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Assignment 2

Aim: - Study Shell Scripting.





Description :-

1. What Is a Shell?

Shell is a user interface for access to an operating system's services. In computing, a shell is a user interface for access to an operating system's services. A shell is a way of accessing the operating system. In other words, it is a program that takes commands from the keyboard and gives them to the operating system to perform.

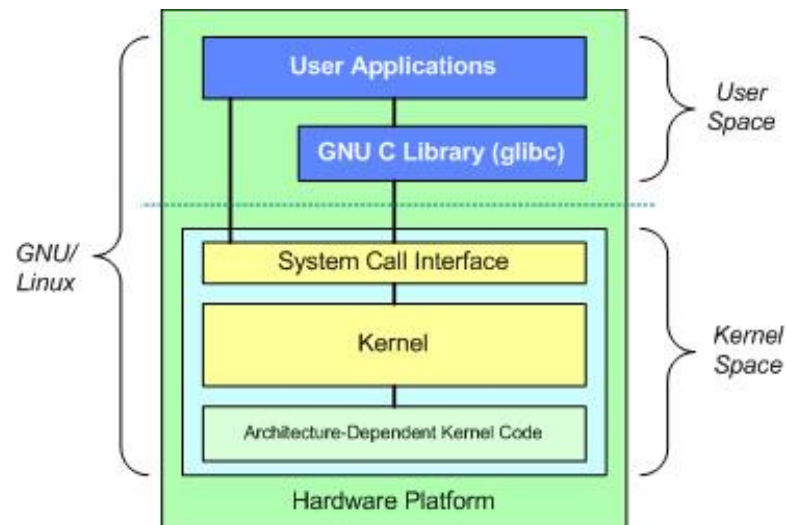
In the context of Linux, shell refers to the command-line interface (CLI) that provides users with a way of interacting with the Linux operating system. There are many different shells available for Linux, including the default shell, known as the Bourne-Again Shell (Bash).

A Linux kernel architecture diagram shows the basic components of the Linux operating system and how they interact with each other. The diagram typically includes the following components:

-  Kernel - The core component of the operating system, responsible for managing the hardware resources of the computer and executing processes.
-  System Libraries - Collections of functions and programs that provide basic services to the operating system and application programs.
-  Shell - The interface between the user and the operating system, responsible for receiving and executing user commands.
-  Application Programs - Programs that run on the operating system and provide specific functions for users, such as text editors, web browsers, or media players.

🚦 File System - A hierarchical organization of files and directories on a disk, responsible for storing and retrieving data on the computer.

The shell acts as an intermediary between the user and the operating system, receiving user commands and executing them on behalf of the user. The shell also provides a scripting language, allowing users to automate repetitive tasks and write complex programs.



2. Different Shell types:-

There are different types of shells in Linux, including:

1. Bourne shell (sh) - This is the original shell developed by Steve Bourne at AT&T Bell Labs. It is the standard shell for Unix systems and is commonly used for shell scripting.
2. C shell (csh) - Developed by Bill Joy at UC Berkeley, the C shell is designed to resemble the C programming language. It is commonly used for interactive use, but is less commonly used for scripting compared to the Bourne shell.
3. Korn shell (ksh) - Developed by David Korn at AT&T Bell Labs, the Korn shell is an enhancement of the Bourne shell with additional features. It is commonly used for interactive use and scripting.
4. Bourne-Again shell (bash) - Developed as a free software alternative to the original Bourne shell, bash is now the default shell on most Linux distributions. It is a popular shell for both interactive use and scripting.
5. Z shell (zsh) - Z shell is an advanced shell with additional features and improved performance over other shells. It is commonly used for interactive use and is highly customizable.
6. Fish shell (fish) - Fish is a user-friendly shell with syntax highlighting, auto-suggestions, and other convenient features. It is designed to be easier to use compared to other shells and is a popular choice for new users.

Each shell has its own unique features and syntax for writing commands, and users can choose the shell that best fits their needs.

