

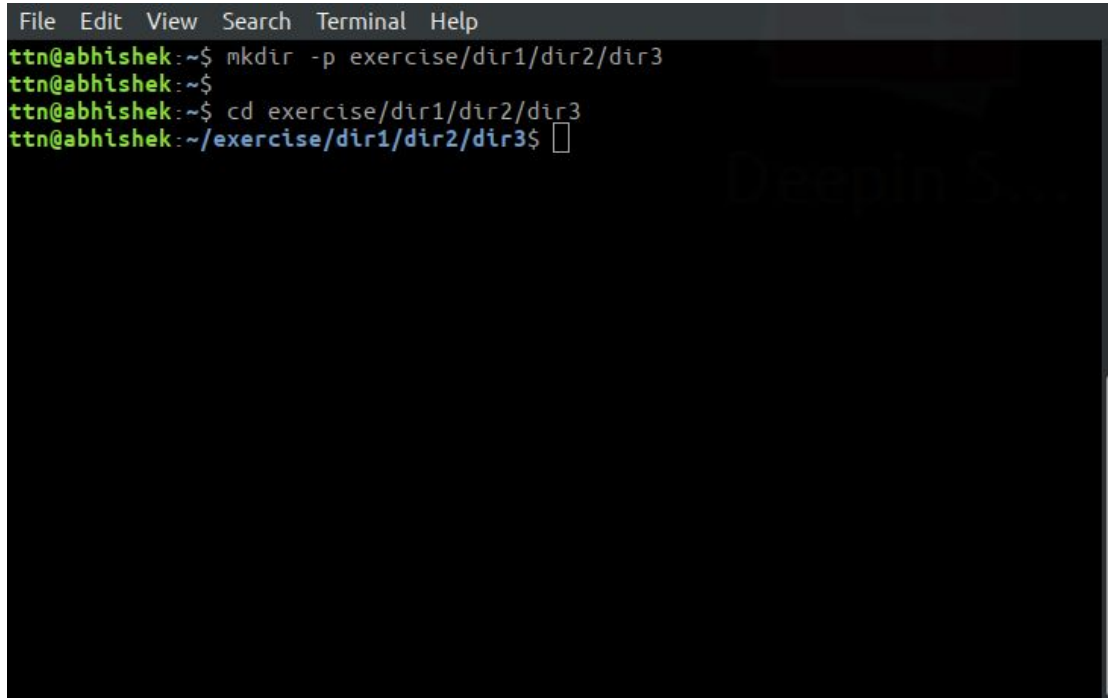
Introduction to Linux

Exercise 1

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- 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
```

A terminal window with a dark background and a menu bar at the top containing 'File', 'Edit', 'View', 'Search', 'Terminal', and 'Help'. The terminal shows the following commands and output:

```
ttn@abhishek:~$ mkdir -p exercise/dir1/dir2/dir3
ttn@abhishek:~$ 
ttn@abhishek:~$ cd exercise/dir1/dir2/dir3
ttn@abhishek:~/exercise/dir1/dir2/dir3$
```

- 2) Create two empty files inside dir2 directory: emptyFile1,emptyFile2 in single command.

