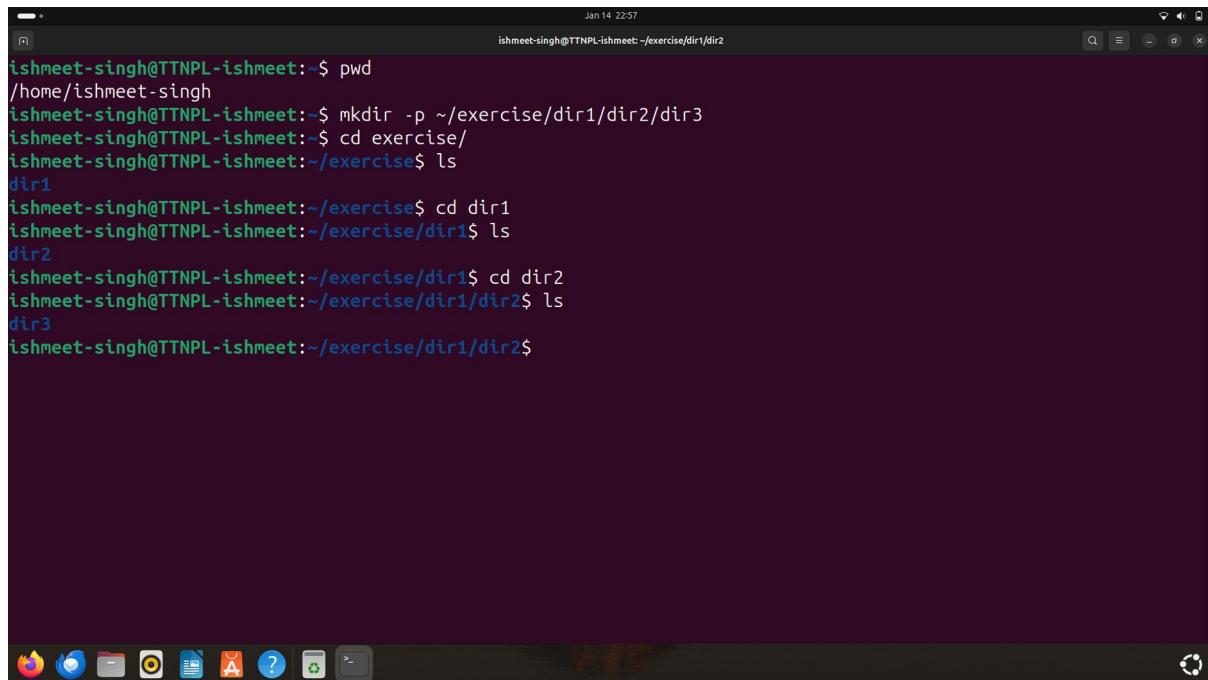


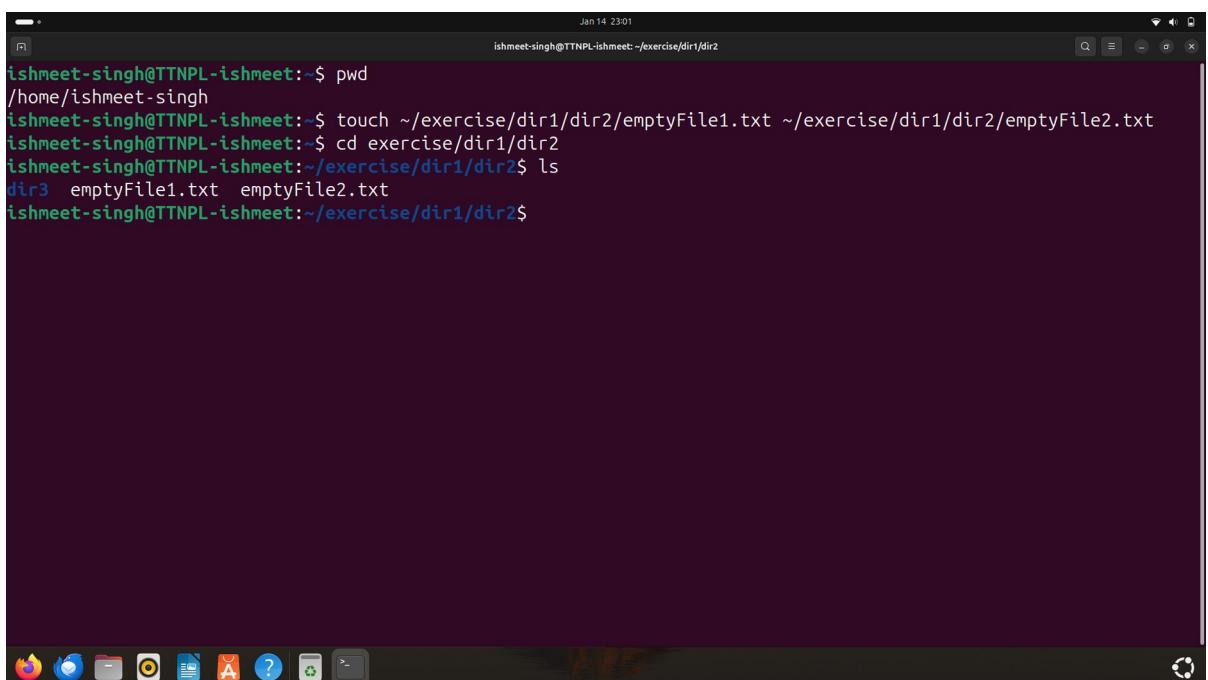
Linux Exercise

Q1. Create a directory "exercise" inside your home directory and create a nested (dir1/dir2/dir3) directory structure inside "excerise" with a single command.



```
ishmeet-singh@TTNPL-ishmeet:~$ pwd
/home/ishmeet-singh
ishmeet-singh@TTNPL-ishmeet:~$ mkdir -p ~/exercise/dir1/dir2/dir3
ishmeet-singh@TTNPL-ishmeet:~$ cd exercise/
ishmeet-singh@TTNPL-ishmeet:~/exercise$ ls
dir1
ishmeet-singh@TTNPL-ishmeet:~/exercise$ cd dir1
ishmeet-singh@TTNPL-ishmeet:~/exercise/dir1$ ls
dir2
ishmeet-singh@TTNPL-ishmeet:~/exercise/dir1$ cd dir2
ishmeet-singh@TTNPL-ishmeet:~/exercise/dir1/dir2$ ls
dir3
ishmeet-singh@TTNPL-ishmeet:~/exercise/dir1/dir2$
```

Q2. Create two empty files inside dir2 directory: emptyFile1, emptyFile2 in single command.



```
ishmeet-singh@TTNPL-ishmeet:~$ pwd
/home/ishmeet-singh
ishmeet-singh@TTNPL-ishmeet:~$ touch ~/exercise/dir1/dir2/emptyFile1.txt ~/exercise/dir1/dir2/emptyFile2.txt
ishmeet-singh@TTNPL-ishmeet:~$ cd exercise/dir1/dir2
ishmeet-singh@TTNPL-ishmeet:~/exercise/dir1/dir2$ ls
dir3  emptyFile1.txt  emptyFile2.txt
ishmeet-singh@TTNPL-ishmeet:~/exercise/dir1/dir2$
```

Q3. Create one file file1.txt containing text "hello world" and save it.

```
ishmeet-singh@TTNPL-ishmeet:~/exercise/dir1/dir2$ cat >file.txt
hello world
^C
ishmeet-singh@TTNPL-ishmeet:~/exercise/dir1/dir2$ cat file.txt
hello world
ishmeet-singh@TTNPL-ishmeet:~/exercise/dir1/dir2$
```

Q4. Find a "passwd" file using find command inside /etc. copy this files as passwd_copy and then rename this file as passwd_backup.

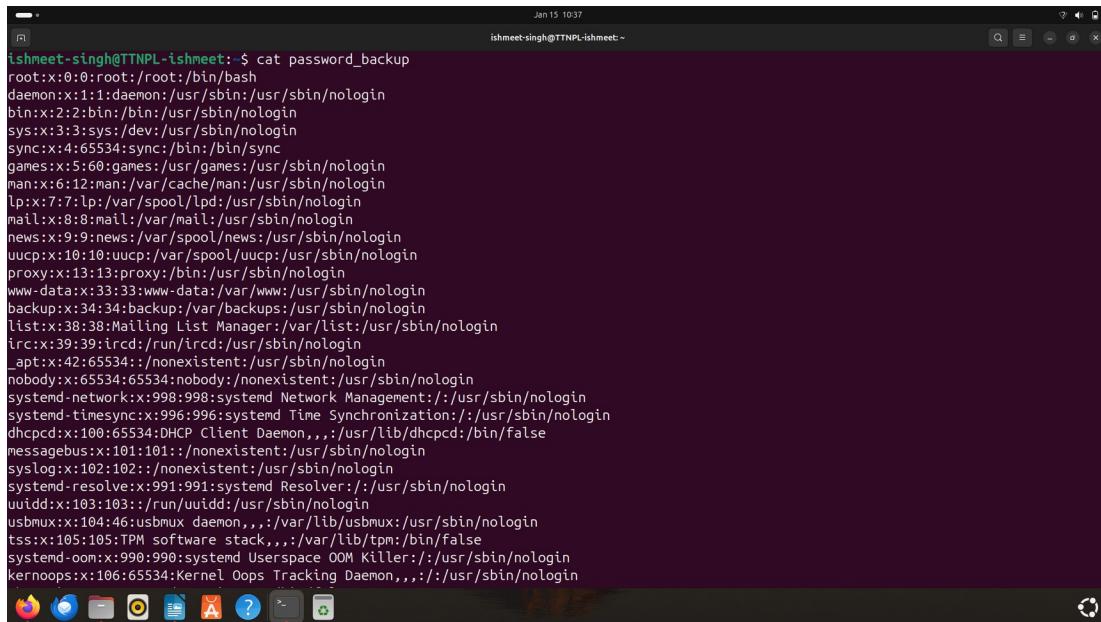
```
ishmeet-singh@TTNPL-ishmeet:~$ pwd
/home/ishmeet-singh
ishmeet-singh@TTNPL-ishmeet:~$ cd /
ishmeet-singh@TTNPL-ishmeet:/$ sudo find ./etc -type f -name passwd
./etc/passwd
./etc/pam.d/passwd
ishmeet-singh@TTNPL-ishmeet:/$ cp ./etc/passwd ~/password_copy
ishmeet-singh@TTNPL-ishmeet:/$ cd
ishmeet-singh@TTNPL-ishmeet: $ ls -l password_copy
-rw-r--r-- 1 ishmeet-singh ishmeet-singh 2925 Jan 14 23:07 password_copy
ishmeet-singh@TTNPL-ishmeet:/$ mv password_copy password_backup
ishmeet-singh@TTNPL-ishmeet: $ ls -l password_backup
-rw-r--r-- 1 ishmeet-singh ishmeet-singh 2925 Jan 14 23:07 password_backup
ishmeet-singh@TTNPL-ishmeet:~$
```