Problems :-

2a) Write a shell script to check user is root user or not

Script 📌

```
#!/bin/bash

# Check if user is root

if [ "$(id -u)" -eq 0 ]; then

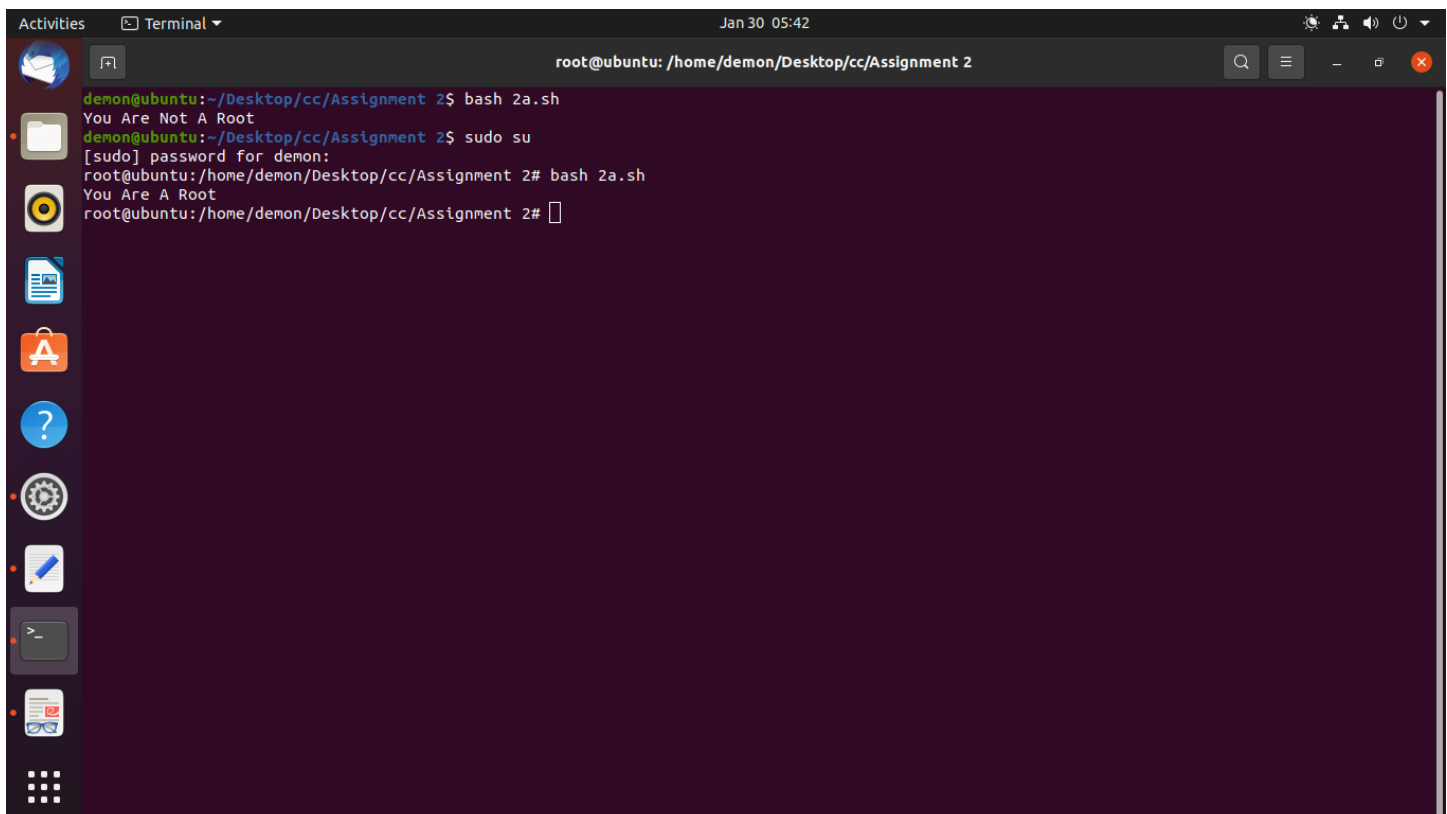
    echo "User is root"

else

    echo "User is not root"

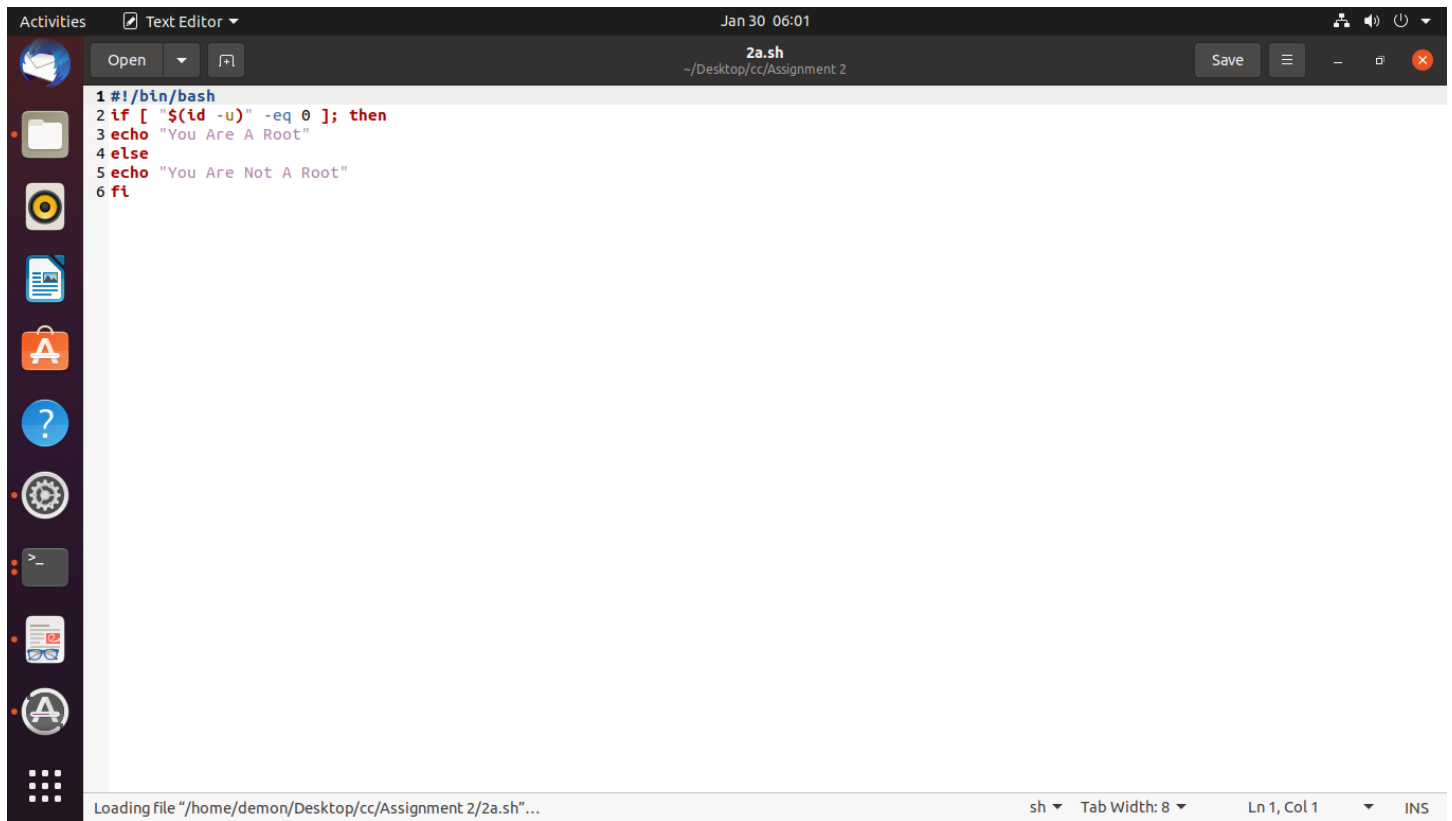
fi
```

