Operating System Paper Solution ***CS -22***

- ***Answer the following.***

(1) the full-form of FCFS?

- First Come First Serve

(2) The memory allocated from secondary storage is called

- Virtual Memory

(3) Which scheduling algorithm automatically executes queued at quantum?

- First Come First Serve

(4) When the process is halt due to 10 interruption is called

- Waiting Mode

- **Answer the following.**

1. **Explain any one OS type based on features point of view.**

Personal Computer :

- ✓ If the user is using a personal computer, the operating system is largely designed to make the interaction easy.
- ✓ Some attention is also paid to the performance of the system, but there is no need for the operating system to worry about resource utilization.
- ✓ This is because the personal computer uses all the resources available and there is no sharing.

OS Types (Features Point of View)

- ✓ Protected and supervisor mode.
- ✓ Allows disk access and file systems
- ✓ Device drivers Networking Security.
- ✓ Program Execution.
- ✓ Memory management
- ✓ Virtual Memory.
- ✓ Multitasking.
- ✓ Handling I/O operations.
- ✓ Manipulation of the file system.
- ✓ Error Detection and handling.
- ✓ Resource allocation.

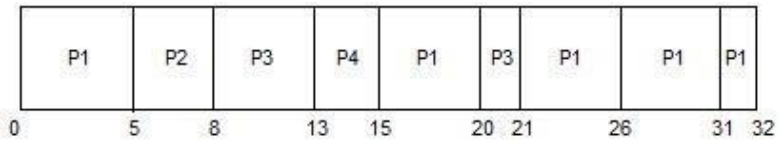
- ***Answer the following.***

1. Explain Round Robbin with example.

- ✓ Round Robin(RR) scheduling algorithm is mainly designed for time-sharing systems.
- ✓ This algorithm is similar to FCFS scheduling, but in Round Robin(RR) scheduling, preemption is added which enables the system to switch between processes.

PROCESS	BURST TIME
P1	21
P2	3
P3	6
P4	2

The GANTT chart for round robin scheduling will be,



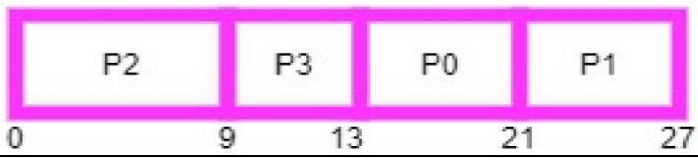
The average waiting time will be, 11 ms.

Priority Base Non Preemptive :

Under non-preemptive scheduling, once the CPU has been allocated to a process, the process keeps the CPU until it releases the CPU either by terminating or by switching to the waiting state.

Priority Base Non Preemptive :

Process	Arrival time	CPU Burst Time (in millisecond
P0	2	8
P1	3	6
P2	0	9
P3	1	4



In this type of Scheduling, the tasks are usually assigned with priorities. At times it is necessary to run a certain task that has a higher priority before another task although it is running. Therefore, the running task is interrupted for some time and resumed later when the priority task has finished its execution.

2. **Explain Virtual Memory using Paging.**

✓ As mentioned above, the memory management function called paging specifies storage locations to the CPU as additional memory, called virtual memory. The CPU cannot directly access storage disk, so the MMU emulates memory by mapping pages to frames that are in RAM.

Page:

A fixed-length contiguous block of virtual memory residing on disk.

Frame:

A fixed-length contiguous block located in RAM; whose sizing is identical to pages.

Physical memory:

The computer's random access memory (RAM), typically contained in DIMM(dual inline memory module) cards attached to the computer's motherboard.

Virtual memory:

Virtual memory is a portion of an HDD or SSD that is reserved to emulate RAM. The MMU serves up virtual memory from disk to the CPU to reduce the workload on physical memory.

Virtual address:

The CPU generates a virtual address for each active process. The MMU maps the virtual address to a physical location in RAM and passes the address to the bus. A virtual address space is the range of virtual addresses under CPU control.

Physical address:

The physical address is a location in RAM. The physical address space is the set of all physical addresses corresponding to the CPU's virtual addresses.

A physical address space is the range of physical addresses under MMU control.

Answer the following.

(1) Who invented Bourn Shell?

- Ken Thompson and Dennis Ritchie

(2) Storing the data in specific format on magnetic media is called

- Magnetic Storage And Magnetic Recoding

(3) Which command gives the details of the user who executed the command?

- whoami command

(4) Which command changes the mode of file?

➢ Chmode

1. **Explain rmdir and mkdir with example.**

rmdir:

Remove an empty directory. if the directory is not empty, it will not be removed.

- Syntax : rmdir directory

-

mkdir:

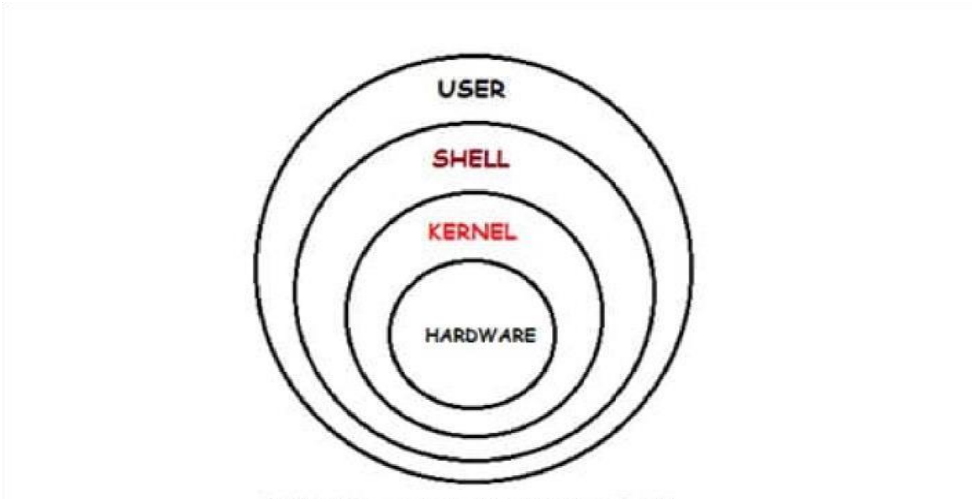
Change Working Directory.
mk directory : Make Directory -
Usage : Create a new directory.

2. **Explain redirection and piping operators.**

✓ Combining piping I/O redirection, and program execution provides a general technique for performing complex operating by putting together simple commands.

✓ Suppose you are fed up and wish to change myprog from prompting you for input from your terminal to reading its input from a file infile.

3. Explain the architecture of UNIX



1)Hardware :

- The bottom layer is the hardware.
- These devices provide various services. For example, printers are used for printout purposes.

2)UNIX Operating System:

- It is also called system kernel, or simply, Kernel.
- It directly interacts with the hardware and provides user programmers required services.
- In short, it provides the simple interface between user programs and hardware.

3)Standard Library:

- Above operating system, next layer is for standard library.
- These procedures are written in assembly language and used to invoke various system calls from user programs.