Q5. Try reading passwd_backup file in multiple tools: less,more,cat,strings etc and find the difference in their usage.

Ans. These are the differences I noticed:

- **cat**

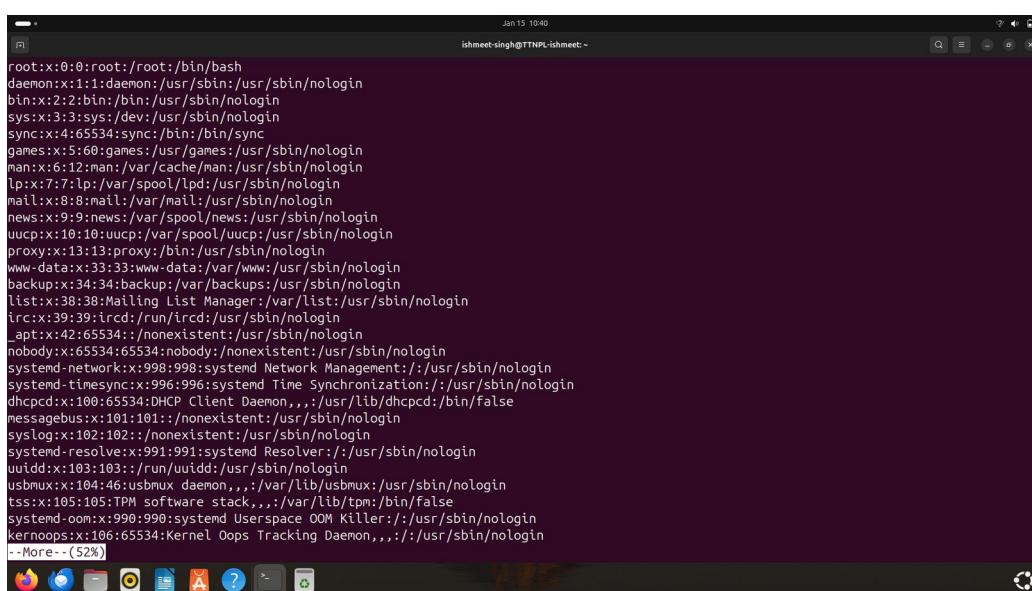
The cat command is used to display the complete content of a file on the terminal at once. It is mainly useful for small text files. When used on large files, it is not very convenient because the entire content is printed at once and quickly scrolls off the screen.



```
ishmeet-singh@TTNPL-ishmeet:~$ cat password_backup
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/run/ircd:/usr/sbin/nologin
_apt:x:42:65534::/nonexistent:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-network:x:998:998:systemd Network Management:/:/usr/sbin/nologin
systemd-timesync:x:996:996:systemd Time Synchronization:/:/usr/sbin/nologin
dhpcd:x:100:65534:DHCP Client Daemon,,,:/usr/lib/dhpcd:/bin/false
messagebus:x:101:101::/nonexistent:/usr/sbin/nologin
kernoops:x:106:65534:Kernel Ops Tracking Daemon,,,:/usr/sbin/nologin
syslog:x:102:102::/nonexistent:/usr/sbin/nologin
systemd-resolve:x:991:991:systemd Resolver:/:/usr/sbin/nologin
uid:103:103::/run/uuid:/usr/sbin/nologin
usbmux:x:104:46:usbmux daemon,,,:/var/lib/usbmux:/usr/sbin/nologin
tss:x:105:105:TPM software stack,,,:/var/lib/tpm:/bin/false
systemd-oom:x:990:990:systemd Userspace OOM Killer:/:/usr/sbin/nologin
kernoops:x:106:65534:Kernel Ops Tracking Daemon,,,:/usr/sbin/nologin
```

- **more**

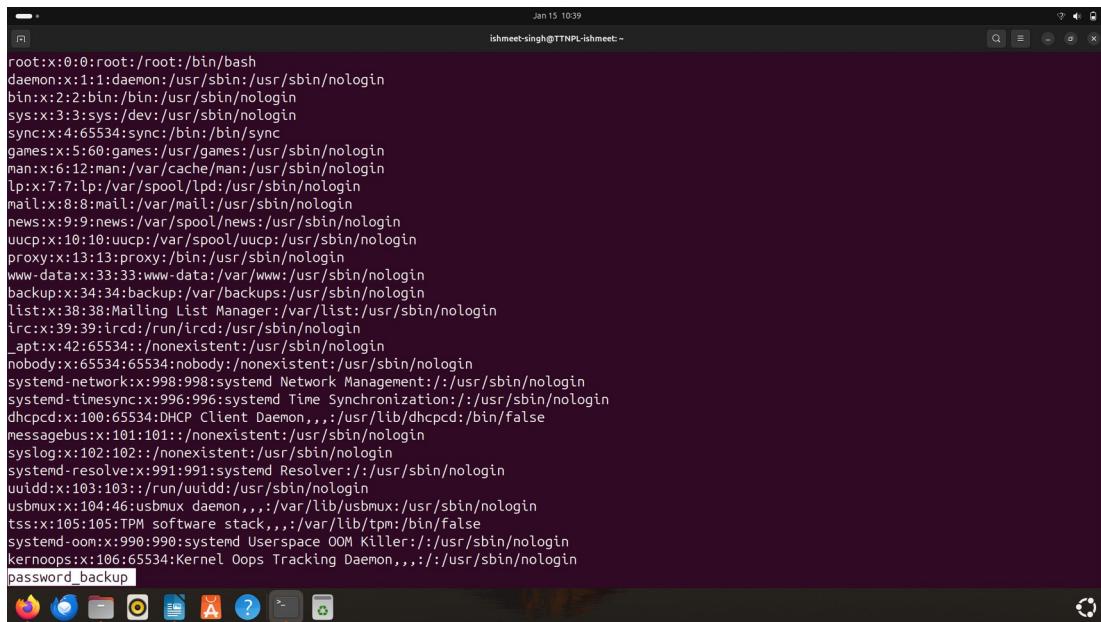
The more command is used to view file content page by page. It shows one screen at a time, which makes it better than **cat** for medium-sized files. However, it only allows forward movement and does not support scrolling backward.



```
ishmeet-singh@TTNPL-ishmeet:~$ more password_backup
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/run/ircd:/usr/sbin/nologin
_apt:x:42:65534::/nonexistent:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-network:x:998:998:systemd Network Management:/:/usr/sbin/nologin
systemd-timesync:x:996:996:systemd Time Synchronization:/:/usr/sbin/nologin
dhpcd:x:100:65534:DHCP Client Daemon,,,:/usr/lib/dhpcd:/bin/false
messagebus:x:101:101::/nonexistent:/usr/sbin/nologin
syslog:x:102:102::/nonexistent:/usr/sbin/nologin
systemd-resolve:x:991:991:systemd Resolver:/:/usr/sbin/nologin
uid:103:103::/run/uuid:/usr/sbin/nologin
usbmux:x:104:46:usbmux daemon,,,:/var/lib/usbmux:/usr/sbin/nologin
tss:x:105:105:TPM software stack,,,:/var/lib/tpm:/bin/false
systemd-oom:x:990:990:systemd Userspace OOM Killer:/:/usr/sbin/nologin
kernoops:x:106:65534:Kernel Ops Tracking Daemon,,,:/usr/sbin/nologin
--More-- (52%)
```