```
> touch emptyFile1 emptyFile2
```

```
File Edit View Search Terminal Help
ttn@abhishek:~$ mkdir -p exercise/dir1/dir2/dir3
ttn@abhishek:~$
ttn@abhishek:~$ cd ~/exercise/dir1/dir2/dir3
ttn@abhishek:~/exercise/dir1/dir2/dir3$
ttn@abhishek:~/exercise/dir1/dir2/dir3$
ttn@abhishek:~/exercise/dir1/dir2/dir3$ cd ~/exercise/dir1/dir2/
ttn@abhishek:~/exercise/dir1/dir2$ touch emptyFile1 emptyFile2
ttn@abhishek:~/exercise/dir1/dir2$ ls
dir3 emptyFile1 emptyFile2
ttn@abhishek:~/exercise/dir1/dir2$
```

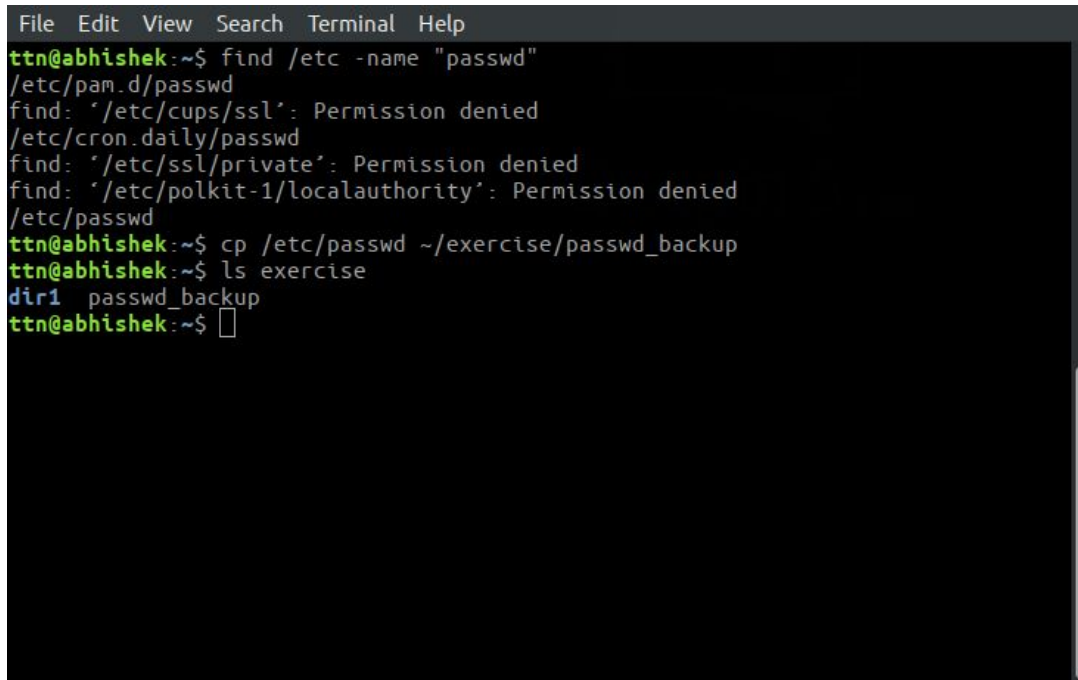
3) Create one file file1.txt containing text "hello world" and save it.

> echo "hello world" > file1.txt

```
File Edit View Search Terminal Help
ttn@abhishek:~$ mkdir -p exercise/dir1/dir2/dir3
ttn@abhishek:~$
ttn@abhishek:~$ cd ~/exercise/dir1/dir2/dir3
ttn@abhishek:~/exercise/dir1/dir2/dir3$
ttn@abhishek:~/exercise/dir1/dir2/dir3$
ttn@abhishek:~/exercise/dir1/dir2/dir3$ cd ~/exercise/dir1/dir2/
ttn@abhishek:~/exercise/dir1/dir2$ touch emptyFile1 emptyFile2
ttn@abhishek:~/exercise/dir1/dir2$ ls
dir3 emptyFile1 emptyFile2
ttn@abhishek:~/exercise/dir1/dir2$ echo "hello world" > file1.txt
ttn@abhishek:~/exercise/dir1/dir2$ cat file1.txt
hello world
ttn@abhishek:~/exercise/dir1/dir2$
```

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_backup

A terminal window with a dark background and a menu bar at the top containing 'File', 'Edit', 'View', 'Search', 'Terminal', and 'Help'. The terminal shows the following commands and output:

```
ttn@abhishek:~$ find /etc -name "passwd"
/etc/pam.d/passwd
find: '/etc/cups/ssl': Permission denied
/etc/cron.daily/passwd
find: '/etc/ssl/private': Permission denied
find: '/etc/polkit-1/localauthority': Permission denied
/etc/passwd
ttn@abhishek:~$ cp /etc/passwd ~/exercise/passwd_backup
ttn@abhishek:~$ ls exercise
dir1  passwd_backup
ttn@abhishek:~$
```

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

- > head passwd_backup
- > tail passwd_backup
- > Less passwd_backup

