

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

```
File Edit View Search Terminal Help
ttn@ttn:~$ ls
Desktop  Downloads  Music  Public  Videos
Documents examples.desktop Pictures Templates
ttn@ttn:~$ mkdir -p exercise/dir1/dir2/dir3
ttn@ttn:~$ ls
Desktop  Downloads  exercise Pictures Templates
Documents examples.desktop Music Public Videos
ttn@ttn:~$ ls -l
total 48
drwxr-xr-x 2 ttn ttn 4096 Feb  2 15:54 Desktop
drwxr-xr-x 2 ttn ttn 4096 Feb  2 15:54 Documents
drwxr-xr-x 2 ttn ttn 4096 Feb  4 13:21 Downloads
-rw-r--r-- 1 ttn ttn 8980 Jan 30 19:18 examples.desktop
drwxr-xr-x 3 ttn ttn 4096 Feb  4 15:29 exercise
drwxr-xr-x 2 ttn ttn 4096 Feb  2 15:54 Music
drwxr-xr-x 2 ttn ttn 4096 Feb  2 15:54 Pictures
drwxr-xr-x 2 ttn ttn 4096 Feb  2 15:54 Public
drwxr-xr-x 2 ttn ttn 4096 Feb  2 15:54 Templates
drwxr-xr-x 2 ttn ttn 4096 Feb  2 15:54 Videos
ttn@ttn:~$ cd exercise
```

```
ttn@ttn:~/exercise$ ls -l
total 4
drwxr-xr-x 3 ttn ttn 4096 Feb  4 15:29 dir1
ttn@ttn:~/exercise$ cd dir1
ttn@ttn:~/exercise/dir1$ ls -l
total 4
drwxr-xr-x 3 ttn ttn 4096 Feb  4 15:29 dir2
ttn@ttn:~/exercise/dir1$ cd dir2
ttn@ttn:~/exercise/dir1/dir2$ cd dir2
bash: cd: dir2: No such file or directory
ttn@ttn:~/exercise/dir1/dir2$ cd dir3
ttn@ttn:~/exercise/dir1/dir2/dir3$
```

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

```
ttn@ttn:~/exercise/dir1/dir2/dir3$ cd ..
ttn@ttn:~/exercise/dir1/dir2$ touch emptyFile1, emptyFile2
ttn@ttn:~/exercise/dir1/dir2$ ls -l
total 4
drwxr-xr-x 2 ttn ttn 4096 Feb  4 15:29 dir3
-rw-r--r-- 1 ttn ttn   0 Feb  4 15:34 emptyFile1,
-rw-r--r-- 1 ttn ttn   0 Feb  4 15:34 emptyFile2
ttn@ttn:~/exercise/dir1/dir2$
```

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

```
ttn@ttn:~/exercise/dir1/dir2$ cd ../../
ttn@ttn:~/exercise$ cat > file1.txt
hello world
^C
ttn@ttn:~/exercise$ cat file1.txt
hello world
ttn@ttn:~/exercise$
```

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

```
ttn@ttn:~/exercise$ find /etc/passwd
/etc/passwd
ttn@ttn:~/exercise$ cp /etc/passwd passwd_copy
ttn@ttn:~/exercise$ mv passwd_copy passwd_backup
ttn@ttn:~/exercise$ cat 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
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:/var/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-network:x:100:102:systemd Network Management,,,:/run/systemd/netif:/usr/sbin/nologin
systemd-resolve:x:101:103:systemd Resolver,,,:/run/systemd/resolve:/usr/sbin/nologin
syslog:x:102:106:./home/syslog:/usr/sbin/nologin
messagebus:x:103:107:./nonexistent:/usr/sbin/nologin
_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
```