- **less**

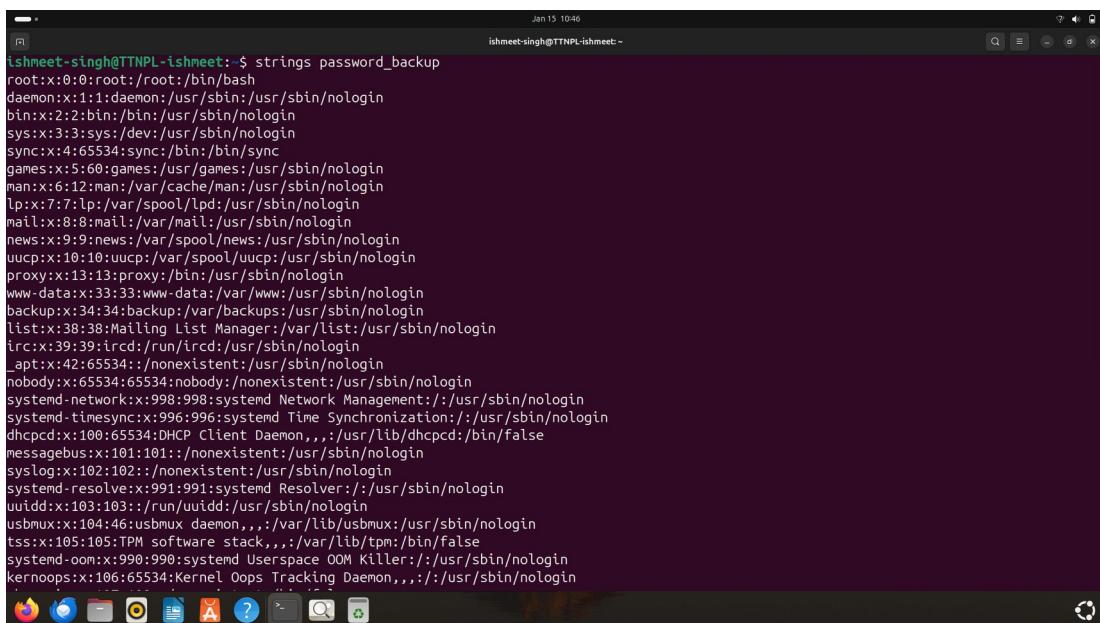
The **less** command is an improved version of **more**. It allows both forward and backward scrolling and also provides search functionality inside the file. It is very efficient for viewing large files and log files, which is why it is commonly used by system administrators.



```
Jan 15 10:39
ishmeet-singh@TTNPL-ishmeet: ~
root:x:0:0:root:/root:/bin/bash
daemon:x::1:daemon:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lpix:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mailx:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/run/ircd:/usr/sbin/nologin
_apt:x:42:65534::/nexistent:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nexistent:/usr/sbin/nologin
systemd-network:x:998:998:systemd Network Management:/usr/sbin/nologin
systemd-timesync:x:996:996:systemd Time Synchronization:/usr/sbin/nologin
dhcpcd:x:100:65534:DHCP Client Daemon,,,:/usr/lib/dhcpcd:/bin/false
messagebus:x:101:101::/nexistent:/usr/sbin/nologin
syslog:x:102:102::/nexistent:/usr/sbin/nologin
systemd-resolve:x:991:991:systemd Resolver:/usr/sbin/nologin
uuid:x:103:103::/run/uuid:/usr/sbin/nologin
usbmux:x:104:46:usbmux daemon,,,:/var/lib/usbmux:/usr/sbin/nologin
tss:x:105:105:TPM software stack,,,:/var/lib/tpm:/bin/false
systemd-oom:x:990:990:systemd Userspace OOM Killer:/usr/sbin/nologin
kernoops:x:106:65534:Kernel Oops Tracking Daemon,,,:/usr/sbin/nologin
password backup
```

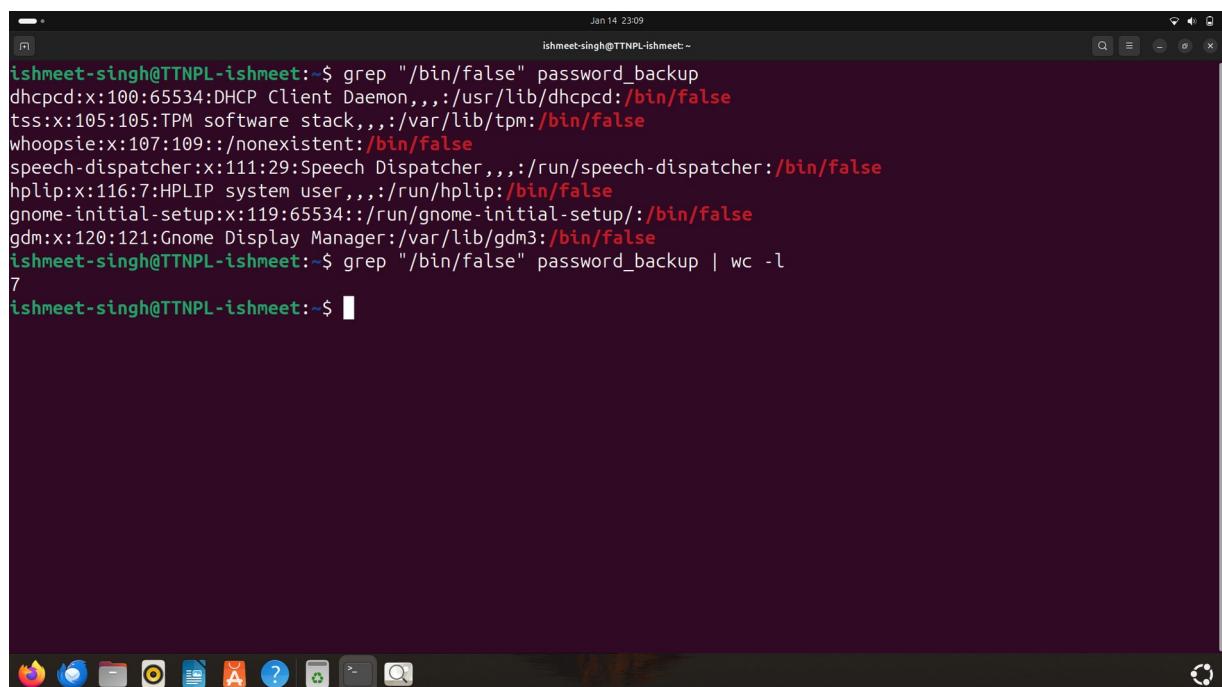
- **strings**

The **strings** command is used to extract readable text from binary files. It displays only printable characters and ignores non-readable data. This command is mostly used for debugging or analyzing executable and binary files, not for normal text files.



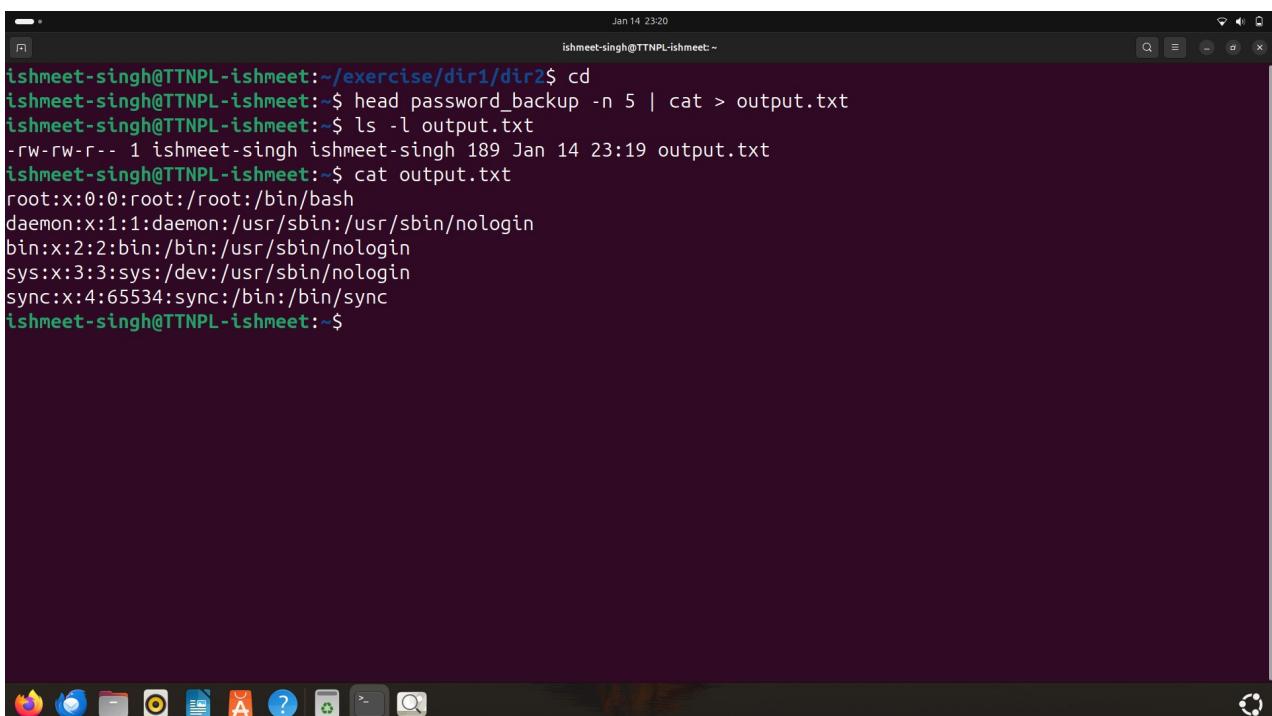
```
Jan 15 10:46
ishmeet-singh@TTNPL-ishmeet: ~
ishmeet-singh@TTNPL-ishmeet: $ strings password_backup
root:x:0:0:root:/root:/bin/bash
daemon:x::1:daemon:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lpix:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mailx:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/run/ircd:/usr/sbin/nologin
_apt:x:42:65534::/nexistent:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nexistent:/usr/sbin/nologin
systemd-network:x:998:998:systemd Network Management:/usr/sbin/nologin
systemd-timesync:x:996:996:systemd Time Synchronization:/usr/sbin/nologin
dhcpcd:x:100:65534:DHCP Client Daemon,,,:/usr/lib/dhcpcd:/bin/false
messagebus:x:101:101::/nexistent:/usr/sbin/nologin
syslog:x:102:102::/nexistent:/usr/sbin/nologin
systemd-resolve:x:991:991:systemd Resolver:/usr/sbin/nologin
uuid:x:103:103::/run/uuid:/usr/sbin/nologin
usbmux:x:104:46:usbmux daemon,,,:/var/lib/usbmux:/usr/sbin/nologin
tss:x:105:105:TPM software stack,,,:/var/lib/tpm:/bin/false
systemd-oom:x:990:990:systemd Userspace OOM Killer:/usr/sbin/nologin
kernoops:x:106:65534:KernelOopsTrackingDaemon,,,:/usr/sbin/nologin
password backup
```

