Q1. usage of basic linux command, file utilities commands.

Ans-:

Basic Utility Commands in Linux

Commands can be run by themselves, or you can pass in additional arguments to make them do different things. Typical command syntax can look something like this:

command [-argument] [-argument] [--argument] [file]

Examples:

Ls	List files in current directory
ls -l	Lists files in “long” format
ls -l –color	As above, with colourized output
cat filename	Show contents of a file
cat -n	filename Show contents of a file, with line numbers

file utilities commands-:

ls	show files in current position

Commands Usage

Cd	change directory
cp	copy file or directory
mv	move file or directory
rm	remove file or directory
pwd	show current position
mkdir	create directory
rmdir	remove directory
cat	display file contents
less	display file contents page wise

man display online manual

touch to create multiple empty files

banner to display the given text in banner

Q2. vi editor & its modes introduction of basic administration commands.

Ans-: vi Editor-:

The default editor that comes with the UNIX operating system is called vi (visual editor). Using vi editor, we can edit an existing file or create a new file from scratch. we can also use this editor to just read a text file.

Syntax: vi filename.

Starting the vi Editor-:

There are following way you can start using vi editor :

vi filename: Creates a new file if it already not exist, otherwise opens existing file.

vi -R filename : Opens an existing file in read only mode.

view filename : Opens an existing file in read only mode.

Save and Exit Commands of the ex Mode :

Need to press [Esc] key followed by the colon (:) before typing the following commands:

q :	Quit
q! :	Quit without saving changes i.e. discard changes.
r fileName :	Read data from file called fileName.
wq :	Write and quit (save and exit).
w fileName :	Write to file called fileName (save as).
w! fileName :	Overwrite to file called fileName (save as forcefully).
!cmd :	Runs shell commands and returns to Command mode.

its modes introduction of basic administration commands-:

Operation Modes

While working with the vi editor, we usually come across the following two modes −

Command mode − This mode enables you to perform administrative tasks such as saving the files, executing the commands, moving the cursor, cutting (yanking) and pasting the lines or words, as well as finding and replacing. In this mode, whatever you type is interpreted as a command.

Insert mode – This mode enables you to insert text into the file. Everything that's typed in this mode is interpreted as input and placed in the file.

vi always starts in the command mode. To enter text, you must be in the insert mode for which simply type i. To come out of the insert mode, press the Esc key, which will take you back to the command mode.

Q3. usage of basic network related commands in linux

Ans-:

ifconfig	**Display and manipulate route and network interfaces.**
ip	**It is a replacement of ifconfig command.**
traceroute	**Network troubleshooting utility.**
tracepath	**Similar to traceroute but doesn't require root privileges.**
ping	**To check connectivity between two nodes.**
netstat	**Display connection information.**
ss	**It is a replacement of netstat.**

dig	Query DNS related information.
nslookup	Find DNS related query.
route	Shows and manipulate IP routing table.
host	Performs DNS lookups.
arp	View or add contents of the kernel's ARP table.
iwconfig	Used to configure wireless network interface.
hostname	To identify a network name.
curl or wget	To download a file from internet.
mtr	Combines ping and tracepath into a single command.
whois	Will tell you about the website's whois.
ifplugstatus	Tells whether a cable is plugged in or not.

Q4. how to check if a file exists linux.

Ans-: The most readable option when checking whether a file exists or not is to use the test command in combination with the if statement .

FILE=/etc/resolv.conf

if [-f "*$FILE*"]; **then**

echo "*$FILE* exists."

Fi

OR

FILE=$1

if [-f $FILE]

then

echo "File $FILE exists"

else

echo "File $FILE does not exist"

fi

Q5. create and execute first bash program.