```
File Edit View Search Terminal Help
_apt:x:104:65534::/nonexistent:/usr/sbin/nologin
uidd:x:105:111:/run/uidd:/usr/sbin/nologin
avahi-autoipd:x:106:112:Avahi autoip daemon,,,:/var/lib/avahi-autoipd:/usr/sbin/nologin
usbmux:x:107:46:usbmux daemon,,,:/var/lib/usbmux:/usr/sbin/nologin
dnsmasq:x:108:65534:dnsmasq,,,:/var/lib/misc:/usr/sbin/nologin
rtkit:x:109:114:RealtimeKit,,,:/proc:/usr/sbin/nologin
cups-pk-helper:x:110:116:user for cups-pk-helper service,,,:/home/cups-pk-helper:/usr/sbin/nologin
speech-dispatcher:x:111:29:Speech Dispatcher,,,:/var/run/speech-dispatcher:/bin/false
whoopsie:x:112:117:/nonexistent:/bin/false
kernoops:x:113:65534:Kernel Oops Tracking Daemon,,,:/usr/sbin/nologin
saned:x:114:119:/var/lib/saned:/usr/sbin/nologin
pulse:x:115:120:PulseAudio daemon,,,:/var/run/pulse:/usr/sbin/nologin
avahi:x:116:122:Avahi mDNS daemon,,,:/var/run/avahi-daemon:/usr/sbin/nologin
colord:x:117:123:colord colour management daemon,,,:/var/lib/colord:/usr/sbin/nologin
hplip:x:118:7:HPLIP system user,,,:/var/run/hplip:/bin/false
geoclue:x:119:124:/var/lib/geoclue:/usr/sbin/nologin
gnome-initial-setup:x:120:65534:/run/gnome-initial-setup:/bin/false
gdm:x:121:125:Gnome Display Manager:/var/lib/gdm3:/bin/false
ttn:x:1000:1000:Abhishek:/home/ttn:/bin/bash
ttn@abhishek:~/exercise$ head passwd_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:/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
ttn@abhishek:~/exercise$ less passwd_backup
ttn@abhishek:~/exercise$
```

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

> grep -rnw passwd_backup -e "/bin/false" | wc -l

```
File Edit View Search Terminal Help
ttn@abhishek:~/exercise$ grep -rnw passwd_backup -e "/bin/false"
30:speech-dispatcher:x:111:29:Speech Dispatcher,,,:/var/run/speech-dispatcher:/bin/false
31:whoopsie:x:112:117:/nonexistent:/bin/false
37:hplip:x:118:7:HPLIP system user,,,:/var/run/hplip:/bin/false
39:gnome-initial-setup:x:120:65534:/run/gnome-initial-setup:/bin/false
40:gdm:x:121:125:Gnome Display Manager:/var/lib/gdm3:/bin/false
ttn@abhishek:~/exercise$ grep -rnw passwd_backup -e "/bin/false" | wc -l
5
ttn@abhishek:~/exercise$
```

7) Get the first 5 lines of a file "password_backup" and Redirect the output of the above commands into file "output".

> head -n 5 passwd_backup > output

```
File Edit View Search Terminal Help
ttn@abhishek:~/exercise$ head -n 5 passwd_backup > output
ttn@abhishek:~/exercise$ cat output
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
ttn@abhishek:~/exercise$
```

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

- > adduser test
- > id -u test
- > id -g test

```
File Edit View Search Terminal Help
ttn@abhishek:~$ sudo su
[sudo] password for ttn:
root@abhishek:/home/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 []: Test
  Room Number []:
  Work Phone []:
  Home Phone []:
  Other []:
Is the information correct? [Y/n] Y
root@abhishek:/home/ttn# id -u test
1001
root@abhishek:/home/ttn# id -g test
1001
root@abhishek:/home/ttn#
```

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

- > touch emptyFile1 emptyFile2

```
File Edit View Search Terminal Help
ttn@abhishek:~$ cd exercise/dir1/dir2
ttn@abhishek:~/exercise/dir1/dir2$ touch emptyFile1 emptyFile2
ttn@abhishek:~/exercise/dir1/dir2$ ls -l
total 8
drwxr-xr-x 2 ttn ttn 4096 Feb  4 15:57 dir3
-rw-r--r-- 1 ttn ttn   0 Feb  4 18:14 emptyFile1
-rw-r--r-- 1 ttn ttn   0 Feb  4 18:14 emptyFile2
-rw-r--r-- 1 ttn ttn  12 Feb  4 16:07 file1.txt
ttn@abhishek:~/exercise/dir1/dir2$
```

10) Login as test user and edit the "output" file created above. Since the permission won't allow you to save the changes. Configure such that test user can edit it.

- 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
- Make the file editable to the world so that test user can access it. Revert the changes after verification.
- Change the ownership to edit the file.