Q6. Find out the number of line in password_backup containing "/bin/false".



```
ishmeet-singh@TTNPL-ishmeet:~$ grep "/bin/false" password_backup
dhpcd:x:100:65534:DHCP Client Daemon,,,:/usr/lib/dhpcd:/bin/false
tss:x:105:105:TPM software stack,,,:/var/lib/tpm:/bin/false
whoopsie:x:107:109::/nonexistent:/bin/false
speech-dispatcher:x:111:29:Speech Dispatcher,,,:/run/speech-dispatcher:/bin/false
hplip:x:116:7:HPLIP system user,,,:/run/hplip:/bin/false
gnome-initial-setup:x:119:65534::/run/gnome-initial-setup:/bin/false
gdm:x:120:121:Gnome Display Manager:/var/lib/gdm3:/bin/false
ishmeet-singh@TTNPL-ishmeet:~$ grep "/bin/false" password_backup | wc -l
7
ishmeet-singh@TTNPL-ishmeet:~$
```

Q7. Get the first 5 lines of a file “password_backup” and Redirect the output of the above commands into file "output".



```
ishmeet-singh@TTNPL-ishmeet:~/exercise/dir1/dir2$ cd
ishmeet-singh@TTNPL-ishmeet:~$ head password_backup -n 5 | cat > output.txt
ishmeet-singh@TTNPL-ishmeet:~$ ls -l output.txt
-rw-rw-r-- 1 ishmeet-singh ishmeet-singh 189 Jan 14 23:19 output.txt
ishmeet-singh@TTNPL-ishmeet:~$ cat output.txt
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
ishmeet-singh@TTNPL-ishmeet:~$
```

Q8. Create a "test" user,create its password and find out its uid and gid.

```
ishmeet-singh@TTNPL-ishmeet:~$ sudo useradd -m -s /bin/bash test
[sudo] password for ishmeet-singh:
ishmeet-singh@TTNPL-ishmeet:~$ sudo passwd test
New password:
Retype new password:
passwd: password updated successfully
ishmeet-singh@TTNPL-ishmeet:~$ id test
uid=1001(test) gid=1002(test) groups=1002(test)
ishmeet-singh@TTNPL-ishmeet:~$
```

Q9. Change the timestamp of emptyFile1,emptyFile2 which are exist in dir2.

```
ishmeet-singh@TTNPL-ishmeet:~$ cd exercise/dir1/dir2
ishmeet-singh@TTNPL-ishmeet:~/exercise/dir1/dir2$ ls -l emptyFile1.txt emptyFile2.txt
-rw-rw-r-- 1 ishmeet-singh ishmeet-singh 0 Jan 14 23:01 emptyFile1.txt
-rw-rw-r-- 1 ishmeet-singh ishmeet-singh 0 Jan 14 23:01 emptyFile2.txt
ishmeet-singh@TTNPL-ishmeet:~/exercise/dir1/dir2$ touch -t 202401011030 emptyFile1.txt emptyFile2.txt
ishmeet-singh@TTNPL-ishmeet:~/exercise/dir1/dir2$ ls -l emptyFile1.txt emptyFile2.txt
-rw-rw-r-- 1 ishmeet-singh ishmeet-singh 0 Jan 1 2024 emptyFile1.txt
-rw-rw-r-- 1 ishmeet-singh ishmeet-singh 0 Jan 1 2024 emptyFile2.txt
ishmeet-singh@TTNPL-ishmeet:~/exercise/dir1/dir2$ stat emptyFile1.txt emptyFile2.txt
  File: emptyFile1.txt
  Size: 0          Blocks: 0          IO Block: 4096   regular empty file
Device: 259,3    Inode: 265230      Links: 1
Access: (0664/-rw-rw-r--)  Uid: ( 1000/ishmeet-singh)  Gid: ( 1000/ishmeet-singh)
Access: 2024-01-01 10:30:00.000000000 +0530
Modify: 2024-01-01 10:30:00.000000000 +0530
Change: 2026-01-14 23:16:34.083538458 +0530
 Birth: 2026-01-14 23:01:40.633732563 +0530
  File: emptyFile2.txt
  Size: 0          Blocks: 0          IO Block: 4096   regular empty file
Device: 259,3    Inode: 283434      Links: 1
Access: (0664/-rw-rw-r--)  Uid: ( 1000/ishmeet-singh)  Gid: ( 1000/ishmeet-singh)
Access: 2024-01-01 10:30:00.000000000 +0530
Modify: 2024-01-01 10:30:00.000000000 +0530
Change: 2026-01-14 23:16:34.084538384 +0530
 Birth: 2026-01-14 23:01:40.635075605 +0530
```

Q10. Login as test user and edit the "output" file created above. Since the permission wont allow you to save the changes. Configure such that test user can edit it.

- a) Add group owner of the "output" file as the secondary group of testuser and check/change the "output" file permission if it is editable by group. Once done revert the changes
 - b) Make the file editable to the world so that test user can access it. Revert the changes after verification
 - c) Change the ownership to edit the file.

A screenshot of a Linux desktop environment. At the top, there's a header bar with the date "Jan 13 14:37" and a search icon. Below the header are two terminal windows. The left terminal window has the title "ishmeet-singh@TTNPL-ishmeet: ~" and the right one has "test@TTNPL-ishmeet: ~". Both terminals are currently empty. At the bottom of the screen is a dock with several icons, including a browser (Firefox), file manager (Nautilus), terminal (GNOME Terminal), and system tray icons. A file manager window is visible in the background, showing a folder structure with files like "output.txt" and "output1.txt".

a)

```
Jan 15 14:47
ishmeet-singh@TTNPL-ishmeet:~
```

ishmeet-singh@TTNPL-ishmeet:~ \$ sudo su - test
test@TTNPL-ishmeet:~\$ nano /home/ishmeet-singh/output.txt
test@TTNPL-ishmeet:~\$ exit
logout
ishmeet-singh@TTNPL-ishmeet:~\$ sudo groupadd testusers
ishmeet-singh@TTNPL-ishmeet:~\$ sudo chgrp testusers output.txt
ishmeet-singh@TTNPL-ishmeet:~\$ ls -l output.txt
-rw-r--r-- 1 ishmeet-singh testusers 189 Jan 14 23:19 output.txt
ishmeet-singh@TTNPL-ishmeet:~\$ sudo usermod -aG testusers test
ishmeet-singh@TTNPL-ishmeet:~\$

```
ishmeet-singh@TTNPL-ishmeet:~$ sudo su - test
test@TTNPL-ishmeet:~$ exit
logout
ishmeet-singh@TTNPL-ishmeet:~$ chmod g+rwx output.txt
ishmeet-singh@TTNPL-ishmeet:~$ ls -l output.txt
-rw-rw---- 1 ishmeet-singh testusers 189 Jan 14 23:19 output.txt
ishmeet-singh@TTNPL-ishmeet:~$ sudo su - test
test@TTNPL-ishmeet:~$ vi /home/ishmeet-singh/output.txt
```

```
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
```

```
test@TTNPL-ishmeet:~$ exit
logout
ishmeet-singh@TTNPL-ishmeet:~$ sudo chgrp ishmeet-singh output.txt
[sudo] password for ishmeet-singh:
ishmeet-singh@TTNPL-ishmeet:~$ ls -l output.txt
-rw-rw---- 1 ishmeet-singh ishmeet-singh 189 Jan 14 23:19 output.txt
ishmeet-singh@TTNPL-ishmeet:~$ sudo groupdel testusers
ishmeet-singh@TTNPL-ishmeet:~$ chmod g-rw output.txt
ishmeet-singh@TTNPL-ishmeet:~$
```

