Linux Distribution:
Three major family distributions:
1. Debian Family Systems (such as Ubuntu)
2. SUSE Family Systems (such as openSUSE)
3. Fedora Family Systems (such as CentOS)

Desktop Environment:
In computing, a desktop environment (DE) is an implementation of the desktop metaphor made of a bundle of programs running on top of a computer operating system that share a common graphical user interface (GUI), sometimes described as a graphical shell.
1. GNOME:
GNOME is a free and open-source desktop environment for Unix-like operating systems.
2. kde:
Stands for "K Desktop Environment." KDE is a contemporary desktop environment for Unix systems. It is a Free Software project developed by hundreds of software programmers across the world. KDE's primary benefit is the modern graphical user interface GUI
KDE applications for example, tend to have more robust functionality than GNOME applications

Linux Boot Process:
In Linux, there are 6 distinct stages in the typical booting process.
1. BIOS
BIOS stands for Basic Input/Output System. In simple terms, the BIOS loads and executes the Master Boot Record (MBR) boot loader.Once the boot loader program is detected, it's then loaded into memory and the BIOS gives control of the system to it.

2. MBR
MBR stands for Master Boot Record, and is responsible for loading and executing the GRUB boot loader.
The MBR is located in the 1st sector of the bootable disk, which is typically /dev/hda, or /dev/sda, depending on your hardware.

3. GRUB
Sometimes called GNU GRUB, which is short for GNU GRand Unified Bootloader, is the typical boot loader for most modern Linux systems.
The GRUB splash screen is often the first thing you see when you boot your computer. It has a simple menu where you can select some options. If you have multiple kernel images installed, you can use your keyboard to select the one you want your system to boot with. By default, the latest kernel image is selected.
The splash screen will wait a few seconds for you to select and option. If you don't, it will load the default kernel image.

4. Kernel

The kernel is often referred to as the core of any operating system, Linux included. It has complete control over everything in your system.

In this stage of the boot process, the kernel that was selected by GRUB first mounts the root file system that's specified in the grub.conf file. Then it executes the /sbin/init program, which is always the first program to be executed. You can confirm this with its process id (PID), which should always be 1.

5. Init

At this point, your system executes runlevel programs. At one point it would look for an init file, usually found at /etc/inittab to decide the Linux run level.

6. Runlevel programs

Depending on which Linux distribution you have installed, you may be able to see different services getting started. For example, you might catch starting sendmail …. OK.

User and Group Management:

Since Linux is a multi-user operating system, several people may be logged in and actively working on a given machine at the same time. Security-wise, it is never a good idea to allow users to share the credentials of the same account. In fact, best practices dictate the use of as many user accounts as people needing access to the machine.

At the same time, it is to be expected that two or more users may need to share access to certain system resources, such as directories and files. User and group management in Linux allows us to accomplish both objectives.

Read-4
Write-2
Execute-1
None-0

While switching between the user, group and others it becomes necessary to provides access to each groups.
-rw-rw-rw-
1st - means file if it is d then it is directory.
2-4 dash represents user access
5-7 dash represents group access
8-10 dash represents other access
chmod 000 means 0(none) for user, 0(none) for group, 0(none) for other
chmod 777means all rights(read+write+execute) for user, all rights(read+write+execute)for group, all rights(read+write+execute) for other

Text Processing Cut command:

The cut command in UNIX is a command for cutting out the sections from each line of files and writing the result to standard output. It can be used to cut parts of a line by byte position, character and field.
Syntax: cut OPTION... [FILE]...

Suppose we have a text file animal.txt
cat el
dog oh
lion
tiger

$ cut -b 1,2 animal.txt
ca
do
li
ti

here -b is byte and the code list the byte without range.

$ cut -c 1,3 animal.txt
ct
dg
lo
tg

-c means column so it extract 1st and 3rd character as a column character of all words

If -d option is used then it considered space as a field separator or delimiter:
if -f option is useful for fixed-length lines.
$ cut -d " " -f 1 animal.txt
cat
dog
lion
Tiger

Assignment-2

1. Shell script to perform simple arithmetic operation
```
#!/bin/bash
echo "Basic Math Operations"
sum=0
i="yes"
echo "enter first number"
read a
echo "enter second number"
read b
while [ $i = "yes" ]
do
```

```
echo "1 for Add"
echo "2 for Subtract"
echo "3 for Multiply"
echo "4 for Divide"
echo "Write the number:"
read ch
case $ch in
1)sum=$(echo " $a + $b"| bc -l)
echo "Addition is =" $sum;;
2)sub=$(echo "$a - $b" | bc -l)
echo "Sub is =" $sub;;
3)mul=$(echo "$a * $b" | bc -l )
echo "Mul is =" $mul;;
4)div=$(echo "$a / $b"| bc -l)
echo "div is =" $div;;
esac
echo "Do you want to continue"
read i
if [ $i != "yes" ]
then
exit
fi
done
```


2. Curl Command:

Curl is a command line tool to transfer data to or from a server, using any of the supported protocols (HTTP, FTP, IMAP, POP3, SCP, SFTP, SMTP, TFTP, TELNET, LDAP or FILE). curl is powered by Libcurl. This tool is preferred for automation, since it is designed to work without user interaction. curl can transfer multiple file at once.

Syntax:

curl [options] [URL...]

Curl is a widely used because of its ability to be flexible and complete complex tasks. For example, you can use curl for things like user authentication, HTTP post, SSL connections, proxy support, FTP uploads, and more! You can also do simple things with curl, such as download web pages and web images.

URL : The most basic use of curl is typing the command followed by the URL.

curl https://www.facebook.com

Another use of curl for FTP uploads and downloads

curl -o downloadfile.zip ftp://speedtest.tail.net/1MB.zip

-o : saves the downloaded file on the local machine with the name provided in the parameters.

Syntax:

curl -o [file_name] [URL...]

-O : This option downloads the file and saves it with the same name as in the URL.

Syntax:

curl -O [URL...]

Example:

curl -O ftp://speedtest.tail.net/1MB.zip

-C – : This option resumes download which has been stopped due to some reason. This is useful when downloading large files and was interrupted.

Syntax:

curl -C - [URL...]

Example:

curl -C - -O ftp://speedtest.tail.net/1MB.zip