Ans-:

```
$ echo "Hello World"
```

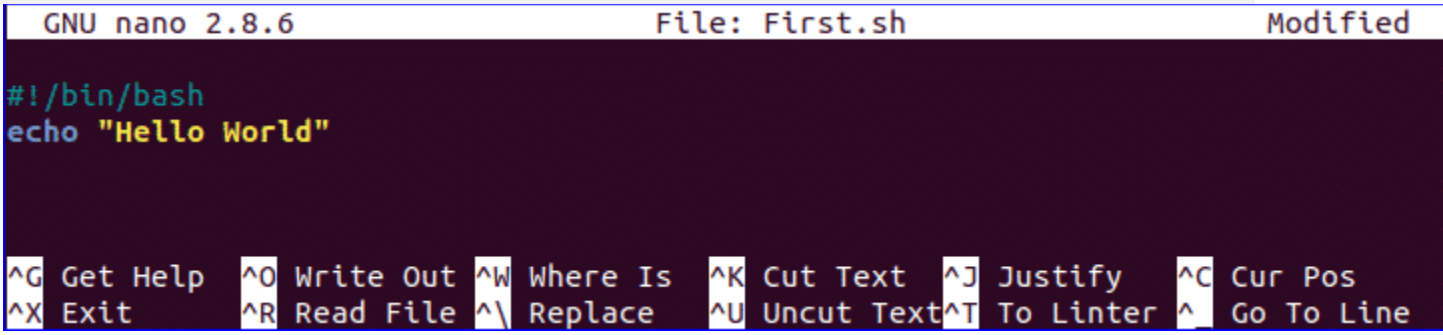
```
ubuntu@ubuntu-VirtualBox:~$ echo "Hello World"
Hello World
ubuntu@ubuntu-VirtualBox:~$
```

Open any editor to create a bash file. Here, **nano** editor is used to create the file and filename is set as '**First.sh**'

```
$ nano First.sh
```

Add the following bash script to the file and save the file.

```
#!/bin/bash
echo "Hello World"
```

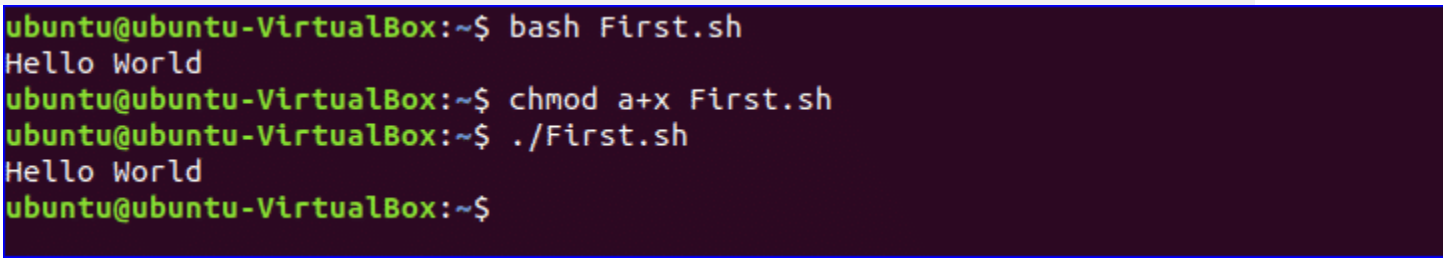


You can run bash file by two ways. One way is by using bash command and another is by setting execute permission to bash file and run the file. Both ways are shown here.

```
$ bash First.sh
```

Or,

```
$ chmod a+x First.sh
$ ./First.sh
```



Q6. how to get arguments from command line.

Ans-: %* for all command line parameters (excluding the script name itself

%0 - the command used to call the batch file (could be foo, ..\foo, c:\bats\foo.bat, etc.)

%1 is the first command line parameter,

%2 is the second command line parameter,

and so on till %9 (and SHIFT can be used for those after the 9th).

%~nx0 - the actual name of the batch file, regardless of calling method (some-batch.bat)

