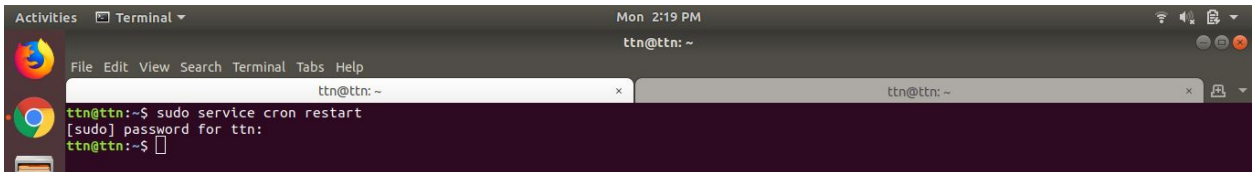


Advance Linux:

1. What is the size of MBR and what does it contains.
2. In which file you can write commands which you want to run whenever Linux system starts/restarts?

rc.local

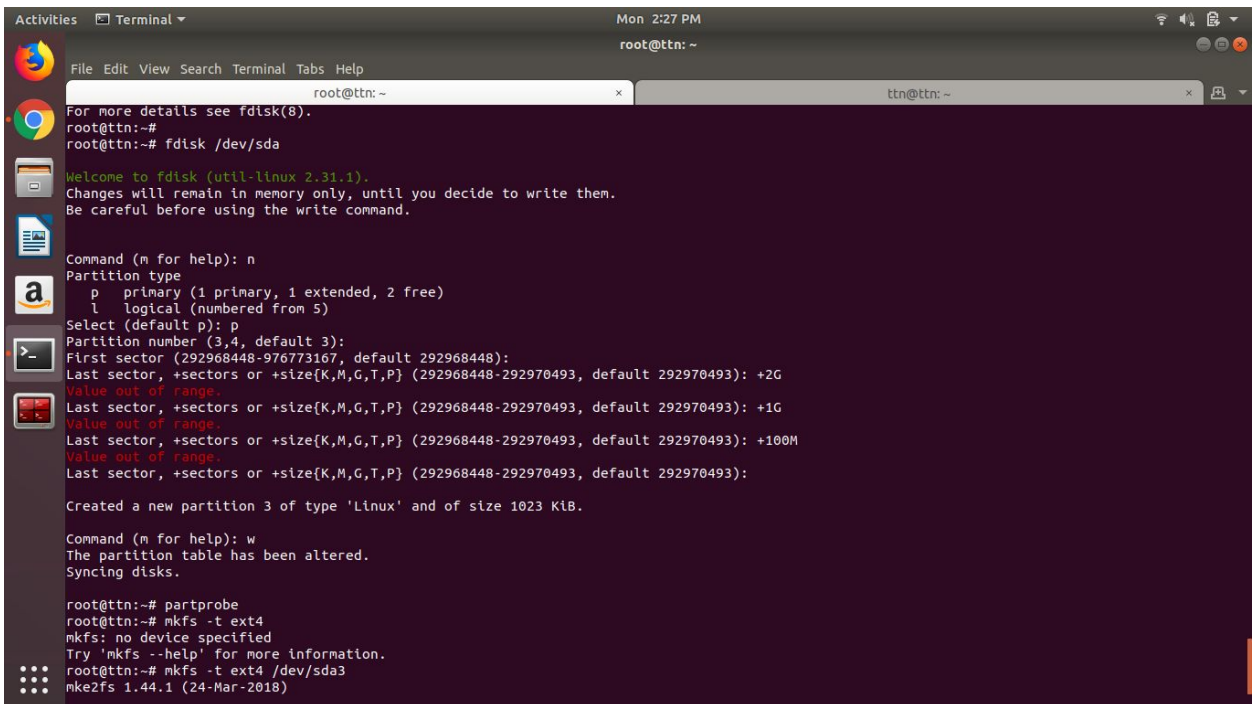
3. Restart cron service.



A terminal window titled 'Terminal' with a menu bar (File, Edit, View, Search, Terminal, Tabs, Help). The prompt is 'ttn@ttn: ~'. The user enters 'sudo service cron restart'. The prompt changes to '[sudo] password for ttn:'. The user enters a password (indicated by a box). The prompt returns to 'ttn@ttn: ~'.

```
ttn@ttn: ~  
ttn@ttn:~$ sudo service cron restart  
[sudo] password for ttn:  
ttn@ttn:~$
```

4. Create an ext4 filesystem



A terminal window titled 'Terminal' with a menu bar (File, Edit, View, Search, Terminal, Tabs, Help). The prompt is 'root@ttn: ~'. The user enters 'fdisk /dev/sda'. The terminal shows the fdisk utility interface. The user selects 'n' for a new partition, 'p' for primary, and '3' for the partition number. The first sector is 292968448 and the last sector is 292970493. The partition is created. The user then enters 'mkfs -t ext4 /dev/sda3'. The terminal shows the mkfs utility creating the ext4 filesystem. The prompt returns to 'root@ttn: ~'.

```
For more details see fdisk(8).  
root@ttn:~#  
root@ttn:~# fdisk /dev/sda  
  
Welcome to fdisk (util-linux 2.31.1).  
Changes will remain in memory only, until you decide to write them.  
Be careful before using the write command.  
  
Command (m for help): n  
Partition type  
  p   primary (1 primary, 1 extended, 2 free)  
  l   logical (numbered from 5)  
Select (default p): p  
Partition number (3,4, default 3):  
First sector (292968448-976773167, default 292968448):  
Last sector, +sectors or +size[K,M,G,T,P] (292968448-292970493, default 292970493): +2G  
Value out of range.  
Last sector, +sectors or +size[K,M,G,T,P] (292968448-292970493, default 292970493): +1G  
Value out of range.  
Last sector, +sectors or +size[K,M,G,T,P] (292968448-292970493, default 292970493): +100M  
Value out of range.  
Last sector, +sectors or +size[K,M,G,T,P] (292968448-292970493, default 292970493):  
Created a new partition 3 of type 'Linux' and of size 1023 KiB.  
  
Command (m for help): w  
The partition table has been altered.  
Syncing disks.  
  
root@ttn:~# partprobe  
root@ttn:~# mkfs -t ext4  
mkfs: no device specified  
Try 'mkfs --help' for more information.  
root@ttn:~# mkfs -t ext4 /dev/sda3  
mke2fs 1.44.1 (24-Mar-2018)
```

```
Activities  Terminal  Mon 2:27 PM
root@ttn: ~

File Edit View Search Terminal Tabs Help

root@ttn: ~
Command (m for help): n
Partition type
  p primary (1 primary, 1 extended, 2 free)
  l logical (numbered from 5)
Select (default p): p
Partition number (3,4, default 3):
First sector (292968448-976773167, default 292968448):
Last sector, +sectors or +size[K,M,G,T,P] (292968448-292970493, default 292970493): +2G
Value out of range.
Last sector, +sectors or +size[K,M,G,T,P] (292968448-292970493, default 292970493): +1G
Value out of range.
Last sector, +sectors or +size[K,M,G,T,P] (292968448-292970493, default 292970493): +100M
Value out of range.
Last sector, +sectors or +size[K,M,G,T,P] (292968448-292970493, default 292970493):
Created a new partition 3 of type 'Linux' and of size 1023 KiB.

Command (m for help): w
The partition table has been altered.
Syncing disks.

root@ttn:~# partprobe
root@ttn:~# mkfs -t ext4
mkfs: no device specified
Try 'mkfs --help' for more information.
root@ttn:~# mkfs -t ext4 /dev/sda3
mke2fs 1.44.1 (24-Mar-2018)

Filesystem too small for a journal
Creating filesystem with 1020 1k blocks and 128 inodes

Allocating group tables: done
Writing inode tables: done
Writing superblocks and filesystem accounting information: done

root@ttn:~#
```