4)Standard Utility Program:

- In addition to operating system and system call library, all versions of UNIX supply a large number of standard programs.
- Such programs make the user tasks simpler. Users interact with them and they, in turn, interact with the operating system to get services from operating system.

5)Users:

- The top most layer is of users.
- Users programs come in this layer. They interact with the system either by using library procedures to invoke system calls, or by using utility programs such as shell.

(1) Which command is used to print the text in shell?

- printf

(2) The software with source code that anyone can modify and enhance is called

- open source software

(3) What is the full form of GUI?

- Graphical User Interface

(4) Which variable displays the absolute pathname of user's mailbox?

- pwd

(5) Explain test command with example.

- **test or [expr] :**

test commands or [expr] is used to see if an expression is true and if it is true it true it return zero , otherwise reruns nonzero for false. test or [expr] works with

Integer File

types

Character string

Syntax : test expression OR [expression]

6. Explain command mode and input mode in vi editor

1. **Command Mode:**

This is the mode you come to when you have finished entering or changing your text.

Deletion with x:

x command deletes the character under the cursor. Move the cursor to the character that need to be deleted and then press x

Input Mode:

By default you are command mode
First enter the following command:
set showmode<enter>
Insertion of text: The input mode is terminated by pressing the <Esc> key which takes you back into the command mode.

Opening a new line with o: You can also open a new line by positioning the cursor at any point in a line and pressing

O opens a line above the current line.

Replacing text: Text is replaced with r, R, s and S. The EX Mode:
Save and quite: Save and exit can be done using ex mode.
Repeating text: Suppose we want to insert a series of 10 vsc in one line, so instead of using i and the entering 10 vsc, we can write.

- **Explain installation and configuration of LINUX with UBUNTU.**

- Requirements.
- Boot from install media.
- Choose your language.
- Choose the correct keyboard layout.
- Choose your install.
- Configure storage.
- Select a device.
- Confirm partitions.

Operating System Paper Solution ***CS -22***

(1) What is the full form of KDE?

- K Desktop Environment.

(2) Write the command to copy varmora.txt to sybca folder in ubuntu.

- ✓ Cp varmora.txt sybca

(3) Which configuration file checks for the graphics in Linux?

- /etc

(4) Which command is used to add new user In Ubuntu?

- useradd

Explain GNOME Panel.

- GNOME was once the most popular Linux desktop environment.
- The GNOME 2.x series was used by default on Ubuntu, fedora, Debian, and most other big Linux distributions.

Explain the purpose of windows manager.

- ✓ Microsoft Windows is a graphical operating system developed and published by Microsoft.it provides a way to store files,run software,play games,watch videos,and connect to the internet.

Explain Configuring X files.

Explain the configuration file of X in the directory
/ etc/X11/Xorg.conf

Configuring X :

/etc/X11/Xorg.conf file : Xorg supports several mechanism for supplying configuration and runtime parameter ,command line option , environment variables , the xorg.conf configuration file , default.
Xorg uses a configuration file called xorg .conf for its initial setup.

This configuration file is searched for in the following place when the server is started as a normal user :
/etc/x11/xorg.conf-4
/etc/x11/xorg.conf
/etc/xorg.conf

Operating System Paper Solution ***CS -22***

1. **Which service is used to resolve (translate) hostnames to internet protocol (IP) addresses and vice versa?**

➢ TCP/IP and DNS.

(1) What is the full form of WINE?

➢ Windows Emulator

(3) Which service is used for directory services authentication?

➢ LDAP(Lightweight Directory Access Protocol)

(4) Which command is used to add the user in Linux?

➢ useradd

(b) Answer the following . 2

What is the use of FTP Service.

- File Transfer Protocol (FTP) is a TCP protocol for uploading and downloading files between computer.
- It continuously listens for FTP request from remote clients.
- When a request is received it manager the login and set up the connection.
- For the duration of the session it executes any of commands set by the FTP client.

(c) Answer the following . 3

How to configure firewall in Linux.

- A firewall is a software or hardware based network security system that control the incoming and outgoing network traffic by analyzing the data packets and determining whether they should be allowed through or not , based on applied rule set.
- Ubuntu include its own firewall , known as ufw short for " uncomplicated firewall".
- Ufw is an easier to use fronted for the standard Linux iptable commands.
- Ubuntu's firewall is designed as an easy way to perform basic firewall tasks without learning iptable.

(d) Answer the following . 5

Write down the steps to install APACHE server.

- Step 1:Install Apache Server on Linux
- Step 2:Verify Apache Service Status
- Step 3:Configure Firewall to Allow Apache Server Access
- Step 4:Understand Apache Directories and Files

Operating System Paper Solution ***CS -22***

(1) Round Robin is __ scheduling algorithm.

CPU.

(2) When Process needs input/output then it will move m state.

Ready Queue.

(3) How many entries per page are there in the PMT ?

1 entry per page.

(4) Which type of 0S is generally used to operate particular device ?

Microsoft Windows for desktop device.

(1) What is OS ? List out its features.

Software that manages a computer's hardware and provides services to other software. It acts as a bridge between the computer's hardware and its software applications.

Some of the key features of an operating system include:

Memory management: The OS manages the allocation and deallocation of memory to different programs and processes.

Process management: The OS controls the execution of different programs and processes, including scheduling their execution and allocating resources to them.

File management: The OS manages the organization, storage, and retrieval of files on a computer's storage devices.

Security: The OS provides security measures such as user authentication and access controls to protect the computer from unauthorized access.

Networking: The OS supports networking capabilities such as managing connections and providing network services to other devices.

User interface: The OS provides a user interface, such as a command

(2) Explain concept of Memory Fragmentation.

Memory fragmentation occurs when the available memory in a computer is split into small, non-contiguous blocks, making it difficult to allocate large blocks of contiguous memory for use by programs and processes.

When a program is running, it requests memory from the operating system to store its data. The operating system uses a memory manager to allocate blocks of memory for the program to use. As the program runs, it may release some of the memory it was using, which the memory manager can then make available for other programs to use.

However, over time, as more and more programs request and release memory, the memory manager may be unable to find a single large block of memory to allocate to a new program. Instead, it may have to allocate multiple smaller blocks of memory, scattered throughout the available memory. This is known as fragmentation.

Fragmentation can lead to poor performance, as the memory manager may have to spend more time searching for available memory, and programs may have to be split across multiple blocks of memory, causing additional overhead.

To minimize fragmentation, some operating systems use memory allocation algorithms that try to keep blocks of memory next to each other when they are freed, so that they can be easily reused by new programs.

(1) Explain process state transition diagram.

A process state transition diagram is a graphical representation of the different states that a process can go through during its lifetime, and the events or actions that cause a transition from one state to another.

The most common states in a process state transition diagram are:

New: The process is created and initialized, but has not yet been scheduled to run by the operating system.

Running: The process is currently executing on the CPU.

Waiting: The process is waiting for an event or resource, such as input from a user or the completion of an I/O operation.