```
> chown :test output
> chmod 664 output
> su - test
> echo hello >> output
```



```
File Edit View Search Terminal Help
ttn@abhishek:~/exercise$ ls -l output
-rw-r--r-- 1 ttn ttn 189 Feb  5 01:31 output
ttn@abhishek:~/exercise$ sudo chown :test output
ttn@abhishek:~/exercise$ sudo chmod 664 output
ttn@abhishek:~/exercise$ ls -l output
-rw-rw-r-- 1 ttn test 189 Feb  5 01:31 output
ttn@abhishek:~/exercise$ su - test
Password:
test@abhishek:~$ cd /home/ttn/exercise/
test@abhishek:/home/ttn/exercise$ echo hello >> output
test@abhishek:/home/ttn/exercise$ cat output
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
hello
test@abhishek:/home/ttn/exercise$
test@abhishek:/home/ttn/exercise$
```

- > chmod 666 output
- > chmod 644 output

```
File Edit View Search Terminal Help
test@abhishek:/home/ttn/exercise$ echo hello >> output
test@abhishek:/home/ttn/exercise$ cat output
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
hello
test@abhishek:/home/ttn/exercise$
test@abhishek:/home/ttn/exercise$ su - ttn
Password:
ttn@abhishek:~$ cd exercise
ttn@abhishek:~/exercise$ sudo chmod 666 output
ttn@abhishek:~/exercise$ ls -l output
-rw-rw-rw- 1 ttn test 195 Feb  5 01:53 output
ttn@abhishek:~/exercise$ sudo chmod 644 output
ttn@abhishek:~/exercise$ ls -l output
-rw-r--r-- 1 ttn test 195 Feb  5 01:53 output
ttn@abhishek:~/exercise$
```


> chown test: output