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

```
ttn@ttn:~/exercise$ more 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
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:/var/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-network:x:100:102:systemd Network Management,,,:/run/systemd/netif:/usr/sbin/nologin
systemd-resolve:x:101:103:systemd Resolver,,,:/run/systemd/resolve:/usr/sbin/nologin
syslog:x:102:106:./home/syslog:/usr/sbin/nologin
messagebus:x:103:107:./nonexistent:/usr/sbin/nologin
_apt:x:104:65534:./nonexistent:/usr/sbin/nologin
uuidd:x:105:111:./run/uuidd:/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
More (60%)
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:TTN,,,:/home/ttn:/bin/bash
ttn@ttn:~/exercise$
```

```
ttn@ttn:~/exercise$ cat 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
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:/var/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-network:x:100:102:systemd Network Management,,,:/run/systemd/netif:/usr/sbin/nologin
systemd-resolve:x:101:103:systemd Resolver,,,:/run/systemd/resolve:/usr/sbin/nologin
syslog:x:102:106:./home/syslog:/usr/sbin/nologin
messagebus:x:103:107:./nonexistent:/usr/sbin/nologin
_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
```



```
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
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:/var/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-network:x:100:102:systemd Network Management,,,:/run/systemd/netif:/usr/sbin/nologin
systemd-resolve:x:101:103:systemd Resolver,,,:/run/systemd/resolve:/usr/sbin/nologin
syslog:x:102:106:./home/syslog:/usr/sbin/nologin
messagebus:x:103:107:./nonexistent:/usr/sbin/nologin
_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
```

```
ttn@ttn:~/exercise$ less passwd_backup
```

```
ttn@ttn:~/exercise$ strings 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
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:/var/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin)/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-network:x:100:102:systemd Network Management,,,:/run/systemd/netif:/usr/sbin/nologin
systemd-resolve:x:101:103:systemd Resolver,,,:/run/systemd/resolve:/usr/sbin/nologin
syslog:x:102:106:/:home/syslog:/usr/sbin/nologin
messagebus:x:103:107:/:nonexistent:/usr/sbin/nologin
_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
```


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

```
ttn@ttn:~/exercise$ grep "/bin/false" 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
ttn@ttn:~/exercise$ grep "/bin/false" passwd_backup | wc -l
5
ttn@ttn:~/exercise$
```

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

```
ttn@ttn:~/exercise$ head -5 passwd_backup > output
ttn@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
ttn@ttn:~/exercise$
```

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

```
ttn@ttn:~/exercise$ sudo adduser test
[sudo] password for ttn:
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
ttn@ttn:~/exercise$
```

```
ttn@ttn:~/exercise$ id -u test
1001
ttn@ttn:~/exercise$ id -g test
1001
ttn@ttn:~/exercise$
```


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

```
ttn@ttn:~/exercise$ cd dir1/dir2/
ttn@ttn:~/exercise/dir1/dir2$ ls -l
total 4
drwxr-xr-x 2 ttn ttn 4096 Feb  4 15:29 dir3
-rw-r--r-- 1 ttn ttn   0 Feb  4 15:34 emptyFile1,
-rw-r--r-- 1 ttn ttn   0 Feb  4 15:34 emptyFile2
ttn@ttn:~/exercise/dir1/dir2$ touch emptyFile1, emptyFile2
ttn@ttn:~/exercise/dir1/dir2$ ls -l
total 4
drwxr-xr-x 2 ttn ttn 4096 Feb  4 15:29 dir3
-rw-r--r-- 1 ttn ttn   0 Feb  4 16:34 emptyFile1,
-rw-r--r-- 1 ttn ttn   0 Feb  4 16:34 emptyFile2
ttn@ttn:~/exercise/dir1/dir2$
```

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.