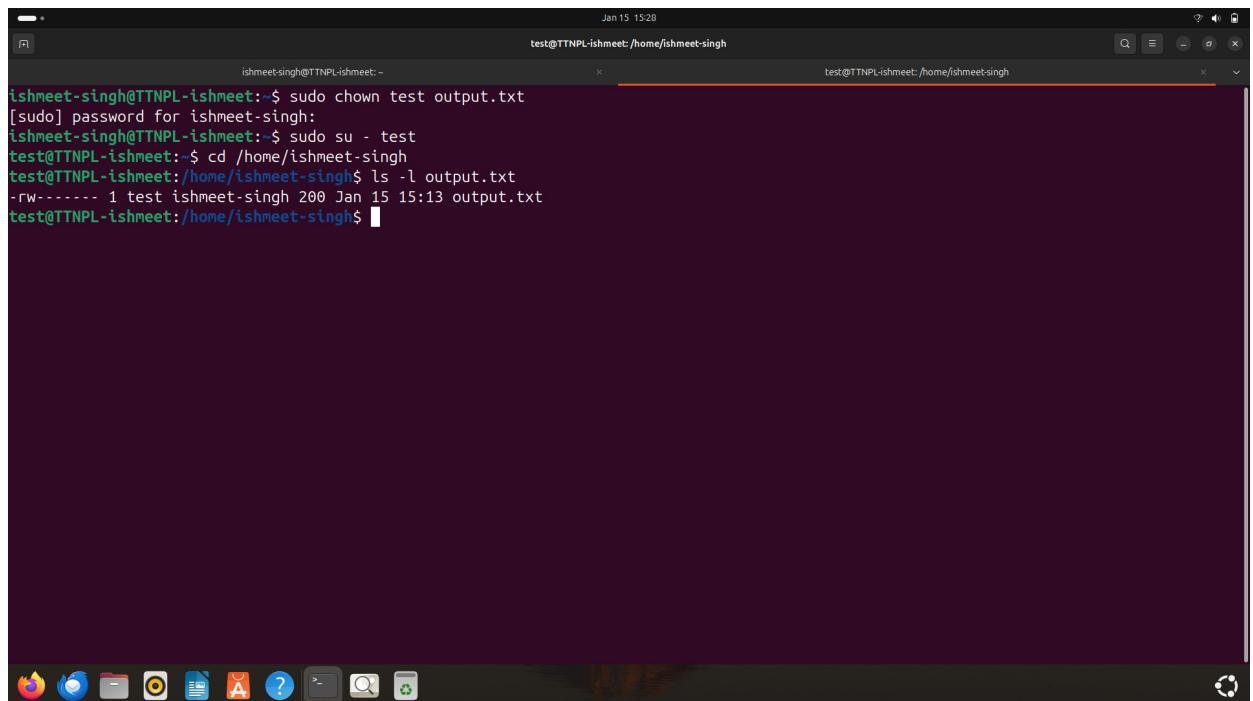
b)

```
ishmeet-singh@TTNPL-ishmeet:~$ chmod o+rw output.txt
ishmeet-singh@TTNPL-ishmeet:~$ ls -l output.txt
-rw----rw- 1 ishmeet-singh ishmeet-singh 189 Jan 14 23:19 output.txt
ishmeet-singh@TTNPL-ishmeet:~$ sudo su - test
test@TTNPL-ishmeet:~$ vi /home/ishmeet-singh/output.txt
test@TTNPL-ishmeet:~$ vi /home/ishmeet-singh/output.txt
```

```
edited
A
B
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/sync
~
~
~
~
~
```

```
ishmeet-singh@TTNPL-ishmeet:~$ chmod o+rw output.txt
ishmeet-singh@TTNPL-ishmeet:~$ ls -l output.txt
-rw----rw- 1 ishmeet-singh ishmeet-singh 189 Jan 14 23:19 output.txt
ishmeet-singh@TTNPL-ishmeet:~$ sudo su - test
test@TTNPL-ishmeet:~$ vi /home/ishmeet-singh/output.txt
test@TTNPL-ishmeet:~$ vi /home/ishmeet-singh/output.txt
test@TTNPL-ishmeet:~$ exit
logout
ishmeet-singh@TTNPL-ishmeet:~$ chmod o-rw output.txt
ishmeet-singh@TTNPL-ishmeet:~$ ls -l output.txt
-rw----- 1 ishmeet-singh ishmeet-singh 200 Jan 15 15:13 output.txt
ishmeet-singh@TTNPL-ishmeet:~$
```

c)



```
ishmeet-singh@TTNPL-ishmeet: ~
[sudo] password for ishmeet-singh:
ishmeet-singh@TTNPL-ishmeet: ~$ sudo su - test
test@TTNPL-ishmeet:~$ cd /home/ishmeet-singh
test@TTNPL-ishmeet:/home/ishmeet-singh$ ls -l output.txt
-rw----- 1 test ishmeet-singh 200 Jan 15 15:13 output.txt
test@TTNPL-ishmeet:/home/ishmeet-singh$
```

Q11. Create alias with your name so that it creates a file as "/tmp/aliastesting".

A screenshot of a Linux desktop environment showing a terminal window. The terminal window has a dark background and light-colored text. At the top, it shows the date and time: "Jan 14 21:49". The prompt is "ishmeet-singh@TTNPL-ishmeet:~\$". The user runs the command "alias ishmeet='touch /tmp/aliastesting'". Then they run "ishmeet" which executes the alias. Finally, they run "ls -l tmp/aliastesting" to show the created file.

```
ishmeet-singh@TTNPL-ishmeet:~$ alias ishmeet='touch /tmp/aliastesting'
ishmeet-singh@TTNPL-ishmeet:~$ ishmeet
ishmeet-singh@TTNPL-ishmeet:~$ ls
bin          boot  dev   home  lib64      lost+found  mnt   proc      root  sbin      snap  sys   usr
bin usr-is-merged cdrom etc  lib lib usr-is-merged media    opt  Quarantine  run  sbin usr-is-merged  srv  tmp   var
ishmeet-singh@TTNPL-ishmeet:~$ ls -l tmp/aliastesting
-rw-rw-r-- 1 ishmeet-singh ishmeet-singh 0 Jan 14 21:48 tmp/aliastesting
ishmeet-singh@TTNPL-ishmeet:~$
```

Q12. Edit ~/.bashrc file such that when you change to "test" user it should clear the screen and print "Welcome".

A screenshot of a Linux desktop environment showing a terminal window. The terminal window has a dark background and light-colored text. At the top, it shows the date and time: "Jan 14 23:28". The prompt is "test@TTNPL-ishmeet:~\$". The user runs "sudo su - test" to switch to the "test" user. They then run "ls" and "pwd" to check their current directory. Finally, they run "nano ~/.bashrc" to edit the file.

```
ishmeet-singh@TTNPL-ishmeet:~$ sudo su - test
test@TTNPL-ishmeet:~$ ls
test@TTNPL-ishmeet:~$ pwd
/home/test
test@TTNPL-ishmeet:~$ nano ~/.bashrc
```

GNU nano 7.2

Jan 14 23:29

test@TTNPL-ishmeet: ~

```
./.bashrc *
```

```
# ~/.bash_aliases, instead of adding them here directly.
# See /usr/share/doc/bash-doc/examples in the bash-doc package.

if [ -f ~/.bash_aliases ]; then
. ~/.bash_aliases
fi

# enable programmable completion features (you don't need to enable
# this, if it's already enabled in /etc/bash.bashrc and /etc/profile
# sources /etc/bash.bashrc).
if ! shopt -oq posix; then
if [ -f /usr/share/bash-completion/bash_completion ]; then
. /usr/share/bash-completion/bash_completion
elif [ -f /etc/bash_completion ]; then
. /etc/bash_completion
fi
fi

clear
echo "Welcome"
```

^G Help ^O Write Out ^W Where Is ^K Cut ^T Execute ^C Location M-U Undo
^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^/ Go To Line M-E Redo