Output 📌



The screenshot shows a terminal window titled "Terminal" with the date and time "Jan 30 05:42". The window is open to a directory "/home/demon/Desktop/cc/Assignment 2". The user "demon" is at the prompt. They run the command "bash 2a.sh", which outputs "You Are Not A Root". Then, they run "sudo su", which prompts for a password. After entering the password, the prompt changes to "root@ubuntu:/home/demon/Desktop/cc/Assignment 2#". The user then runs "bash 2a.sh" again, which outputs "You Are A Root". Finally, they run "root@ubuntu:/home/demon/Desktop/cc/Assignment 2#".

```
root@ubuntu: /home/demon/Desktop/cc/Assignment 2
demon@ubuntu:~/Desktop/cc/Assignment 2$ bash 2a.sh
You Are Not A Root
demon@ubuntu:~/Desktop/cc/Assignment 2$ sudo su
[sudo] password for demon:
root@ubuntu:/home/demon/Desktop/cc/Assignment 2# bash 2a.sh
You Are A Root
root@ubuntu:/home/demon/Desktop/cc/Assignment 2#
```



```
1#!/bin/bash
2if [ "$(id -u)" -eq 0 ]; then
3echo "You Are A Root"
4else
5echo "You Are Not A Root"
6fi
```

2b) Write a shell script to install any particular software (ex: java or python)

Script

```
#!/bin/bash
#Updating My System
sudo apt-get update
#Installing htop software . it is a process viewer software.
sudo apt-get install -y htop
#confirm insatlling
if [ $? -eq 0 ]; then
    echo "htop installed "
else
    echo "Opps Error Occured"
fi
```

Output

```
Activities Terminal Jan 30 05:43
demon@ubuntu: ~/Desktop/cc/Assignment 2
demon@ubuntu:~/Desktop/cc/Assignment 2$ bash 2b.sh
Get:1 http://us.archive.ubuntu.com/ubuntu focal InRelease [265 kB]
Get:2 http://us.archive.ubuntu.com/ubuntu focal-updates InRelease [114 kB]
Get:3 http://us.archive.ubuntu.com/ubuntu focal-backports InRelease [108 kB]
Get:4 http://us.archive.ubuntu.com/ubuntu focal/main i386 Packages [718 kB]
Get:5 http://us.archive.ubuntu.com/ubuntu focal/main amd64 Packages [970 kB]
Get:6 http://us.archive.ubuntu.com/ubuntu focal/main Translation-en [506 kB]
Get:7 http://us.archive.ubuntu.com/ubuntu focal/main amd64 DEP-11 Metadata [494 kB]
Get:8 http://us.archive.ubuntu.com/ubuntu focal/main DEP-11 48x48 Icons [98.4 kB]
Get:9 http://us.archive.ubuntu.com/ubuntu focal/main DEP-11 64x64 Icons [163 kB]
Get:10 http://us.archive.ubuntu.com/ubuntu focal/main DEP-11 64x64@2 Icons [15.8 kB]
Get:11 http://us.archive.ubuntu.com/ubuntu focal/main amd64 c-n-f Metadata [29.5 kB]
Get:12 http://us.archive.ubuntu.com/ubuntu focal/restricted amd64 Packages [22.0 kB]
Get:13 http://us.archive.ubuntu.com/ubuntu focal/restricted i386 Packages [8,112 B]
Get:14 http://us.archive.ubuntu.com/ubuntu focal/restricted Translation-en [6,212 B]
Get:15 http://us.archive.ubuntu.com/ubuntu focal/restricted amd64 c-n-f Metadata [392 B]
Get:16 http://us.archive.ubuntu.com/ubuntu focal/universe amd64 Packages [8,628 kB]
0% [16 Packages 5,328 kB/8,628 kB 62%] 151 kB/s 4min 8s
```

```
Activities Text Editor Jan 30 06:01
2b.sh ~/Desktop/cc/Assignment 2
Save
*2d.sh 2b.sh
1#!/bin/bash
2#Updating My System
3sudo apt-get update
4#Installing htop software . it is a process viewer software.
5sudo apt-get install -y htop
6
7#confirm insatlling
8if [ $? -eq 0 ]; then
9    echo "htop installed "
10else
11    echo "Opps Error Occured"
12fi
```

