

## Q. I A

1) What is Thread?

→ A member of collection of instances of a single program running in multiple place at the same time.

2) SJF stand for?

→ Shortest job first

3) Queue at ticket window is example of type of scheduling algorithm.

→ FCFS method

4) When running process requires some input / output it goes to state.

→ Blocked or wait

## Q. I B

1) Explain context switching.

→ Loading the corresponding process control block stored to get information about the state of the new process.

→ like The process is running using the CPU to do its job.

→ While a process is running others (process with the highest priority queue up to use the CPU to complete their job.

- switching the CPU to another process requires performing a state save of the current process and a state restore of a different process.
- This task is known as a context switch.
- Context switch time is pure overhead because the system does no useful work while switching.

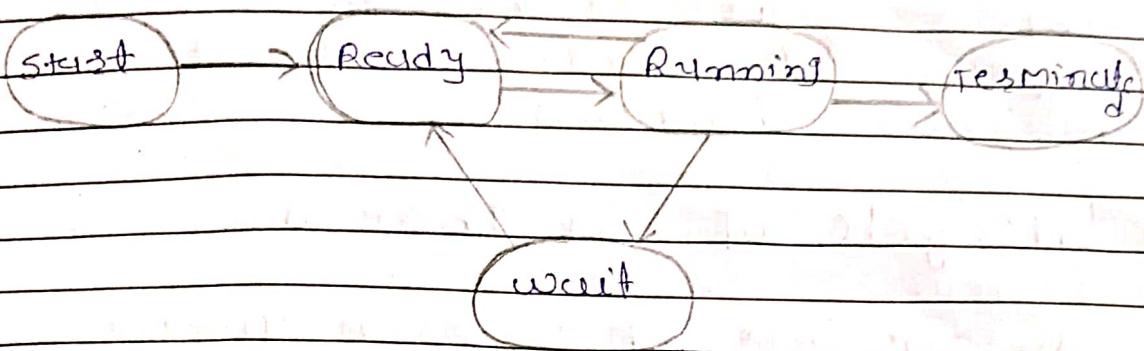
2. What is OS? Lists out its features

- An operating system is in most general sense is software that allows user to run other application on a computing device
- operating system is a interface between user and hardware
- A system application whose user can run their application and manage hardware on it.
  - 1) security management
  - 2) process management
  - 3) storage and memory management
  - 4) Disk Management
  - 5) I/O operations
  - 6) device management

## Q. 1 C

1 Explain process state transition diagram in brief.

→ process state diagram



→ When a process executes it passes through different states.

→ These stages may differ in difference operating systems and the names of these states are also not standardized.

→ In general a process can have one of the following five states at a time.

1) Start :- This is initial state when a process is first started / created.

2) Ready :- This is process waiting to be assigned to a processor.

3) Running :- Once the process has been assigned to a processor by the OS scheduler.

4) Waiting :- Process moves into the waiting state if needs to wait for a resource.

5) Terminated :- Once the process finishes its execution off it is terminated by the operating system.

## 2) Explain multithreads.

- A thread is a path which is followed during a program's execution.
- Majority of programs written nowadays run as a single thread.
- Let's say for example a program is not capable of reading keystrokes while making drawings.

### \* Lifecycle of a thread.

- 1) NEW.
- The Lifecycle of a born thread starts in this state - it remains in this state till a program starts.

### 2) Runnable

- A thread becomes runnable after it starts. It is considered to be executing the task given to it.

### 3) waiting

- While waiting for another thread to perform a task, the currently running thread goes into the waiting state.

### 4) Terminated (dead)

- A thread enters into this state after completing its task.

Q.1 D

1 Explain RR with suitable example?

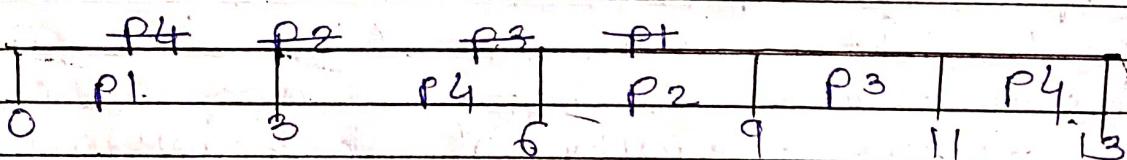
- Round Robin is the preemptive process scheduling algorithm.
- Each process is provided a fix time to execute. It is called quantum.
- w One a process is executed for a given time period, it is preempted and other processes execute for a given time period.