Ready: The process is ready to run, but is waiting for the operating system to schedule it for execution.

Terminated: The process has completed execution or been terminated by the operating system.

The most common events or actions that cause a transition from one state to another are:

The operating system scheduling a process for execution

The process requesting a resource or input

The process releasing a resource or completing an I/O operation

The process being terminated by the operating system
The process state transition diagram is a useful tool for understanding the different states that a process can go through, and for identifying potential bottlenecks or issues in the system.

(2) Time sharing OS. with example.

Time-sharing operating systems, also known as multitasking operating systems, are designed to allow multiple users or multiple programs to share the resources of a single computer, by rapidly switching the CPU between different tasks. This allows multiple users to work on the same computer at the same time, or for a single user to run multiple programs simultaneously.
An example of a time-sharing operating system is UNIX, which was first developed in the 1970s. UNIX is a multi-user, multi-tasking operating system that is widely used on servers, workstations, and other types of computers. It allows multiple users to log in to the same computer and work on their own tasks at the same time, and also allows multiple programs to run simultaneously.
Another example of a time-sharing operating system is Windows, it allows multiple users to log in to the same computer and work on their own tasks at the same time, and also allows multiple programs to run simultaneously.
The time-sharing operating systems are widely used in shared-resource environments such as offices, Internet cafes, schools, and libraries, as well as in distributed computing environments such as cloud computing and grid computing.

(1) Write a note on virtual memory and its types.

Virtual memory is a memory management technique that allows a computer to use more memory than is physically available by temporarily transferring data from RAM to a hard disk or other storage device. This allows a computer to run more programs or larger programs than would otherwise be possible with the physical memory alone.
There are two types of virtual memory:
Swapping: In this type of virtual memory, the operating system swaps entire processes in and out of memory. When the physical memory becomes full, the operating system chooses a process that is currently running and temporarily transfers it to disk storage. This process is known as "swapping" and it allows the operating system to free up memory for other processes.

Paging: In this type of virtual memory, the operating system breaks up the process into small fixed-size blocks called pages. When physical memory becomes full, the operating system selects a page that is currently in use and temporarily transfers it to disk storage. This allows the operating system to free up memory for other pages.
Both types of virtual memory enable the operating system to use disk storage as an extension of physical memory, allowing it to run more programs or larger programs than would otherwise be possible. Paging is more efficient than swapping as it allows the operating system to work with smaller, fixed-size blocks of memory and it also allows for a more efficient use of disk space.

(2) Write a note on priority based scheduling Techniques.

Priority-based scheduling techniques are a method of allocating resources in an operating system, such as CPU time, by assigning a priority level to each process. The operating system then schedules the execution of the processes based on their priority levels, with the highest-priority process being executed first.
There are several types of priority-based scheduling techniques:
Priority scheduling: Each process is assigned a priority level, and the operating system schedules the execution of the processes based on their priority levels. The higher the priority level, the more CPU time the process will receive.
Preemptive priority scheduling: A variation of priority scheduling in which the operating system can interrupt a lower-priority process to run a higher-priority process. This ensures that high-priority processes are executed in a timely manner.
Round Robin scheduling: A variation of priority scheduling in which each process is assigned a priority level, and the operating system schedules the execution of the processes based on their priority levels. Each process is given a fixed time quantum, and if a process is not completed within that time quantum, the CPU is given to the next process in line.
Aging: A variation of priority scheduling where the priority of a process increases as it waits longer for the CPU. This technique is used to prevent low-priority processes from remaining in the ready queue for too long.
Priority-based scheduling techniques are useful in real-time systems, where it is important to ensure that high-priority processes are executed in a timely

manner. It is also useful in other systems where certain processes need to be given priority over others, for example, background tasks, user tasks etc.
An example of priority-based scheduling is a system where the operating system is responsible for scheduling the execution of processes in a hospital's intensive care unit (ICU).
In this system, processes representing vital signs monitoring and life support equipment are assigned the highest priority level. These processes are critical to the health and well-being of the patients in the ICU, and must be executed in a timely manner to ensure their safety.
Processes representing less critical tasks, such as updating patient records or ordering supplies, are assigned lower priority levels. These processes can be executed at a lower priority, as they are not as time-sensitive as the life support equipment processes.
In this system, the operating system schedules the execution of the processes based on their priority levels. The highest-priority processes are executed first, ensuring that the vital signs monitoring and life support equipment are functioning properly and that the patients in the ICU are safe.
This is an example of how priority-based scheduling can be used in a real-time system where it is important to ensure that critical processes are executed in a timely manner. It can be used in other systems as well where certain processes need to be given priority over others to ensure the smooth running of the system.

(1) The hidden files can be listed out with _ Command.

ls -a .

(2) redirection operator IS used to append content to a file.

>> using cat >> filename .

(3) Which is the default directory to store device files in UNIX?

/dev .

(4) By default, Kill command uses numbered signal to stop process.

Pid stands to process identifier.

(b) Attempt anyone question : 2

(1) Types of files in UNIX.

→ Search on google.

(2) File comparison commands.

In UNIX-like operating systems, there are several commands that can be used to compare files:

"diff" command: This command compares the contents of two files and displays the differences.

"cmp" command: This command compares the contents of two files byte by byte and displays the location of the first mismatch.

"md5sum" command: This command computes and checks the MD5 message digest of a file.

"sha1sum" command: This command computes and checks the SHA-1 message digest of a file.

"grep" command: This command can be used to search for a specific string or pattern in a file.

"comm" command: This command compares two sorted files line by line and displays the lines that are unique to each file.

"sdiff" command: This command compares two files side by side and displays the differences.

(c) Attempt anyone question : 3

(1) Explain concept of Mounting and demounting file system in UNIX.

In UNIX-like operating systems, the process of "mounting" a file system refers to making a file system accessible at a specific location in the file hierarchy. When a file system is mounted, it becomes part of the file hierarchy and its files and directories can be accessed like any other files and directories on the system.

For example, a USB drive or an external hard drive can be connected to a UNIX-like system and then mounted at a specific location, such as "/mnt/mydrive", so that its files and directories can be accessed through that location.

On the other hand, "unmounting" or "demounting" a file system refers to the process of making a file system inaccessible, so that it is no longer part of the file hierarchy. This is typically done when a device is disconnected or when the file system is no longer needed.

When you unmount a file system, you need to make sure that no programs are accessing any file on the file system.
The command to mount a file system in UNIX is "mount" and the command to unmount a file system is "umount" or "unmount".
Note that you need to have permission to mount and unmount file systems, typically only superuser or root have the permission to do that.