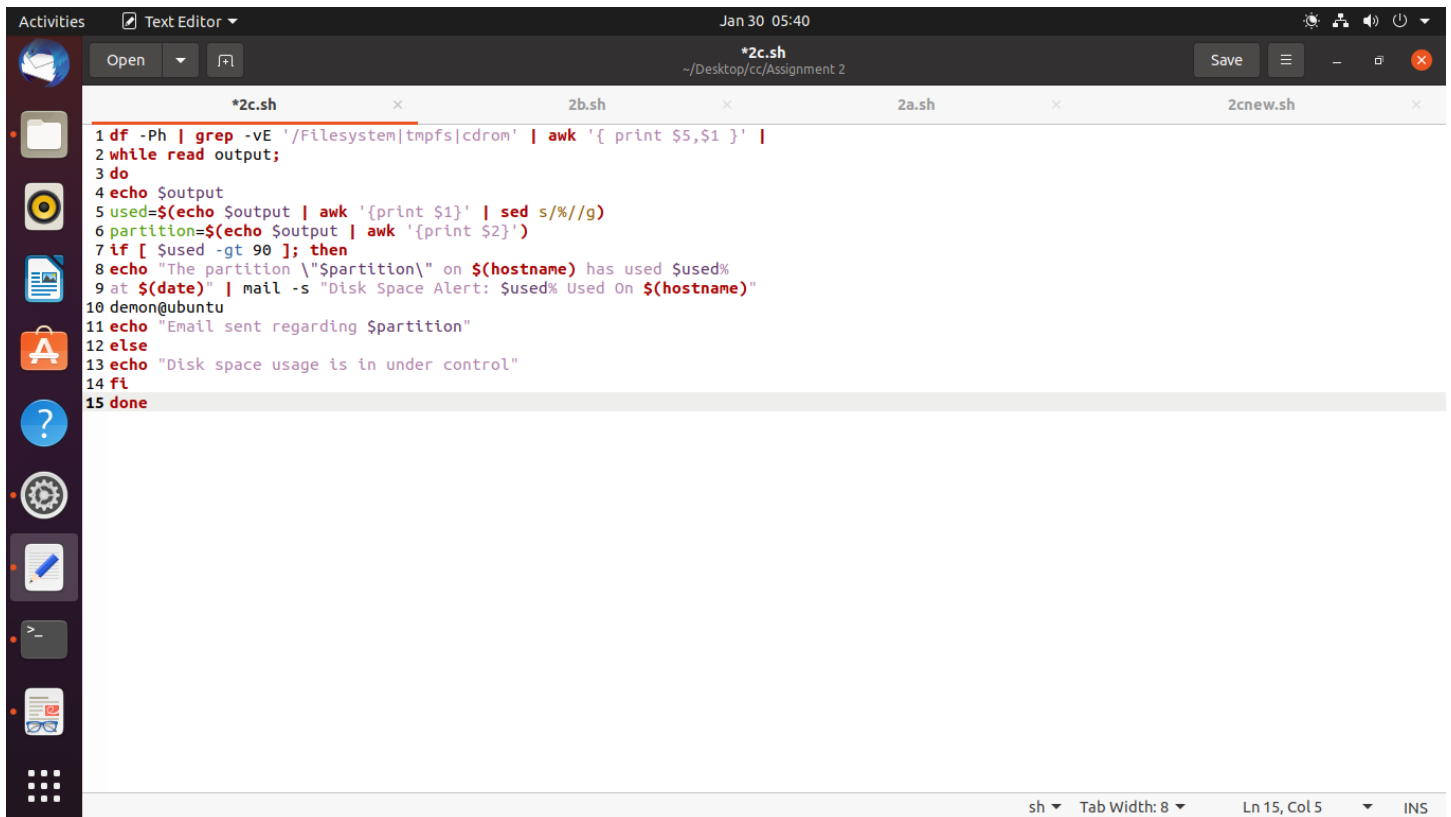
sh Tab Width: 8 Ln 1, Col 1 INS

2c) Write a shell script to check disk usage of the system and if disk usage is more than 90% it should send an email to system admin. This script should run every day at 8:00 AM.