1. 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
2. Make the file editable to the world so that test user can access it. Revert the changes after verification
3. Change the ownership to edit the file.

```
test@ttn:/home/ttn/exercise$ ls -l
total 20
-rw-r--r-- 1 ttn ttn 2398 Feb  4 16:17 back1
drwxr-xr-x 3 ttn ttn 4096 Feb  4 15:29 dir1
-rw-r--r-- 1 ttn ttn  12 Feb  4 15:37 file1.txt
-rw-r--r-- 1 ttn ttn  189 Feb  4 16:26 output
-rw-r--r-- 1 ttn ttn 2398 Feb  4 15:44 passwd_backup
test@ttn:/home/ttn/exercise$ cat >> output
bash: output: Permission denied
test@ttn:/home/ttn/exercise$ su ttn
Password:
ttn@ttn:~/exercise$ ls -l
total 20
-rw-r--r-- 1 ttn ttn 2398 Feb  4 16:17 back1
drwxr-xr-x 3 ttn ttn 4096 Feb  4 15:29 dir1
-rw-r--r-- 1 ttn ttn  12 Feb  4 15:37 file1.txt
-rw-r--r-- 1 ttn ttn  189 Feb  4 16:26 output
-rw-r--r-- 1 ttn ttn 2398 Feb  4 15:44 passwd_backup
ttn@ttn:~/exercise$ sudo chmod g=rwx output
ttn@ttn:~/exercise$ ls -l
total 20
-rw-r--r-- 1 ttn ttn 2398 Feb  4 16:17 back1
drwxr-xr-x 3 ttn ttn 4096 Feb  4 15:29 dir1
-rw-r--r-- 1 ttn ttn  12 Feb  4 15:37 file1.txt
-rw-rwxr-- 1 ttn ttn  189 Feb  4 16:26 output
-rw-r--r-- 1 ttn ttn 2398 Feb  4 15:44 passwd_backup
ttn@ttn:~/exercise$ su test
Password:
```

```
test@ttn:/home/ttn/exercise$ ls -l
total 20
-rw-r--r-- 1 ttn ttn 2398 Feb  4 16:17 back1
drwxr-xr-x 3 ttn ttn 4096 Feb  4 15:29 dir1
-rw-r--r-- 1 ttn ttn  12 Feb  4 15:37 file1.txt
-rw-rwxr-- 1 ttn ttn  189 Feb  4 16:26 output
-rw-r--r-- 1 ttn ttn 2398 Feb  4 15:44 passwd_backup
test@ttn:/home/ttn/exercise$ cat >> output
1
^C
test@ttn:/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
1
test@ttn:/home/ttn/exercise$ sudo chmod g-wx output
[sudo] password for test:
test is not in the sudoers file. This incident will be reported.
test@ttn:/home/ttn/exercise$ su ttn
Password:
ttn@ttn:~/exercise$ sudo chmod g-wx output
ttn@ttn:~/exercise$ ls -l
total 20
-rw-r--r-- 1 ttn ttn 2398 Feb  4 16:17 back1
drwxr-xr-x 3 ttn ttn 4096 Feb  4 15:29 dir1
-rw-r--r-- 1 ttn ttn  12 Feb  4 15:37 file1.txt
-rw-r--r-- 1 ttn ttn  191 Feb  4 17:19 output
-rw-r--r-- 1 ttn ttn 2398 Feb  4 15:44 passwd_backup
ttn@ttn:~/exercise$ sudo chmod a=rwx output
```



```
test@ttn:/home/ttn/exercise$ ls -l
total 20
-rw-r--r-- 1 ttn ttn 2398 Feb  4 16:17 back1
drwxr-xr-x 3 ttn ttn 4096 Feb  4 15:29 dir1
-rw-r--r-- 1 ttn ttn  12 Feb  4 15:37 file1.txt
-rw-rwxr-- 1 ttn ttn  189 Feb  4 16:26 output
-rw-r--r-- 1 ttn ttn 2398 Feb  4 15:44 passwd_backup
test@ttn:/home/ttn/exercise$ cat>> output
1
^C
test@ttn:/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
1
test@ttn:/home/ttn/exercise$ sudo chmod g-wx output
[sudo] password for test:
test is not in the sudoers file. This incident will be reported.
test@ttn:/home/ttn/exercise$ su ttn
Password:
ttn@ttn:~/exercise$ sudo chmod g-wx output
ttn@ttn:~/exercise$ ls -l
total 20
-rw-r--r-- 1 ttn ttn 2398 Feb  4 16:17 back1
drwxr-xr-x 3 ttn ttn 4096 Feb  4 15:29 dir1
-rw-r--r-- 1 ttn ttn  12 Feb  4 15:37 file1.txt
-rw-r--r-- 1 ttn ttn  191 Feb  4 17:19 output
-rw-r--r-- 1 ttn ttn 2398 Feb  4 15:44 passwd_backup
ttn@ttn:~/exercise$ sudo chmod a=rwx output
```

```
ttn@ttn:~/exercise$ sudo chmod g-wx output
ttn@ttn:~/exercise$ ls -l
total 20
-rw-r--r-- 1 ttn ttn 2398 Feb  4 16:17 back1
drwxr-xr-x 3 ttn ttn 4096 Feb  4 15:29 dir1
-rw-r--r-- 1 ttn ttn  12 Feb  4 15:37 file1.txt