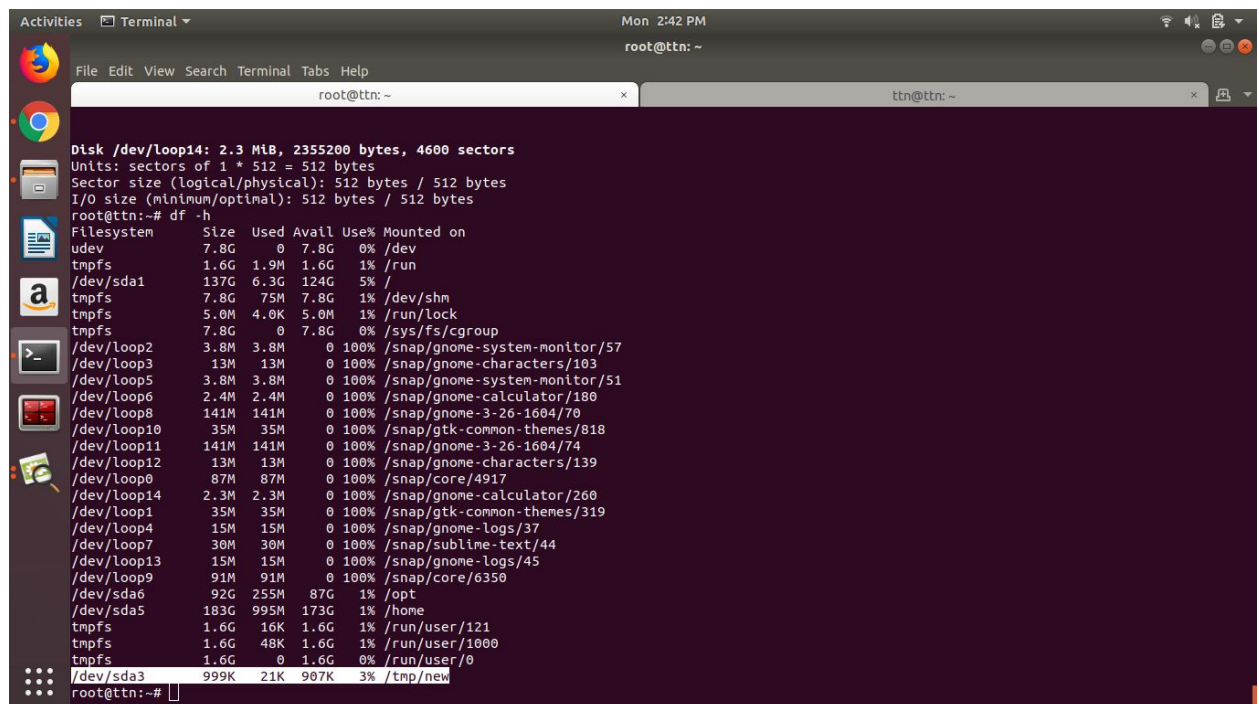
```
Activities  Terminal  Mon 2:58 PM
root@ttn: /opt/test

File Edit View Search Terminal Tabs Help

root@ttn: /opt/test
root@ttn:/opt/test# df -hT
Filesystem      Type      Size  Used Avail Use% Mounted on
udev            devtmpfs  7.8G   0  7.8G   0% /dev
tmpfs           tmpfs     1.6G   1.9M 1.6G   1% /run
/dev/sda1       ext4      137G   6.3G 124G   5% /
tmpfs           tmpfs     7.8G   37M  7.8G   1% /dev/shm
tmpfs           tmpfs     5.0M   4.0K 5.0M   1% /run/lock
tmpfs           tmpfs     7.8G   0  7.8G   0% /sys/fs/cgroup
/dev/loop2     squashfs  3.8M   3.8M   0 100% /snap/gnome-system-monitor/57
/dev/loop3     squashfs  13M    13M   0 100% /snap/gnome-characters/103
/dev/loop5     squashfs  3.8M   3.8M   0 100% /snap/gnome-system-monitor/51
/dev/loop6     squashfs  2.4M   2.4M   0 100% /snap/gnome-calculator/180
/dev/loop8     squashfs  141M   141M   0 100% /snap/gnome-3-26-1604/70
/dev/loop10    squashfs  35M    35M   0 100% /snap/gtk-common-themes/818
/dev/loop11    squashfs  141M   141M   0 100% /snap/gnome-3-26-1604/74
/dev/loop12    squashfs  13M    13M   0 100% /snap/gnome-characters/139
/dev/loop0     squashfs  87M    87M   0 100% /snap/core/4917
/dev/loop14    squashfs  2.3M   2.3M   0 100% /snap/gnome-calculator/260
/dev/loop1     squashfs  35M    35M   0 100% /snap/gtk-common-themes/319
/dev/loop4     squashfs  15M    15M   0 100% /snap/gnome-logs/37
/dev/loop7     squashfs  30M    30M   0 100% /snap/sublime-text/44
/dev/loop13    squashfs  15M    15M   0 100% /snap/gnome-logs/45
/dev/loop9     squashfs  91M    91M   0 100% /snap/core/6350
/dev/sda6      ext4      92G    255M  87G   1% /opt
/dev/sda5      ext4     183G   994M 173G   1% /home
tmpfs          tmpfs     1.6G    16K  1.6G   1% /run/user/121
tmpfs          tmpfs     1.6G   48K  1.6G   1% /run/user/1000
tmpfs          tmpfs     1.6G   0  1.6G   0% /run/user/0
/dev/sda3      ext4     999K   21K  907K   3% /tmp/new
root@ttn:/opt/test#
```

5. Mount the created filesystem on /partition directory.

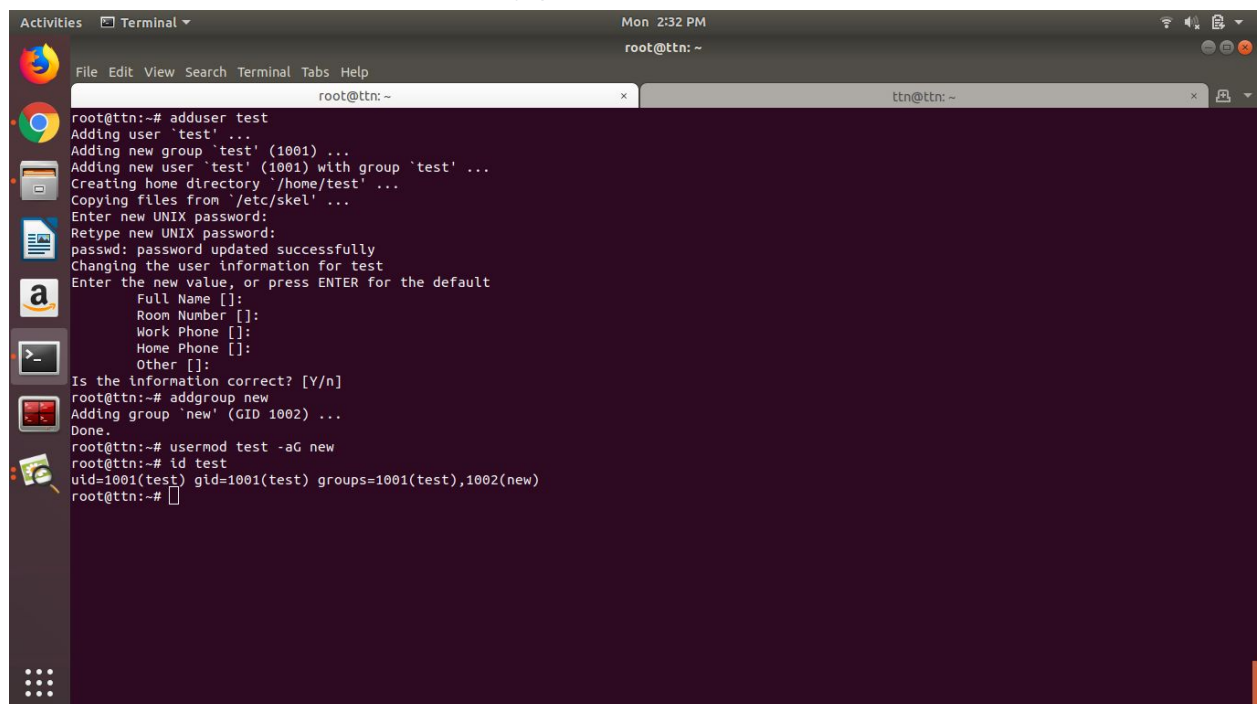
```
root@ttn:~# mkdir /tmp/new
root@ttn:~# mount /dev/sda3 /tmp/new
root@ttn:~#
```



The terminal window shows the output of the `df -h` command, displaying disk usage for various filesystems. The output is as follows:

Filesystem	Size	Used	Avail	Use%	Mounted on
udev	7.8G	0	7.8G	0%	/dev
tmpfs	1.6G	1.9M	1.6G	1%	/run
/dev/sda1	137G	6.3G	124G	5%	/
tmpfs	7.8G	75M	7.8G	1%	/dev/shm
tmpfs	5.0M	4.0K	5.0M	1%	/run/lock
tmpfs	7.8G	0	7.8G	0%	/sys/fs/cgroup
/dev/loop2	3.8M	3.8M	0	100%	/snap/gnome-system-monitor/57
/dev/loop3	13M	13M	0	100%	/snap/gnome-characters/103
/dev/loop5	3.8M	3.8M	0	100%	/snap/gnome-system-monitor/51
/dev/loop6	2.4M	2.4M	0	100%	/snap/gnome-calculator/180
/dev/loop8	141M	141M	0	100%	/snap/gnome-3-26-1604/70
/dev/loop10	35M	35M	0	100%	/snap/gtk-common-themes/818
/dev/loop11	141M	141M	0	100%	/snap/gnome-3-26-1604/74
/dev/loop12	13M	13M	0	100%	/snap/gnome-characters/139
/dev/loop0	87M	87M	0	100%	/snap/core/4917
/dev/loop14	2.3M	2.3M	0	100%	/snap/gnome-calculator/260
/dev/loop1	35M	35M	0	100%	/snap/gtk-common-themes/319
/dev/loop4	15M	15M	0	100%	/snap/gnome-logs/37
/dev/loop7	30M	30M	0	100%	/snap/sublime-text/44
/dev/loop13	15M	15M	0	100%	/snap/gnome-logs/45
/dev/loop9	91M	91M	0	100%	/snap/core/6350
/dev/sda6	92G	255M	87G	1%	/opt
/dev/sda5	183G	995M	173G	1%	/home
tmpfs	1.6G	16K	1.6G	1%	/run/user/121
tmpfs	1.6G	48K	1.6G	1%	/run/user/1000
tmpfs	1.6G	0	1.6G	0%	/run/user/0
/dev/sda3	999K	21K	907K	3%	/tmp/new

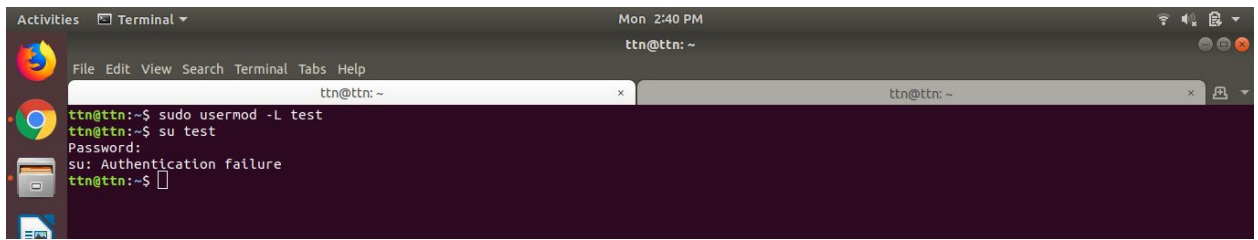
6. Create a user and add it to one secondary group.