example

PROCESS ID.	ARRIVAL TIME	BURST TIME
P <sub>1</sub>	0	5 (2)
P <sub>2</sub>	2	3
P <sub>3</sub>	3	2
P <sub>4</sub>	1	3

Step 1

→ Count burst



Step 2

PID	ARRIVAL TIME	BURST TIME	COMPLETION TIME	TURN AROUND	WAITING
P <sub>1</sub>	0	5	13	13	8
P <sub>2</sub>	2	3	9	7	4
P <sub>3</sub>	3	2	11	8	6
P <sub>4</sub>	1	3	6	5	2

Step 3

v) Avg. Turn Around time = Total Turn around time / No. of process.

$$(13 + 7 + 8) / 4 = 33 / 4 = 8.25$$

Waiting time = Total waiting time / No. of processes

$$(8 + 4 + 6 + 2) / 4 = 20 / 4 = 5$$

Step 4

$\rightarrow$  Throughput = total burst time / No. of process

$$(13 + 7 + 8 + 2) / 4 = 30 / 4 = 3.75$$

Step 5

v) CPU Utilization = total estimated time / \* 100.

$$13 / 13 * 100 = 100\%$$

2 Explain function of OS?

v) 1) I/O system management

$\rightarrow$  one of the main object of any OS is to hide the specialty of that hardware device from the user.

2) secondary storage management.

$\rightarrow$  System have several type of storage which include primary storage, secondary storage and cache storage.

### 3) Security

→ security module protects the data and information of computer system against malicious threat and unauthorized access.

### 4) Command interpretation

→ This module is interpreting commands given by the end-user to system resources to process that commands.

### 5) Networking

→ A distributed system is a group of processes which do not share memory hardware devices.

→ The processes communicate with one another through the network.

### 6) Job accounting

→ Keeping track of time & resource used by various job and users.

### 7) Communication Management

→ Condition and assignment of compilers, interpreted and another software resource of the various users of the computer systems.

## Q. 2 A

1) What is fragmentation?

- In a computer's storage system as process size loaded and removed from memory the free memory space is broken into small pieces.

2) Full form of PCB

- Printed circuit board

3) Memory allocation is the process of

- allocate memory to processes on demand.

4) Full form of SMT

- Simultaneous multithreading.

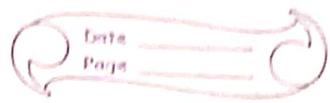
## Q. 2 B

1) Explain deadlock?

- A deadlock is a situation in which two computer programs sharing the same resource are effectively preventing each other from accessing the resource resulting in both programs failing to function.

→ The earliest computer operating system can run only one program at a time.

→ All of the resources of the system are available to this one program.



→ A deadlock is a situation where a set of processes are blocked because each process is holding a resource and waiting for another resource acquired by some other process.

Explanation:

2) Explain difference between paging and segmentation.

→

1) Paging.

- paging is a method or technique which is used for non contiguous memory allocation.
- it is fixed size partitioning theme.
- In paging both main memory and secondary are divided into equal fixed size partitions.
- The partitions of the secondary memory are known as pages and frames respectively.

2) Segmentation.

- Segmentation is another non contiguous memory allocation scheme like paging.
- like paging in segmentation the process is not divided indiscriminately into fixed size pages.
- it is a variable size partitioning theme.
- The partitions of secondary memory are units are known as segments.

## Q. 2 C

I Explain physical memory and virtual memory

1) Physical memory

→ physical memory is the actual real memory used in RAM.

→ physical memory is the only memory that is directly accessible to the CPU.

→ The data that is operated will also be stored in Physical memory in uniform manner.

2) Virtual memory

→ Virtual memory as the name suggests it is not real.

→ Virtual memory is one classification of memory which was created by using the hard disk for simulating additional RAM or RAM the addressable space available for the user.

