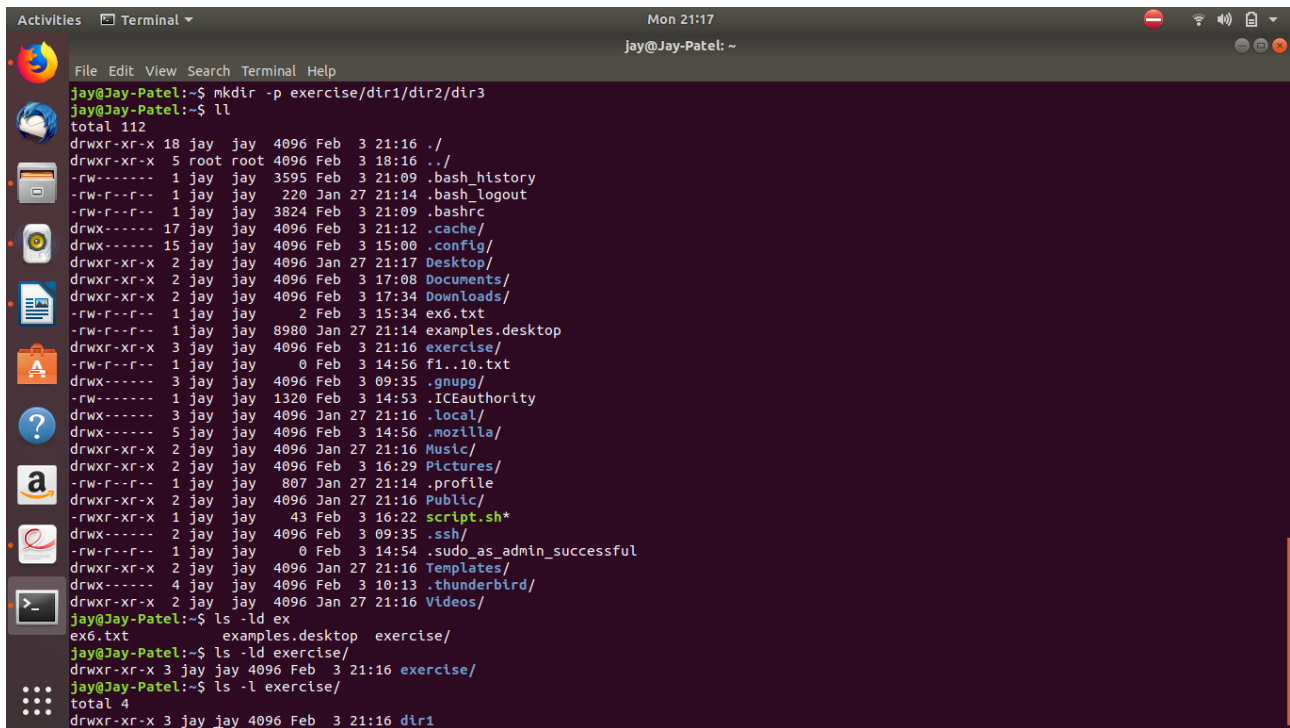


Session : Introduction to Linux

Exercise 1: Create a directory "exercise" inside your home directory and create nested(dir1/dir2/dir3) directory structure inside "exercise" with single command.

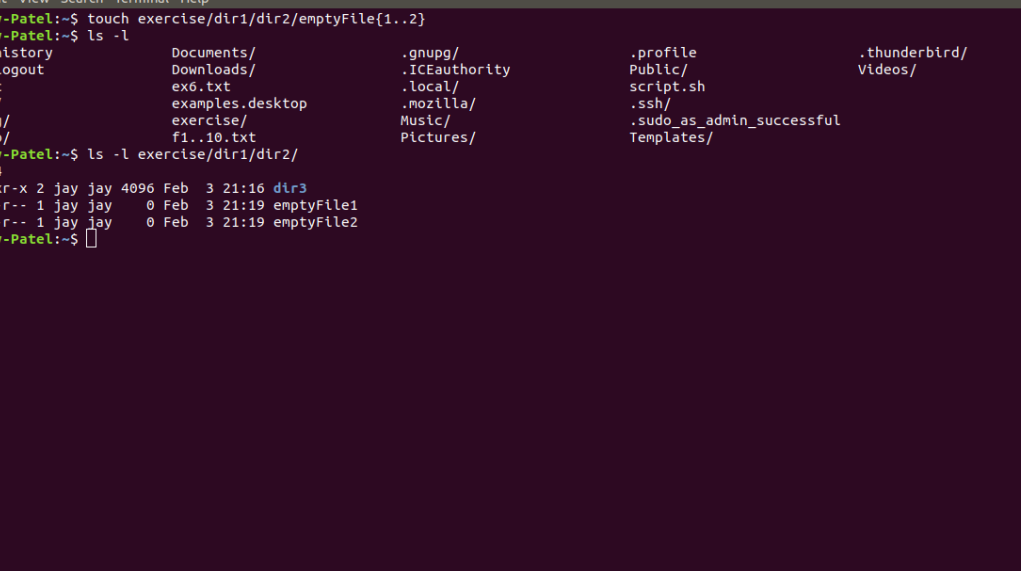
Mkdir -p exercise/dir1/dir2/dir3



```
Activities Terminal Mon 21:17 jay@Jay-Patel: ~
File Edit View Search Terminal Help
jay@Jay-Patel:~$ mkdir -p exercise/dir1/dir2/dir3
jay@Jay-Patel:~$ ll
total 112
drwxr-xr-x 18 jay jay 4096 Feb  3 21:16 ./
drwxr-xr-x  5 root root 4096 Feb  3 18:16 ../
-rw-r----- 1 jay jay 3595 Feb  3 21:09 .bash_history
-rw-r--r--  1 jay jay  220 Jan 27 21:14 .bash_logout
-rw-r--r--  1 jay jay 3824 Feb  3 21:09 .bashrc
drwx----- 17 jay jay 4096 Feb  3 21:12 .cache/
drwx----- 15 jay jay 4096 Feb  3 15:00 .config/
drwxr-xr-x  2 jay jay 4096 Jan 27 21:17 Desktop/
drwxr-xr-x  2 jay jay 4096 Feb  3 17:08 Documents/
drwxr-xr-x  2 jay jay 4096 Feb  3 17:34 Downloads/
-rw-r--r--  1 jay jay    2 Feb  3 15:34 ex6.txt
-rw-r--r--  1 jay jay 8980 Jan 27 21:14 examples.desktop
drwxr-xr-x  3 jay jay 4096 Feb  3 21:16 exercise/
-rw-r--r--  1 jay jay    0 Feb  3 14:56 f1..10.txt
drwx-----  3 jay jay 4096 Feb  3 09:35 .gnupg/
-rw-----  1 jay jay 1320 Feb  3 14:53 .ICEauthority
drwx-----  3 jay jay 4096 Jan 27 21:16 .local/
drwx-----  5 jay jay 4096 Feb  3 14:56 .mozilla/
drwxr-xr-x  2 jay jay 4096 Jan 27 21:16 Music/
drwxr-xr-x  2 jay jay 4096 Feb  3 16:29 Pictures/
-rw-r--r--  1 jay jay  807 Jan 27 21:14 .profile
drwxr-xr-x  2 jay jay 4096 Jan 27 21:16 Public/
-rwxr-xr-x  1 jay jay  43 Feb  3 16:22 script.sh*
drwx-----  2 jay jay 4096 Feb  3 09:35 .ssh/
-rw-r--r--  1 jay jay    0 Feb  3 14:54 .sudo_as_admin_successful
drwxr-xr-x  2 jay jay 4096 Jan 27 21:16 Templates/
drwx-----  4 jay jay 4096 Feb  3 10:13 .thunderbird/
drwxr-xr-x  2 jay jay 4096 Jan 27 21:16 Videos/
jay@Jay-Patel:~$ ls -ld ex
ex6.txt      examples.desktop  exercise/
jay@Jay-Patel:~$ ls -ld exercise/
drwxr-xr-x  3 jay jay 4096 Feb  3 21:16 exercise/
jay@Jay-Patel:~$ ls -l exercise/
total 4
drwxr-xr-x  3 jay jay 4096 Feb  3 21:16 dir1
```

```
touch exercise/dir1/dir2/emptyFile{1..2}
```

```
touch exercise/dir1/dir2/emptyFile{1..2}
```