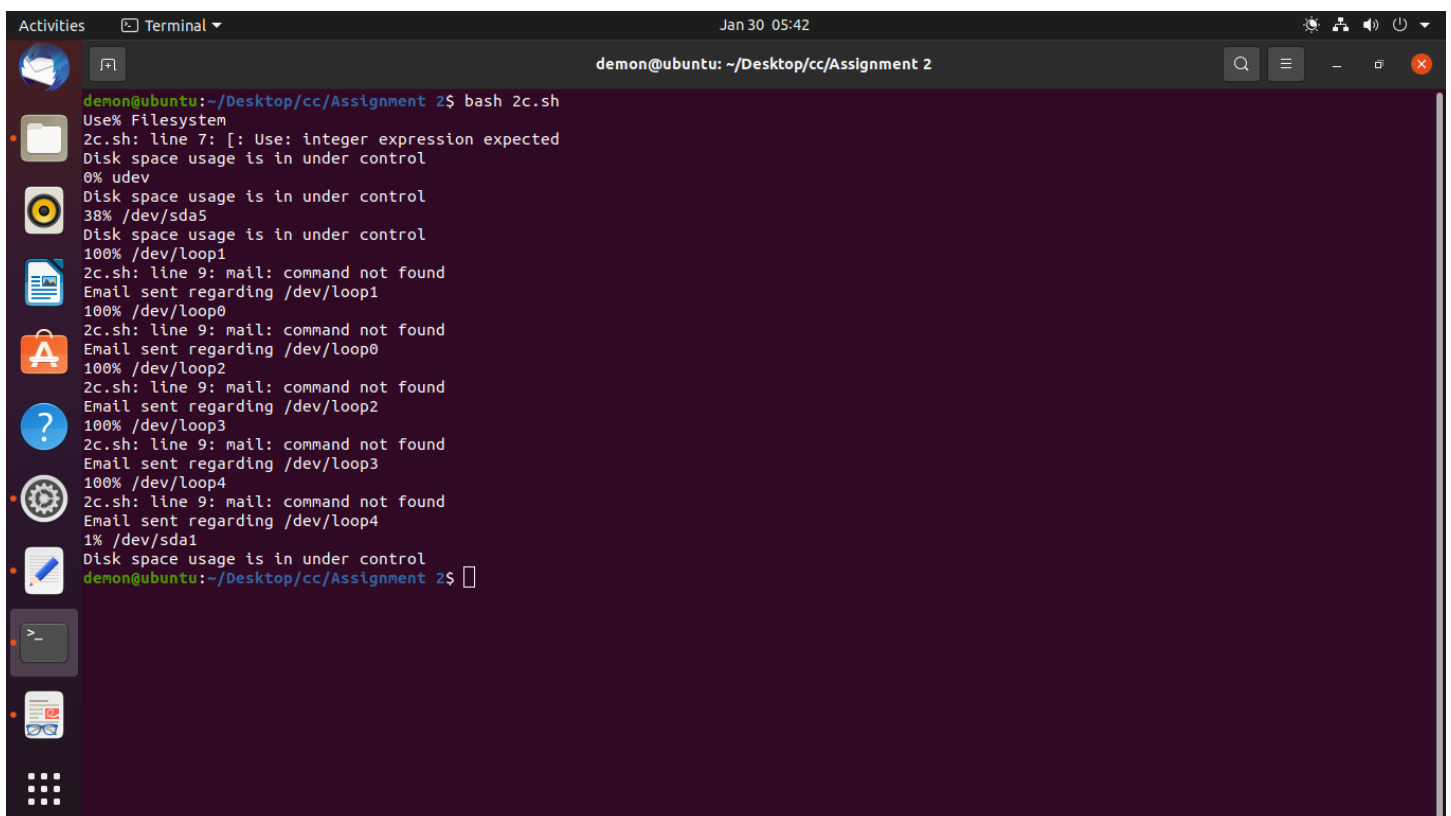
Script 📌

```
#!/bin/bash
df -Ph | grep -vE '/Filesystem|tmpfs|cdrom' | awk '{ print $5,$1 }' |
while read output;
do
echo $output
used=$(echo $output | awk '{print $1}' | sed s/%//g)
partition=$(echo $output | awk '{print $2}')
    if [ $used -gt 90 ]; then
        echo "The partition \"$partition\" on demon@ubuntu has used $used% at $(date)" | mail -s "Disk Space
Alert: $used% Used On demon@ubuntu"
        echo "Email sent regarding $partition"
    else
        echo "Disk space usage is in under control"
    fi
done
```