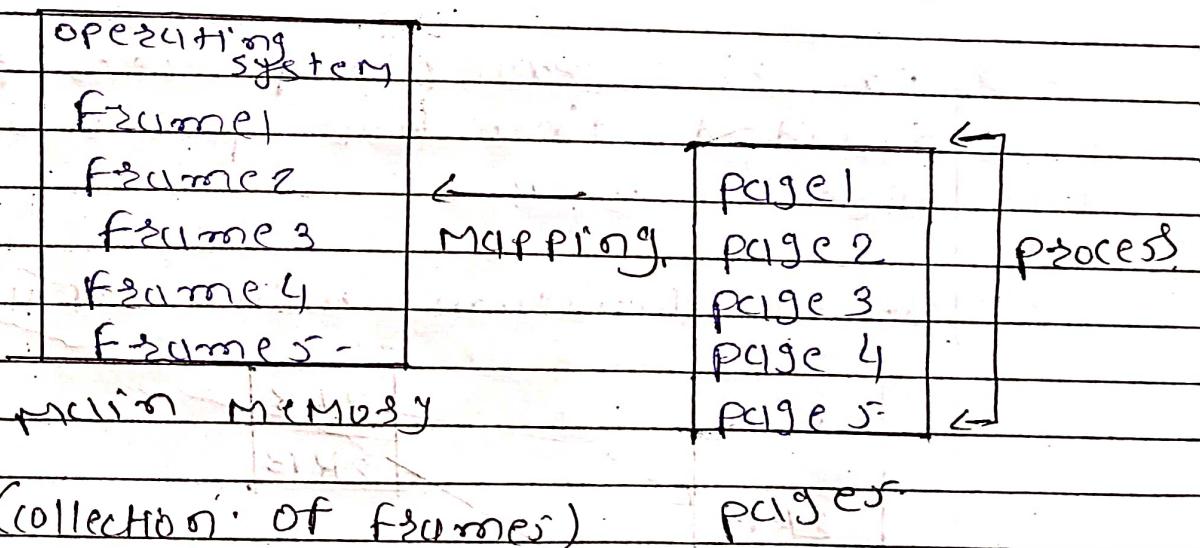
→ Virtual addresses are mapped into real addresses.

→ The OS uses Virtual memory as a memory management technique.

Q) write short note on paging.

- Paging is a method or technique which is used for non contiguous memory allocation.
- it is fixed size partitioning theme.
- in paging both main memory and secondary memory are divided into equal fixed size partitions.

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.



Q. 2 D

I) Explain non contiguous memory allocation.

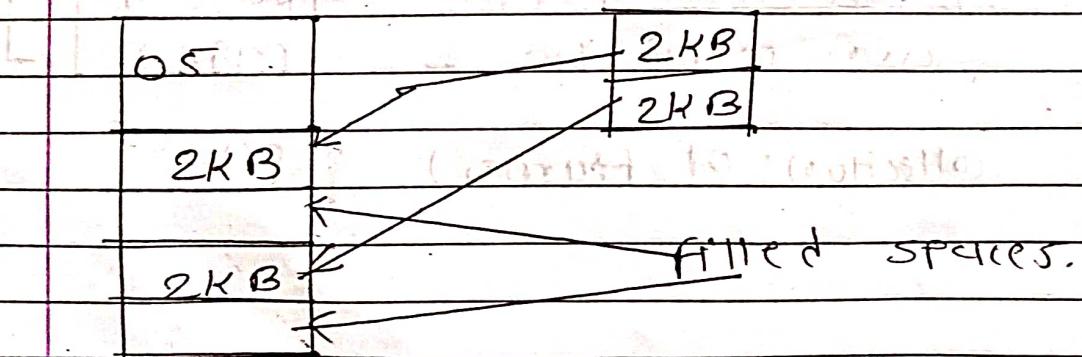
→ In the non contiguous memory allocation, process will acquire the memory space but it is not a one place it is at the different location according to the process requirement.

→ This technique of non contiguous memory allocation reduce the wastage of memory which leads to internal and external fragmentation.

→ This utilizes all the free memory space which is created by a different process.

→ in this example process P can be divided into two parts of equal size — 2 KB

→ Below diagram will explain in better.



u) There are two types of noncontiguous memory allocation.

- 1) Paging (Q, 2, C) (2)
- 2) Segmentation (Q)

## 2) Segmentation.

- The process known as segmentation is a virtual process that executes address spaces of various sizes in a computer system called segments.
- each segments is a different virtual address space that directly corresponds to process objects.
- when a process executed, segmentation assigns selected data into segments for faster processing.