The screenshot shows a terminal window with the following content:

```

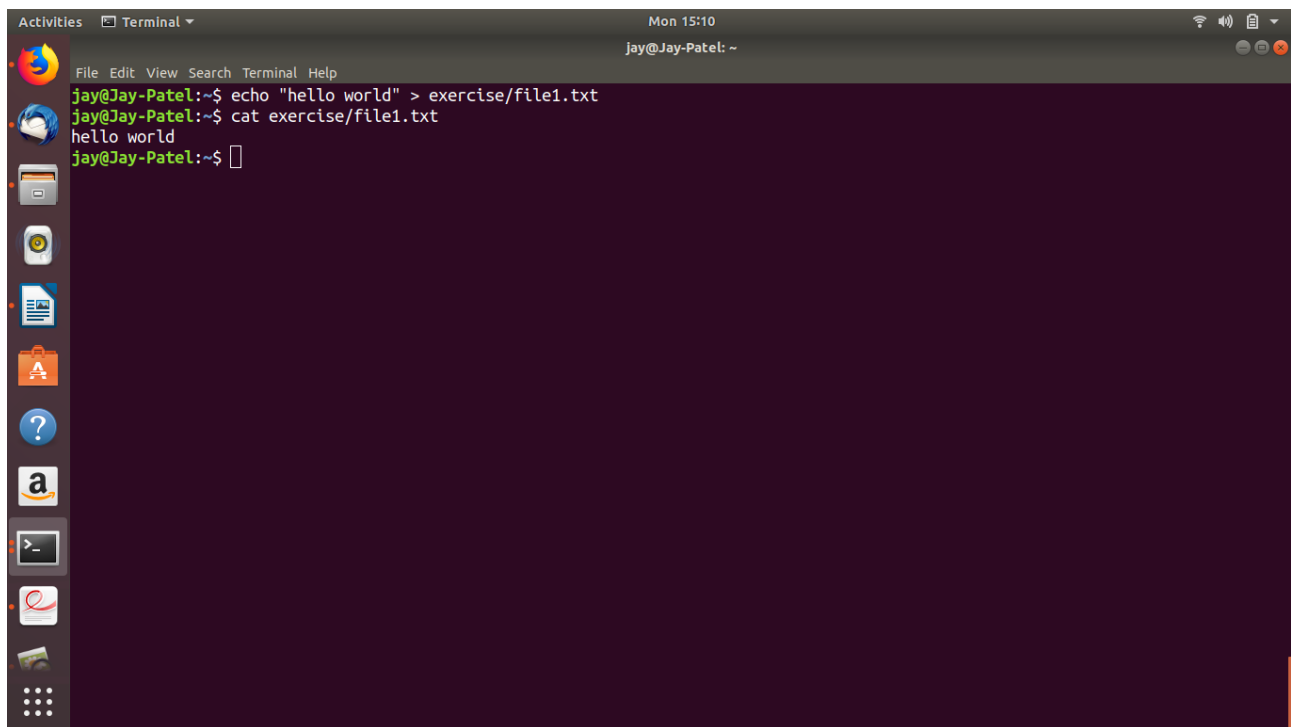
jay@Jay-Patel:~$ touch exercise/dir1/dir2/emptyFile{1..2}
jay@Jay-Patel:~$ ls -l
total 100
drwxr-xr-x  2 jay jay 4096 Feb  3 21:16 dir3
-rw-r--r--  1 jay jay   0 Feb  3 21:19 emptyFile1
-rw-r--r--  1 jay jay   0 Feb  3 21:19 emptyFile2
jay@Jay-Patel:~$

```

The terminal window has a menu bar with 'File', 'Edit', 'View', 'Search', 'Terminal', and 'Help'. The title bar shows 'jay@Jay-Patel: ~' and the system clock 'Mon 21:19'. The left sidebar contains various application icons, including the Dash icon at the top, followed by Firefox, Files, and several other utility icons.

Exercise 3 :Create one file file1.txt containing text "hello world" and save it

\$ echo "hello world" > exercise/file1.txt

A screenshot of a Linux terminal window. The window title is "Terminal" and it shows the user "jay@Jay-Patel" at the prompt. The user enters the command "echo 'hello world' > exercise/file1.txt". The prompt changes to "jay@Jay-Patel:~\$" and the user enters "cat exercise/file1.txt". The output "hello world" is displayed. The prompt returns to "jay@Jay-Patel:~\$". The terminal has a dark purple background and a menu bar with "File", "Edit", "View", "Search", "Terminal", and "Help". A sidebar on the left contains various application icons.

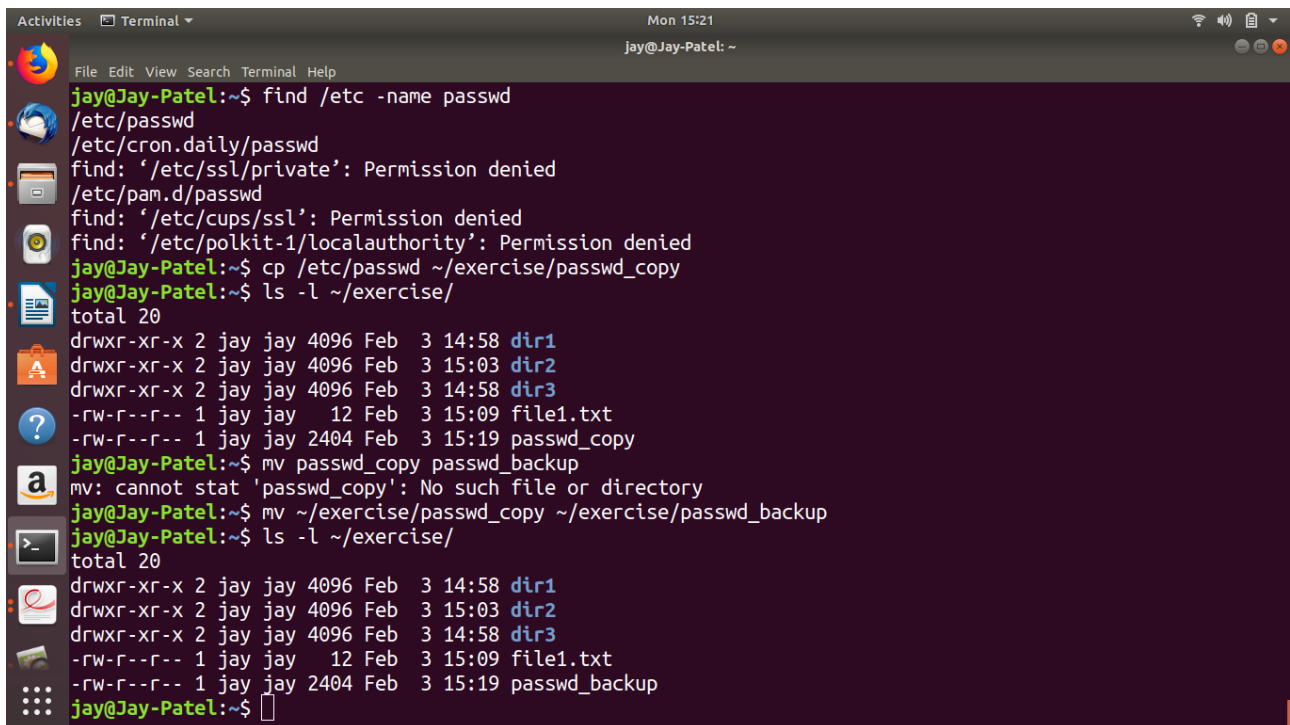
```
jay@Jay-Patel:~$ echo "hello world" > exercise/file1.txt
jay@Jay-Patel:~$ cat exercise/file1.txt
hello world
jay@Jay-Patel:~$
```

Exercise 4 :Find a "passwd" file using find command inside /etc. copy this files as passwd_copy and then rename this file as passwd_backup.

find /etc -name passwd

cp /etc/passwd ~/exercise/passwd_copy

mv passwd_copy passwd_backup



```
Mon 15:21
jay@Jay-Patel: ~
File Edit View Search Terminal Help
jay@Jay-Patel:~$ find /etc -name passwd
/etc/passwd
/etc/cron.daily/passwd
find: '/etc/ssl/private': Permission denied
/etc/pam.d/passwd
find: '/etc/cups/ssl': Permission denied
find: '/etc/polkit-1/localauthority': Permission denied
jay@Jay-Patel:~$ cp /etc/passwd ~/exercise/passwd_copy
jay@Jay-Patel:~$ ls -l ~/exercise/
total 20
drwxr-xr-x 2 jay jay 4096 Feb  3 14:58 dir1
drwxr-xr-x 2 jay jay 4096 Feb  3 15:03 dir2
drwxr-xr-x 2 jay jay 4096 Feb  3 14:58 dir3
-rw-r--r-- 1 jay jay  12 Feb  3 15:09 file1.txt
-rw-r--r-- 1 jay jay 2404 Feb  3 15:19 passwd_copy
jay@Jay-Patel:~$ mv passwd_copy passwd_backup
mv: cannot stat 'passwd_copy': No such file or directory
jay@Jay-Patel:~$ mv ~/exercise/passwd_copy ~/exercise/passwd_backup
jay@Jay-Patel:~$ ls -l ~/exercise/
total 20
drwxr-xr-x 2 jay jay 4096 Feb  3 14:58 dir1
drwxr-xr-x 2 jay jay 4096 Feb  3 15:03 dir2
drwxr-xr-x 2 jay jay 4096 Feb  3 14:58 dir3
-rw-r--r-- 1 jay jay  12 Feb  3 15:09 file1.txt
-rw-r--r-- 1 jay jay 2404 Feb  3 15:19 passwd_backup
jay@Jay-Patel:~$
```

Exercise 5 :Try reading passwd_backup file in multiple tools: less,more,cat,strings etc and find the difference in their usage.

Answer :

In less is type of pager in which we navigate using up and down arrow keys and then by passing q we can exit.

Man less – for more info

In more is also type of pager in which we navigate through space bar and after reaching at end of the file it automatically send to command line mode

man more –for more info

In cat command is used to display the file on terminal and we can not navigate the file in terminal and it only display the output of a file