-rw-r--r-- 1 ttn ttn  191 Feb  4 17:19 output
-rw-r--r-- 1 ttn ttn 2398 Feb  4 15:44 passwd_backup
ttn@ttn:~/exercise$ sudo chmod a=rwx output
ttn@ttn:~/exercise$ ls -l
total 20
-rw-r--r-- 1 ttn ttn 2398 Feb  4 16:17 back1
drwxr-xr-x 3 ttn ttn 4096 Feb  4 15:29 dir1
-rw-r--r-- 1 ttn ttn  12 Feb  4 15:37 file1.txt
-rwxrwxrwx 1 ttn ttn  191 Feb  4 17:19 output
-rw-r--r-- 1 ttn ttn 2398 Feb  4 15:44 passwd_backup
ttn@ttn:~/exercise$ su test
Password:
test@ttn:/home/ttn/exercise$ ls -l
total 20
-rw-r--r-- 1 ttn ttn 2398 Feb  4 16:17 back1
drwxr-xr-x 3 ttn ttn 4096 Feb  4 15:29 dir1
-rw-r--r-- 1 ttn ttn  12 Feb  4 15:37 file1.txt
-rwxrwxrwx 1 ttn ttn  191 Feb  4 17:19 output
-rw-r--r-- 1 ttn ttn 2398 Feb  4 15:44 passwd_backup
test@ttn:/home/ttn/exercise$ cat >> output
2
^C
```

```
test@ttn:/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
1
test@ttn:/home/ttn/exercise$ sudo chmod g-wx output
[sudo] password for test:
test is not in the sudoers file. This incident will be reported
test@ttn:/home/ttn/exercise$ su ttn
Password:
ttn@ttn:~/exercise$ sudo chmod g-wx output
ttn@ttn:~/exercise$ ls -l
total 20
-rw-r--r-- 1 ttn ttn 2398 Feb  4 16:17 back1
drwxr-xr-x 3 ttn ttn 4096 Feb  4 15:29 dir1
-rw-r--r-- 1 ttn ttn  12 Feb  4 15:37 file1.txt
-rw-r--r-- 1 ttn ttn  191 Feb  4 17:19 output
-rw-r--r-- 1 ttn ttn 2398 Feb  4 15:44 passwd_backup
ttn@ttn:~/exercise$ sudo chmod a=rwx output
ttn@ttn:~/exercise$ ls -l
total 20
-rw-r--r-- 1 ttn ttn 2398 Feb  4 16:17 back1
drwxr-xr-x 3 ttn ttn 4096 Feb  4 15:29 dir1
-rw-r--r-- 1 ttn ttn  12 Feb  4 15:37 file1.txt
-rwxrwxrwx 1 ttn ttn  191 Feb  4 17:19 output
-rw-r--r-- 1 ttn ttn 2398 Feb  4 15:44 passwd_backup
ttn@ttn:~/exercise$ su test
Password:
```



```
test@ttn:/home/ttn/exercise$ ls -l
total 20
-rw-r--r-- 1 ttn ttn 2398 Feb  4 16:17 back1
drwxr-xr-x 3 ttn ttn 4096 Feb  4 15:29 dir1
-rw-r--r-- 1 ttn ttn  12 Feb  4 15:37 file1.txt
-rwxrwxrwx 1 ttn ttn  191 Feb  4 17:19 output
-rw-r--r-- 1 ttn ttn 2398 Feb  4 15:44 passwd_backup
test@ttn:/home/ttn/exercise$ cat >> output
2
^C
test@ttn:/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
1
2
test@ttn:/home/ttn/exercise$ su sudo
No passwd entry for user 'sudo'
test@ttn:/home/ttn/exercise$ su ttn
Password:
ttn@ttn:~/exercise$ ls -l
total 20
-rw-r--r-- 1 ttn ttn 2398 Feb  4 16:17 back1
drwxr-xr-x 3 ttn ttn 4096 Feb  4 15:29 dir1
-rw-r--r-- 1 ttn ttn  12 Feb  4 15:37 file1.txt
-rwxrwxrwx 1 ttn ttn  193 Feb  4 17:25 output
-rw-r--r-- 1 ttn ttn 2398 Feb  4 15:44 passwd_backup
ttn@ttn:~/exercise$ sudo chown test:test output
ttn@ttn:~/exercise$ ls-l
ls-l: command not found
```

```
test@ttn:/home/ttn/exercise$ su sudo
No passwd entry for user 'sudo'
test@ttn:/home/ttn/exercise$ su ttn
Password:
ttn@ttn:~/exercise$ ls -l
total 20
-rw-r--r-- 1 ttn ttn 2398 Feb  4 16:17 back1
drwxr-xr-x 3 ttn ttn 4096 Feb  4 15:29 dir1
-rw-r--r-- 1 ttn ttn  12 Feb  4 15:37 file1.txt
-rwxrwxrwx 1 ttn ttn  193 Feb  4 17:25 output
-rw-r--r-- 1 ttn ttn 2398 Feb  4 15:44 passwd_backup
ttn@ttn:~/exercise$ sudo chown test:test output
ttn@ttn:~/exercise$ ls-l
ls-l: command not found
ttn@ttn:~/exercise$ ls -l
total 20
-rw-r--r-- 1 ttn ttn 2398 Feb  4 16:17 back1
drwxr-xr-x 3 ttn ttn 4096 Feb  4 15:29 dir1
-rw-r--r-- 1 ttn ttn  12 Feb  4 15:37 file1.txt
-rwxrwxrwx 1 test test 193 Feb  4 17:25 output
-rw-r--r-- 1 ttn ttn 2398 Feb  4 15:44 passwd_backup
ttn@ttn:~/exercise$
```