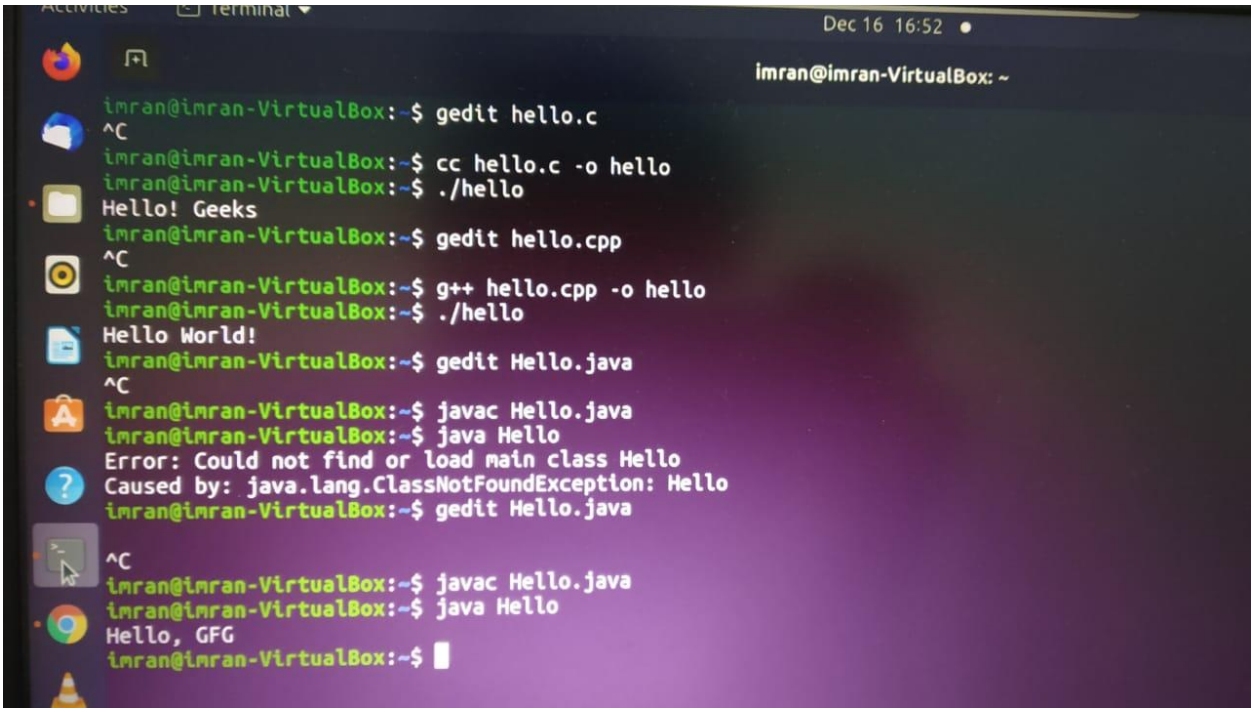
%~dp0 - drive and path to the script (d:\scripts)

%~dpnx0 - is the fully qualified path name of the script (d:\scripts\some-batch.bat)

Q7. create a simple c program for departmental the user of compile and execute

Ans-:

```c
#include<stdio.h>
int main() {
  double first, second, temp;
  printf("Enter first number: ");
  scanf("%lf", &first);
  printf("Enter second number: ");
  scanf("%lf", &second);
  temp = first;
  first = second;
  second = temp;
  printf("\nAfter swapping, first number = %.2lf\n", first);
  printf("After swapping, second number = %.2lf", second);
  return 0;
}
```



Q8. how to install gcc (c/c++) compileri in linux create a sample C++ program then compile and Execute the code.

Ans- :

Step #1: Install C/C++ compiler and related tools-

$ sudo apt-get update
$ sudo apt-get install build-essential manpages-dev

Step #2: Verify installation

Type the following command to display the version number and location of the compiler on Linux:
$ whereis gcc
$ which gcc
$ gcc –version

Create a file called demo.c using a text editor such as vi, emacs or joe:

```
#include<stdio.h>
/* demo.c:  My first C program on a Linux */
int main(void)
{
 printf("Hello! This is a test prgoram.\n");
 return 0;
}
```

compile the program

```
cc demo.c -o executable-file-name
```

compile demo.c

```
./demo
```

Compiling and running a simple C++ program

Create a program called demo2.C as follows:

```
#include "iostream"
// demo2.C - Sample C++ program
```

```cpp
int main(void)
{
    std::cout << "Hello! This is a C++ program.\n";
    return 0;
}
```

compile this program

```
g++ demo2.cpp -o demo2
```

To run this program

```
./demo2
```

Q9. how to install java n inux creating a simple java program.

Ans-:

1. `sudo apt update`
2. `sudo apt install default-jdk`
3. Confirm the installation by typing **y** (yes) and press **Enter**.
4. `sudo apt update`
5. `sudo apt install default-jre`
6. Type **y** (yes) and press **Enter** to confirm the installation.