The terminal window shows the output of the `adduser` and `addgroup` commands. The output is as follows:

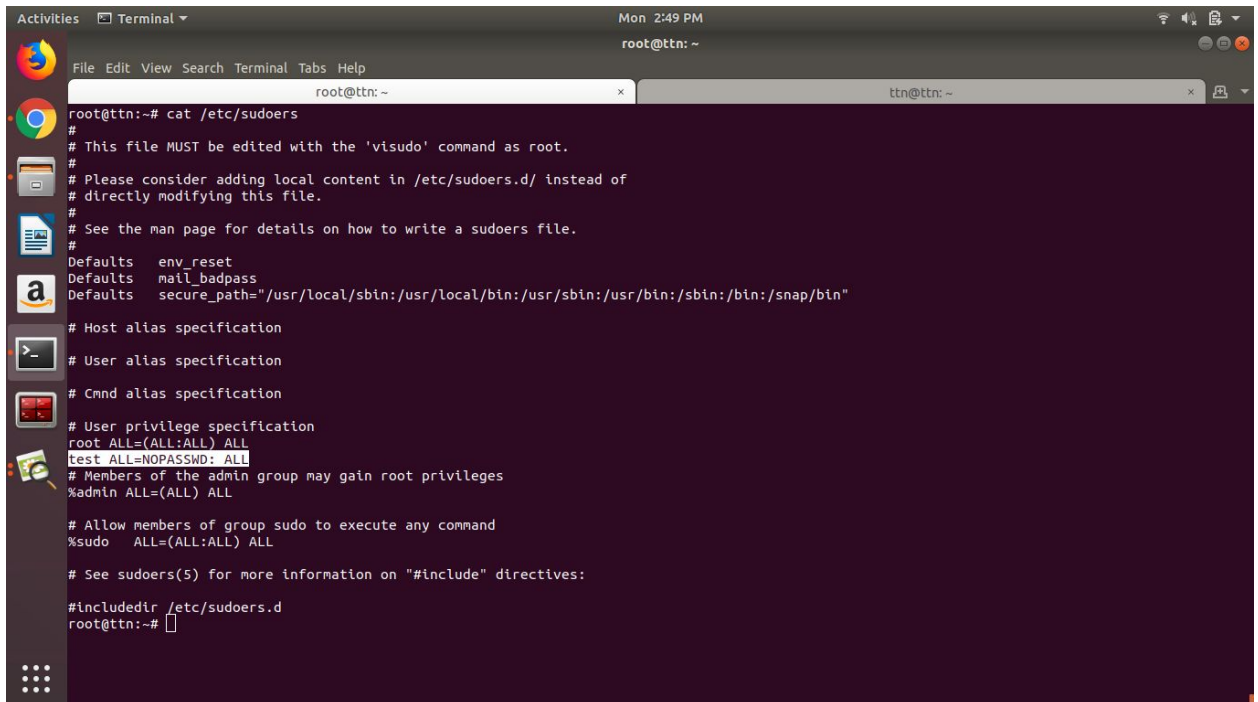
```
root@ttn:~# adduser test
Adding user 'test' ...
Adding new group 'test' (1001) ...
Adding new user 'test' (1001) with group 'test' ...
Creating home directory '/home/test' ...
Copying files from '/etc/skel' ...
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
Changing the user information for test
Enter the new value, or press ENTER for the default
Full Name []:
Room Number []:
Work Phone []:
Home Phone []:
Other []:
Is the information correct? [Y/n]
root@ttn:~# addgroup new
Adding group 'new' (GID 1002) ...
Done.
root@ttn:~# usermod test -aG new
root@ttn:~# id test
uid=1001(test) gid=1001(test) groups=1001(test),1002(new)
root@ttn:~#
```

7. Lock this user.

A terminal window titled 'Terminal' with a menu bar (File, Edit, View, Search, Terminal, Tabs, Help) and a status bar (Mon 2:40 PM, ttn@ttn: ~). The terminal shows a user 'ttn' at 'ttn:~' prompt. They run 'sudo usermod -L test', then 'su test'. A password prompt appears, followed by 'su: Authentication failure' and the prompt returns to 'ttn@ttn:~\$'.

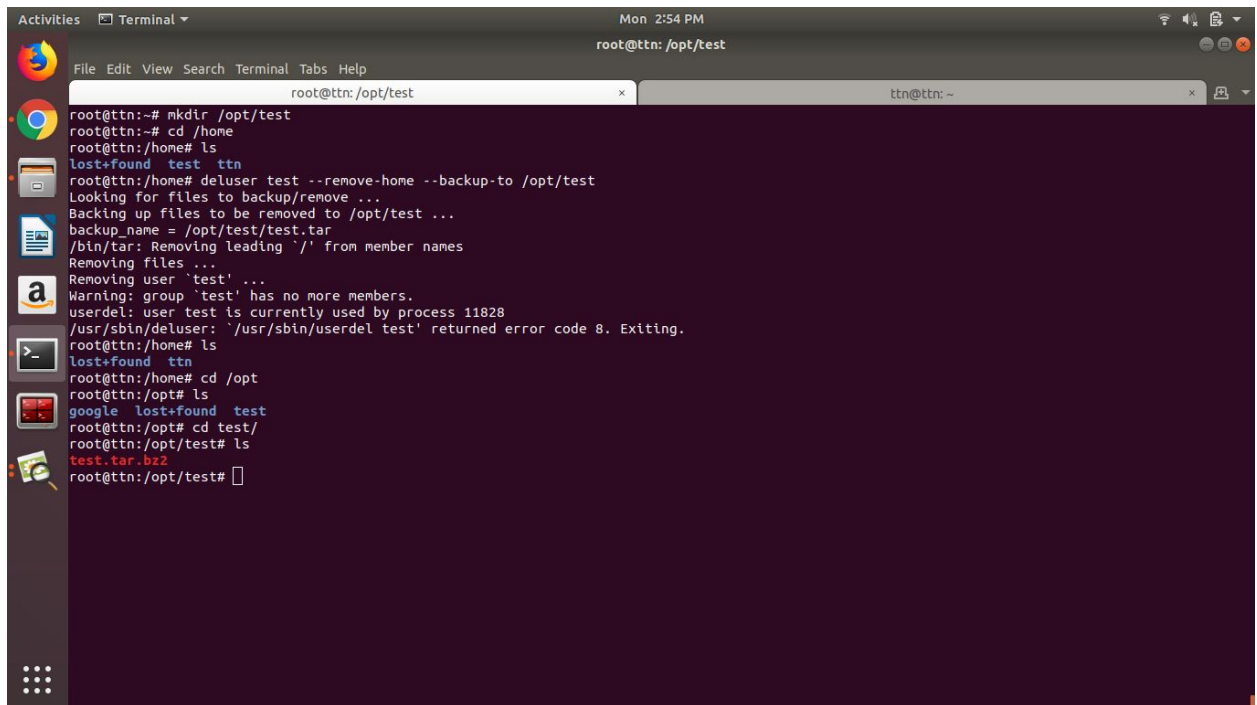
```
ttn@ttn:~$ sudo usermod -L test
ttn@ttn:~$ su test
Password:
su: Authentication failure
ttn@ttn:~$
```

8. Give this user full access (without password).

A terminal window titled 'Terminal' with a menu bar (File, Edit, View, Search, Terminal, Tabs, Help) and a status bar (Mon 2:49 PM, root@ttn: ~). The terminal shows a user 'root' at 'root@ttn:~' prompt. They run 'cat /etc/sudoers'. The output shows the content of the sudoers file, including comments, defaults, and privilege specifications. The line 'test ALL=NOPASSWD: ALL' is highlighted.

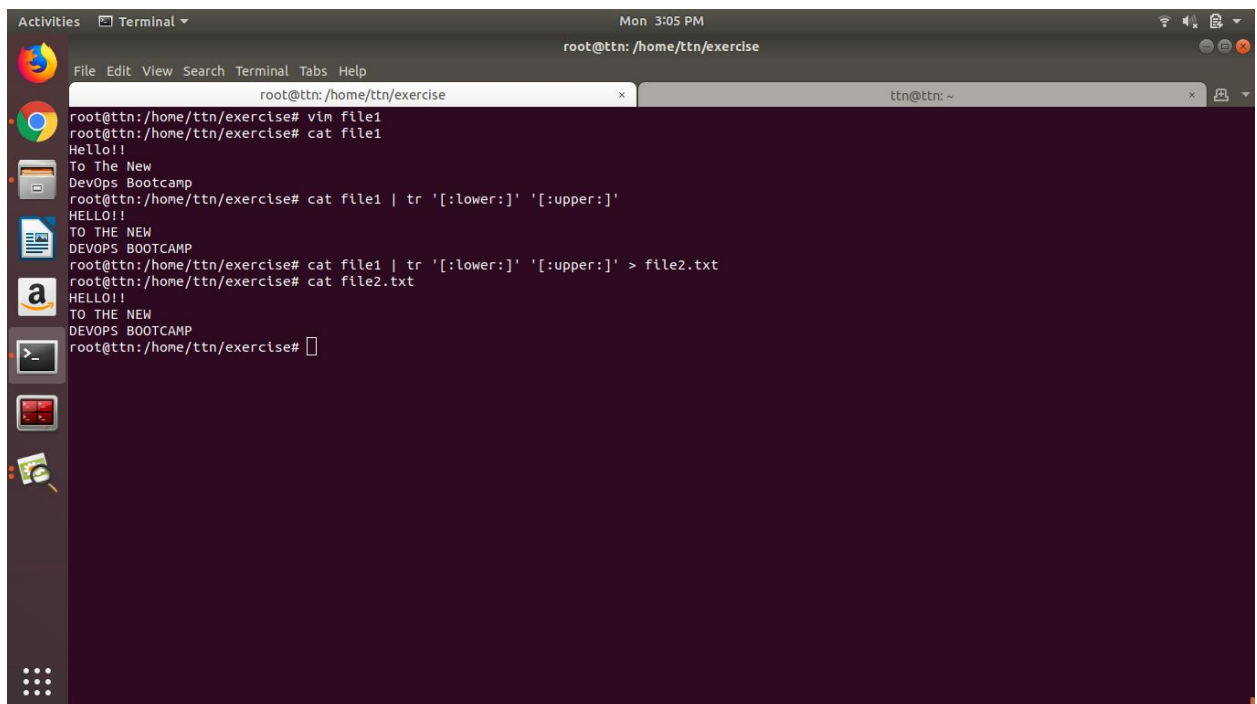
```
root@ttn:~# cat /etc/sudoers
#
# This file MUST be edited with the 'visudo' command as root.
#
# Please consider adding local content in /etc/sudoers.d/ instead of
# directly modifying this file.
#
# See the man page for details on how to write a sudoers file.
#
Defaults    env_reset
Defaults    mail_badpass
Defaults    secure_path="/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin"
#
# Host alias specification
#
# User alias specification
#
# Cmnd alias specification
#
# User privilege specification
root ALL=(ALL:ALL) ALL
test ALL=NOPASSWD: ALL
# Members of the admin group may gain root privileges
%admin ALL=(ALL) ALL
#
# Allow members of group sudo to execute any command
%sudo  ALL=(ALL:ALL) ALL
#
# See sudoers(5) for more information on "#include" directives:
#include_dir /etc/sudoers.d
root@ttn:~#
```