cat - concatenate files and print on the standard output

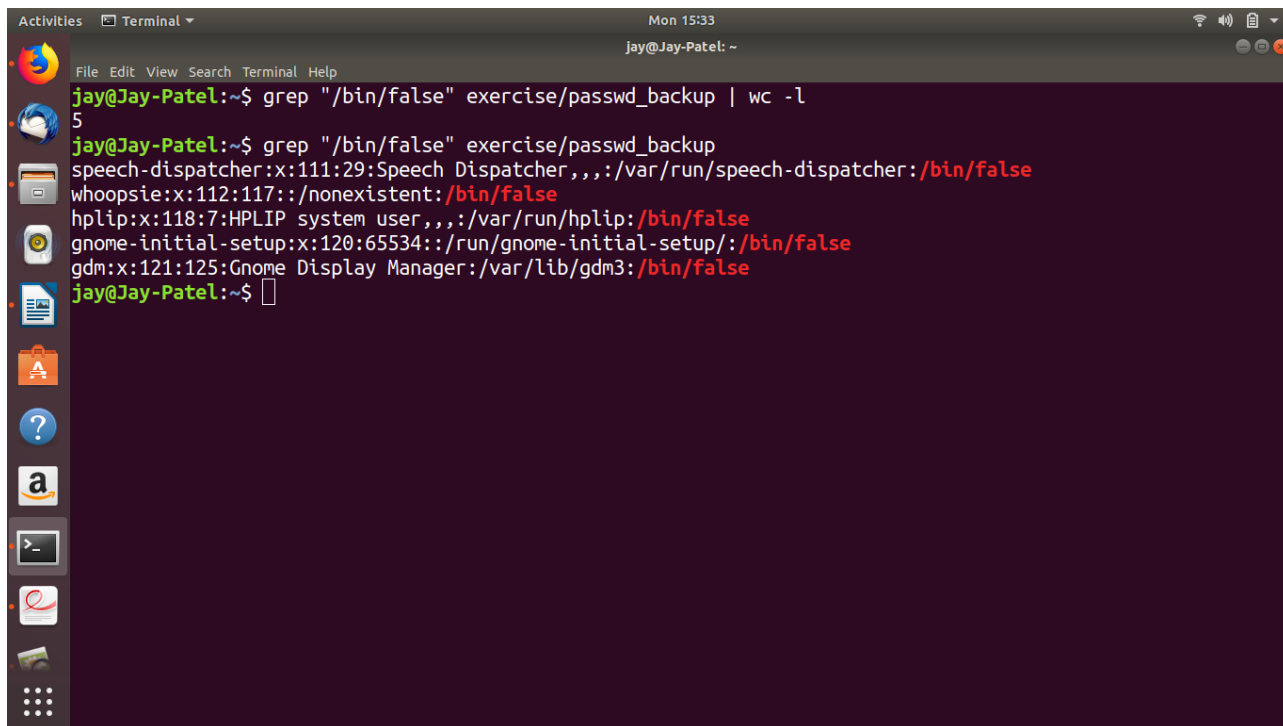
man cat –for more info

In string comands also works like cat command strings - print the strings of printable characters in files.

Man strings – for more info

Exercise 6 :Find out the number of line in password_backup containing "/bin/false".

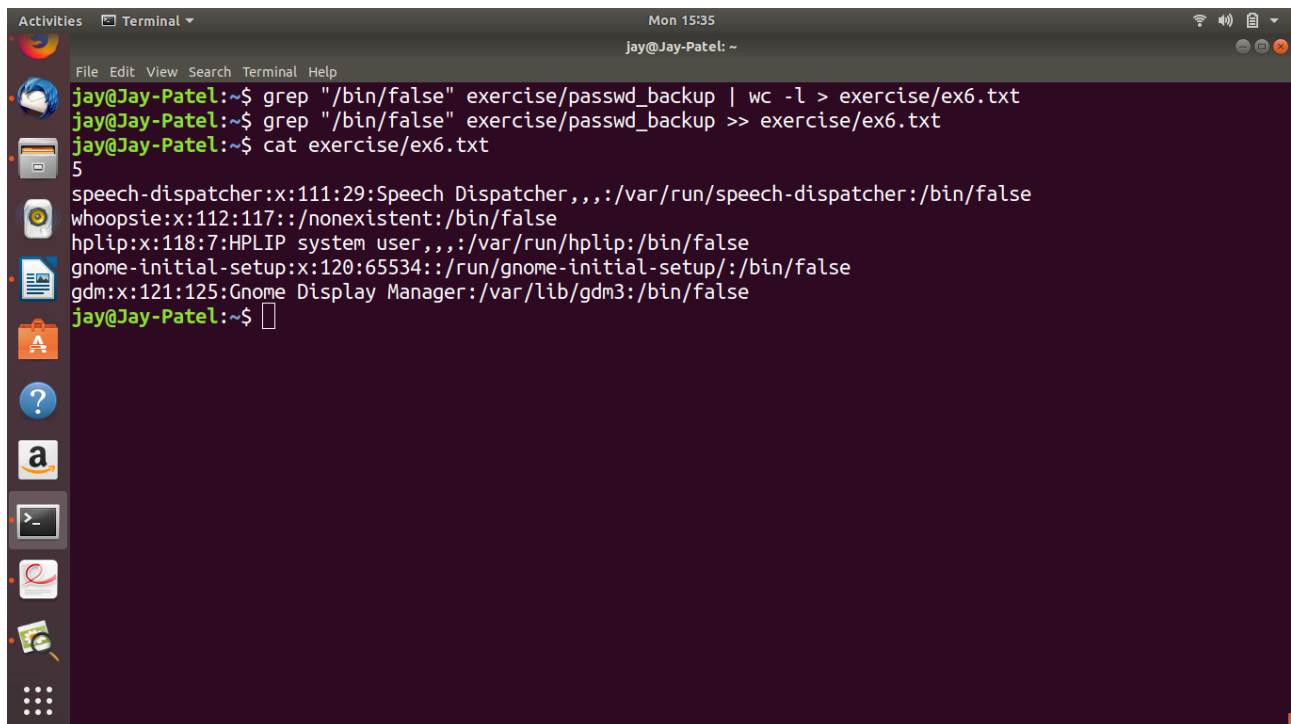
grep "/bin/false" exercise/passwd_backup | wc -l



```
Mon 15:33
jay@Jay-Patel: ~
File Edit View Search Terminal Help
jay@Jay-Patel:~$ grep "/bin/false" exercise/passwd_backup | wc -l
5
jay@Jay-Patel:~$ grep "/bin/false" exercise/passwd_backup
speech-dispatcher:x:111:29:Speech Dispatcher,,,:/var/run/speech-dispatcher:/bin/false
whoopsie:x:112:117:/:nonexistent:/bin/false
hplip:x:118:7:HPLIP system user,,,:/var/run/hplip:/bin/false
gnome-initial-setup:x:120:65534:/:run/gnome-initial-setup:/bin/false
gdm:x:121:125:Gnome Display Manager:/var/lib/gdm3:/bin/false
jay@Jay-Patel:~$
```

Exercise 7: Redirect the output of the above commands into file "output".

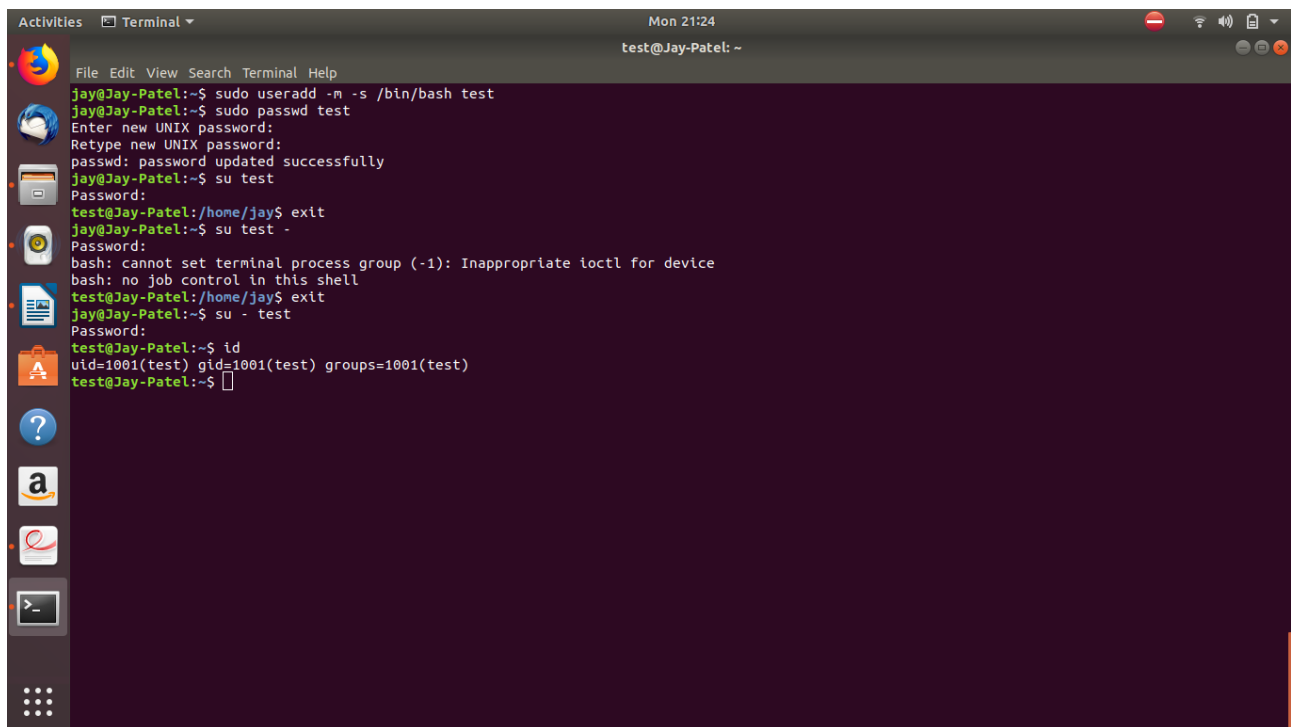
```
jay@Jay-Patel:~$ grep "/bin/false" exercise/passwd_backup | wc -l > exercise/ex6.txt
jay@Jay-Patel:~$ grep "/bin/false" exercise/passwd_backup >> exercise/ex6.txt
jay@Jay-Patel:~$ cat exercise/ex6.txt
```

A screenshot of a Linux terminal window. The window title is "Terminal" and it shows the user "jay@Jay-Patel" at the prompt. The terminal displays the following commands and their output:

```
jay@Jay-Patel:~$ grep "/bin/false" exercise/passwd_backup | wc -l > exercise/ex6.txt
jay@Jay-Patel:~$ grep "/bin/false" exercise/passwd_backup >> exercise/ex6.txt
jay@Jay-Patel:~$ cat exercise/ex6.txt
5
speech-dispatcher:x:111:29:Speech Dispatcher,,,:/var/run/speech-dispatcher:/bin/false
whoopsie:x:112:117:/:nonexistent:/bin/false
hplip:x:118:7:HPLIP system user,,,:/var/run/hplip:/bin/false
gnome-initial-setup:x:120:65534:/:run/gnome-initial-setup:/bin/false
gdm:x:121:125:Gnome Display Manager:/var/lib/gdm3:/bin/false
jay@Jay-Patel:~$
```

The terminal output shows the number of lines (5) and the specific lines from the passwd file that contain "/bin/false". The window also shows a sidebar with various application icons and system status indicators at the top.