Hello.java code-

Svae-: $gedit Hello.java

```
class Hello
{
	// Main Method
	public static void main(String args[])
	{
		System.out.println("Hello, GFG");
	}
```

```
}
```

Compile-: `$javac Hello.java`

Run-: `$java Hello`

Q10. how to install linux , Apache, MySQL, PHP(LAMP)

Ans-:

Installing Apache-Open up the Terminal (Applications > Accessories > Terminal).

1)First, make sure your `apt` cache is updated with:

- `sudo apt update`

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

- `sudo apt install apache2`

3)Testing Apache To make sure everything installed correctly we will now test Apache to ensure it is working properly. 1. Open up any web browser and then enter the following into the web address: http://localhost/

Installing MySQL-open up Terminal

1)use `apt` to acquire and install this software:

- `sudo apt install mysql-server`
- `sudo mysql_secure_installation`

2)This will ask if you want to configure the `VALIDATE PASSWORD PLUGIN`.

Answer `Y` for yes, or anything else to continue without enabling.

3)When you're finished, test if you're able to log in to the MySQL console by typing:

- `sudo mysql`

Installing PHP-: open up the Terminal

1)Run the following command to install all three packages and their dependencies:

- sudo apt-get install php5 libapache2-mod-php5

```
pt-get install php5 libapache2-mod-php5

2)In order for PHP to work and be compatible with Apache we must
restart it.following code in Terminal to do this:

sudo /etc/init.d/apache2 restar

Test PHP-:

Step 1. In the terminal copy/paste the following line:

sudo gedit /var/www/testphp.php

This will open up a file called phptest.php.

<?php phpinfo(); ?>

Step 2. Save and close the file.

Step 3. Now open you're web browser and type the following into the
web address:

http://localhost/testphp.php

The page should look like this successfully installed.
```

Q1. what is difference between linux and unix?

Ans-:

Sr. No.	Key	Linux	Unix
1	Development	Linux is open source and is developed by Linux community of developers.	Unix was developed by AT&T Bell labs and is not open source.
2	Cost	Linux is free to use.	Unix is licensed OS.
3	Supportd File systems	Ext2, Ext3, Ext4, Jfs, ReiserFS, Xfs, Btrfs, FAT, FAT32, NTFS.	fs, gpfs, hfs, hfs+, ufs, xfs, zfs.
4	GUI	Linux uses KDE and Gnome. Other GUI supported are LXDE, Xfce, Unity, Mate.	Unix was initially a command based OS. Most of the unix distributions now have Gnome.
5	Usage	Linux is used in wide varieties from desktop, servers, smartphones to mainframes.	Unix is mostly used on servers, workstations or PCs.
6	Default Shell	Bash (Bourne Again SHell) is default shell for Linux.	Bourne Shell is default shell for Unix.
7	Target processor	Linux was initially developed for Intel's x86 hardware processors. Now it supports 20+ processor families.	CUnix supports PA-RISC and Itanium family.

Sr. No.	Key	Linux	Unix
8	Example	Ubuntu, Debian GNU, Arch Linux, etc.	SunOS, Solaris, SCO UNIX, AIX, HP/UX, ULTRIX etc.

Q2. what are the features of linux operating system

Ans-:

- **Multiuser capability:** Multiple users can access the same system resources like memory, hard disk, etc. But they have to use different terminals to operate.
- **Multitasking:** More than one function can be performed simultaneously by dividing the CPU time intelligently.
- **Portability:** Portability doesn't mean it is smaller in file size or can be carried in pen drives or memory cards. It means that it support different types of hardware.
- **Security:** It provides security in three ways namely authenticating (by assigning password and login ID), authorization (by assigning permission to read, write and execute) and encryption (converts file into an unreadable format).
- **Live CD/USB:** Almost all Linux distros provide live CD/USB so that users can run/try it without installing it.
- **Graphical User Interface (X Window system):** Linux is command line based OS but it can be converted to GUI based by installing packages.
- **Support's customized keyboard:** As it is used worldwide, hence supports different languages keyboards.
- **Application support:** It has its own software repository from where users can download and install many applications.
- **File System:** Provides hierarchical file system in which files and directories are arranged.
- **Open Source:** Linux code is freely available to all and is a community based development project.