9. Delete the create user after taking backup of it home directory.



```
root@ttn: /opt/test
root@ttn:~# mkdir /opt/test
root@ttn:~# cd /home
root@ttn:/home# ls
lost+found test ttn
root@ttn:/home# deluser test --remove-home --backup-to /opt/test
Looking for files to backup/remove ...
Backing up files to be removed to /opt/test ...
backup_name = /opt/test/test.tar
/bin/tar: Removing leading '/' from member names
Removing files ...
Removing user 'test' ...
Warning: group 'test' has no more members.
userdel: user test is currently used by process 11828
/usr/sbin/deluser: '/usr/sbin/userdel test' returned error code 8. Exiting.
root@ttn:/home# ls
lost+found ttn
root@ttn:/home# cd /opt
root@ttn:/opt# ls
google lost+found test
root@ttn:/opt# cd test/
root@ttn:/opt/test# ls
test.tar.bz2
root@ttn:/opt/test#
```

10. Create a file with some content. Change all lower case letter to upper case letter and save output to another file using redirections.



```
root@ttn:/home/ttn/exercise
root@ttn:/home/ttn/exercise# vim file1
root@ttn:/home/ttn/exercise# cat file1
Hello!!
To The New
DevOps Bootcamp
root@ttn:/home/ttn/exercise# cat file1 | tr '[:lower:]' '[:upper:]'
HELLO!!
TO THE NEW
DEVOPS BOOTCAMP
root@ttn:/home/ttn/exercise# cat file1 | tr '[:lower:]' '[:upper:]' > file2.txt
root@ttn:/home/ttn/exercise# cat file2.txt
HELLO!!
TO THE NEW
DEVOPS BOOTCAMP
root@ttn:/home/ttn/exercise#
```

11. Set nice value of a process to -1.



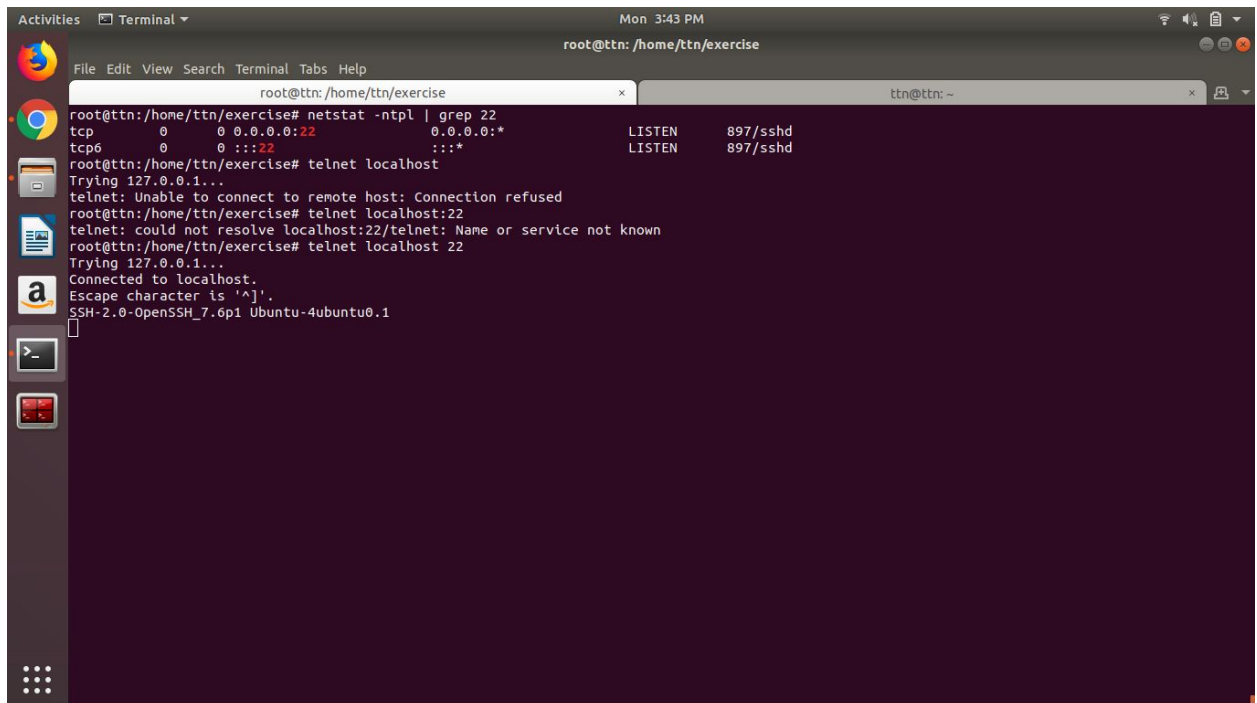
```
root@ttn:/home/ttn/exercise# renice -n -1 -p 6
6 (process ID) old priority -20, new priority -1
root@ttn:/home/ttn/exercise#
```


12. Get list of all files used by “telnet”.

```
Activities Terminal Mon 7:54 PM root@ttn: /usr/bin ttn@ttn: ~/exercise
root@ttn:/usr/bin# dpkg -L telnet
./
./usr
./usr/bin
./usr/bin/telnet.netkit
./usr/share
./usr/share/doc
./usr/share/doc/telnet
./usr/share/doc/telnet/BUGS
./usr/share/doc/telnet/README.gz
./usr/share/doc/telnet/README.telnet
./usr/share/doc/telnet/README.telnet.old.gz
./usr/share/doc/telnet/changelog.Debian.gz
./usr/share/doc/telnet/copyright
./usr/share/lintian
./usr/share/lintian/overrides
./usr/share/lintian/overrides/telnet
./usr/share/man
./usr/share/man/man1
./usr/share/man/man1/telnet.netkit.1.gz
./usr/share/menu
./usr/share/menu/telnet
root@ttn:/usr/bin#
```

```
Activities Terminal Mon 7:56 PM root@ttn: /usr/bin ttn@ttn: ~/exercise
root@ttn:/usr/bin# dpkg -L telnet
./
./usr
./usr/bin
./usr/bin/telnet.netkit
./usr/share
./usr/share/doc
./usr/share/doc/telnet
./usr/share/doc/telnet/BUGS
./usr/share/doc/telnet/README.gz
./usr/share/doc/telnet/README.telnet
./usr/share/doc/telnet/README.telnet.old.gz
./usr/share/doc/telnet/changelog.Debian.gz
./usr/share/doc/telnet/copyright
./usr/share/lintian
./usr/share/lintian/overrides
./usr/share/lintian/overrides/telnet
./usr/share/man
./usr/share/man/man1
./usr/share/man/man1/telnet.netkit.1.gz
./usr/share/menu
./usr/share/menu/telnet
root@ttn:/usr/bin# dpkg-query --listfiles telnet
./
./usr
./usr/bin
./usr/bin/telnet.netkit
./usr/share
./usr/share/doc
./usr/share/doc/telnet
./usr/share/doc/telnet/BUGS
./usr/share/doc/telnet/README.gz
./usr/share/doc/telnet/README.telnet
./usr/share/doc/telnet/README.telnet.old.gz
./usr/share/doc/telnet/changelog.Debian.gz
./usr/share/doc/telnet/copyright
```