Process Table		Memory	
segment	SN	Size	Memory Address
1	1	400	100
	2	200	1500
	3	100	1600
2	N	X	NM
			100
			200
			400
			500
			600
			900
			800
3			
N			NM

Q) Explain virtual memory using PGM.

→ Q.2.c (2)

Q. 3 A

- 1) Unix was developed By.  
→ Ken Thompson and Dennis Ritchie.
- 2) Which is the extension for shell script file?  
→ .sh
- 3) The Bourne shell written by?  
→ Stephen Bourne.
- 4) Bash stand for  
→ Bourne Again Shell.

### Q.3 B

1) Explain shell

- The shell is the utility that processes your requests
- When you type in a command at your terminal the shell interprets the command and calls the program that you want
- C shell Bourne shell and Korn shell are the most famous shells which are available with most of the Unix variants.
- A Unix shell is a command-line interpreter of shell that provides a command-line user interface for Unix-like operating system. TYPE
  - 1) The Bourne shell
  - 2) The c shell
  - 3) The Korn shell
  - 4) The Bourne Again shell

2) Explain following commands.

- cut

- ls

- cut

- This command is generally used to create a file see the content of the file and append data to a file.

Syntax : executing a file \$ cut -f filenum

Syntax 2 :- Append data to a file  
e.g. cat -> filename

ls

→ ls if it lists the directories and files in the current directory

Syntax \$ ls

e.g. \$ ls -l

Output :- detailed list of files and directories.

option

→ -l : long listing of file showing with seven attributes.

→ -m : it displays the user group id. with long list format.

→ -a : it is used for displaying hidden

→ -R : it displays folders and subfolders

Q. 3 C

1) Explain comparison command in Linux

1) Cmp

→ This command compares two files byte by byte that means the first byte of first file with the first byte of the second file.

## Syntax

`diff file1 file2`  
file1 file2 differs ; byte 13 line 1

## 2) Comm

- This command is useful to compare two sorted files line by line.

## Syntax

`$ comm [option] file1  
file2`

- 1 lines unique to file1
- 2 lines unique to file2
- 3 lines that occurs in both files

## 3) DIFF

- The command finds difference between two files

## Syntax

- c treat all files as text and compare them line by line.
- b ignore changes in amount of white space.
- i ignore change in case

- 4) T2 :- This command is useful for changing the case from uppercase to lowercase.

→ `t2 [option] 'src1' 'src2' $cat file`  
`t2 "[A-Z]" "[a-z]"`

- d delete characters in the first set

- s replaces repeated characters

5) sed :- sed is a stream editor used for modifying the files in memory.

### Syntax

\$ sed 's/unix/linux/' file.txt

2) Explain any three process related commands.

### -1. ps

on every unix-like OS the process status command displays information about active processes.

### Syntax

ps

### Ex

\$ ps

### 2) nice

→ nice command affects process scheduling.  
→ A process with a lower nice value is given higher priority.

### Syntax

nice <command>

### Ex

\$ nice <command>

### 3) kill

→ On unix-like OS the kill command sends a signal to a process.

## Syntax

kill pid

Ex

\$ kill -9

4) csh and batch.

5) cron and crontab

6) wait

7) sleep

## Q.3 D

1) explain types of file in Unix.

→

The unix file system contains several different types of files.

### ⇒ Ordinary Files.

- used to store your information such as some text you have written.
- Always located within / under a directory file.
- Do not contain other files.

### ⇒ Directories.

- Branching points in the hierarchical tree
- used to organize group of files.