Q3. what is linu kernel

Ans-: Linux kernel is a free, open-source, monolithic, modular, Unix-like operating system kernel. It is the main component of the Linux operating system (OS) and is the core interface between the computer's hardware and its processes.

The kernel has 4 jobs:

1. **Memory management:** Keep track of how much memory is used to store what, and where
2. **Process management:** Determine which processes can use the central processing unit (CPU), when, and for how long
3. **Device drivers:** Act as mediator/interpreter between the hardware and processes
4. **System calls and security:** Receive requests for service from the processes

Q4. how many types of shell are there in linux?Explain

Ans-:

Linux Shell-

The shell can be defined as a command interpreter within an operating system like Linux/GNU or Unix. It is a program that runs other programs. The shell facilitates every user of the computer as an interface to the Unix/GNU Linux system. Hence, the user can execute different tools/utilities or commands with a few input data.

Bash Shell

In the bash shell, bash means Bourne Again Shell. It could be installed over Windows OS. It facilitates practical improvements on sh for interactive and programming use which contains:

- Job Control
- Command-line editing
- Shell Aliases and Functions
- Unlimited size command history
- Integer arithmetic in a base from 2-64

Csh/Tcsh Shell

Tcsh is an upgraded C shell. This shell can be used as a shell script command processor and interactive login shell.
Tcsh shell includes the following characteristics:

- C like syntax
- Filename completion and programmable word
- Command-line editor
- Job control
- Spelling correction

Zsh Shell

Zsh shell is developed to be reciprocal and it combines various aspects of other GNU/Unix Linux shells like ksh, tcsh, and bash. Some of its unique features are listed as follows:

- Startup files
- Filename generation
- Login/Logout watching
- Concept index
- Closing comments
- Variable index
- Key index

Fish

Fish stands for "**friendly interactive shell**". Fish shell was developed to be fully user-friendly and interactive just like other shells. It contains some good features which are mentioned below:

- Web-based configuration
- Man page completions
- Auto-suggestions
- Support for term256 terminal automation
- Completely scripted with clean scripts

Graphical Shells

- These shells specifies the manipulation of programs that are based on the graphical user interface (GUI) by permitting for operations like **moving, closing, resizing,** and **opening windows** and switching focus among windows as well. Ubuntu OS or Windows OS could be examined as a good example that offers a graphical user interface to the user to interact with the program. Various users don't need for typing in any command for all the actions.

Command-line Shell

- Various shells could be accessed with the help of a command-line interface by users. A unique program known as **Command prompt** in Windows or Terminal in macOS/Linux is offered for typing in the human-understandable commands like "ls", "cat", etc and after that, it is being run. The result is further shown to the user on the terminal

Q5. explain file permission types in linux.

Ans-: The type of permission:

- +r adds read permission
- -r removes read permission
- +w adds write permission
- -w removes write permission
- +x adds execute permission
- -x removes execute permission
- +rw adds read and write permissions
- +rwx adds read and write and execute permissions

File Permissions

All the three owners (user owner, group, others) in the Linux system have three types of permissions defined. Nine characters denotes the three types of permissions.

1. **Read (r) :** The read permission allows you to open and read the content of a file. But you can't do any editing or modification in the file.
2. **Write (w) :** The write permission allows you to edit, remove or rename a file. For instance, if a file is present in a directory, and write permission is set on the file but not on the directory, then you can edit the content of the file but can't remove, or rename it.

3. **Execute (x):** In Unix type system, you can't run or execute a program unless execute permission is set.But in Windows, there is no such permission available.

Permissions are listed below:

permission	on a file	on a directory
r (read)	read file content (cat)	read directory content (ls)
w (write)	change file content (vi)	create file in directory (touch)
x (execute)	execute the file	enter the directory (cd)

Q6. what are the symbolic link

Ans-: A symbolic link is a file-system object that points to another file system object. The object being pointed to is called the target.

Symbolic links are transparent to users; the links appear as normal files or directories, and can be acted upon by the user or application in exactly the same manner.

Symbolic links are designed to aid in migration and application compatibility with UNIX operating systems. Microsoft has implemented its symbolic links to function just like UNIX links.

For example: I have a directory- let's say example.com. However, I want a shortcut to another directory within the example.com. To do this, you would create a symbolic

Q7. explain about chmod command?

Ans-: In Unix-like operating systems, the **chmod** command is used to change the access mode of a file.