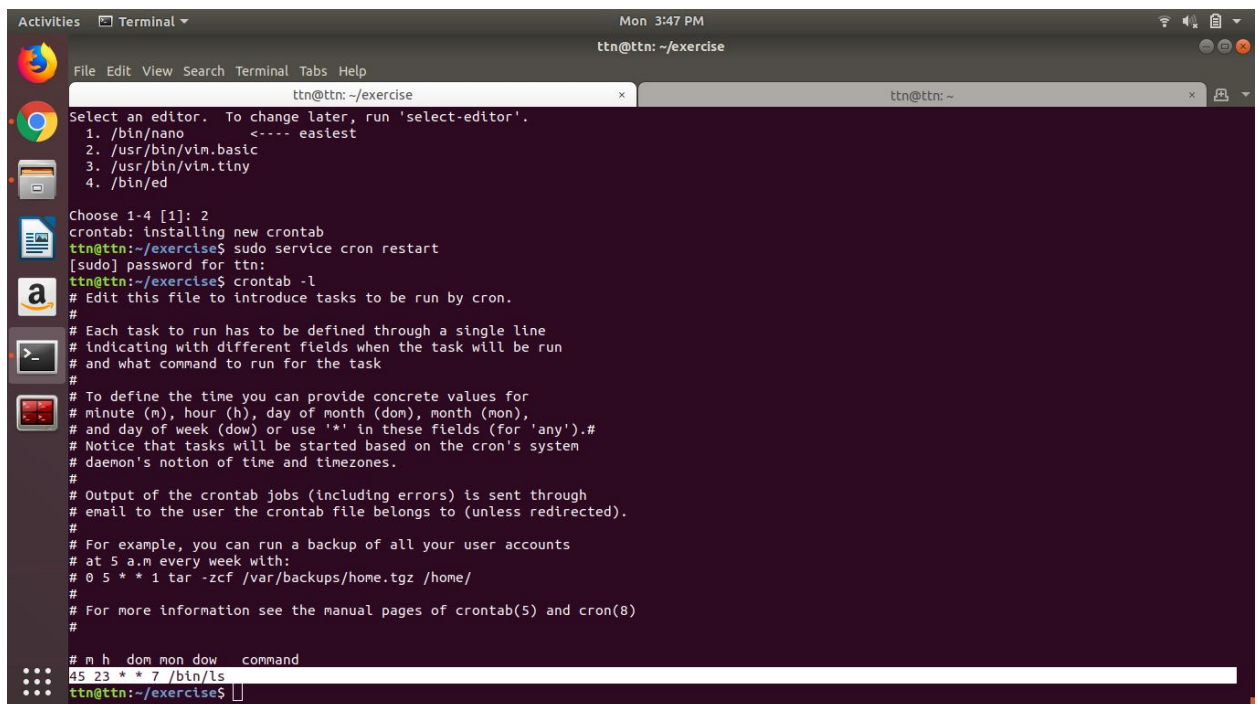
13. Check if port 22 is listening using netstat and telnet command.

A terminal window titled 'root@ttn: /home/ttn/exercise' showing the execution of netstat and telnet commands. The netstat command shows port 22 is listening for sshd. The telnet command shows a connection to localhost on port 22, which is an SSH connection.

```
root@ttn:/home/ttn/exercise# netstat -ntpl | grep 22
tcp        0      0 0.0.0.0:22          0.0.0.0:*           LISTEN      897/sshd
tcp6       0      0 :::22              :::*                 LISTEN      897/sshd

root@ttn:/home/ttn/exercise# telnet localhost
Trying 127.0.0.1...
telnet: Unable to connect to remote host: Connection refused
root@ttn:/home/ttn/exercise# telnet localhost:22
telnet: could not resolve localhost:22:telnet: Name or service not known
root@ttn:/home/ttn/exercise# telnet localhost 22
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^['.
SSH-2.0-OpenSSH_7.6p1 Ubuntu-4ubuntu0.1
```

14. Create a cron job which runs once in a week at 23:45.

A terminal window titled 'ttn@ttn: ~/exercise' showing the setup of a cron job. The user selects nano as the editor, installs the crontab, and sets up a cron job to run /bin/ls at 23:45 on the 7th of each month.

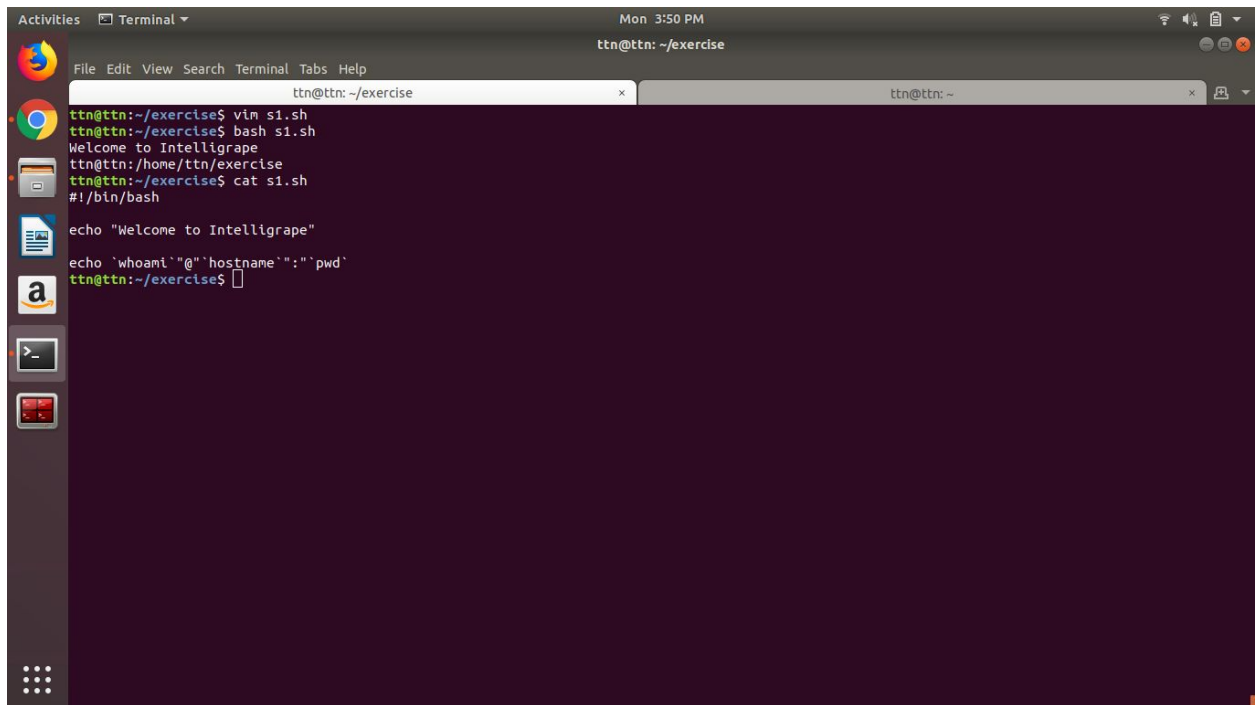
```
ttn@ttn: ~/exercise
Select an editor. To change later, run 'select-editor'.
 1. /bin/nano        <---- easiest
 2. /usr/bin/vim.basic
 3. /usr/bin/vim.tiny
 4. /bin/ed

Choose 1-4 [1]: 2
crontab: installing new crontab
ttn@ttn:~/exercise$ sudo service cron restart
[sudo] password for ttn:
ttn@ttn:~/exercise$ crontab -l
# Edit this file to introduce tasks to be run by cron.
#
# Each task to run has to be defined through a single line
# indicating with different fields when the task will be run
# and what command to run for the task
#
# To define the time you can provide concrete values for
# minute (m), hour (h), day of month (dom), month (mon),
# and day of week (dow) or use '*' in these fields (for 'any').#
# Notice that tasks will be started based on the cron's system
# daemon's notion of time and timezones.
#
# Output of the crontab jobs (including errors) is sent through
# email to the user the crontab file belongs to (unless redirected).
#
# For example, you can run a backup of all your user accounts
# at 5 a.m every week with:
# 0 5 * * 1 tar -zcf /var/backups/home.tgz /home/
#
# For more information see the manual pages of crontab(5) and cron(8)
#
# m h dom mon dow   command
45 23 * * 7 /bin/ls
ttn@ttn:~/exercise$
```

Shell Script:

15. 1. (output to terminal)Write a script to print:
16. a. "Welcome to IntelliJrap"

17. b. <username>@<hostname>:<your present working directory>



The screenshot shows a terminal window titled 'Terminal' with a menu bar (File, Edit, View, Search, Terminal, Tabs, Help). The window has two tabs, both labeled 'ttn@ttn: ~/exercise'. The terminal content shows a user running a script 's1.sh' with 'vim' and 'bash'. The script prints 'Welcome to Intelligrape', changes the directory to '/home/ttn/exercise', and then prints the output of 'cat s1.sh'. The output of the script is 'Welcome to Intelligrape' and 'whoami'@'hostname': 'pwd'.

```
ttn@ttn:~/exercise$ vim s1.sh
ttn@ttn:~/exercise$ bash s1.sh
Welcome to Intelligrape
ttn@ttn:/home/ttn/exercise$ cat s1.sh
#!/bin/bash

echo "Welcome to Intelligrape"

echo `whoami`@"`hostname`":"`pwd`"
ttn@ttn:~/exercise$
```

18. 2 (arguments)Write a script

19. a. which takes in two arguments and print those arguments.

20. b. which checks the number of arguments passed and if the number is greater than two print ERROR message along with printing the number of arguments.

21. 3. Continue with the above script

22. a. check the two arguments are only integer values and if these are not integers print the proper error on terminal and also log it into a file.