Firefox LibreOffice Terminal Dash Home

ishmeet-singh@TTNPL-ishmeet:~\$ sudo su - test

test@TTNPL-ishmeet:~\$ cd

test@TTNPL-ishmeet:~\$ pwd

/home/test

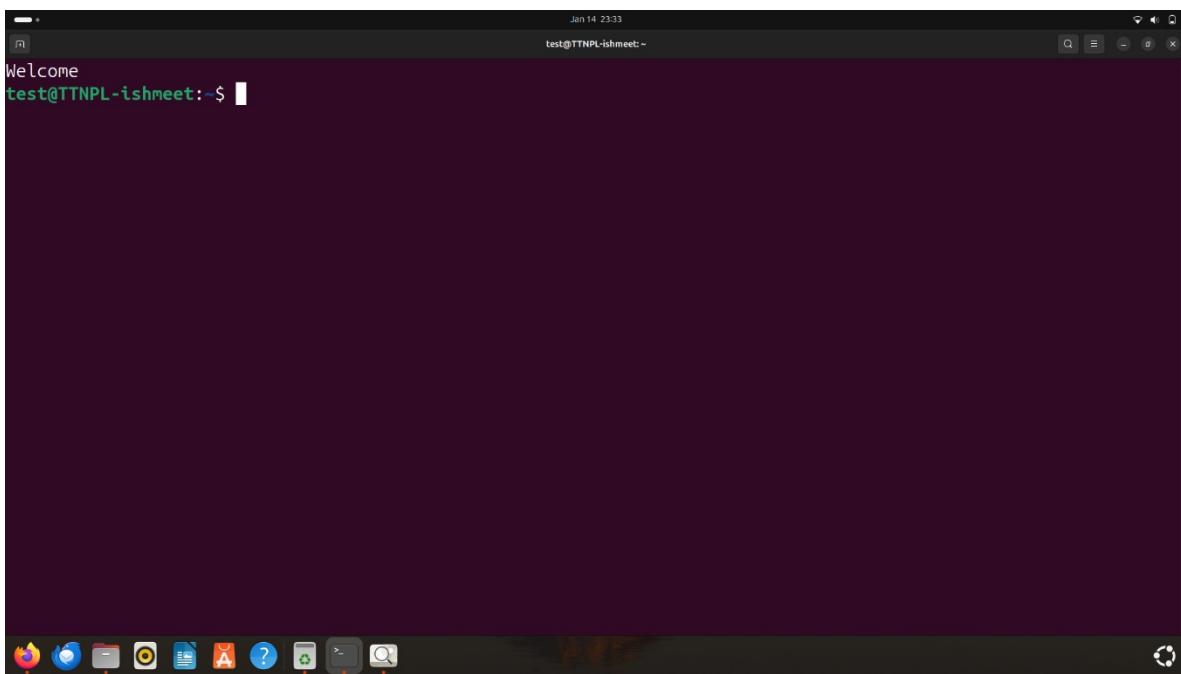
test@TTNPL-ishmeet:~\$ nano ./bashrc

test@TTNPL-ishmeet:~\$. ./bashrc

Jan 14 23:36

test@TTNPL-ishmeet:~

Firefox LibreOffice Terminal Dash Home



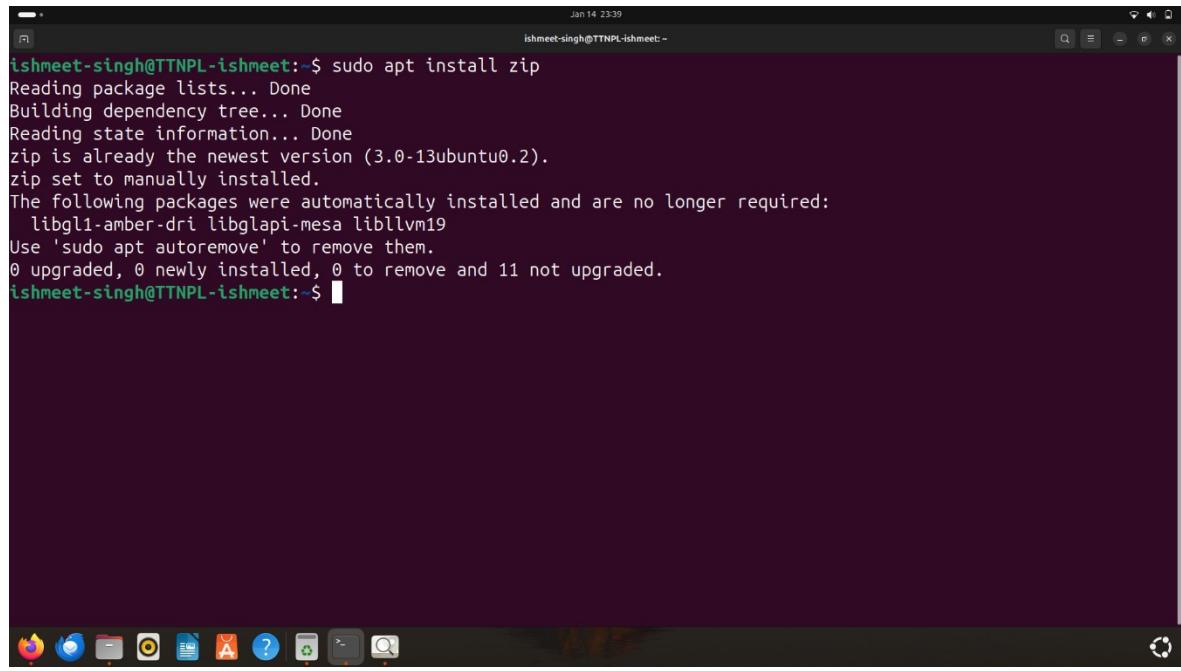
A screenshot of a Linux desktop environment, likely Ubuntu, showing a terminal window. The terminal window has a dark background and contains the following text:

```
Jan 14 23:33
test@TTNPL-ishmeet: ~
```

Welcome
test@TTNPL-ishmeet: \$

The desktop interface includes a dock at the bottom with various icons for applications like a web browser, file manager, and system tools.

Q13. Install “zip” package.



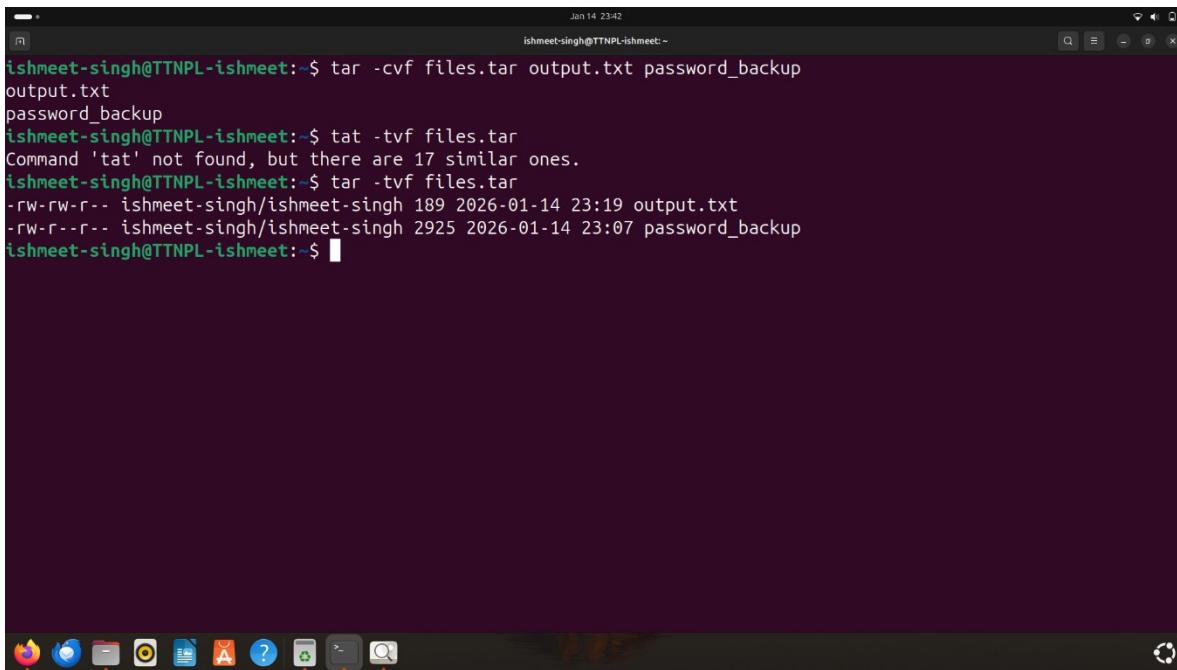
A screenshot of a Linux desktop environment, likely Ubuntu, showing a terminal window. The terminal window has a dark background and contains the following text:

```
Jan 14 23:39
ishmeet-singh@TTNPL-ishmeet: ~
```

```
ishmeet-singh@TTNPL-ishmeet: $ sudo apt install zip
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
zip is already the newest version (3.0-13ubuntu0.2).
zip set to manually installed.
The following packages were automatically installed and are no longer required:
  libgl1-amber-dri libglapi-mesa liblvm19
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 11 not upgraded.
ishmeet-singh@TTNPL-ishmeet: $
```

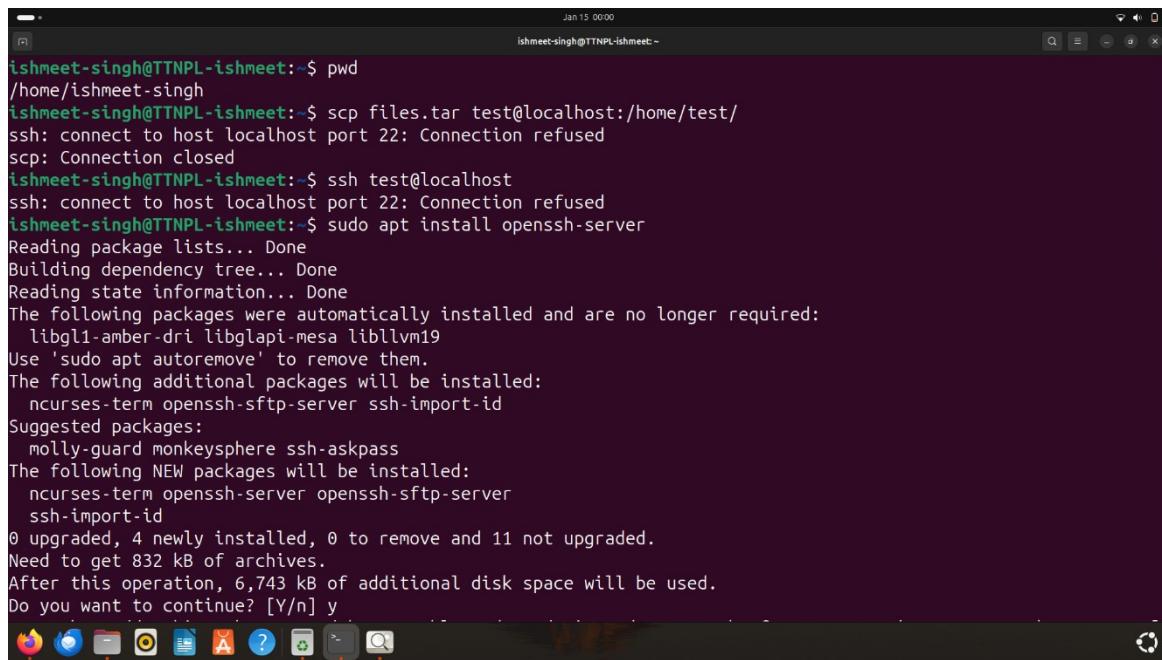
The desktop interface includes a dock at the bottom with various icons for applications like a web browser, file manager, and system tools.