Syntax :

chmod [reference][operator][mode] file...

OPTIONS

Tag	Description
-f, --silent, --quiet	suppress most error messages
-v, --verbose	output a diagnostic for every file processed
-c, --changes	like verbose but report only when a change is made
-c, --reference=RFile	use RFile's mode instead of MODE values
-R, --recursive	change files and directories recursively
--help	display help and exit
--version	output version information and exit

EXAMPLES

Read by owner only

```
$ chmod 400 sample.txt
```

Read by group only

```
$ chmod 040 sample.txt
```

Read by anyone

```
$ chmod 004 sample.txt
```

Q8. where is password file located in linux and how can you improve the security of password.

Ans-: Linux passwords are stored in the /etc/shadow file. They are salted and the algorithm being used depends on the particular distribution and is configurable.

From what I recall, the algorithms supported are MD5, Blowfish, SHA256 and SHA512. Most recent distributions should be on SHA512 by default if my memory serves me right.

improve the security-

For enhanced security, a shadow copy of the password file is made, which stores hashed passwords of all the users. The hashed password is a long string of characters, generated based on the hashing method used.

Q9. how do you create a new user account and set the password for a user from a shell prompt in linux.

Ans-:

Steps to create a user account on Ubuntu Linux

1. Open the terminal application
2. Log in to remote box by running the ssh user@your-ubuntu-box-ip
3. To add a new user in Ubuntu run sudo adduser userNameHere
4. Enter password and other needed info to create a user account on Ubuntu server
5. New username would be added to /etc/passwd file, and encrypted password stored in the /etc/shadow file

Verification

Use the grep command or cat command as follows:

```
$ cat /etc/passwd
$ grep '^vivek' /etc/passwd
```

How to change Linux user password

Run the following passwd command:

```
sudo passwd {username}
sudo passwd tom
```

To change your own password, enter:

```
passwd
```

First, the user is prompted for their current password. If the current password is correctly typed, a new password is requested. The new password must be entered twice to avoid password mismatch errors.

Q10. what are the different types of kernel? Explain.

Ans-:

Kernel in Operating System –

Kernel is central component of an operating system that manages operations of computer and hardware. It basically manages operations of memory and CPU time.

Types of Kernel :

1. Monolithic Kernel –
It is one of types of kernel where all operating system services operate in kernel space. It has dependencies between systems components. It has huge lines of code which is complex.

Example :

Unix, Linux, Open VMS, XTS-400 etc.

- **Advantage :**
  It has good performance.
- **Disadvantage :**
  It has dependencies between system component and lines of code in millions.

2. Micro Kernel –

It is kernel types which has minimalist approach. It has virtual memory and thread scheduling. It is more stable with less services in kernel space.

Example :

Mach, L4, AmigaOS, Minix, K42 etc.

Advantage :

It is more stable.

Disadvantage :

There are lots of system calls and context switches.

3. Hybrid Kernel –
It is the combination of both monolithic kernel and mircrokernel. It has speed and design of monolithic kernel and modularity and stability of microkernel.

Example :

Windows NT, Netware, BeOS etc.

- **Advantage :**
  It combines both monolithic kernel and microkernel.
- **Disadvantage :**
  It is still similar to monolithic kernel.

4. Exo Kernel –

It is the type of kernel which follows end-to-end principle. It has fewest hardware abstractions as possible. It allocates physical resources to applications.

Example :

Nemesis, ExOS etc.

Advantage :

It has fewest hardware abstractions.

Disadvantage :

There is more work for application developers.

5. Nano Kernel –
It is the type of kernel that offers hardware abstraction but without system services. Micro Kernel also does not have system services therefore the Micro Kernel and Nano Kernel have become analogous.

Example :

EROS etc.

- **Advantage :**
  It offers hardware abstractions without system services.
- **Disadvantage :**
  It is quite same as Micro kernel hence it is less used.

Q11. what is the difference between "rm" and "rm -r"

Ans-: "rm" command is used to delete all the files

Syntax:

rm [OPTION]... FILE...

while "rm –r" command is used to delete all the files in a directory and also in subdirectories.

For Example,

rm file.txt: It will delete the file with name file.txt

rm –r directory: It will remove directories and subdirectories and also their contents.