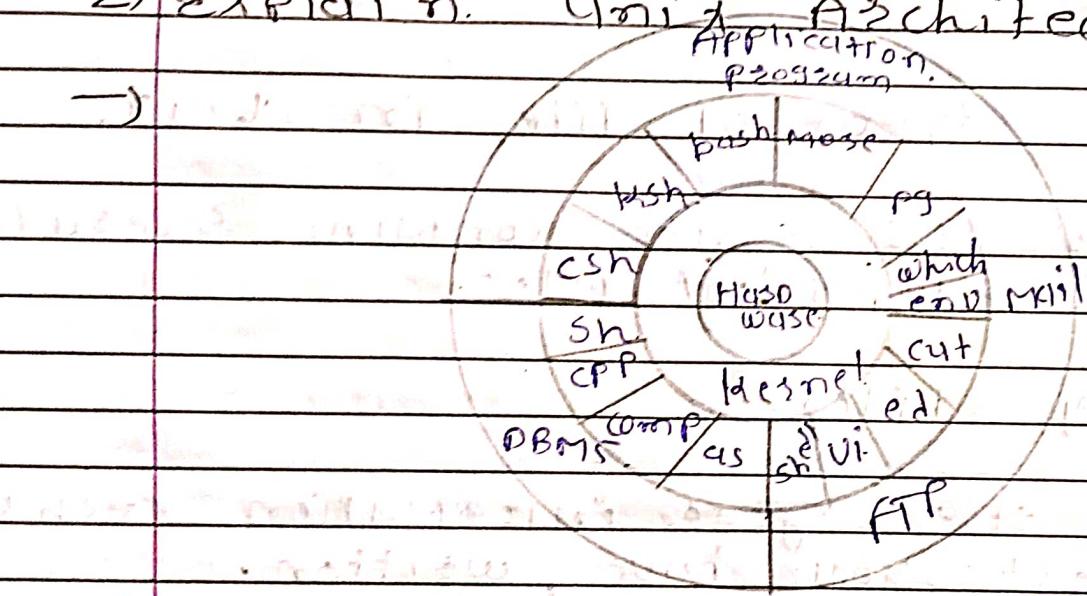
→ May contain ordinary files  
or other directories.

### 3) SPECIAL FILES

→ Used to represent a real physical device such as a printer, tape drive or terminal used for input / output operations.

## 2) EXPLAIN UNIX ARCHITECTURE.

→ The UNIX system will consist of Application program.



→ The UNIX operating system is a set of programs that act as a link between the computer and the user.

→ UNIX was originally developed in 1969 by a group of AT&T employees Ken Thompson, Dennis Ritchie at Bell Labs.

→ User communicate with the kernel through a program known as the shell.

## 1) Kernel.

- The kernel is the heart of the OS.
- it interacts with the hardware and most of the tasks like memory management, task scheduling and file management.

## 2) shell.

- The shell is the utility that processes your requests.
- When you type in a command in your terminal that shell interprets the command and calls the program that you want.
- c shell Bourne shell and korn shell are the most famous shells which are available with most of the Unix variants.

## 3) Command and utilities.

- These use various command and utilities which you can make use of in your day to day activities.
- CP MV CAT and grep etc. etc.  
Few examples of commands and utilities.
- All the commands come along with various options.

## 4) Files and Directories

- All the data of Unix is organized into files
- All files are then organized into directories
- These directories are further organized into a tree-like structure called the filesystem.

## Q 6 A

### 1) How to define variable?

→ type the name you want and set its value using the equals sign (=)

### 2) Give the name of some shell keyword

→ echo    if              trap  
      read    else          until  
      set      fi            eval

### 3) What is system variable?

→ These variables are used to configuration environment during the boot sequence or after user login so they are also visible.

### 4) Explain test command

→ evaluates the expression parameter and if the expression value is true returns a zero exit value.

## Q4 B

### 1 Explain positional parameters.

- A positional parameters is a variable within a shell program.
- its value is set from an argument specified on the command line that invokes the program.
- positional parameters are numbered and are referred to with a preceding " \$": \$1, \$2, \$3, and so on.

\$0 The filename of the current script

\$# The number of arguments supplied to a script.

\$\* All the arguments are double quoted. If a script receives two arguments \$\* is equivalent to \$1 \$2.

\$@ All the arguments are individually double quoted.

### 2 Explain Looping structure in unix.

- A looping is a series of commands that will continue to repeat over again until condition is met.
- In each case a block of code is executed repeatedly until a loop exit condition is satisfied.

## I) while.

### Syntax

while / condition :

do

# series of code

done.

→ The bash while loop is a control flow statement that allows code to be executed repeatedly based on given condition.

2) until

3) for

for variable in 1,2,3,4-n

do

# series of code

done.

→ The bash for loops allows the repeatedly executed until the code to be given no of iteration.