Output 📌



```
1 df -Ph | grep -vE '/Filesystem|tmpfs|cdrom' | awk '{ print $5,$1 }' |
2 while read output;
3 do
4 echo $output
5 used=$(echo $output | awk '{print $1}' | sed s/%//g)
6 partition=$(echo $output | awk '{print $2}')
7 if [ $used -gt 90 ]; then
8 echo "The partition \"$partition\" on $(hostname) has used $used%"
9 at $(date) | mail -s "Disk Space Alert: $used% Used On $(hostname)"
10 demon@ubuntu
11 echo "Email sent regarding $partition"
12 else
13 echo "Disk space usage is in under control"
14 fi
15 done
```



```
demon@ubuntu:~/Desktop/cc/Assignment 2$ bash 2c.sh
Use% Filesystem
2c.sh: line 7: [: Use: integer expression expected
Disk space usage is in under control
0% udev
Disk space usage is in under control
38% /dev/sda5
Disk space usage is in under control
100% /dev/loop1
2c.sh: line 9: mail: command not found
Email sent regarding /dev/loop1
100% /dev/loop0
2c.sh: line 9: mail: command not found
Email sent regarding /dev/loop0
100% /dev/loop2
2c.sh: line 9: mail: command not found
Email sent regarding /dev/loop2
100% /dev/loop3
2c.sh: line 9: mail: command not found
Email sent regarding /dev/loop3
100% /dev/loop4
2c.sh: line 9: mail: command not found
Email sent regarding /dev/loop4
1% /dev/sda1
Disk space usage is in under control
demon@ubuntu:~/Desktop/cc/Assignment 2$
```

2d) write a shell script to take MySQL database server backup. This script should run weekly on every Sunday at 11:00 PM.

Script 

```
#!/bin/sh

echo "Backing Up My Data"

db_backup="db.gz"

sudo mysqldump

-uroot -p test | gzip -c > ./backup/${db_backup}

if [ "$?" -eq 0 ]; then

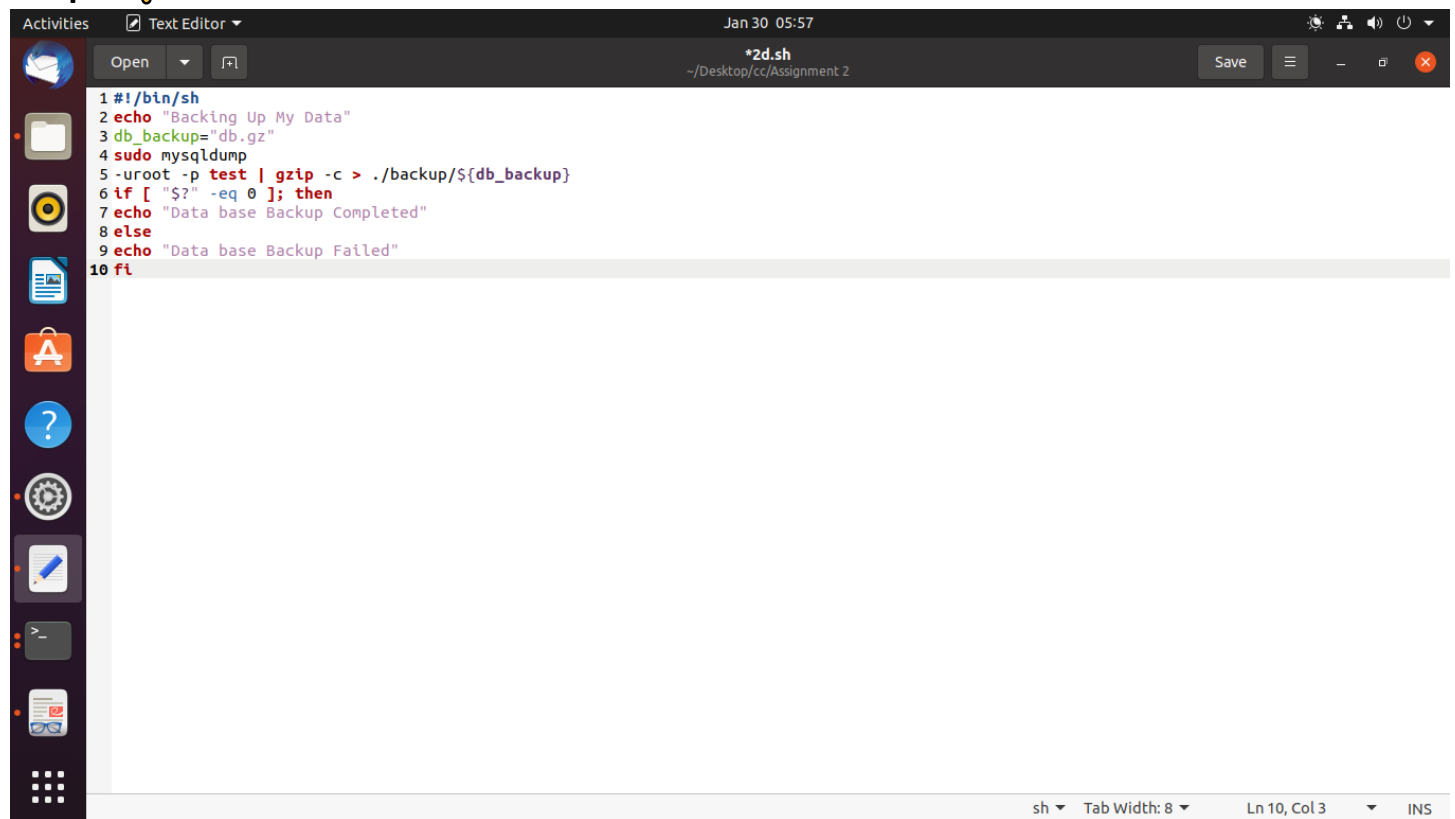
    echo "Data base Backup Completed"

else

    echo "Data base Backup Failed"

fi
```