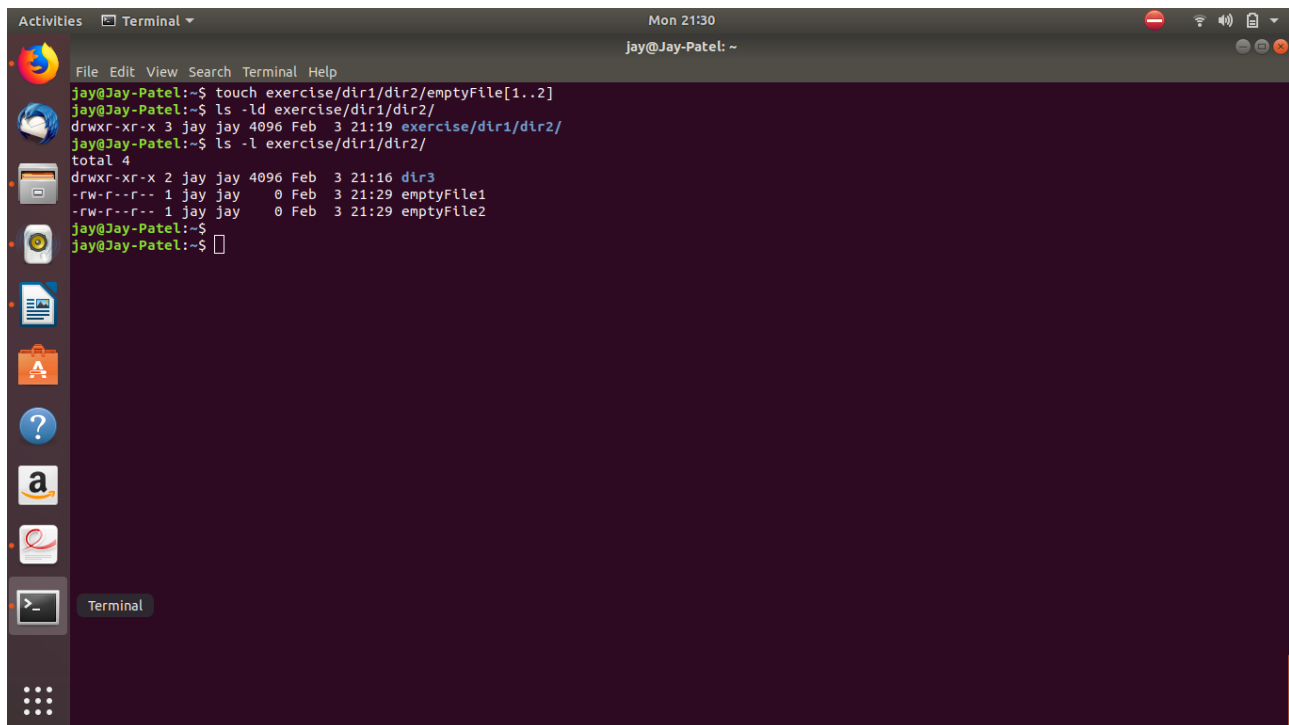
Exercise 8 : Create a "test" user,create its password and find out its uid and gid.



A terminal window titled "Terminal" with a menu bar (File, Edit, View, Search, Terminal, Help) and a status bar (Mon 21:24, test@Jay-Patel: ~). The terminal shows the following commands and output:

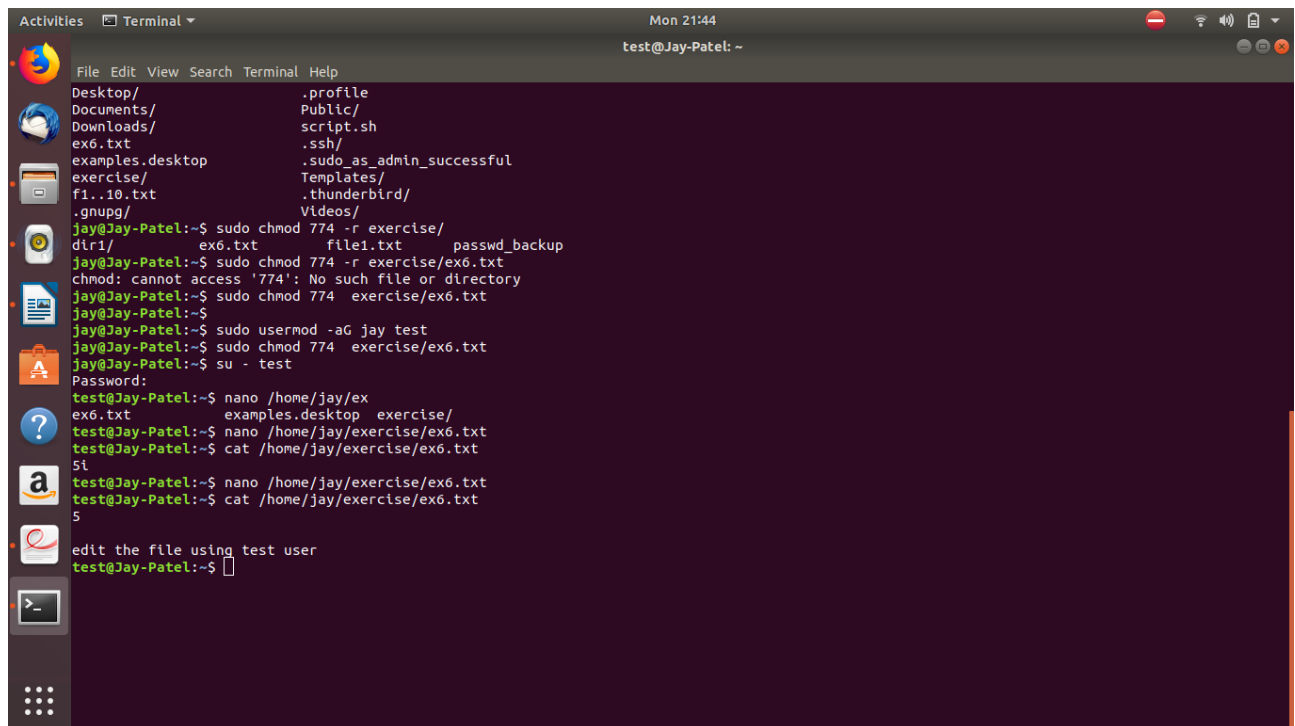
```
jay@Jay-Patel:~$ sudo useradd -m -s /bin/bash test
jay@Jay-Patel:~$ sudo passwd test
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
jay@Jay-Patel:~$ su test
Password:
test@Jay-Patel:/home/jay$ exit
jay@Jay-Patel:~$ su test -
Password:
bash: cannot set terminal process group (-1): Inappropriate ioctl for device
bash: no job control in this shell
test@Jay-Patel:/home/jay$ exit
jay@Jay-Patel:~$ su - test
Password:
test@Jay-Patel:~$ id
uid=1001(test) gid=1001(test) groups=1001(test)
test@Jay-Patel:~$
```


Exercise 9 : Change the timestamp of emptyFile1,emptyFile2 which are exist in dir2

A terminal window titled 'Terminal' with a menu bar (File, Edit, View, Search, Terminal, Help) and a status bar (Mon 21:30, jay@Jay-Patel: ~). The terminal shows a series of commands and their outputs. The user creates a file 'emptyFile1' in 'exercise/dir1/dir2' using 'touch'. Then, they list the directory 'exercise/dir1/dir2' using 'ls -ld', showing 'exercise/dir1/dir2' with permissions 'drwxr-xr-x' and timestamp '2020 Feb 3 21:19'. Next, they list 'exercise/dir1/dir2' using 'ls -l', showing 'dir3' with permissions 'drwxr-xr-x' and timestamp '2020 Feb 3 21:16', and two files 'emptyFile1' and 'emptyFile2' with permissions '-rw-r--r--' and timestamp '2020 Feb 3 21:29'. The terminal prompt is 'jay@Jay-Patel:~\$'.

Exercise 10: 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.

10.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



```
Activities Terminal Mon 21:44 test@Jay-Patel: ~
File Edit View Search Terminal Help
Desktop/ .profile
Documents/ Public/
Downloads/ script.sh
ex6.txt .ssh/
examples.desktop .sudo_as_admin_successful
exercise/ Templates/
fi..10.txt .thunderbird/
.gnupg/ Videos/
jay@Jay-Patel:~$ sudo chmod 774 -r exercise/
dir1/ ex6.txt file1.txt passwd_backup
jay@Jay-Patel:~$ sudo chmod 774 -r exercise/ex6.txt
chmod: cannot access '774': No such file or directory
jay@Jay-Patel:~$ sudo chmod 774 exercise/ex6.txt
jay@Jay-Patel:~$
jay@Jay-Patel:~$ sudo usermod -aG jay test
jay@Jay-Patel:~$ sudo chmod 774 exercise/ex6.txt
jay@Jay-Patel:~$ su - test
Password:
test@Jay-Patel:~$ nano /home/jay/ex
ex6.txt examples.desktop exercise/
test@Jay-Patel:~$ nano /home/jay/exercise/ex6.txt
test@Jay-Patel:~$ cat /home/jay/exercise/ex6.txt
5i
test@Jay-Patel:~$ nano /home/jay/exercise/ex6.txt
test@Jay-Patel:~$ cat /home/jay/exercise/ex6.txt
5
edit the file using test user
test@Jay-Patel:~$
```