Q. 4 C

I) Explain 'decision statements' in unix

→ while waiting in a shell script may be a situation when you need to choose one path out of the given two paths

→ so you need to make use of conditional statement that allows your program to make correct decisions and perform the right actions.

- Unix shell supports conditional statement which are used to perform different action based on different conditions.
- Unix shell provides decision making using if then else and case structure.
- if then fi
- given condition is true then command is executed else command is executed.

### Syntax

```
if [Condition]
then
    execute command if condition true
else
    execute command if condition false
fi
```

### 2) if elif else fi

- The if elif else fi stat is the one level recursive form of control stat that allows shell to make correct decision out of several cond.

### 3) The case esac statement

- Unix shell supports case esac stat which handles exactly this situation.
- There is only one form of case esac stat.

## 2) Explain nano editor?

→

GNU nano is a friendly and convenient file editor like vi and emacs.

→ It offers many other extra features like word searching → replacing, jump to a line or column, filename, tab completion, auto indentation, etc.

→ nano is a clone of the pico text editor. nano is not pre-installed in all distros but ubuntu has it.

### Syntax

nano

→ Look at the above snapshot. After the default nano screen on pressing command nano.

→ At the top GNU nano version is shown at the left. And in the middle filename is shown being edited.

→ At the end of the screen keyboard commands given

→ Command written as ^M means press  $\text{ctrl} + \text{g}$  key and command M-P means press  $\text{alt} + \text{z}$ .

- There is no use of uppercase letters in any of the keyboard command in nano editor.
- you can use lowercase letters with ctrl and alt keys.

Q. 4 D

1) Explain VI editor in detail.

- No matter what work you do with the unix system you will eventually write some C program or shell script.
  - For all this you must learn to use an editor on unix. Provides a very versatile one vi editor. vi editor is a screen editor.
  - where a portion of the file is displayed on the terminal screen and the cursor can be moved around the screen to indicate where you want to make changes.
  - you can select which part of the file you want to have displayed.
- \* invoking VI is easiest possible.
- it will put filename into a buffer and display the file on the screen.
  - if filename does not exist, vi will create it.

\* Modes in vi editor.

→ 1) command mode

→ This is default mode of vi editor.

→ This mode is used to give some commands for navigation, edition and copy or cut.

2) Input or insert mode.

→ This mode is used to enter data in vi editor.

→ This mode will be selected from command mode pressing `I` or `i` or `a` or `A`.

3) execute mode.

→ This mode is used to save or quit from vi editor.

→ whatever the changes user has done in file using vi editor if user wants to save.

→ The vi editor in this mode will supports user to quit from the vi editor.

# Switching mode in VI

→ While you start vi editor at that time you will be at vi mode that will ready to accept defined cmd on that particular key but not any input.

→ if you want to input text into the file you will have to go to input mode for that you will have to press `i`.

- \* Cursor movement in vi editor.
- whatever the command you are giving that will work on vi mode only.
- The eight arrows will cause the cursor to move one position to the right.

h. left arrow  
 j. down arrow  
 k. up arrow  
 l. right arrow

#### \* Screen control command.

- whatever the command you are giving that will work on vi mode only.

$C + \downarrow + F$  ⇒ This will move the user forward

$C + \downarrow + b$  ⇒ This will move the user backward

$C + p$  ⇒ This will move the cursor to end of file

$C + n$  ⇒ This will bring the cursor,

## 2 write a shell script to display a digital clock.

- unix has the inbuilt functionality to show the current time.

→ usually linux shows the current time in general format rather than word and with this may some users disagree.

→ if we direct run the time command in Linux or Unix then will get output like following

Command: date +%T

Output: 11:02:08 PM IST

### \* Example

→ Current Time 11:02:03:25 AM IST

Time in word is Two hours Thirty minutes  
Twenty Five seconds AM

### \* Script code Approach

→ To write the script to display the time in the word - we require some simple Linux inbuilt commands like date, echo.

### Q. 5 A

1) give full form of LAMP.

→ Lightweight Directory Access protocol.

2) write a syntax to add user to particular group.

→

3) The UFW is an acronym for \_\_\_\_\_

→

4) wine stands for?

→ wine is not an Emulator

### Q. 5 B

I difference between LILO and GRUB

→

#### LILO

#### GRUB

1) LILO on the other hand GRUB has a more powerful interactive command line interface.