(2) Various modes in VI editor.
VI editor is a command-line based text editor that is commonly used in UNIX-like operating systems. It has two main modes of operation:
Command mode: This is the default mode when VI editor is first opened. In this mode, the user can move the cursor, delete text, and perform other editing commands. The user can also switch to other modes from this mode.
Insert mode: In this mode, the user can insert or edit text. This mode is entered by pressing the "i" key in command mode. Once in insert mode, the user can type text as if in a normal text editor. To return to command mode, the user can press the "Esc" key.
Visual mode: In this mode, the user can select text to be operated on. This mode is entered by pressing the "v" key in command mode.
Ex mode: In this mode, the user can execute commands to save and exit the editor, search and replace operations, and other advanced features. This mode is entered by pressing the ":" key in command mode.
Replace mode: In this mode, the user can overwrite existing text. This mode is entered by pressing the "R" key in command mode.
Command-line mode: In this mode, the user can enter a command to be executed by the editor. This mode is entered by pressing the ":" key in command mode.
These are the most common modes of the VI editor, but it can also have other modes depending on the version and distribution.

(d) Attempt anyone question : 5
(1) Draw and explain UNIX Architecture.
The architecture of UNIX-like operating systems is typically divided into several layers:
Hardware layer: This is the lowest layer and includes the physical components of the computer, such as the CPU, memory, and storage devices.

Kernel layer: This is the core of the operating system and includes the kernel, which controls all system resources and manages the communication between the hardware and the software. The kernel is responsible for process management, memory management, and input/output operations.
System Call Interface layer: This layer provides an interface for user-level programs to access the services provided by the kernel. Programs use system calls to request services from the kernel, such as opening a file or creating a new process.
Shell layer: This is the command-line interface of the operating system, which allows users to interact with the system using commands. The shell provides a command prompt and interprets the commands entered by the user, passing them to the system call interface layer to be executed by the kernel.
User-level Programs layer: This layer includes the various programs that are used by the system and its users, such as text editors, compilers, and utilities. These programs use the system call interface to request services from the kernel and are executed in user-space.
A typical UNIX architecture can be visualized as a layered architecture with the kernel at the center, providing services to the user-level programs via system calls, and managing the underlying hardware.
It's worth mentioning that this is a high-level view of a UNIX-like operating system architecture, different distributions and implementations may have slight variations.

(2) Explain following commands

(1) Step

It means basic commands includes cat,cp,mv,mkdir,rm and many more, search google.

(2) Cut

1. "cut" command: This command is used to cut sections from each line of a file or input and write the result to standard output. It can be used to extract columns or fields from a file, for example, to extract the third column from a file with tab-separated values, you could use the command "cut -f 3 -d '\t' file.txt".

(3) Is

This command use to show list of directories or files or hidden files in unix.

(4) umask

1. "umask" command: This command is used to set or display the file mode creation mask of the current shell session. The file mode creation mask controls the default permissions for newly created files and directories. The umask value is subtracted from the default permissions to determine the actual permissions.

(5) .Script

1. "script" command: This command is used to record a terminal session to a file. When the script command is run, it creates a typescript of everything that is displayed on the terminal, including all typed commands and their output. It is useful for creating documentation, debugging sessions, or for keeping a record of a long session. The command is usually used with the "script" command followed by the name of the file to which the session will be recorded.

(1) Full form of GRUB.

- ✓ The full form of GRUB is "GRand Unified Bootloader".

(2) Full form of MBR

The full form of MBR is "Master Boot Record".

(3) *unset* command is used to delete variable from shell script.

(4) echo $0 returns *Name of a shell* .

(b) Attempt anyone question 2

(1) Explain concept of Positional parameters.

In UNIX-like operating systems, positional parameters are a way of passing arguments to a script or command. They are represented by special variables, such as $1, $2, $3, etc. that correspond to the first, second, third, etc. arguments passed to a script or command.

For example, if you have a script called "myscript" and you run it with the command "myscript arg1 arg2 arg3", the positional parameters $1, $2, and $3 would contain the values "arg1", "arg2", and "arg3" respectively. Within the script, you could reference these variables to access the values passed as arguments.

Positional parameters can also be accessed using the special variable "$@" which contains all the arguments passed to the script or command.

Additionally, the special variable "$#" contains the number of arguments passed to the script or command.

Positional parameters are widely used in shell scripts and commands, they provide a way for the script to access the input provided by the user and act accordingly.

(2) Define: Freeware.

Freeware is software that is available for free to use, distribute, and modify. It is a type of software that is distributed without a cost but without the source code, meaning users can't modify it.

Freeware is typically funded by advertising, sponsorships, or other non-monetary means. Freeware is often used as a way to introduce users to a product, with the hope that they will eventually upgrade to a paid version.

Examples of freeware include some open-source software, such as Linux distributions, GIMP, and LibreOffice, which are distributed with a free license, but also some proprietary software like VLC media player, and 7-Zip.

It's worth mentioning that there are different types of free software such as Freeware, Shareware and Open-Source. Each of them has different distribution and usage rights.

(c) Attempt anyone question 3

(1) File structure of Linux.

/ - Root directory that forms the base of the file system. ...

/bin - Contains the executable programs that are part of the Linux operating system. ...

/boot - Contains the Linux kernel and other files needed by LILO and GRUB boot managers.

/dev - Contains all device files.

(2) Write note on system variables of UNIX.

In UNIX-like operating systems, system variables are used to store and control various settings and configurations of the system. These variables are typically set and managed by the system administrator, and are used by the operating system and various programs and scripts.

Some examples of common system variables in UNIX include:

PATH: This variable contains a list of directories that the shell searches for executables when a command is entered. It allows users to run a command without specifying the full path to the executable.

HOME: This variable contains the path to the home directory of the current user. It is often used as the default location for user-specific configuration files and data.

SHELL: This variable contains the path to the user's default shell. It is used by the system to determine which shell to use when a user logs in.
USER: This variable contains the username of the current user. It is used by various programs and scripts to determine the user's identity.
LANG: This variable is used to set the system's locale and character encoding, it will affect the language and regional settings of the system.
TEMP: This variable contains the path to the system's temporary directory, it is used by various programs and scripts to store temporary files.
These are just some examples, there are many other system variables that are used in UNIX-like operating systems, each with its own specific purpose and function. These variables can be accessed and modified using the command line, typically using export or set command.

(d) Attempt anyone question: 5

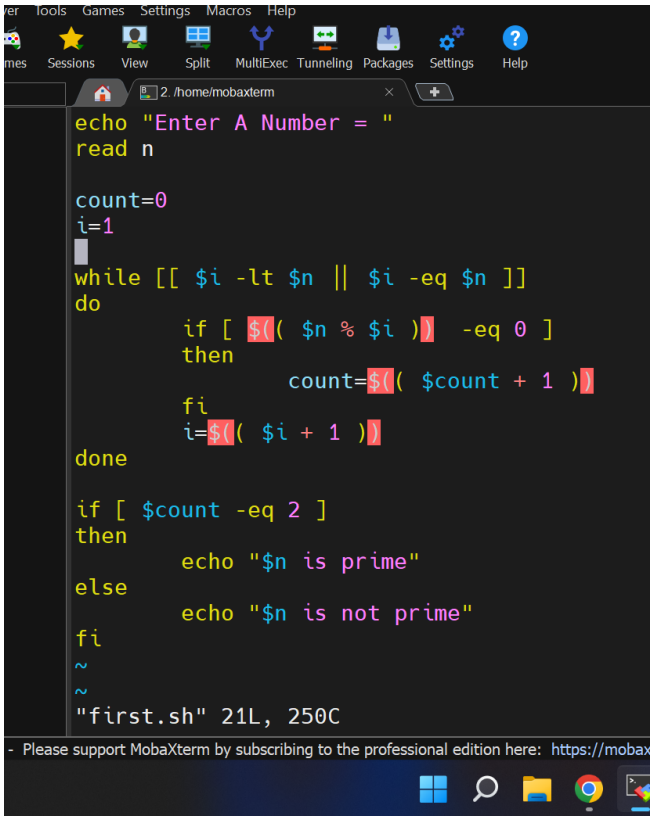
(1) Note on Linux Boot Loaders.