Q14. Compress "output" and "password_backup" files into a tar ball. List the files present inside the tar created.



```
ishmeet-singh@TTNPL-ishmeet: $ tar -cvf files.tar output.txt password_backup
output.txt
password_backup
ishmeet-singh@TTNPL-ishmeet: $ tar -tvf files.tar
Command 'tat' not found, but there are 17 similar ones.
ishmeet-singh@TTNPL-ishmeet: $ tar -tvf files.tar
-rw-rw-r-- ishmeet-singh/ishmeet-singh 189 2026-01-14 23:19 output.txt
-rw-r--r-- ishmeet-singh/ishmeet-singh 2925 2026-01-14 23:07 password_backup
ishmeet-singh@TTNPL-ishmeet: $
```

Q15. scp this file to test user.



```
ishmeet-singh@TTNPL-ishmeet: $ pwd
/home/ishmeet-singh
ishmeet-singh@TTNPL-ishmeet: $ scp files.tar test@localhost:/home/test/
ssh: connect to host localhost port 22: Connection refused
scp: Connection closed
ishmeet-singh@TTNPL-ishmeet: $ ssh test@localhost
ssh: connect to host localhost port 22: Connection refused
ishmeet-singh@TTNPL-ishmeet: $ sudo apt install openssh-server
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  libgl1-amber-dri libglapi-mesa liblllvm19
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  ncurses-term openssh-sftp-server ssh-import-id
Suggested packages:
  molly-guard monkeysphere ssh-askpass
The following NEW packages will be installed:
  ncurses-term openssh-server openssh-sftp-server
  ssh-import-id
0 upgraded, 4 newly installed, 0 to remove and 11 not upgraded.
Need to get 832 kB of archives.
After this operation, 6,743 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
```

```
Jan 15 00:01  
ishmeet-singh@TTNPL-ishmeet:~$ sudo systemctl start ssh  
ishmeet-singh@TTNPL-ishmeet:~$ sudo systemctl enable ssh  
Synchronizing state of ssh.service with SysV service script with /usr/lib/systemd/systemd-sysv-install.  
Executing: /usr/lib/systemd/systemd-sysv-install enable ssh  
Created symlink /etc/systemd/system/sshd.service → /usr/lib/systemd/system/ssh.service.  
Created symlink /etc/systemd/system/multi-user.target.wants/ssh.service → /usr/lib/systemd/system/ssh.service.  
ishmeet-singh@TTNPL-ishmeet:~$ sudo systemctl status ssh  
● ssh.service - OpenBSD Secure Shell server  
    Loaded: loaded (/usr/lib/systemd/system/ssh.service)  
    Active: active (running) since Thu 2026-01-15 00:  
TriggeredBy: ● ssh.socket  
    Docs: man:sshd(8)  
          man:sshd_config(5)  
      Main PID: 19491 (sshd)  
        Tasks: 1 (limit: 18629)  
       Memory: 1.2M (peak: 1.7M)  
         CPU: 32ms  
        CGroup: /system.slice/sshd.service  
                └─19491 "sshd: /usr/sbin/sshd -D [listene  
  
Jan 15 00:00:50 TTNPL-ishmeet systemd[1]: Starting ssh>  
Jan 15 00:00:50 TTNPL-ishmeet sshd[19491]: Server list>  
Jan 15 00:00:50 TTNPL-ishmeet sshd[19491]: Server list>  
Jan 15 00:00:50 TTNPL-ishmeet systemd[1]: Started ssh.>  
ishmeet-singh@TTNPL-ishmeet:~$
```

```
Jan 15 00:03  
ishmeet-singh@TTNPL-ishmeet:~$ scp files.tar test@localhost:/home/test/  
The authenticity of host 'localhost (127.0.0.1)' can't be established.  
ED25519 key fingerprint is SHA256:K2Wk4WQF6EskPrL2agwI/pPNGAlrb9jzAyi88PcEpo.  
This key is not known by any other names.  
Are you sure you want to continue connecting (yes/no/[fingerprint])? y  
Please type 'yes', 'no' or the fingerprint: yes  
Warning: Permanently added 'localhost' (ED25519) to the list of known hosts.  
test@localhost's password:  
files.tar      100%   10KB  28.2MB/s  00:00  
ishmeet-singh@TTNPL-ishmeet:~$
```

Q16. Unzip this tar file by logging into the remote server.

A screenshot of a terminal window titled "test@TTNPL-ishmeet:~". The session starts with a password prompt for "test@localhost". It then displays standard Ubuntu 24.04 LTS welcome messages, including documentation, management, and support links. A note about expanded security maintenance for applications is shown, followed by a message indicating 10 updates available immediately. The user runs "apt list --upgradable" and then enables ESM Apps for additional security updates. Finally, the user runs "tar -xvf files.tar" to extract the contents of the tar file, which results in "output.txt", "password_backup", and "snap" being listed in the current directory.

```
ishmeet-singh@TTNPL-ishmeet:~$ ssh test@localhost
test@localhost's password:
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.14.0-37-generic x86_64)

 * Documentation: https://help.ubuntu.com
 * Management: https://landscape.canonical.com
 * Support: https://ubuntu.com/pro

Expanded Security Maintenance for Applications is not enabled.

10 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional security updates.
See https://ubuntu.com/esm or run: sudo pro status

Last login: Thu Jan 15 07:27:47 2026 from 127.0.0.1
test@TTNPL-ishmeet: $ tar -xvf files.tar
output.txt
password_backup
test@TTNPL-ishmeet: $ ls
files.tar  output.txt  password_backup  snap
test@TTNPL-ishmeet: $
```

Q17. Download any image from web and move to desktop

A screenshot of a terminal window titled "ishmeet-singh@TTNPL-ishmeet:~". The user runs "wget -O salah.jpg https://upload.wikimedia.org/wikipedia/commons/thumb/e/ea/Mohamed_Salah_2021_CAN_Final.jpg/250px-Mohamed_Salah_2021_CAN_Final.jpg" to download the image. The command shows the progress and success of the download, saving the file as "salah.jpg". After the download is complete, the user runs "mv salah.jpg ~/Desktop/salah.jpg" to move the downloaded image to the desktop directory.

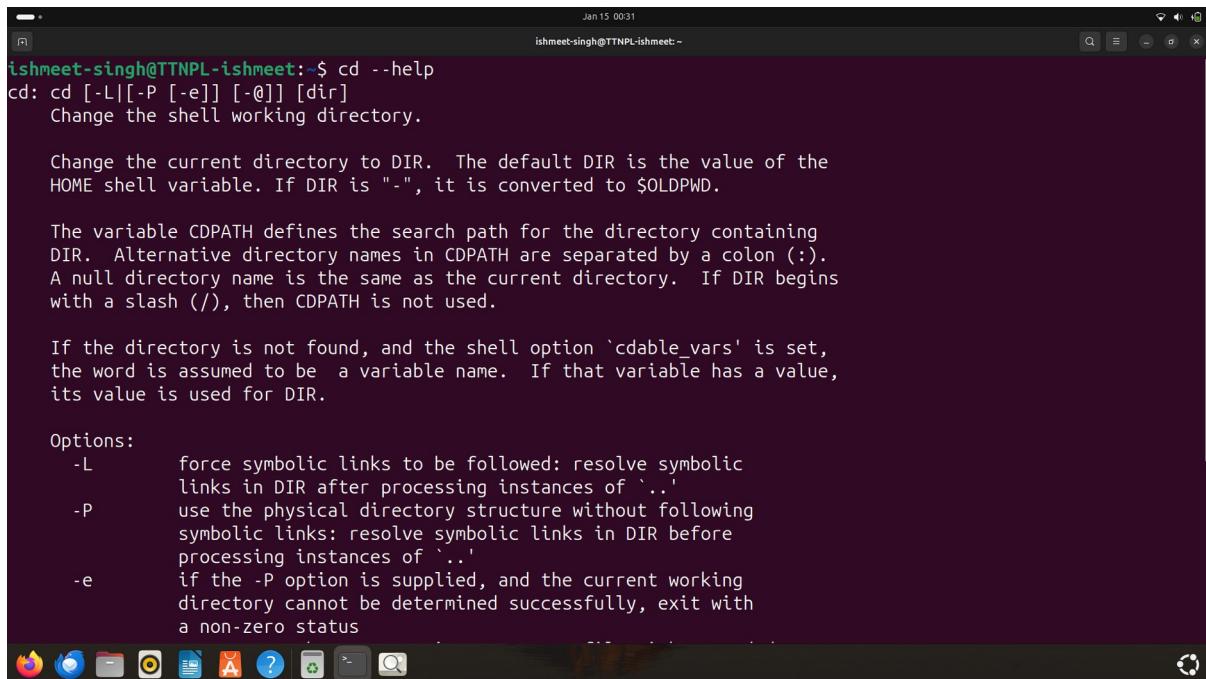
```
ishmeet-singh@TTNPL-ishmeet:~$ wget -O salah.jpg https://upload.wikimedia.org/wikipedia/commons/thumb/e/ea/Mohamed_Salah_2021_CAN_Final.jpg/250px-Mohamed_Salah_2021_CAN_Final.jpg
--2026-01-15 00:28:37-- https://upload.wikimedia.org/wikipedia/commons/thumb/e/ea/Mohamed_Salah_2021_CAN_Final.jpg/250px-Mohamed_Salah_2021_CAN_Final.jpg
Resolving upload.wikimedia.org (upload.wikimedia.org)... 103.102.166.240, 2001:df2:e500:ed1a::2:b
Connecting to upload.wikimedia.org (upload.wikimedia.org)|103.102.166.240|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 28350 (28K) [image/jpeg]
Saving to: 'salah.jpg'

salah.jpg      100% 27.69K  ---KB/s    in 0.07s

2026-01-15 00:28:37 (391 KB/s) - 'salah.jpg' saved [28350/28350]

ishmeet-singh@TTNPL-ishmeet:~$ mv salah.jpg ~/Desktop/salah.jpg
ishmeet-singh@TTNPL-ishmeet:~$
```