23. b. perform addition on the two arguments and print result on screen. Use function for this.


```
Activities Terminal Mon 5:17 PM
ttn@ttn: ~/exercise

ttn@ttn:~/exercise$ bash s1.sh 1 2 abc
Error number of arguments passed is 3
1 is an integer
2 is an integer
sum of 1 and 2 is 3
ttn@ttn:~/exercise$ bash s1.sh 2 abc
2 is an integer
abc is not an integer
expr: non-integer argument
sum of 2 and abc is
ttn@ttn:~/exercise$ cat s1.sh
#!/bin/bash
if [ $# -gt 2 ]
then
    echo Error number of arguments passed is $#
fi
if [ $1 -eq $1 2>>log.txt ]
then
    echo $1 is an integer
else
    echo $1 is not an integer
fi
if [ $2 -eq $2 2>>log.txt ]
then
    echo $2 is an integer
else
    echo $2 is not an integer
fi
sum() {
    x=`expr $1 + $2`
    echo sum of $1 and $2 is $x
}
sum $1 $2
ttn@ttn:~/exercise$
```

24. 4. Create a calculator using the above script which would perform addition, subtraction, division and multiplication.
25. a. the script should ask user which operation the user wants to perform: +, -, *, /
26. b. if user enters other than "+, -, *, /", print proper message on terminal and keeps on asking for correct input (use while loop to accomplish this).
27. c. Use case statement instead of if.

```
Activities Terminal Mon 2:32 PM
ttn@ttn: ~/exercise/dir1/dir2

ttn@ttn:/$ pwd
/
ttn@ttn:/$ cd /home/ttn
ttn@ttn:/$ pwd
/home/ttn
ttn@ttn:/$ mkdir -p exercise/dir1/dir2/dir3
ttn@ttn:/$ ls
Desktop Documents Downloads examples.desktop exercise Music Pictures Public Templates Videos
ttn@ttn:/$ cd exercise
ttn@ttn:~/exercise$ ls
dir1
ttn@ttn:~/exercise$ cd dir1
ttn@ttn:~/exercise/dir1$ ls
dir2
ttn@ttn:~/exercise/dir1$ cd dir3
bash: cd: dir3: No such file or directory
ttn@ttn:~/exercise/dir1$ cd dir2
ttn@ttn:~/exercise/dir1/dir2$ ls
dir3
ttn@ttn:~/exercise/dir1/dir2$
```

Activities Terminal Mon 4:22 PM ttn@ttn: ~/exercise

File Edit View Search Terminal Tabs Help

ttn@ttn: ~/exercise

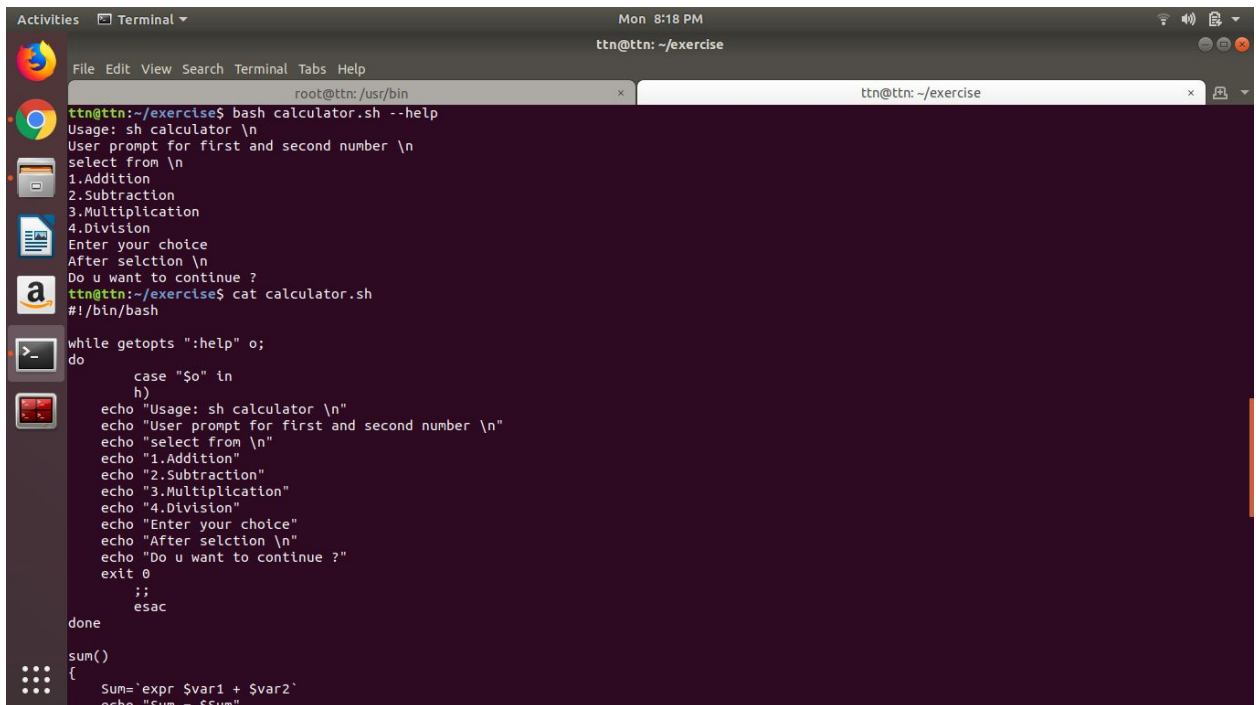
```
ttn@ttn:~/exercise$ vim calculator.sh
ttn@ttn:~/exercise$ bash calculator.sh 2 3
First Argument : 2
Second Argument : 3
Enter a choice 1 for + ,2 for - ,3 for *,4 for / ,5 for exit
1
Sum = 5
Enter a choice 1 for + ,2 for - ,3 for *,4 for / ,5 for exit
2
Difference = -1
Enter a choice 1 for + ,2 for - ,3 for *,4 for / ,5 for exit
3
Product = 6
Enter a choice 1 for + ,2 for - ,3 for *,4 for / ,5 for exit
4
Division = 0
Enter a choice 1 for + ,2 for - ,3 for *,4 for / ,5 for exit
5
ttn@ttn:~/exercise$
```

```
Activities Terminal Mon 4:22 PM ttn@ttn: ~/exercise
File Edit View Search Terminal Tabs Help
ttn@ttn: ~/exercise
ttn@ttn:~/exercise$ cat calculator.sh
#!/bin/bash
sum()
{
    Sum=`expr $var1 + $var2`
    echo "Sum = $Sum"
}
subtract()
{
    sub=`expr $var1 - $var2`
    echo "Difference = $sub"
}
multiply()
{
    mul=`expr $var1 \\* $var2`
    echo "Product = $mul"
}
divide()
{
    div=`expr $var1 / $var2`
    echo "Division = $div"
}
var1=$1
var2=$2
if [ $# -eq 2 ]
then
    if [ $var1 -eq $var1 ] && [ $var2 -eq $var2 ]
    then
        echo "First Argument : $var1"
        echo "Second Argument : $var2"
        while :
        do
            echo "Enter a choice 1 for + ,2 for - ,3 for *,4 for / ,5 for exit"
            read option
            case $option in
                1)

```

```
then
    echo "First Argument : $var1"
    echo "Second Argument : $var2"
    while :
    do
        echo "Enter a choice 1 for + ,2 for - ,3 for *,4 for / ,5 for exit"
        read option
        case $option in
            1)
                sum
                ;;
            2)
                subtract
                ;;
            3)
                multiply
                ;;
            4)
                divide
                ;;
            5)
                break;
                ;;
            *)
                echo "Choose a valid option ...."
                ;;
        esac
    done
    else
        echo Only integeres allowed > error
    fi
else
    echo "Only 2 arguments allowed"
    echo "Number of arguments passed : $#"
```

28. 5. Write proper help documentation and print it with -h for above script.

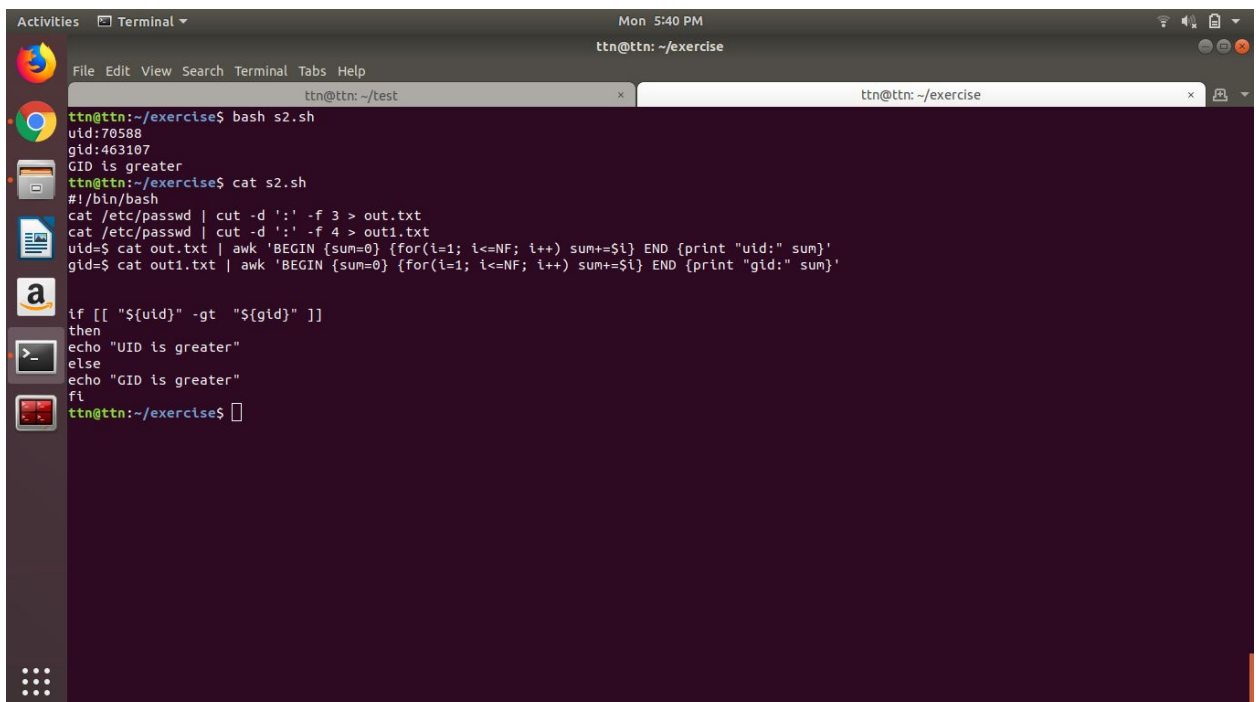


```
root@ttn: /usr/bin
ttn@ttn: ~/exercise
ttn@ttn:~/exercise$ bash calculator.sh --help
Usage: sh calculator \n
User prompt for first and second number \n
select from \n
1.Addition
2.Subtraction
3.Multiplication
4.Division
Enter your choice
After selction \n
Do u want to continue ?
ttn@ttn:~/exercise$ cat calculator.sh
#!/bin/bash

while getopts ":help" o;
do
    case "$o" in
        h)
            echo "Usage: sh calculator \n"
            echo "User prompt for first and second number \n"
            echo "select from \n"
            echo "1.Addition"
            echo "2.Subtraction"
            echo "3.Multiplication"
            echo "4.Division"
            echo "Enter your choice"
            echo "After selction \n"
            echo "Do u want to continue ?"
            exit 0
            ;;
        esac
    done
done

sum()
{
    Sum=`expr $var1 + $var2`
    echo "Sum = $Sum"
```