A boot loader, also called a boot manager, is a small program that places the operating system (OS) of a computer into memory. When a computer is powered-up or restarted, the basic input/output system (BIOS) performs some initial tests, and then transfers control to the Master Boot Record (MBR) where the boot loader resides. Most new computers are shipped with boot loaders for some version of Microsoft Windows or the Mac OS. If a computer is to be used with Linux, a special boot loader must be installed.
For Linux, the two most common boot loaders are known as LILO (LInux LOader) and LOADLIN (LOAD LINux). An alternative boot loader, called GRUB (GRand Unified Bootloader), is used with Red Hat Linux. LILO is the most popular boot loader among computer users that employ Linux as the main, or only, operating system. The primary advantage of LILO is the fact that it allows for fast boot-up. LOADLIN is preferred by some users whose computers have multiple operating systems, and who spend relatively little time in Linux. LOADLIN is sometimes used as a backup boot loader for Linux in case LILO fails. GRUB is preferred by many users of Red Hat Linux, because it is the default boot loader for that distribution.

(2) Write a shell script to check whether a number is prime or not.

```
echo "enter number"
read num
function prime
{
for((i=2; i<=num/2; i++))
```

```
do
  if [ $((num%i)) -eq 0 ]
  then
    echo "$num is not a prime number."
    exit
  fi
done
echo "$num is a prime number."
}
r=`prime $number`
echo "$r"
```



(1) Write syntax to install a package in linux.

install [OPTION]... [-T] SOURCE DEST
install [OPTION]... SOURCE... DIRECTORY
install [OPTION]... -t DIRECTORY SOURCE...
install [OPTION]... -d DIRECTORY… .

(2) Full form of GNOME.

GNOME (GNU Network Object Model Environment.

(3) Write syntax to add a user to particular group.

usermod -a -G <group> <username> .

-a : The -a option is used to append the user to the specified group.

(4) Use of startx command.

- ✓ *The "startx" command is used to start the X Window System, which is a graphical user interface (GUI) for UNIX-like operating systems. The X Window System provides a framework for managing graphical windows and user input devices, such as a mouse and keyboard.*
- ✓ *The "startx" command is typically used on systems that do not have a graphical login manager, such as a server or embedded systems.*

(1) What is the purpose of window manager?

- ✓ The job of a window manager is to handle how all of the windows created by various applications that share the screen and who gets user input at any given time. As part of the X Windows API, applications supply a size, position and stacking order for each window they create.

(2) What are the basic window management functionalities ?

Search on google.

(1) Configuring X-window.

- ✓ /etc/X11/Xorg.conf file : Xorg supports several mechanism for supplying configuration and runtime parameter ,command line option , environment variables , the xorg.conf configuration file , default.
- ✓ Xorg uses a configuration file called xorg .conf for its initial setup.
- ✓ This configuration file is searched for in the following place when the server is started as a normal user :

/etc/x11/xorg.conf-4
/etc/x11/xorg.conf
/etc/xorg.conf

2) Tuning Xorg.conf : One of the changes on the Ubuntu 9.10 is that xorg.conf is missing.

- ✓ The reason for this is that the configuration to be done on the user level.

3) Changing window Manager : Obviously if you to try different windows manager you need to know

how to change the default window manager.

(2) Write commands to create, delete. copy and list files and folders.

- ✓ Commands related to files :-

To create :- touch filename or cat > filename
To delete :- rm -r filename or rm filename
To copy :- cp source_filename destination_filename
Commands related to directories :-
To create :- mkdir directory_name
To delete :- rmdir directory_name

(1) Explain layered structure of X window system.

- ✓ https://en.wikipedia.org/wiki/Comparison_of_X_Window_System_desktop_environments ,visit it for answer.

(2) Write a note on KDE and GNOME desktop environments.

Visit OS Pdf page 134,135,136 .

5 (a) Attempt following questions : 4
(1) The UFW is an acronym for _
Uncomplicated Firewall .

(2) Which package is used to install FTP server on ubuntu ?
Vsftpd package.
(3) WINE stands for _
Windows Emulator.

(3) What is the meaning of Sudo ?

- ✓ sudo , which is an acronym for **superuser do or substitute user do**, is a command that runs an elevated prompt without a need to change your identity. Depending on your settings in the /etc/sudoers file, you can issue single commands as root or as another user.

(b) Attempt anyone question : 2

(1) Types of users in Ubuntu.

- ✓ root, service/system and user.

(2) Optimizing LDAP services.

- ✓ LDAP stands to Lightweight Directory Access Protocol.

(c) Attempt anyone question : 3

(1) Installing and configuring WINE.

- ✓ https://www.linuxfoundation.org/blog/blog/classic-sysadmin-how-to-install-and-use-wine-to-run-windows-applications-on-linux , visit it to see the steps.

(2) How to work with apache server in linux ?

- ✓ https://www.layerstack.com/resources/tutorials/Installing-Apache-server-on-Linux-Cloud-Servers , visit it to learn about this question.

(d) Attempt anyone question: 5

(1) Write a note on working with SAMBA server.

- ✓ https://www.redhat.com/sysadmin/getting-started-samba#:~:text=Samba%20is%20a%20suite%20of,Samba%20is%20open%20source%20software. , visit it to learn about this question.

(2) Optimizing and working with FTP services.

FTP SERVER

- ✓ File Transfer Protocol (FTP) is a TCP protocol for uploading and downloading files between computer FTP works on a client / server model.
- ✓ It continuously listens for FTP request from remote clients.
- ✓ When a request is received it manager the login and set up the connection.
- ✓ For the duration of the session it executes any of commands set by the FTP client.

Optimizing LDAP Services :

- ✓ LDAP (Lightweight Directory Access Protocol) directory service is based on a client server model.
- ✓ One or more LDAP server contain the data making up the LDAP directory tree or LDAP backed database.
- ✓ LDAP server a client connects to , it see the same view of the directory a name presented to one LDAP server reference the same entry it would at another LDAP server.
- ✓ LDAP is directory services that runs over TCP / IP .

1 Attempt the following :

(1) What is operating system?

- ✓ An Operating system is a program that controls the execution of application programs and acts as an interface between the user and the computer hardware.