2)

2) LILO for Linux Loader.

2) GRUB (Grand unified Bootloader)

3) LILO is old (developed stopped in 2005)

3) GRUB is newer and still being maintained

4) On the other hand Lilo is an older boot loader with single or device management.

5) GRUB is a boot loader package from the GNU project.

1) GRUB is a new boot loader with multi or device management.

5) Lilo is a boot loader for Linux.  
→ it was the default boot loader for most Linux distributions.

## 2) Explain FTP optimization!

→

FTP servers use a common way of sharing files between individuals with or without authentication.

→ FTP is superior to HTTP if the goal is to transfer files, not display information.

→ After successful setup of an FTP server you may need to optimize its services to get the better performance every time.

→ For this you need its proper configuration.

→ FTP is file transfer protocol security must be for safe file transfer.

## Q. 5

1) Q) what is wine?

→ As we know that Linux is a great OS if you like a windows game or other app you need to use wine to run it right on your Ubuntu desktop.

\* installing wine

→ You will find the wine download in the Ubuntu software center in all version  
→ Download and install it.

\* Running an Application

→ You can also use terminal to install an application.

→ use following command

\* wine / path / application.exe

→ After installation of the application you can find its shortcut icon on desktop as we find it on windows or

Q 2) Explain Firewall and how to enable Firewall in Linux.

- Firewall is considered as the first method of defense in securing your cloud server.
- Ubuntu includes its own Firewall known as ufw.
- ufw stands for uncomplicated Firewall.
- Its main goal is to provide an easy to use interface.
- The firewall is disabled by default.
- To enable the Firewall run the following commands from a terminal.

→ `sudo ufw enable`

→ To install Firewall

→ `sudo aptitude install ufw`  
OR

→ `sudo apt-get install ufw`

→ To check the status use following command

→ `sudo ufw status`

→ `sudo ufw status`

→ `sudo ufw default deny incoming`

→ `sudo ufw default allow outgoing`

Q. 5 D

1. What is Samba server? Explain its installation process.

- Samba is a software package released in 1992 gives network administrators flexibility and freedom in term of setup configuration and choice of system and equipment.
- Because of its ease and flexibility Samba has become extremely popular and continues to do so.
- Samba runs on Unix platform but can communicate to windows clients just like the native platform.
- It allows Linux system to move into a windows network without causing any mix-up.

#### \* Installing and Managing Samba Server:

- w) If you want to share files between your Linux and windows computers the best option is the Samba.
- Download latest version of samba from the site! - <https://>
- To install first open terminal window and enter the following command.

# sudo apt-get install samba smbfS

→ After the successful execution of this command the samba will get installed now you must configure it to make it accessible.

sudo gedit /etc/lsmbuf/smb.conf

Find the following section in the file

# security = user

→ Remove the comment before the security line and add the following line just below it.

→ Security = user

→ username map = /etc/lsmbuf/smbusers

→ creating sambu user.

2. These are two steps to creating user.

→ sudo smbpasswd -a <username>

Next we will add the username to the smbusers file i.e. domain\user

sudo gedit /etc/lsmbuf/smbusers

2) Explain Apache server in detail with installation?

- The Apache webserver is one of the most popular open-source HTTP servers.
- It's powerful, secure and fully featured web server.

#### \* Installing Apache HTTP web server.

- First you should have the Apache server downloaded or download the Apache server for Linux, and do the following steps.
- Now extract the apache files by following commands.

```
gunzip -d httpd-2.0>NN.tar.gz
```

```
tar xvf httpd-2.0>NN.tar
```

- To install Apache server on Ubuntu use following command.

```
Sudo apt-get update
```

```
Sudo apt-get install apache2
```

- The Apache server is installed.

- To check if Apache is installed go to your browser enter service's IP address.

## \* Managing Apache server

→ You must understand the main configuration files of Apache which can be found in the "etc/apache2" folder.

cd /etc/apache2

ls

→ You will see file listing. Following configuration files are necessary to understand.

→ apache2.conf :- This is the main configuration file for the server.

→ ports.conf :- You can specify the ports from where virtual host can listen.

→ sites-available :- This directory contains all of the virtual host files that define different web sites.

→ sites-enabled/ :-

→ mods-enabled/ :-