29. 6. Create a script which takes input of "/etc/passwd" file and find out and print the sum of uids and gids. The script should tell which sum of greater.



```
ttn@ttn: ~/exercise
ttn@ttn:~/exercise$ bash s2.sh
uid:70588
gid:463107
GID is greater
ttn@ttn:~/exercise$ cat s2.sh
#!/bin/bash
cat /etc/passwd | cut -d ':' -f 3 > out.txt
cat /etc/passwd | cut -d ':' -f 4 > out1.txt
uid=$ cat out.txt | awk 'BEGIN {sum=0} {for(i=1; i<=NF; i++) sum+= $i} END {print "uid:" sum}'
gid=$ cat out1.txt | awk 'BEGIN {sum=0} {for(i=1; i<=NF; i++) sum+= $i} END {print "gid:" sum}'

if [[ "${uid}" -gt "${gid}" ]]
then
echo "UID is greater"
else
echo "GID is greater"
fi
ttn@ttn:~/exercise$
```

30. 7. A directory contains files and sub-directories. Move files to destination1 and directories to destination2

```
ff ./github/clone/test_repo/file ./github/clone/test_repo/xyz ./github/clone/test_repo/abc ./github/clone/file2 ./github/clone/file1 ./test.ht
ml ./file2.txt ./dir1/dir2/file2 ./dir1/dir2/file1 ./file1.txt ./out1.txt ./s2.sh ./file1 ./output ./Desktop/671281.jpg ./2 ./out.txt
ttn@ttn:~/exercise$ mkdir /tmp/files
ttn@ttn:~/exercise$ find /home/ttn/exercise -type f -print0 | xargs -0 mv -t /tmp/files
mv: cannot remove '/home/ttn/exercise/.git/description': Permission denied
mv: cannot remove '/home/ttn/exercise/.git/HEAD': Permission denied
mv: cannot remove '/home/ttn/exercise/.git/hooks/pre-applypatch.sample': Permission denied
mv: cannot remove '/home/ttn/exercise/.git/hooks/post-update.sample': Permission denied
mv: cannot remove '/home/ttn/exercise/.git/hooks/applypatch-msg.sample': Permission denied
mv: cannot remove '/home/ttn/exercise/.git/hooks/pre-rebase.sample': Permission denied
mv: cannot remove '/home/ttn/exercise/.git/hooks/fsmonitor-watchman.sample': Permission denied
mv: cannot remove '/home/ttn/exercise/.git/hooks/update.sample': Permission denied
mv: cannot remove '/home/ttn/exercise/.git/hooks/commit-msg.sample': Permission denied
mv: cannot remove '/home/ttn/exercise/.git/hooks/pre-commit.sample': Permission denied
mv: cannot remove '/home/ttn/exercise/.git/hooks/pre-push.sample': Permission denied
mv: cannot remove '/home/ttn/exercise/.git/info/exclude': Permission denied
mv: cannot remove '/home/ttn/exercise/github/.git/objects/e8/052990dd88294461bf67cd31e8c9854f7b8233': Permission denied
mv: cannot remove '/home/ttn/exercise/github/.git/objects/f9/1022407c35305680e9e4645611b581f32bf1e': Permission denied
mv: cannot remove '/home/ttn/exercise/github/.git/objects/03/aa86dc09f06fefa2600be51aeb36e60283417': Permission denied
```

```
Activities Terminal Mon 5:04 PM
ttn@ttn: ~/exercise

File Edit View Search Terminal Tabs Help

ttn@ttn: ~/exercise
mv: cannot remove '/home/ttn/exercise/github/clone/file2': Permission denied
mv: cannot remove '/home/ttn/exercise/github/clone/file1': Permission denied
mv: will not overwrite just-created '/tmp/files/file2' with '/home/ttn/exercise/dir1/dir2/file2'
mv: will not overwrite just-created '/tmp/files/file1' with '/home/ttn/exercise/dir1/dir2/file1'
mv: will not overwrite just-created '/tmp/files/file1' with '/home/ttn/exercise/file1'
ttn@ttn:~/exercise$ ls /tmp/files
0051d84615b435123e1e2dec703173a17a2e59  9a29e56b590b0cbbaafd44f4b8b0873f9bb89e0  fsmonitor-watchman.sample
0136250380ba8db996f756967f9e9ca394464a  9ac57f9c9e3141cbadac3a451ca7b98c64d575  HEAD
052990dd88294461bf67cd31e8c9854f7b8233  9c52fe93648ce3f9b2380991ed33c8fb0d24d5  index
0552f9ac78524dbbf63bf01c461ad3881ce7fa  9de29bb2d1d6434b8b29ae775ad8c2e48c5391  master
0c85ae05309e67ad7251c6b0bc74aea8df07f0  9e880b1a48b27b213bcc374ab3967deb00d877  newfile
1022407c35305680e9e4645611b581f32bf1e  aa806dc09f06fefa2600be51aeb36e60283417  ORIG_HEAD
1218a1024a212b3db30becd860315f9f3ac52  abc  out1.txt
14bf95656d76db9ea38346323da43f5703343  abc.txt  output
16e91885fcb2069bc933c7857b73fca3e33ca  aef1b4abc478178b004d62031cf7fe6db6f903  out.txt
1bf9d9d4ec0e03f723ef2b284ca72281c41af  annol  pack-a5e3e1960ed4b75dfed23175f290027a68e1620d.idx
1d1e07d84eeb4a7924ca84b3f1ea1517a1239d  applypatch-msg.sample  pack-a5e3e1960ed4b75dfed23175f290027a68e1620d.pack
2  b993948113131267ec41dff7a83ee16c0921a8  packed-refs
2622b2514000f4651c7b1a3d787068d0733cf2  calculator.sh  post-update.sample
4543e83b9bccc26df0400cf8c9a85f9b4b115  check_diff  pre-applypatch.sample
465cc78c2861f459b6a29784d6be8c509c1681  COMMIT_EDITMSG  pre-commit.sample
4d1b762deaf57600824c928053b75d7d9c9a83  commit-msg.sample  prepare-commit-msg.sample
4d72748d31846f66c88580a37bf41c1bd9a27c  config  pre-push.sample
518df596381ad5320bb0e2a067416c0d9cb2cd  description  pre-rebase.sample
5af273ba36fe5176e5aab349661a56b3d27a0  eS9de9aceb5b3edfcd569ec18a8cb15b764e14  pre-receive.sample
60b4c8f199058442a0e3f4fb226f2f18b7c9f  e6078899e450b48e7871468bfbe182a026bc7b  s1.sh
671281.jpg  exclude  s2.sh
6ea1c07d0fd88f88248f40a874396fa996dfbe  fbe2433dc4e52099088f03559c141dabf6cfc5  Session4.html
74c100238d2864909c73e1df94112c5c0bcf4e  FETCH_HEAD  'Session5 question12.html'
7a65c346d6e385bd9fbae35e19bd5018cbace  file  test
841b18023f94bdf0f636b918bc92327822045e  file1  test.html
849d459a9f1be7149402831f0f30fb959ae6b0  file1.txt  test.tar
876f7ce5fbb26ba09364cec8e77702f884a970  file2  untitled.html
8b563d56b78cf77ade97ef5060b7031e645a44  file2.txt  update.sample
91ad84127464ff651c01d4627d92b9ef418111  xyz
ttn@ttn:~/exercise$ mkdir /tmp/folder
ttn@ttn:~/exercise$ find /home/ttn/exercise -type d -print0 | xargs -0 mv -t /tmp/folder
```



```
Activities Terminal Mon 5:04 PM
ttn@ttn: ~/exercise

ttn@ttn: ~/exercise
rm: cannot remove '/home/ttn/exercise/github/clone/file1': Permission denied
mv: will not overwrite just-created '/tmp/files/file2' with '/home/ttn/exercise/dir1/dir2/file2'
mv: will not overwrite just-created '/tmp/files/file1' with '/home/ttn/exercise/dir1/dir2/file1'
mv: will not overwrite just-created '/tmp/files/file1' with '/home/ttn/exercise/file1'

ttn@ttn: ~/exercise$ ls /tmp/files
0051d84615b435123e12dec703173a17a2e59  9a29e56b590b0c0baafd44f4b8b0873f9bb89e0  fsmonitor-watchman.sample
013625030ba8dba906f756967f9e9ca394464a  9ac57f9c9e3141cbadac3a451ca7b98c64d575  HEAD
052990dd88294461bf67cd31e8c9854f7b8233  9c52fe93648ce3f9b2380991ed33c8fb0d24d5  index
0552f9ac7852dbbf63bf01c461ad3881ce7fa  9de29bb2d1d6434b8b29ae775ad8c2e48c5391  master
0c85ae05309e67ad7251c6b0bc74aea8df07f0  9e080b1a48b27b213bcc374ab3967deb00d877  newfile
1022407c35305680e9e4645611b581f32bf1e  aa806dc09f06fefa2600be51aeb36e60283417  ORIG_HEAD
1218a1024a212b3db30becd860315f9f3ac52  abc  out1.txt
14bf95656d76d9e0a38346323da435f703343  abc.txt  output
16e918855fbb2069bc933c7857b73fca3e33ca  aef1b4abc478178b004d62031cf7fe6db6f903  out.txt
1b6f9d94ec06e03f723ef2b204ca72281c414f  annol  pack-a5e3e1960ed4b75dfed23175f290027a68e1620d.idx
1d1e07d84eeb4a7924ca84b3f1ea1517a1239d2  applypatch-msg.sample  pack-a5e3e1960ed4b75dfed23175f290027a68e1620d.pack
262d2b514000f4651c7b1a3d787068d0733cf2  b983be36b73c0788dc9c0cb76cbb80fc7bb057  packed-refs
4543e83b9bceec26df0400c7f8c9a85f9b4b115  b993948113131267ec41dff7a83ee16c0921a8  post-update.sample
465cc78c2861f459b6a29784d6be8c509c1681  calculator.sh  pre-applypatch.sample
4d1b762deaf57600824c928053b75d7d9c9a83  check_diff  pre-commit.sample
4d72748d31846f66c88580a37bf41c1bd9a27c  COMMIT_EDITMSG  prepare-commit-msg.sample
518df596381ad5320bb0e2a067416c0d9cb2cd  commit-msg.sample  pre-push.sample
5af273ba36fe5176e5eaab349661a56b3d27a0  config  pre-rebase.sample
60b4c8f109658442a0e3f4fb226f2ff18b7c9f  description  pre-receive.sample
671281.jpg  e59de9aceb5b3edfcd569ec18a8cb15b764e14  s1.sh
6ea1c07d0fd8ef88248f40a874396fa996dfbe  e6078899e450b48e7871468bfbe182a026cb7b  s2.sh
74c100238d2864999c73e1df94112c5c0bcf4e  exclude  session4.html
7a65c346d6e385bd94fbae35e19bd5018cbace  fbe2433dc4e5209908f03559c141dabf6cfc5  'Session5 question12.html'
841b18023f94bdf0f636b918bc92327822045e  FETCH_HEAD  test
849d459a9f1be7149402831f0f30fb959ae6b0  file  test.html
876f7ce5fbb26ba09364cec8e77702f884a970  file1  test.tar
8b563d56b78cf77ade97ef5060b7031e645a44  file1.txt  untitled.html
91ad84127464ff651c01d4627d92b9ef418111  file2  update.sample
91ad84127464ff651c01d4627d92b9ef418111  file2.txt  xyz

ttn@ttn: ~/exercise$ mkdir /tmp/folder
ttn@ttn: ~/exercise$ find /home/ttn/exercise -type d -print0 | xargs -0 mv -t /tmp/folder

ttn@ttn: ~/exercise$ ls /tmp/folder
03 1a 24 2d 45 7a 89 8f aa exercise github info origin remotes
15 1c 27 30 72 7f 8a 96 b8 ce e5 ea f0 heads logs pack tags
17 20 2c 38 77 84 8b 9f branches clone e6 ed f9 hooks objects refs test_repo

ttn@ttn: ~/exercise$
```