(2) The process had to wait in ready queue until it starts execution, it is called,

- ✓ FCFS

(3) What is preemptive scheduling'?

- ✓ once the CPU has been allocated to a process, the process keeps the CPU until it releases the CPU either by terminating or by switching to the waiting state.

(4) The main memory is divided into equal sized blocks known as,

- ✓ Contiguous Memory Allocation

(B) \ttempt the following : (Any One)

(l) What is turnaround time and, response time?

- ✓ TAT refers to the total time interval present between the time of process submission and the time of its compiletion.The difference between the time of arrival is known as the Turn Around Time of the process.

- ✓ The difference between the arrival time and the time at which the process gets the CPU is called Response Time

(2) Explain virtual memory using segmentation in brief.

- ✓ The process known as segmentation is a virtual process that creates address spaces of various sizes in a computer system, called segments. Each segment is a different virtual address space that directly corresponds to process objects.

The Segmentation Process

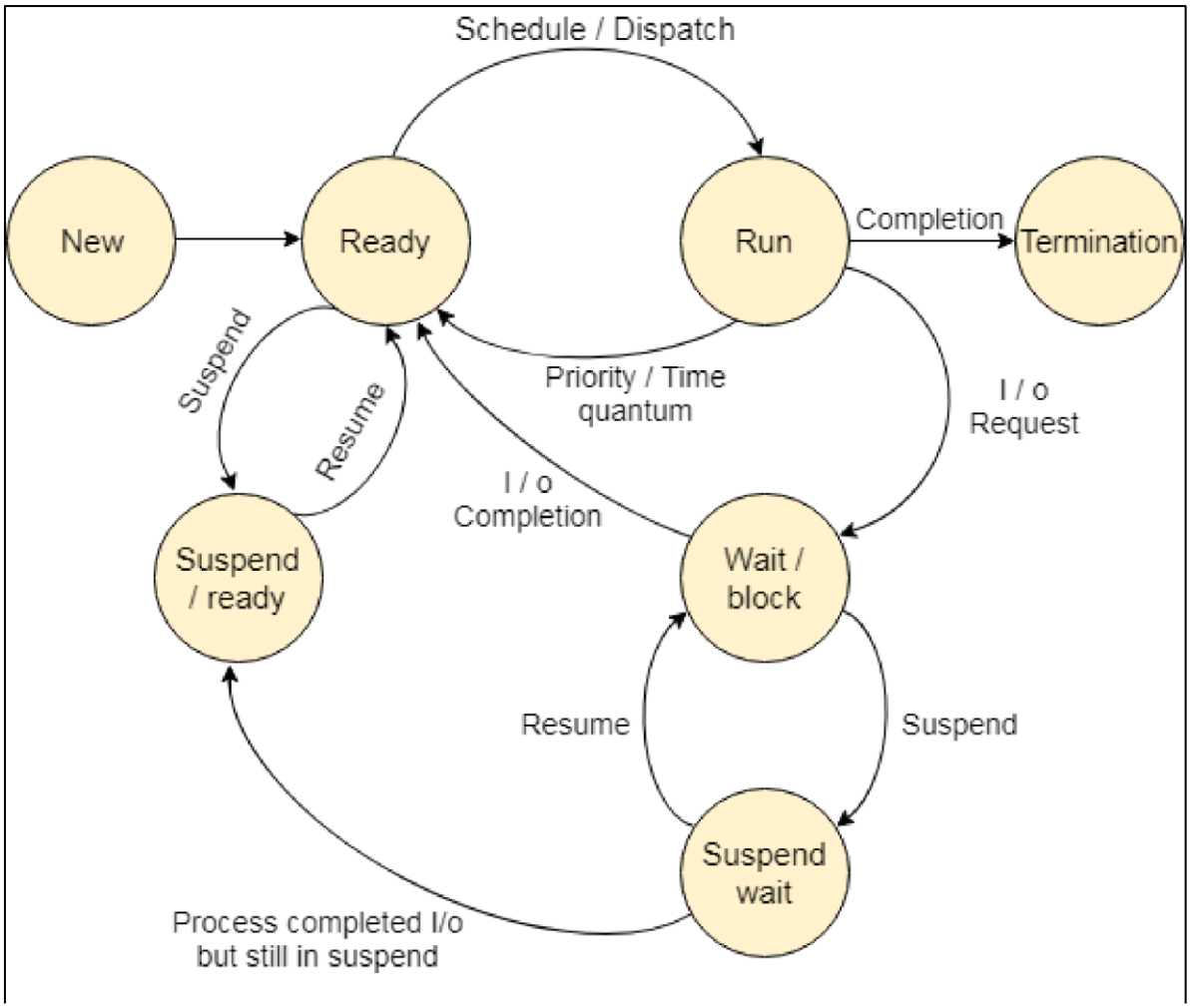
Each segment stores the processes primary function, data structures, and utilities. The CPU keeps a segment map table for every process and memory blocks, along with segment identification and memory locations. The CPU generates virtual addresses for running processes. Segmentation translates the CPUgenerated virtual addresses into physical addresses that refer to a unique physical memory location. The translation is not strictly one-to-one: different virtual addresses can map to the same physical address.

(C) **Attempt the following : (Any One)**

(1) **Explain Best-fit algorithm**.

- ✓ The best fit deals with allocating the smallest free paritition which meets the requirement of the requesting process this algorithm first searches the entire list of free partition and considers the smallest hole that is adequate it then tries to find a hole which is close to actual process size needed.

(2) **Explain process state transition diagram.**



.

1 New

A program which is going to be picked up by the OS into the main memory is called a new process.

2 Ready

Whenever a process is created, it directly enters in the ready state, in which, it waits for the CPU to be assigned.

3 Running

One of the processes from the ready state will be chosen by the OS depending upon the scheduling algorithm. Hence, if we have only one CPU in our system, the number of running processes for a particular time

will always be one. If we have n processors in the system then we can have n processes running simultaneously.

4 Block or wait

From the Running state, a process can make the transition to the block or wait state depending upon the scheduling algorithm or the intrinsic behavior of the process.

When a process waits for a certain resource to be assigned or for the input from the user then the OS move this process to the block or wait state and assigns the CPU to the other processes.

5 Completion or termination

When a process finishes its execution, it comes in the termination state. All the context of the process (Process Control Block) will also be deleted the process will be terminated by the Operating system.

6 Suspend ready

A process in the ready state, which is moved to secondary memory from the main memory due to lack of the resources (mainly primary memory) is called in the suspend ready state.

If the main memory is full and a higher priority process comes for the execution then the OS have to make the room for the process in the main memory by throwing the lower priority process out into the secondary memory. The suspend ready processes remain in the secondary memory until the main memory gets available.

7 Suspend wait

Instead of removing the process from the ready queue, it's better to remove the blocked process which is waiting for some resources in the main memory.

Since it is already waiting for some resource to get available hence it is better if it waits in the secondary memory and make room for the higher priority process. These processes complete their execution once the main memory gets available and their wait is finished.