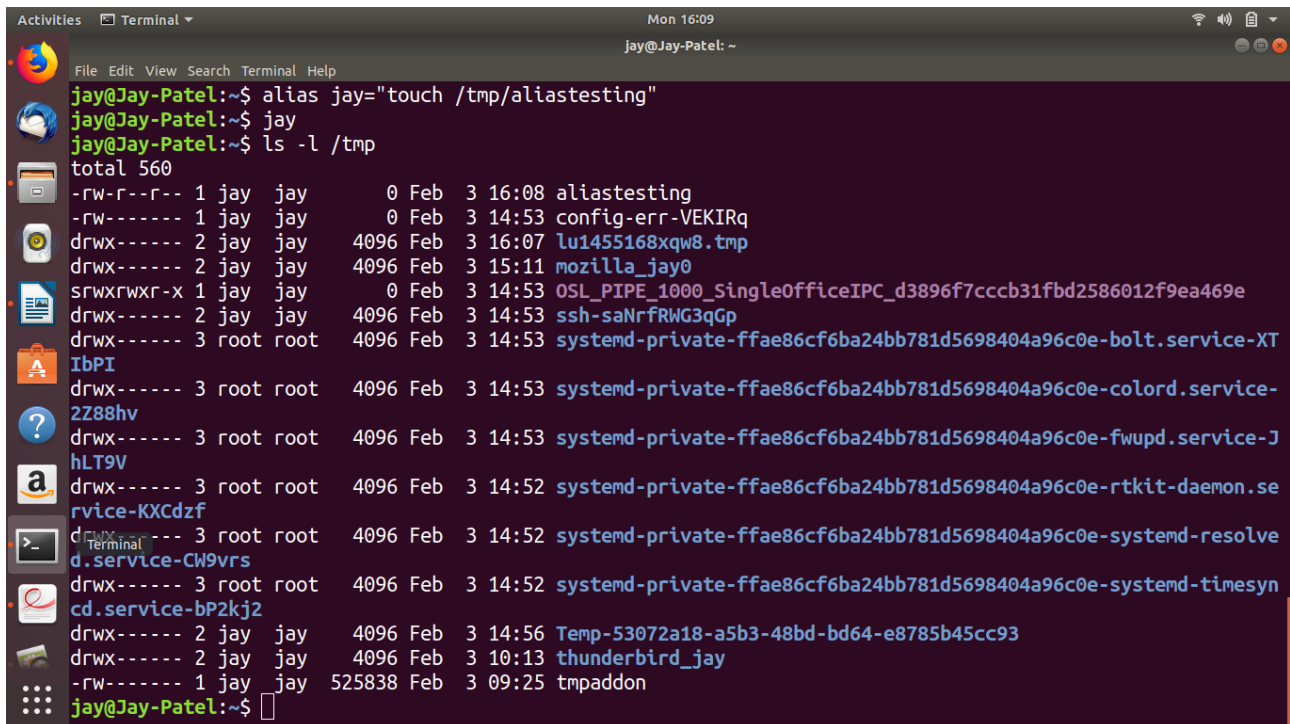
10.b Make the file editable to the world so that test user can access it. Revert the changes after verification

10.c Change the ownership to edit the file

Activities Terminal Mon 21:46 Jay@Jay-Patel: ~

```
File Edit View Search Terminal Help
jay@Jay-Patel:~$ sudo chmod 777 ex
ex6.txt      examples.desktop exercise/
jay@Jay-Patel:~$ sudo chmod 777 exercise/ex6.txt
jay@Jay-Patel:~$ ls -l exercise/ex6.txt
-rwxrwxrwx 1 jay jay 33 Feb  3 21:43 exercise/ex6.txt
jay@Jay-Patel:~$
```

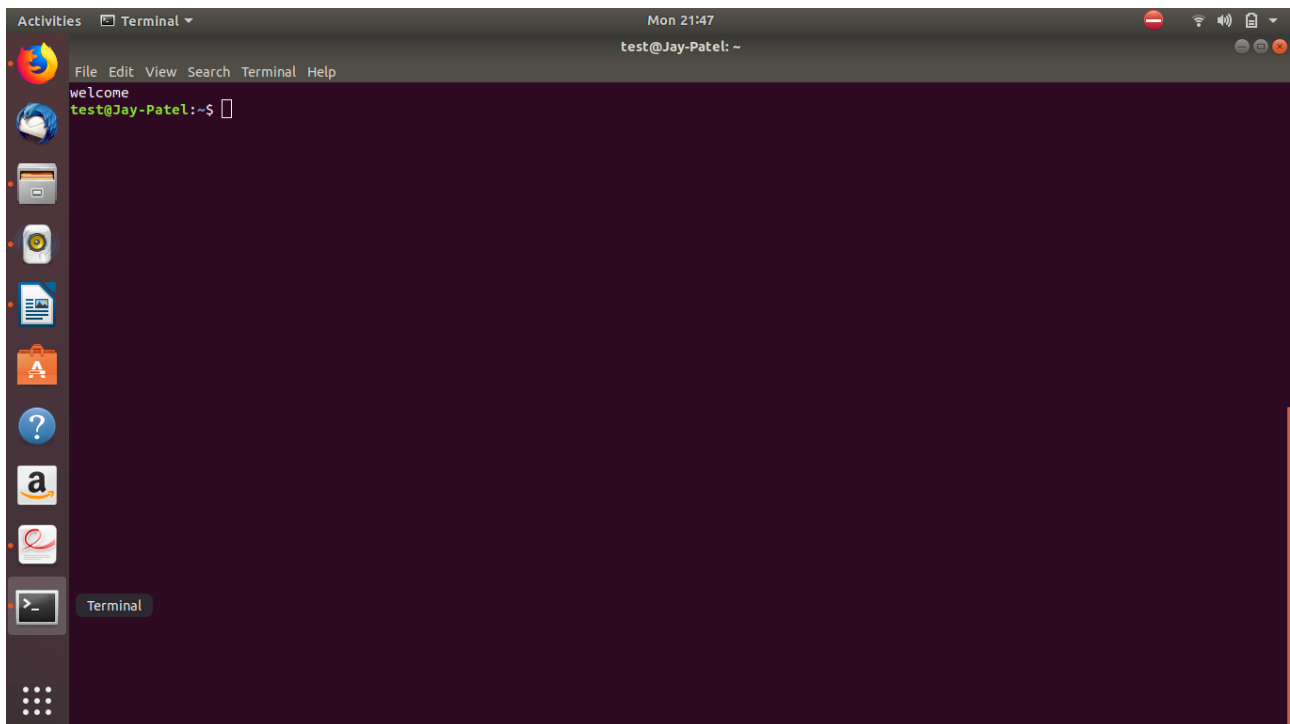
Exercise 11 : Create alias with your name so that it creates a file as `"/tmp/aliastesting"`.



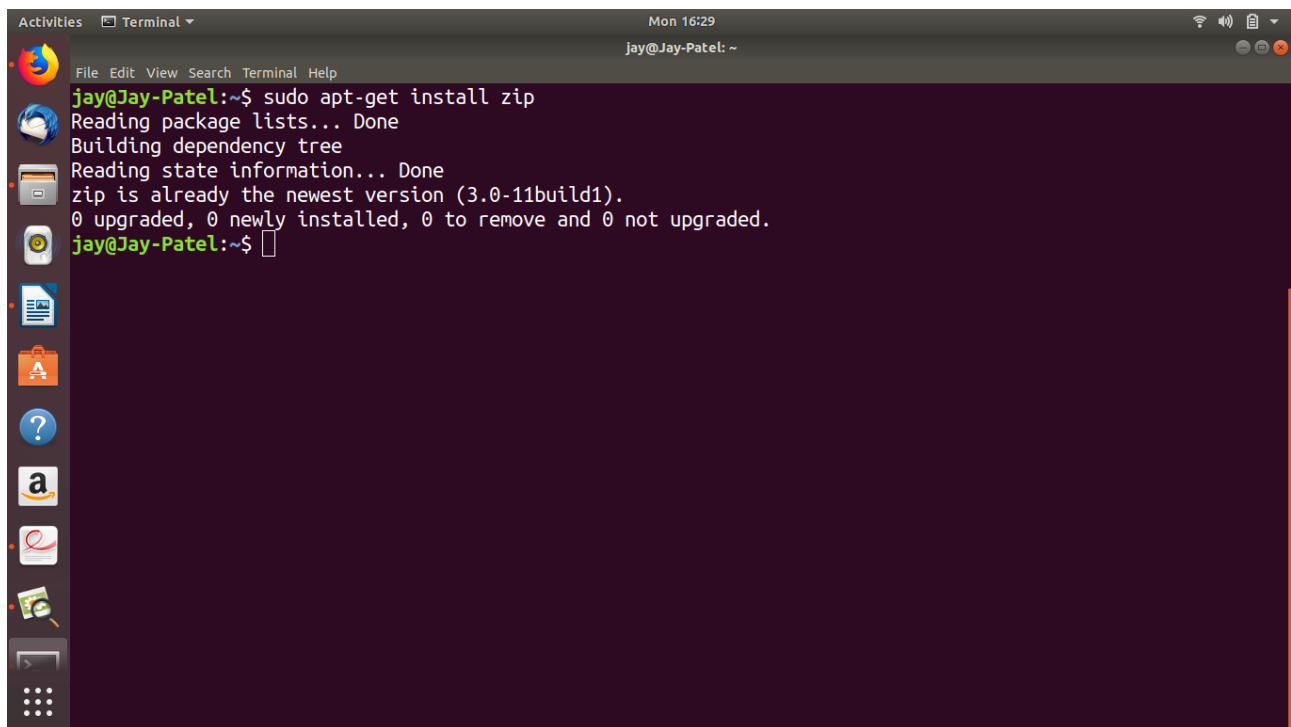
The image shows a terminal window with the following commands and output:

```
jay@Jay-Patel:~$ alias jay="touch /tmp/aliastesting"
jay@Jay-Patel:~$ jay
jay@Jay-Patel:~$ ls -l /tmp
total 560
-rw-r--r-- 1 jay jay      0 Feb  3 16:08 aliastesting
-rw----- 1 jay jay      0 Feb  3 14:53 config-err-VEKIRq
drwx----- 2 jay jay    4096 Feb  3 16:07 lu1455168xqw8.tmp
drwx----- 2 jay jay    4096 Feb  3 15:11 mozilla_jay0
srwxrwxr-x 1 jay jay      0 Feb  3 14:53 OSL_PIPE_1000_SingleOfficeIPC_d3896f7cccb31fbd2586012f9ea469e
drwx----- 2 jay jay    4096 Feb  3 14:53 ssh-saNrFRWG3qGp
drwx----- 3 root root  4096 Feb  3 14:53 systemd-private-ffae86cf6ba24bb781d5698404a96c0e-bolt.service-XT
IbPI
drwx----- 3 root root  4096 Feb  3 14:53 systemd-private-ffae86cf6ba24bb781d5698404a96c0e-colord.service-
2Z88hv
drwx----- 3 root root  4096 Feb  3 14:53 systemd-private-ffae86cf6ba24bb781d5698404a96c0e-fwupd.service-J
hLT9V
drwx----- 3 root root  4096 Feb  3 14:52 systemd-private-ffae86cf6ba24bb781d5698404a96c0e-rtkit-daemon.se
rvice-KXCdzf
drwx----- 3 root root  4096 Feb  3 14:52 systemd-private-ffae86cf6ba24bb781d5698404a96c0e-systemd-resolve
d.service-CW9vrs
drwx----- 3 root root  4096 Feb  3 14:52 systemd-private-ffae86cf6ba24bb781d5698404a96c0e-systemd-timesyn
cd.service-bP2kj2
drwx----- 2 jay jay    4096 Feb  3 14:56 Temp-53072a18-a5b3-48bd-bd64-e8785b45cc93
drwx----- 2 jay jay    4096 Feb  3 10:13 thunderbird_jay
-rw----- 1 jay jay   525838 Feb  3 09:25 tmpaddon
jay@Jay-Patel:~$
```