31. 8. Create a script which take three arguments, append first argument to every line in a file and second argument to the end of every line of the same file.

```
Activities Terminal Mon 8:36 PM
ttn@ttn: ~/exercise

root@ttn: /usr/bin

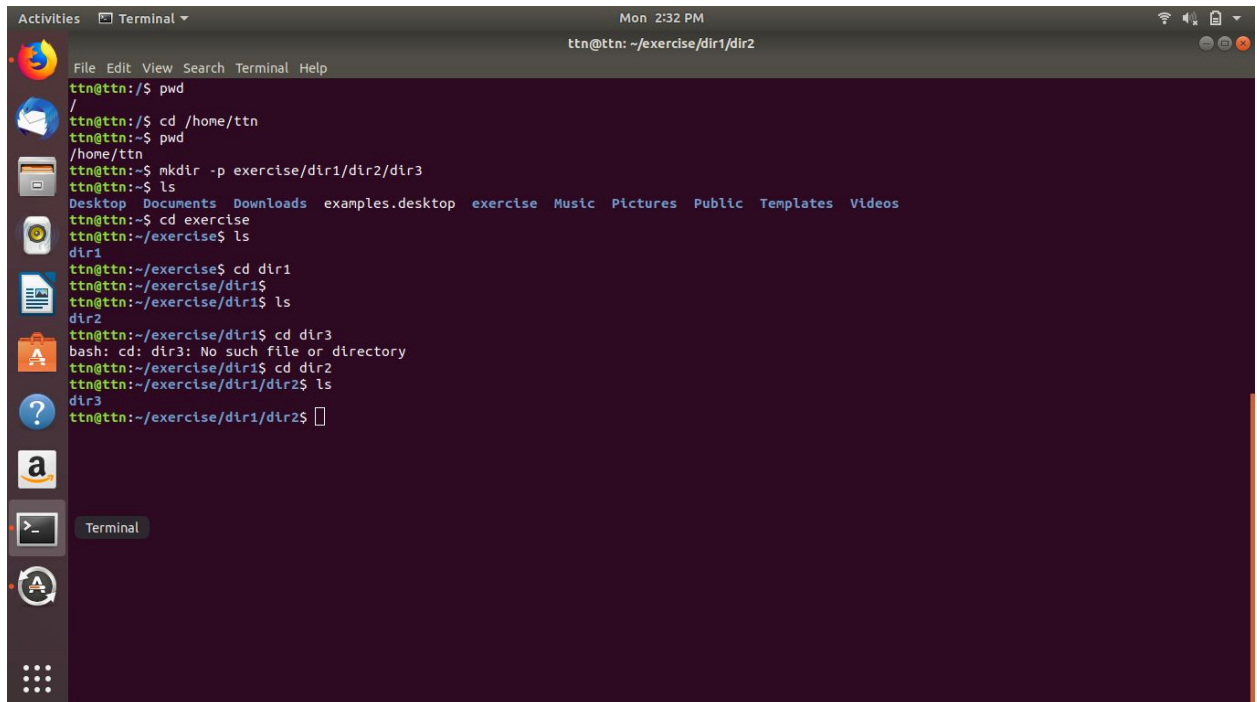
ttn@ttn: ~/exercise$ vim file
ttn@ttn: ~/exercise$ cat file
1
2
3
4
5
6
7
8
9
0

ttn@ttn: ~/exercise$ bash s4.sh hello world file
ttn@ttn: ~/exercise$ cat file
hello1world
hello2world
hello3world
hello4world
hello5world
hello6world
hello7world
hello8world
hello9world
hello0world

ttn@ttn: ~/exercise$ cat s4.sh
#!/bin/bash

sed -i s/$/$2/ $3
sed -i -e s/^/$1/ $3
ttn@ttn: ~/exercise$
```

32. 9. Make a list of files in /usr/bin that have the letter "a" as the second character. Put the result in a temporary file.



```
Activities Terminal Mon 2:32 PM
ttn@ttn: ~/exercise/dir1/dir2

ttn@ttn:/$ pwd
/
ttn@ttn:/$ cd /home/ttn
ttn@ttn:/$ pwd
/home/ttn
ttn@ttn:/$ mkdir -p exercise/dir1/dir2/dir3
ttn@ttn:/$ ls
Desktop Documents Downloads examples.desktop exercise Music Pictures Public Templates Videos
ttn@ttn:/$ cd exercise
ttn@ttn:~/exercise$ ls
dir1
ttn@ttn:~/exercise$ cd dir1
ttn@ttn:~/exercise/dir1$ 
ttn@ttn:~/exercise/dir1$ ls
dir2
ttn@ttn:~/exercise/dir1$ cd dir3
bash: cd: dir3: No such file or directory
ttn@ttn:~/exercise/dir1$ cd dir2
ttn@ttn:~/exercise/dir1/dir2$ ls
dir3
ttn@ttn:~/exercise/dir1/dir2$
```

```
Activities Terminal Mon 5:44 PM
ttn@ttn: ~/exercise

File Edit View Search Terminal Tabs Help

ttn@ttn: ~/test
ttn@ttn: ~/exercise

ttn@ttn:~/exercise$ vim s3.sh
ttn@ttn:~/exercise$ bash s3.sh
ttn@ttn:~/exercise$ cat temp.txt
aa-enabled
aa-exec
baobab
base32
base64
basename
bashbug
cal
calendar
calibrate_ppa
cancellable-gtk-play
cancel
captinfo
catchsegv
catman
cautious-launcher
factor
faillog
fallocate
gamma4scanimage
gapplication
gatttool
laptop-detect
last
lastb
lastlog
lavadecode
macptopbm
man
mandb
manpath
mapscrn
mattrib
```

```
Activities Terminal Mon 5:45 PM
ttn@ttn: ~/exercise

File Edit View Search Terminal Tabs Help

ttn@ttn: ~/test
ttn@ttn: ~/exercise

pamstack
pamstretch
pamstretch-gen
paperconf
paplay
parec
parecord
parsechangelog
partx
passwd
paste
pasuspender
patch
pathchk
paxiipublish
ranlib
rasttopnm
rawtopgm
rawtoppm
sane-find-scanner
savepng
tabs
tac
tail
taskset
ua
wall
watch
watchnupg
xargs
xauth
ttn@ttn:~/exercise$ cat s3.sh
#!/bin/bash

ls /usr/bin | grep "^a" > temp.txt
ttn@ttn:~/exercise$
```

33. 10. List all files in your home directory and print name and size in a table format.

```
ttn@ttn:~$ ls -l | column -t -c 2 -s " " | awk {'print $5 " " $9'}
4096      Desktop
4096      Documents
4096      Downloads
8980      examples.desktop
4096      exercise
57127360  google-chrome-stable_current_amd64.deb
4096      Music
12288     Pictures
4096      Public
4096      snap
4096      Templates
4096      test
4096      Videos
ttn@ttn:~$
```