Q18. How to get help of commands usages.



```
ishmeet-singh@TTNPL-ishmeet:~$ cd --help
cd: cd [-L][-P [-e]] [-@] [dir]
      Change the shell working directory.

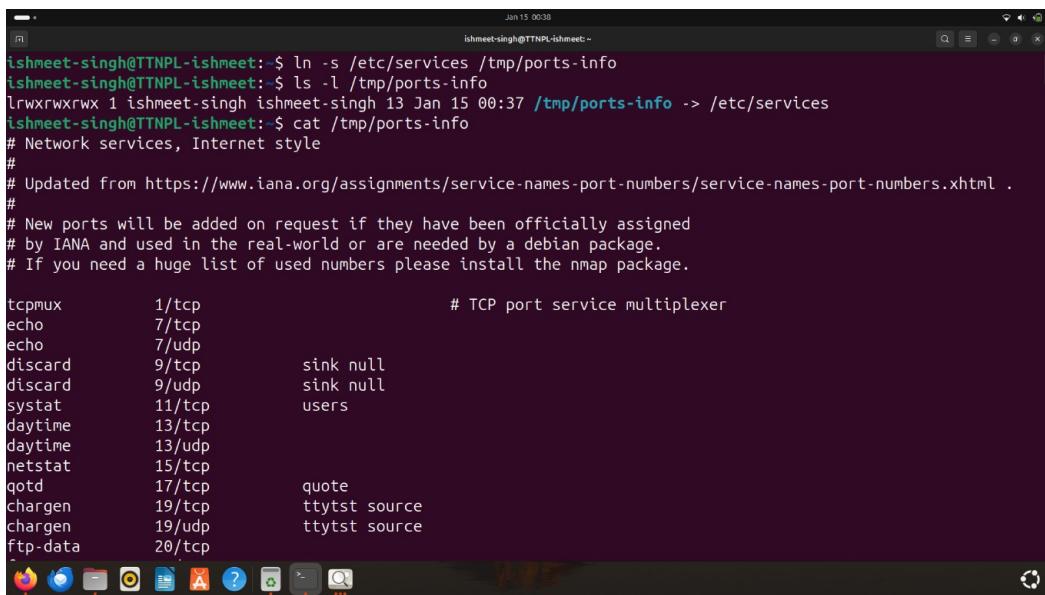
      Change the current directory to DIR.  The default DIR is the value of the
      HOME shell variable. If DIR is "-", it is converted to $OLDPWD.

      The variable CDPATH defines the search path for the directory containing
      DIR. Alternative directory names in CDPATH are separated by a colon (:).
      A null directory name is the same as the current directory. If DIR begins
      with a slash (/), then CDPATH is not used.

      If the directory is not found, and the shell option `cdable_vars' is set,
      the word is assumed to be a variable name. If that variable has a value,
      its value is used for DIR.

Options:
  -L      force symbolic links to be followed: resolve symbolic
          links in DIR after processing instances of `..'
  -P      use the physical directory structure without following
          symbolic links: resolve symbolic links in DIR before
          processing instances of `..'
  -e      if the -P option is supplied, and the current working
          directory cannot be determined successfully, exit with
          a non-zero status
```

Q19. Create a symlink of /etc/services into /tmp/ports-info.



```
ishmeet-singh@TTNPL-ishmeet:~$ ln -s /etc/services /tmp/ports-info
ishmeet-singh@TTNPL-ishmeet:~$ ls -l /tmp/ports-info
lrwxrwxrwx 1 ishmeet-singh ishmeet-singh 13 Jan 15 00:37 /tmp/ports-info -> /etc/services
ishmeet-singh@TTNPL-ishmeet:~$ cat /tmp/ports-info
# Network services, Internet style
#
# Updated from https://www.iana.org/assignments/service-names-port-numbers/service-names-port-numbers.xhtml .
#
# New ports will be added on request if they have been officially assigned
# by IANA and used in the real-world or are needed by a debian package.
# If you need a huge list of used numbers please install the nmap package.

tcpmux      1/tcp          # TCP port service multiplexer
echo        7/tcp
echo        7/udp
discard     9/tcp          sink null
discard     9/udp          sink null
systat      11/tcp         users
daytime     13/tcp
daytime     13/udp
netstat     15/tcp
qotd       17/tcp          quote
chargen    19/tcp          ttyst source
chargen    19/udp          ttyst source
ftp-data   20/tcp
```

Q20. You are appointed as a Software/DevOps Engineer in ABC media services. On your first day you need to troubleshoot a problem. There is a command “xyz” somewhere installed in that linux system. But as a new joinee you do not have any idea about where is that Installed. How can you check that?

Ans. Here are the most effective ways to find the location of the command **xyz** in a Linux system:

1. which command

This is usually the quickest way to find the full path of a command if it is present in the system's PATH environment variable. It prints the path of the executable that will be executed when the command name is used.

Example:

```
which xyz
```

2. whereis command

The whereis command is designed to locate the binary file, source file, and manual pages related to a command. It is more comprehensive than which and searches standard system directories.

Example:

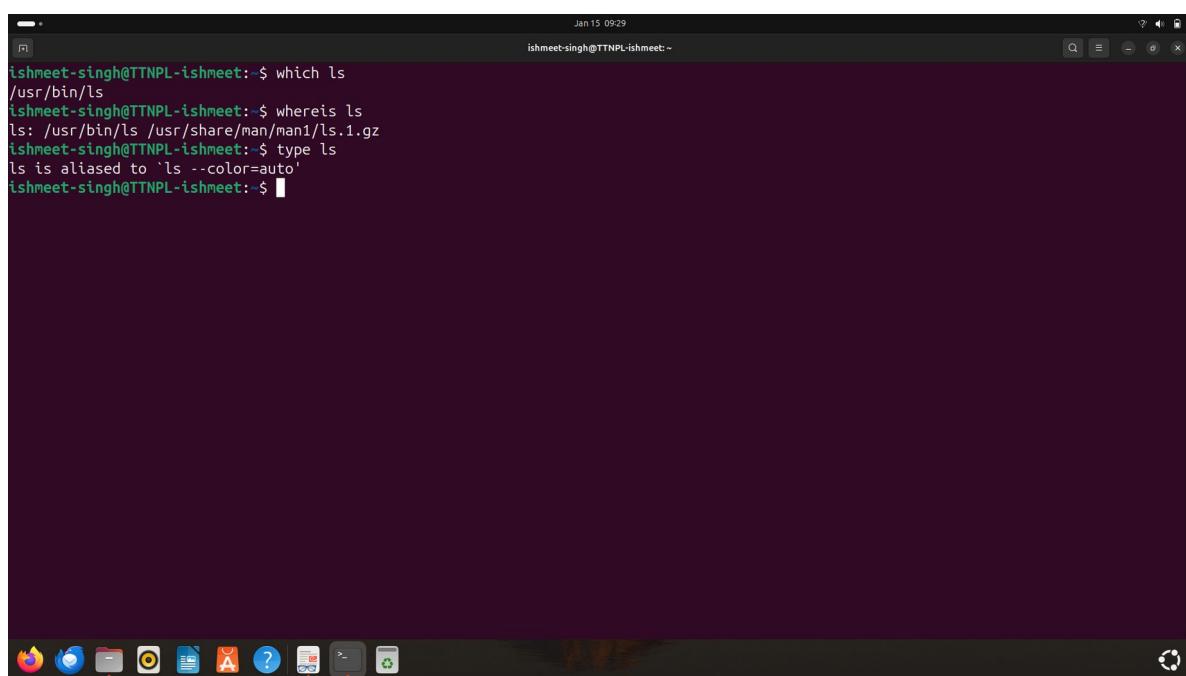
```
whereis xyz
```

3. type command

The type command is a shell built-in that tells how the shell interprets a command. It helps determine whether the command is an executable file, alias, shell function, or built-in command, and may also show its path.

Example:

```
type xyz
```



A screenshot of a Linux terminal window titled 'Terminal'. The window shows a command-line session with the following output:

```
ishmeet-singh@TTNPL-ishmeet: ~$ which ls
/usr/bin/ls
ishmeet-singh@TTNPL-ishmeet: ~$ whereis ls
ls: /usr/bin/ls /usr/share/man/man1/ls.1.gz
ishmeet-singh@TTNPL-ishmeet: ~$ type ls
ls is aliased to `ls --color=auto'
ishmeet-singh@TTNPL-ishmeet: ~$
```

The terminal window has a dark background and light-colored text. At the bottom, there is a dock with various icons, including a browser, file manager, and system tools. The window title bar shows the date and time as 'Jan 15 09:29'.