Exercise 12 :Edit ~/.bashrc file such that when you change to "test" user it should clear the screen and print "Welcome".



Exercise13 : Install “zip” package.



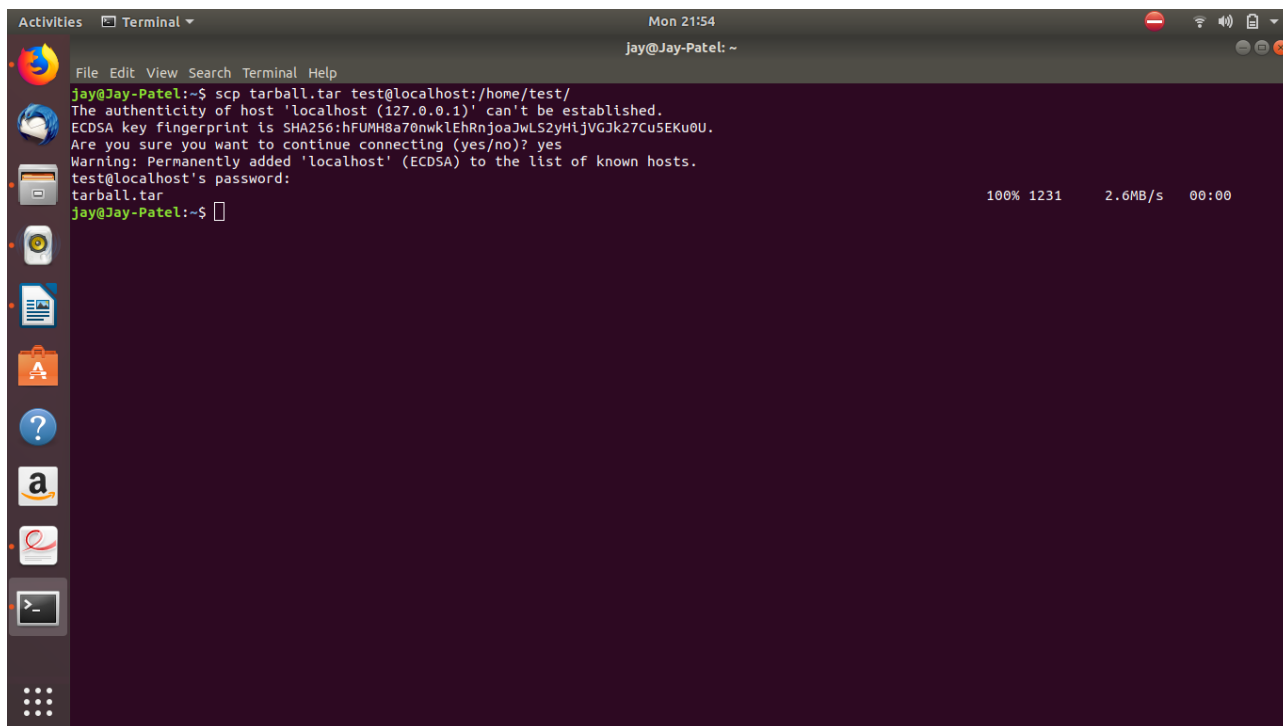
A terminal window titled "Terminal" is shown, displaying the command to install the zip package. The user is logged in as "jay" on a machine named "Jay-Patel". The terminal output shows the command being executed, the package lists being read, the dependency tree being built, and the state information being read. The output indicates that the zip package is already the newest version (3.0-11build1) and that no packages need to be upgraded, installed, removed, or not upgraded.

```
jay@Jay-Patel:~$ sudo apt-get install zip
Reading package lists... Done
Building dependency tree
Reading state information... Done
zip is already the newest version (3.0-11build1).
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
jay@Jay-Patel:~$
```

Exercise 14: Compress "output" and "password_backup" files into a tar ball. List the files present inside the tar created.

```
Activities Terminal Mon 21:50 jay@Jay-Patel: ~
File Edit View Search Terminal Help
jay@Jay-Patel:~$ tar -cvzf tarball.tar ex
ex6.txt          examples.desktop exercise/
jay@Jay-Patel:~$ tar -cvzf tarball.tar ex
ex6.txt          examples.desktop exercise/
jay@Jay-Patel:~$ tar -cvzf tarball.tar exercise/
exercise/
exercise/passwd_backup
exercise/ex6.txt
exercise/dir1/
exercise/dir1/dir2/
exercise/dir1/dir2/dir3/
exercise/dir1/dir2/emptyFile2
exercise/dir1/dir2/emptyFile1
exercise/file1.txt
jay@Jay-Patel:~$ ls -l
total 60
drwxr-xr-x 2 jay jay 4096 Jan 27 21:17 Desktop
drwxr-xr-x 2 jay jay 4096 Feb  3 21:38 Documents
drwxr-xr-x 2 jay jay 4096 Feb  3 17:34 Downloads
-rw-r--r-- 1 jay jay  2 Feb  3 15:34 ex6.txt
-rw-r--r-- 1 jay jay 8980 Jan 27 21:14 examples.desktop
drwxr-xr-x 3 jay jay 4096 Feb  3 21:34 exercise
-rw-r--r-- 1 jay jay  0 Feb  3 14:56 fi..10.txt
drwxr-xr-x 2 jay jay 4096 Jan 27 21:16 Music
drwxr-xr-x 2 jay jay 4096 Feb  3 21:47 Pictures
drwxr-xr-x 2 jay jay 4096 Jan 27 21:16 Public
-rwxr-xr-x 1 jay jay  43 Feb  3 16:22 script.sh
-rw-r--r-- 1 jay jay 1231 Feb  3 21:49 tarball.tar
drwxr-xr-x 2 jay jay 4096 Jan 27 21:16 Templates
drwxr-xr-x 2 jay jay 4096 Jan 27 21:16 Videos
jay@Jay-Patel:~$
```

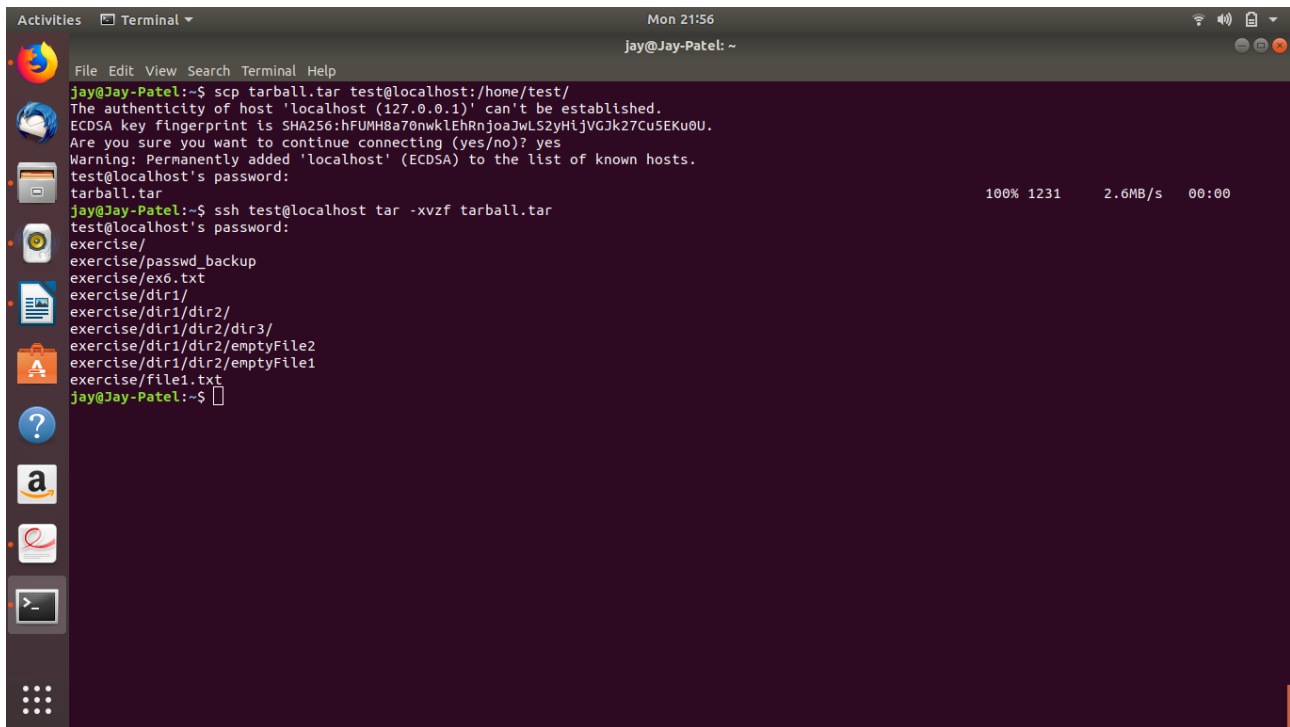
Exercise 15 : scp this file to test user