```
File Edit View Search Terminal Help
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
hello
test@abhishek:/home/ttn/exercise$
test@abhishek:/home/ttn/exercise$ su - ttn
Password:
ttn@abhishek:~$ cd exercise
ttn@abhishek:~/exercise$ sudo chmod 666 output
ttn@abhishek:~/exercise$ ls -l output
-rw-rw-rw- 1 ttn test 195 Feb  5 01:53 output
ttn@abhishek:~/exercise$ sudo chmod 644 output
ttn@abhishek:~/exercise$ ls -l output
-rw-r--r-- 1 ttn test 195 Feb  5 01:53 output
ttn@abhishek:~/exercise$ chown test: output
chown: changing ownership of 'output': Operation not permitted
ttn@abhishek:~/exercise$ sudo chown test: output
ttn@abhishek:~/exercise$ ls -l output
-rw-r--r-- 1 test test 195 Feb  5 01:53 output
ttn@abhishek:~/exercise$
```

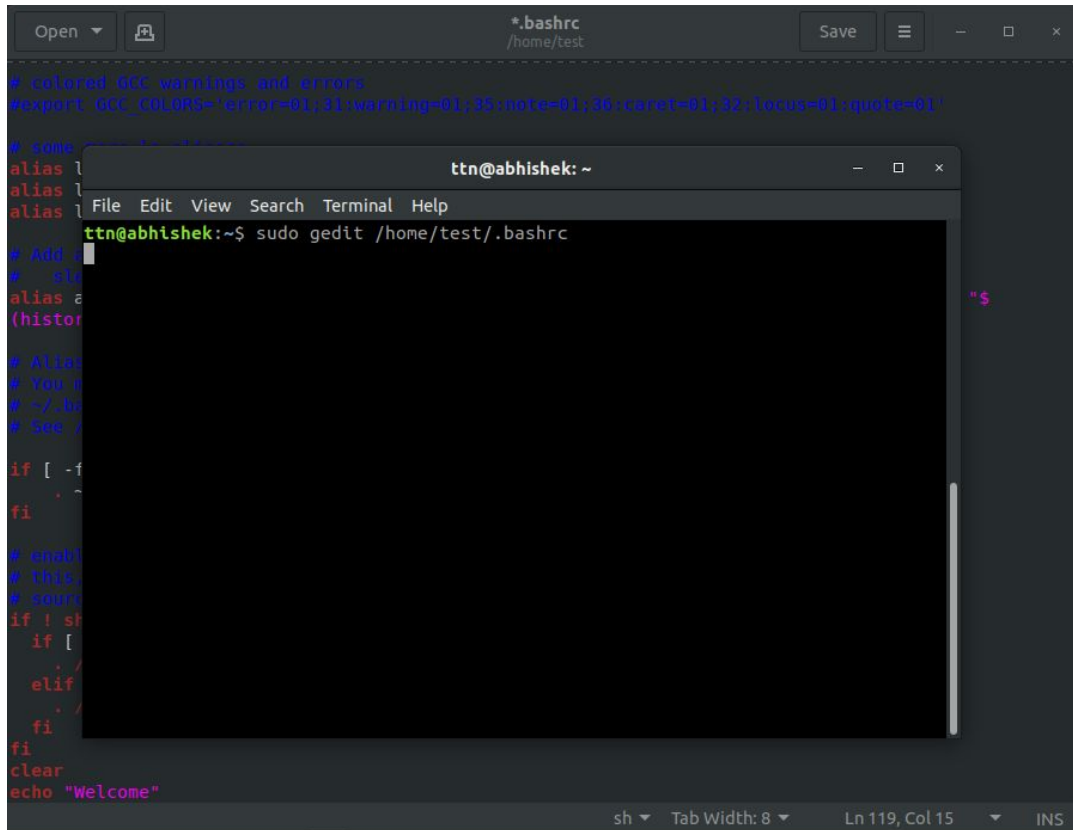
11) Create alias with your name so that it creates a file as "/tmp/aliastesting".

> alias abhishek='mkdir -p /tmp/aliastesting'

```
File Edit View Search Terminal Help
ttn@abhishek:/tmp$ alias abhishek='mkdir -p /tmp/aliastesting'
ttn@abhishek:/tmp$ abhishek
ttn@abhishek:/tmp$ ls -l /tmp/aliastesting
total 0
ttn@abhishek:/tmp$
```

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

```
> sudo gedit /home/test/.bashrc
```



```
* colored GCC warnings and errors
export GCC_COLORS='error=01;31:warning=01;35:note=01;36:caret=01;32:locus=01:quote=01'

# some more to add here

alias [
alias [
alias [
# Add a
# ali
alias a
(histor

# Alias
# You r
# ~/.ba
# See /

if [ -f
fi

# enabl
# this
# sourc
if ! sh
if [
+ /
elif
+ /
fi
fi
clear
echo "Welcome"
```

```
> su - test
```

```
File Edit View Search Terminal Help
Welcome
test@abhishek:~$
```

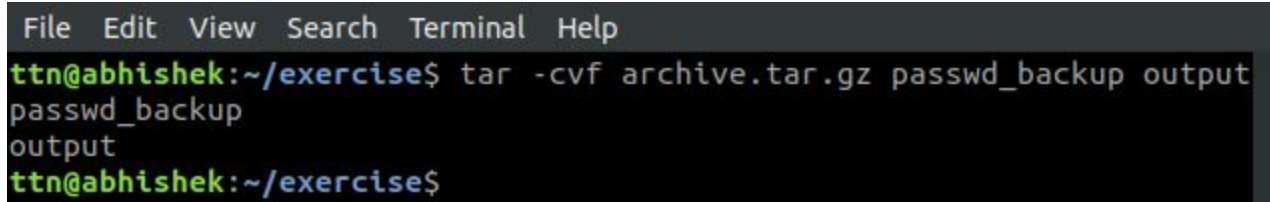
13) Install “zip” package.

> sudo apt-get update