(D) \ttempt the following : (Any One)

(l) Explain FCFS with example.

- ✓ As the name suggests, the process coming first in the ready state will be executed first by the CPU irrespective of the burst time or the priority.

This is implemented by using the First In First Out (FIFO) queue. So, what happens is that, when a process enters into the ready state, then the PCB of that process will be linked to the tail of the queue and the CPU starts executing the processes by taking the process from the head of the queue.

If the CPU is allocated to a process then it can't be taken back until it finishes the execution of that process.

Process	Arrival time	Burst time
P1	0 ms	18 ms
P2	2 ms	7 ms
P3	2 ms	10 ms

Gantt Chart

P1		P2		P3	
0 ms	18 ms	18 ms	25 ms	25 ms	35 ms

Advantages of FCFS:

It is the most simple scheduling algorithm and is easy to implement.

Disadvantages of FCFS:

This algorithm is non-preemptive so you have to execute the process fully and after that other processes will be allowed to execute. Throughput is not efficient.

FCFS suffers from the Convey effect i.e. if a process is having very high burst time and it is coming first, then it will be executed first irrespective of the fact that a process having very less time is there in the ready state.

(2) Explain functions of OS.

Functions of OS :

- ✓ Implementing the user interface

Sharing hardware among users

Allowing users to share data among themselves

Preventing users from interfering with one another

Scheduling resources among users

(A) Attempt the föllowing ..

(1) The _____ command is used to rename a file in Linux.

- ✓ Mv

(2) What is ordinary file?

- ✓ This is the traditional of a file.

This includes all data, source programs, object and executable code, all Unix commands, as well as any files created by the user.

(3) What is permission?

- ✓ The cd command can sometimes fail if you don't have proper permissions to access the directory.

(4) The pwd command is used fine changmg the password of the user. (True / False)

- ✓ False

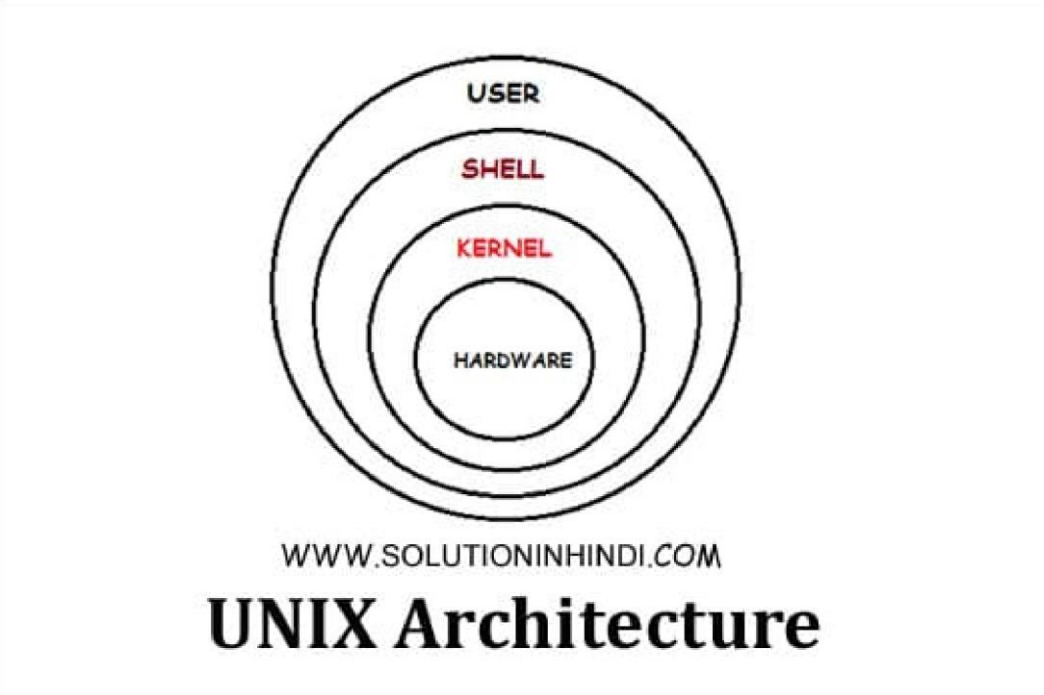
(B) Attempt the following : (Any One)

(1) Explain grep command.

- ✓ The commands sort and grep are often used when piping.
  - ✓ For example:
  - ✓ % cat phonenos | sort | lpr

(2) Explain UNIX architecture in brief.

✓



1.Hardware :

- ✓ The bottom layer is the hardware.
- ✓ These devices provide various services. For example, printers are used for printout purposes.

2.**Unix Operating System:**

- ✓ It is also called system kernel, or simply, Kernel.
- ✓ It directly interacts with the hardware and provides user programmers required services.
- ✓ In short, it provides the simple interface between user programs and hardware.

3.Standard Library:

- ✓ Above operating system, next layer is for standard library.
- ✓ These procedures are written in assembly language and used to invoke various system calls from user programs.

4.Standard Utility Program

- ✓ In addition to operating system and system call library, all versions of UNIX supply a large number of standard programs.
- ✓ Such programs make the user tasks simpler. Users interact with them and they, in turn, interact with the operating system to get services from operating system. The top most layer is of users.

5.Users

- ✓ Users programs come in this layer. They interact with the system either by using library procedures to invoke system calls, or by using utility programs such as shell.

(C) Attempt the following : (Any One)

(1) Explain chmod, chown, chgrp command

- ✓ **Chmod :**

- Syntax : chmod [ugoa][+ - =] file
  Chmod ### file

(2) Explain wall, touch, od command.

- ✓ **Wall:**
- ✓ The wall command has more urgency then others as it address all the users simultaneously.
- ✓ syntax: $ wall [message]

(D) Attempt the following : (Any One)

(1) Explain operators used in redirection and piping.

- ✓ Combining piping I/O redirection, and program execution provides a general technique for performing complex operating by putting together simple commands.

Suppose you are fed up and wish to change myprog from prompting you for input from your terminal to reading its input from a file infile.

(2) Explain VI editor modes.

- ✓ The Vi editor has two modes: **Command and Insert**. When you first open a file with Vi, you are in Command mode. Command mode means you can use keyboard keys to navigate, delete, copy, paste, and do a number of other tasks—except entering text. To enter Insert mode, press i .

3 Attempt the following:4

(1) What is shell?

- ✓ The UNIX shell is also a programming language.

It supports all the programming features such as variables, control structures, loops and so on.

(2) The system variable $# is display last command's status. (True / False)

- ✓ Search Google

(3) List the basic features of the GNU public license.

- ✓ Linux Kernel
- ✓ Microsoft .NET.

(4) Give full form: GRUB

- ✓ Grand Unified Boot Loader

(B) Attempt the following : (Any One)

(1) Explain IF decision statement.

- ✓ An if-else statement allows you to execute iterative conditional statements in your code. We use if-else in shell scripts when we wish to evaluate a condition, then decide to execute one set between two or more sets of statements using the result.