A terminal window titled "Terminal" with a menu bar (File, Edit, View, Search, Terminal, Help) and a status bar (Mon 21:54, jay@Jay-Patel: ~). The terminal shows the execution of the command `scp tarball.tar test@localhost:/home/test/`. It displays a warning about the authenticity of the host 'localhost' and asks for confirmation to continue. After entering the password, a progress bar is shown for the file 'tarball.tar'.

```
File Edit View Search Terminal Help
Mon 21:54
jay@Jay-Patel: ~
jay@Jay-Patel:~$ scp tarball.tar test@localhost:/home/test/
The authenticity of host 'localhost (127.0.0.1)' can't be established.
ECDSA key fingerprint is SHA256:hFUMH8a70nwkLEhRnjoaJwLS2yHijVGJk27Cu5EKu0U.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'localhost' (ECDSA) to the list of known hosts.
test@localhost's password:
tarball.tar                                100% 1231      2.6MB/s   00:00
jay@Jay-Patel:~$
```


Exercise 16 :Unzip this tar bar by logging into the remote server



A terminal window titled "Terminal" with a menu bar (File, Edit, View, Search, Terminal, Help) and a status bar (Mon 21:56, jay@Jay-Patel: ~). The terminal shows the following commands and output:

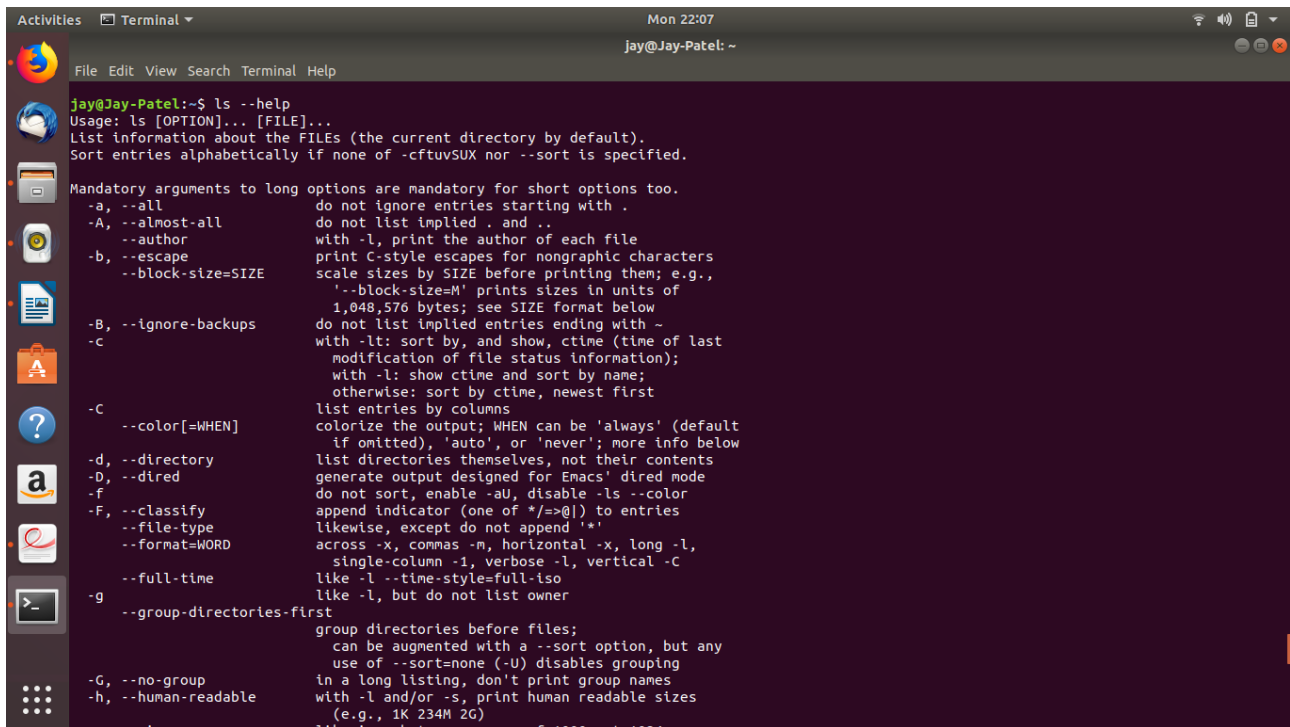
```
jay@Jay-Patel:~$ scp tarball.tar test@localhost:/home/test/
The authenticity of host 'localhost (127.0.0.1)' can't be established.
ECDSA key fingerprint is SHA256:hFUMH8a70nwkLEhRnjoaJwLS2yHijVGJK27Cu5EKu0U.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'localhost' (ECDSA) to the list of known hosts.
test@localhost's password:
tarball.tar                                100% 1231      2.6MB/s   00:00
jay@Jay-Patel:~$ ssh test@localhost tar -xvzf tarball.tar
test@localhost's password:
exercise/
exercise/passwd_backup
exercise/ex6.txt
exercise/dir1/
exercise/dir1/dir2/
exercise/dir1/dir2/dir3/
exercise/dir1/dir2/emptyFile2
exercise/dir1/dir2/emptyFile1
exercise/file1.txt
jay@Jay-Patel:~$
```

Exercise 17 :Download any image from web and move to desktop

```
Activities Terminal Mon 22:06 jay@Jay-Patel: ~
File Edit View Search Terminal Help
jay@Jay-Patel:~$ wget https://encrypted-tbn0.gstatic.com/images?q=tbn%3AAND9GcRfKudVcT7uvmUNZWZk4RwF-vpGrn_haZRpixlNRVBjvntvI-SB -P Desktop/
--2020-02-03 22:06:42-- https://encrypted-tbn0.gstatic.com/images?q=tbn%3AAND9GcRfKudVcT7uvmUNZWZk4RwF-vpGrn_haZRpixlNRVBjvntvI-SB
Resolving encrypted-tbn0.gstatic.com (encrypted-tbn0.gstatic.com)... 172.217.161.14, 2404:6800:4002:80e::200e
Connecting to encrypted-tbn0.gstatic.com (encrypted-tbn0.gstatic.com)|172.217.161.14|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 4656 (4.5K) [image/png]
Saving to: 'Desktop/images?q=tbn:AND9GcRfKudVcT7uvmUNZWZk4RwF-vpGrn_haZRpixlNRVBjvntvI-SB'

images?q=tbn:AND9GcRfKudVcT7uvmUNZW 100%[=====] 4.55K --KB/s in 0s
2020-02-03 22:06:42 (29.5 MB/s) - 'Desktop/images?q=tbn:AND9GcRfKudVcT7uvmUNZWZk4RwF-vpGrn_haZRpixlNRVBjvntvI-SB' saved [4656/4656]
jay@Jay-Patel:~$ ls -l Desktop/
total 72
-rw-r--r-- 1 jay jay 4656 Jun 20 2019 'images?q=tbn:AND9GcRfKudVcT7uvmUNZWZk4RwF-vpGrn_haZRpixlNRVBjvntvI-SB'
-rw-r--r-- 1 jay jay 60049 Jan 21 22:43 'Onboarding Guide for Trainees.pdf'
jay@Jay-Patel:~$
```

Exercise 18 : How to get help of commands usages.'