```
File Edit View Search Terminal Help
ttn@abhishek:~/exercise$ sudo apt-get update
Hit:1 http://archive.ubuntu.com/ubuntu bionic InRelease
Ign:2 http://dl.google.com/linux/chrome/deb stable InRelease
Hit:3 http://archive.canonical.com/ubuntu bionic InRelease
Hit:4 http://archive.ubuntu.com/ubuntu bionic-updates InRelease
Hit:5 http://ppa.launchpad.net/gerardpuig/ppa/ubuntu bionic InRelease
Get:6 http://archive.ubuntu.com/ubuntu bionic-backports InRelease [74
.6 kB]
Hit:7 http://ppa.launchpad.net/inkscape.dev/stable/ubuntu bionic InRe
lease
Get:8 http://archive.ubuntu.com/ubuntu bionic-security InRelease [88.
7 kB]
Hit:9 http://dl.google.com/linux/chrome/deb stable Release
Fetched 163 kB in 1s (123 kB/s)
Reading package lists... Done
ttn@abhishek:~/exercise$
```

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

```
> tar -cvf archive.tar.gz passwd_backup output
```

A terminal window with a dark background and a menu bar at the top containing 'File', 'Edit', 'View', 'Search', 'Terminal', and 'Help'. The prompt is 'ttn@abhishek:~/exercise\$'. The command 'tar -cvf archive.tar.gz passwd_backup output' has been entered and executed. The output shows 'passwd_backup' and 'output' being listed. The prompt returns to 'ttn@abhishek:~/exercise\$'.

```
File Edit View Search Terminal Help
ttn@abhishek:~/exercise$ tar -cvf archive.tar.gz passwd_backup output
passwd_backup
output
ttn@abhishek:~/exercise$
```

15) scp this file to test user

```
> scp archive.tar.gz ttn@localhost.xyz:/home/remote/ttn
```

```
File Edit View Search Terminal Help
ttn@abhishek:~$ scp archive.tar.gz ttn@localhost.xyz:/home/remote/ttn
ssh: Could not resolve hostname localhost.xyz: Name or service not known
lost connection
ttn@abhishek:~$
```

16) Unzip this tar bar by logging into the remote server

> ssh user@host tar czf - /home/remote/ttn/

17) Download any image from web and move to desktop

> wget http://www.tothenew.com/themes/ttnd/images/logo.png | mv ~/logo.png
~/Desktop

```
File Edit View Search Terminal Help
ttn@abhishek:~$ wget http://www.tothenew.com/themes/ttnd/images/logo.png | mv ~/lo
go.png ~/Desktop
--2019-02-05 01:16:20-- http://www.tothenew.com/themes/ttnd/images/logo.png
Resolving www.tothenew.com (www.tothenew.com)... 13.35.130.116, 13.35.130.10, 13.3
5.130.78, ...
Connecting to www.tothenew.com (www.tothenew.com)|13.35.130.116|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 12019 (12K) [image/png]
Saving to: 'logo.png'

logo.png          100%[=====] 11.74K  --.-KB/s   in 0.002s

2019-02-05 01:16:20 (5.63 MB/s) - 'logo.png' saved [12019/12019]

ttn@abhishek:~$
```

18) How to get help of commands usages.

> by using whatis <command> , info <command>, man <command>, etc

```
File Edit View Search Terminal Help
test@abhishek:~$ whatis su
su (1)                  - change user ID or become superuser
test@abhishek:~$ info su
test@abhishek:~$ man su
test@abhishek:~$
```

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

> ln -s /etc/services /tmp/ports-info

```
File Edit View Search Terminal Help
ttn@abhishek:~$ ln -s /etc/services /tmp/ports-info
ttn@abhishek:~$ ls -l /tmp/ports-info
lrwxrwxrwx 1 ttn ttn 13 Feb  5 00:42 /tmp/ports-info -> /etc/services
ttn@abhishek:~$
```


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 joiner you do not have any idea about where is that installed. How can you check that?

- > By using whereis command

Ex-

```
File Edit View Search Terminal Help
ttn@abhishek:~/exercise$ whereis xyz
xyz:
ttn@abhishek:~/exercise$ whereis mv
mv: /bin/mv /usr/share/man/man1/mv.1.gz
ttn@abhishek:~/exercise$
```