(2) Explain read and echo command.

- ✓ **READ COMMAND**
- ✓ Input the variable value from keyword
- ✓ Syntax : read variablename

- ✓ **ECHO COMMAND**

  Use echo command to display text or value of variable .

  Syntax : echo [option] [string , variables…….]

(C) Attempt the following : (Any One)

(l) List the types of loops in LINUX and explain any one.

- ✓ While loop

- ✓ Do while loop
- ✓ For loop

(2) Explain case statement with example.

- ✓ Case expression in
- ✓ execute command ;;
- ✓ command;;

n) command_list_N;; case

(D) Attempt the following : (Any One)

(1) Write a shell script to print 1 1 2 3 5 8 13 ... N series.

```
echo "Enter the value of n"
read n
a=0
b=1
count=2
echo "Fibonacci series:"
echo $a
echo $b
while [ $count -le $n ]
do
fib=`expr $a + $b`
a=$b
b=$fib
echo $fib
count=`expr $count + 1`
done
```

(2) Write a shell script to check whether the string is palindrome or not.

```
echo "Enter a String"
read input
reverse=""

len=${#input}
for (( i=$len-1; i>=0; i-- ))
do
    reverse="$reverse${input:$i:1}"
done
if [ $input == $reverse ]
```

```
then
   echo "$input is palindrome"
else
   echo "$input is not palindrome"
fi
```

4 Attempt the following 4

(1) What is start X command?

- ✓ x command deletes the character under the cursor. Move the cursor to the character that need to be deleted and then press x

(2) Write the step to change desktop of GNOME.

- ✓ At The login Screen select your name from the list.Click the options icon in the bottom right corner.Select GNOME from the list.

(3) List the KDE start menu items.

- ✓ KDE Panel
- ✓ Desktop Icons
- ✓ Managing Windows
- ✓ The KDE Control Panel

(4) What is Windows X?

- ✓ The X Window system , developed at MIT

(Massachusetts Institute of Technology) in the late 1980.

It is rapidly becoming the industry standard windowing system for graphics workstation.

The software is freely available , very versatile and is suitable for a wide range of hardware platform , from high end microcomputer to mainframes.

The X Windows system commonly referred to as X is network based graphical window system.

The X Window system uses a client server architecture.

It enables multiple programs to share and access a common set of hardware.

This hardware include both input and display device such as mouse , keyboard video adapters and monitor that are connected to the server.

The X Window system consists of X server and X clients.

The X Clients are application program that do not have direct access to the display.

(B) Attempt the following : (Any One)

(1) Write the step for creates new földer and rename of the folder in Ubuntu.

Step1:

- ✓ To Create a folder choose a location where the folder needs to be created.
- ✓ Step 2:
- ✓ Then right click and choose the option of new Folder.
- ✓ Step3:
- ✓ Provide a name for the folder accordingly.

(2) Explain GNOME panel of the Ubuntu.

- ✓ GNOME was once the most popular Linux desktop environment.
- ✓ The GNOME 2.x series was used by default on Ubuntu, fedora, Debian, and most other big Linux distributions.

(C) Attempt the following :

(1) Explain open source & freeware.

✓ **Open Source Software :**

In general , open source refers to any program whose source code is made available for use or modification as users or other developers see it.

Open source software is usually developed as a public collaboration and made free available.

Open source is a certification ark owed by the Open Source Initiative (OSI).

✓ Beside Linux ,Mozilla , Apache , PNG are all examples very popular software that is based on Open Source.

(2) Explain GNOME- control panel in Ubuntu.

- ✓ GNOME was once the most popular Linux desktop environment.
- ✓ The GNOME 2.x series was used by default on Ubuntu, fedora, Debian, and most other big Linux distributions.

(D) Attempt the following : (Any One)

(1) Explain elements of Xorg.conf file.

- ✓ /etc/X11/Xorg.conf file : Xorg supports several mechanism for supplying configuration and runtime parameter ,command line option , environment variables , the xorg.conf configuration file , default.
- ✓ Xorg uses a configuration file called xorg .conf for its initial setup.
- ✓ This configuration file is searched for in the following place when the server is started as a normal user :

/etc/x11/xorg.conf-4

/etc/x11/xorg.conf

/etc/xorg.conf

(1) Write the steps för installing and uninstalling software in Ubuntu.

- ✓ Click on the Ubuntu Software icon in the Activities toolbar;This will open the Ubuntu Software manager through which you can search for install and uninstall software from your computer From the list of applications look up one you want to uninstall and then click the Remove button against it.

(2) (A) Attempt the following 4

(1) Give full form : LDAP

✓ Lightweight Directory Access Protocol

(2)List the special three section of the smb.conf file.

✓ The section name is the name of the shared resource and the parameters within the section define the shares attributes. There are three special sections, **[global], [homes] and [printers]**, which are described under special sections.

(2) Give full form,: SWAT

✓ Special Weapons and Tactics.

(4) What is WINE?

✓ Wine is a free and open source software application that allows you to run many Windows programs on Linux

✓ Its homepage can be found at http://www.winehq.org

(B) Attempt the föllowing : (Any One)

(1) Write a note on DNS services.

- ✓ The domain name system (DNS) is **a naming database in which internet domain names are located and translated into Internet Protocol (IP) addresses**. The domain name system maps the name people use to locate a website to the IP address that a computer uses to locate that website.

(2) How to install Apache server in Ubuntu.

- ✓ Installing Apache:To install Apache,install the latest meta package apache2 by running sudo apt update sudo apt install apache2.
- ✓ Creating Your Own Website.By default,Apache comes with a basic site enabled.
- ✓ Setting up the VirtualHost Configuration File.

(C)**Attempt the following : (Any One)**

(l) How can user configure Firewall in Ubuntu'?

- ✓ A firewall is a software or hardware based network security system that control the incoming and outgoing network traffic by analyzing the data packets and determining whether they should be allowed through or not , based on applied rule set.
- ✓ Ubuntu include its own firewall , known as ufw short for " uncomplicated firewall". Ufw is an easier to use fronted for the standard Linux iptable commands. Ubuntu's firewall is designed as an easy way to perform basic firewall tasks without learning iptable.

(2) Write the steps for create new user in Ubuntu.

- ➢ Creating and Managing Users In Ubuntu :
  - ✓ step 1 : Accessing the user and groups tool.
  - ✓ Step 2 : Adding a new user
  - ✓ Step 3 : Making future change to user

(D) **Attempt the following : (Any One)**

(l) How to install Samba server and manage.

- ✓ Samba is an easy way to share files over Linux and windows environment. Samba is presented by samba .org and is an Open Source / Free software suit that provides seamless file and print services to SMP clients.

(3) Explain optimizing web server in Ubuntu.

- ✓ Apache is generally recognized as the words most popular Web server (HTTP server).
- ✓ Apache is free software , distributed by the Apache Software foundation that promotes various free and open source advanced web technologies.