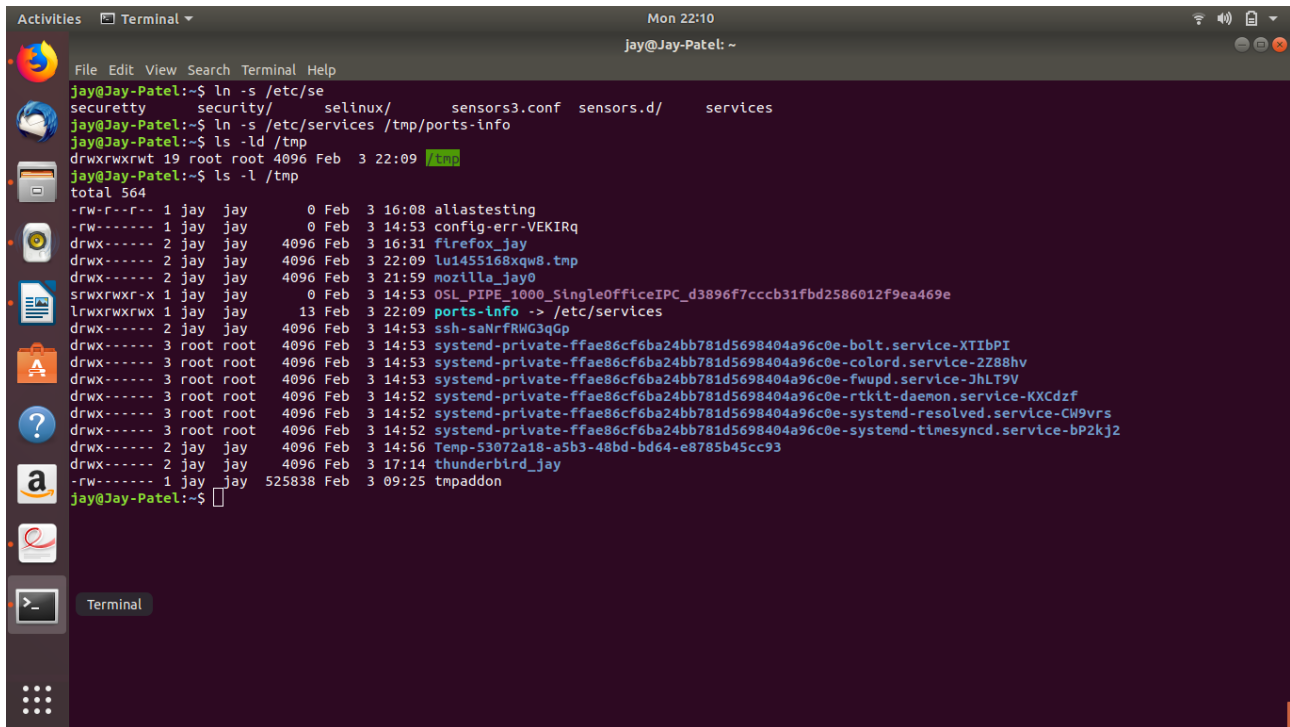


The screenshot shows a terminal window titled 'Terminal' with the user 'jay@Jay-Patel'. The command 'ls --help' has been executed, displaying the usage and options for the 'ls' command. The output is as follows:

```
jay@Jay-Patel:~$ ls --help
Usage: ls [OPTION]... [FILE]...
List information about the FILES (the current directory by default).
Sort entries alphabetically if none of -cftuvSUX nor --sort is specified.

Mandatory arguments to long options are mandatory for short options too.
  -a, --all                do not ignore entries starting with .
  -A, --almost-all        do not list implied . and ..
  -l, --long               with -l, print the author of each file
  -B, --block-size=SIZE    print C-style escapes for nongraphic characters
                          scale sizes by SIZE before printing them; e.g.,
                          '--block-size=M' prints sizes in units of
                          1,048,576 bytes; see SIZE format below
  -b, --escape             do not list implied entries ending with ~
  -C, --columns            with -lt: sort by, and show, ctime (time of last
                          modification of file status information);
                          with -l: show ctime and sort by name;
                          otherwise: sort by ctime, newest first
  -c, --sort=TYPE          list entries by columns
                          colorize the output; WHEN can be 'always' (default
                          if omitted), 'auto', or 'never'; more info below
  -d, --directory         list directories themselves, not their contents
  -D, --dired              generate output designed for Emacs' dired mode
  -f, --full-time          do not sort, enable -aU, disable -ls --color
  -F, --classify           append indicator (one of */=>@|) to entries
                          likewise, except do not append '*'
  -G, --group-directories-first
                          across -x, commas -m, horizontal -x, long -l,
                          single-column -1, verbose -l, vertical -C
  -g, --group-directories-first
                          like -l --time-style=full-iso
                          like -l, but do not list owner
  -H, --human-readable    group directories before files;
                          can be augmented with a --sort option, but any
                          use of --sort=none (-U) disables grouping
  -l, --long               in a long listing, don't print group names
  -L, --logical            with -l and/or -s, print human readable sizes
                          (e.g., 1K 234M 2G)
  -m, --vertical           like -l, but use a format of 1000 oct 1000
  -n, --no-group           like -l, but use a format of 1000 oct 1000
  -o, --long               like -l, but use a format of 1000 oct 1000
  -p, --long               like -l, but use a format of 1000 oct 1000
  -q, --long               like -l, but use a format of 1000 oct 1000
  -r, --long               like -l, but use a format of 1000 oct 1000
  -s, --long               like -l, but use a format of 1000 oct 1000
  -S, --long               like -l, but use a format of 1000 oct 1000
  -t, --long               like -l, but use a format of 1000 oct 1000
  -u, --long               like -l, but use a format of 1000 oct 1000
  -v, --long               like -l, but use a format of 1000 oct 1000
  -w, --long               like -l, but use a format of 1000 oct 1000
  -x, --long               like -l, but use a format of 1000 oct 1000
  -y, --long               like -l, but use a format of 1000 oct 1000
  -z, --long               like -l, but use a format of 1000 oct 1000
```

Exercise 19 :Create a symlink of /etc/services into /tmp/ports-info

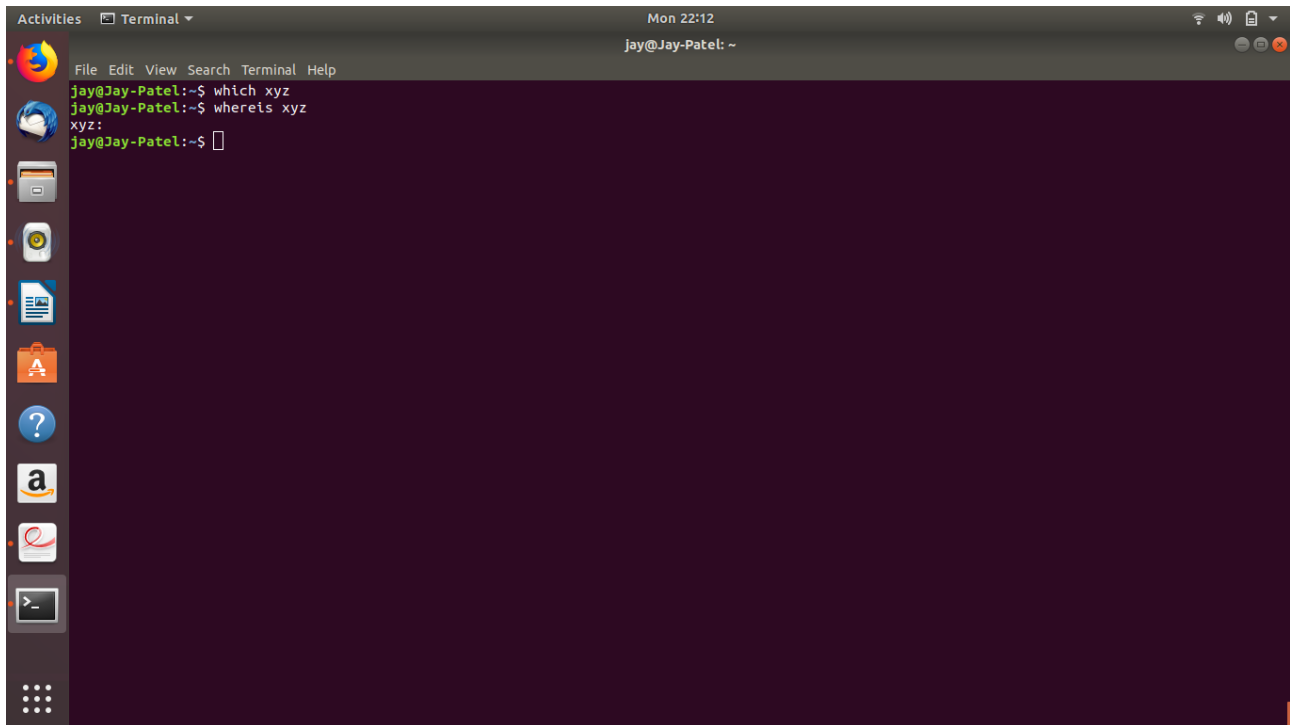


The screenshot shows a terminal window with the following commands and output:

```
jay@Jay-Patel:~$ ln -s /etc/se
securetty security/ selinux/ sensors3.conf sensors.d/ services
jay@Jay-Patel:~$ ln -s /etc/services /tmp/ports-info
jay@Jay-Patel:~$ ls -ld /tmp
drwxrwxrwt 19 root root 4096 Feb 3 22:09 /tmp
jay@Jay-Patel:~$ ls -l /tmp
total 564
-rw-r--r-- 1 jay jay 0 Feb 3 16:08 aliastesting
-rw----- 1 jay jay 0 Feb 3 14:53 config-err-VEKIRq
drwx----- 2 jay jay 4096 Feb 3 16:31 firefox_jay
drwx----- 2 jay jay 4096 Feb 3 22:09 lu1455168xqw8.tmp
drwx----- 2 jay jay 4096 Feb 3 21:59 mozilla_jay0
srwxrwxr-x 1 jay jay 0 Feb 3 14:53 OSL_PIPE_1000_SingleOfficeIPC_d3896f7cccb31fbd2586012f9ea469e
lrwxrwxrwx 1 jay jay 13 Feb 3 22:09 ports-info -> /etc/services
drwx----- 2 jay jay 4096 Feb 3 14:53 ssh-saNrFRWG3qGp
drwx----- 3 root root 4096 Feb 3 14:53 systemd-private-ffae86cf6ba24bb781d5698404a96c0e-bolt.service-XTIbPI
drwx----- 3 root root 4096 Feb 3 14:53 systemd-private-ffae86cf6ba24bb781d5698404a96c0e-colord.service-2Z88hv
drwx----- 3 root root 4096 Feb 3 14:53 systemd-private-ffae86cf6ba24bb781d5698404a96c0e-fwupd.service-JhLT9V
drwx----- 3 root root 4096 Feb 3 14:52 systemd-private-ffae86cf6ba24bb781d5698404a96c0e-rtkit-daemon.service-KXCdzf
drwx----- 3 root root 4096 Feb 3 14:52 systemd-private-ffae86cf6ba24bb781d5698404a96c0e-systemd-resolved.service-CW9vrs
drwx----- 2 jay jay 4096 Feb 3 14:56 Temp-53072a18-a5b3-48bd-bd64-e8785b45cc93
drwx----- 2 jay jay 4096 Feb 3 17:14 thunderbird_jay
-rw----- 1 jay jay 525838 Feb 3 09:25 tmpaddon
jay@Jay-Patel:~$
```

The terminal window has a menu bar with 'File', 'Edit', 'View', 'Search', 'Terminal', and 'Help'. The title bar shows 'Mon 22:10' and 'jay@Jay-Patel: ~'. The left sidebar contains icons for various applications, including a file manager, a terminal, and a web browser. The terminal output shows the successful creation of the symlink 'ports-info' pointing to '/etc/services'.

Exercise 20 : 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?



```
jay@Jay-Patel:~$ which xyz
jay@Jay-Patel:~$ whereis xyz
xyz:
jay@Jay-Patel:~$
```