Output👉



```
Activities Jan 30 05:57
*2d.sh
~/Desktop/cc/Assignment 2
Save
1 #!/bin/sh
2 echo "Backing Up My Data"
3 db_backup="db.gz"
4 sudo mysqldump
5 -uroot -p test | gzip -c > ./backup/${db_backup}
6 if [ "$?" -eq 0 ]; then
7 echo "Data base Backup Completed"
8 else
9 echo "Data base Backup Failed"
10 fi
sh Tab Width: 8 Ln 10, Col 3 INS
```



```
Activities  Terminal  Jan 30 05:58
demon@ubuntu: ~/Desktop/cc/Assignment 2

Data base Backup Failed
demon@ubuntu:~/Desktop/cc/Assignment 2$ proot
Usage:
  proot [option] ... [command]

Regular options:
-r *path*      Use *path* as the new guest root file-system, default is /.
-b *path*      Make the content of *path* accessible in the guest rootfs.
-q *command*   Execute guest programs through QEMU as specified by *command*.
-w *path*      Set the initial working directory to *path*.
-v *value*     Set the level of debug information to *value*.
-V            Print version, copyright, license and contact, then exit.
-h            Print the version and the command-line usage, then exit.

Extension options:
-k *string*    Make current kernel appear as kernel release *string*.
-o            Make current user appear as "root" and fake its privileges.
-i *string*    Make current user and group appear as *string* "uid:gid".

Alias options:
-R *path*      Alias: -r *path* + a couple of recommended -b.
-S *path*      Alias: -o -r *path* + a couple of recommended -b.
fatal error: see 'proot --help'.
demon@ubuntu:~/Desktop/cc/Assignment 2$ mysqldump
Usage: mysqldump [OPTIONS] database [tables]
OR
  mysqldump [OPTIONS] --databases [OPTIONS] DB1 [DB2 DB3...]
OR
  mysqldump [OPTIONS] --all-databases [OPTIONS]
For more options, use mysqldump --help
demon@ubuntu:~/Desktop/cc/Assignment 2$ bash 2d.sh
Backing Up My Data
Usage: mysqldump [OPTIONS] database [tables]
OR
  mysqldump [OPTIONS] --databases [OPTIONS] DB1 [DB2 DB3...]
OR
  mysqldump [OPTIONS] --all-databases [OPTIONS]
For more options, use mysqldump --help
2d.sh: line 5: ./backup/db.gz: No such file or directory
2d.sh: line 5: -proot: command not found
Data base Backup Failed
demon@ubuntu:~/Desktop/cc/Assignment 2$
```

Conclusion :-

Thus, We Have Studied And Preformed Shell Scripting.
