, to create your new virtual machine. The virtual machine is displayed in the list on the left side of the VirtualBox Manager window, with the name that you entered initially.

VMs can run multiple operating system environments on a single physical computer, saving physical space, time and management costs.