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

```
ttn@ttn:~/exercise$ alias dhruv='touch /tmp/aliastesting'
ttn@ttn:~/exercise$ dhruv
ttn@ttn:~/exercise$ ls /tmp
aliastesting
config-err-LyF1E1
ssh-ZZxeLHDEx1Jh
systemd-private-7a99661cc75145f386e2489ed82e5cc4-bolt.service-NULVpU
systemd-private-7a99661cc75145f386e2489ed82e5cc4-colord.service-wP9D0W
systemd-private-7a99661cc75145f386e2489ed82e5cc4-fwupd.service-ie0DiW
systemd-private-7a99661cc75145f386e2489ed82e5cc4-rtkit-daemon.service-iN2FB2
systemd-private-7a99661cc75145f386e2489ed82e5cc4-systemd-resolved.service-fTnHZR
systemd-private-7a99661cc75145f386e2489ed82e5cc4-systemd-timesyncd.service-AZm1g9
Temp-877a9109-dfaf-40d4-8403-bbe05c99d377
Temp-df45b1c2-223c-43d2-b537-ecb8f5732402
ttn@ttn:~/exercise$
```


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

```
test@ttn:~$ vim ~/.bashrc
```

```
ttn@ttn: ~
File Edit View Search Terminal Help
alias egrep='egrep --color=auto'
fi

# 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 ls aliases
alias ll='ls -alF'
alias la='ls -A'
alias l='ls -CF'

# Add an "alert" alias for long running commands.  Use like so:
#   sleep 10; alert
alias alert='notify-send --urgency=low -i "${[ $? = 0 ]} && echo terminal || echo error)" "${hi
; &]} \s*alert$//\'\'\'"'

# Alias definitions.
# You may want to put all your additions into a separate file like
# ~/.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
alias su= "su -c 'clear;echo welcome'"

-- INSERT --
```

```
test@ttn: /home/ttn
File Edit View Search Terminal Help
ttn@ttn:~$ su test
Password:
```

welcome

test@ttn:/home/ttn\$

Q13. Install “zip” package.

```
ttn@ttn:~$ sudo apt 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 331 not upgraded.
ttn@ttn:~$
```

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

```
ttn@ttn:~/exercise$ tar -czvf archive1.tar.gz output passwd_backup
output
passwd_backup
ttn@ttn:~/exercise$ tar -tvf archive1.tar.gz
-rwxrwxrwx test/test      193 2019-02-04 17:25 output
-rw-r--r-- ttn/ttn       2398 2019-02-04 15:44 passwd_backup
ttn@ttn:~/exercise$ tar -f archive1.tar.gz
tar: You must specify one of the '-Acdrux', '--delete' or '--test-label' options
Try 'tar --help' or 'tar --usage' for more information.
ttn@ttn:~/exercise$ tar -vf archive1.tar.gz
tar: You must specify one of the '-Acdrux', '--delete' or '--test-label' options
Try 'tar --help' or 'tar --usage' for more information.
ttn@ttn:~/exercise$ tar -tvf archive1.tar.gz
-rwxrwxrwx test/test      193 2019-02-04 17:25 output
-rw-r--r-- ttn/ttn       2398 2019-02-04 15:44 passwd_backup
```


Q15. scp this file to test user

```
ttn@ttn:~/exercise$ ls -l
total 24
-rw-rw-r-- 1 ttn ttn 1038 Feb  4 17:48 archive1.tar.gz
-rw-r--r-- 1 ttn ttn 2398 Feb  4 16:17 back1
drwxr-xr-x 3 ttn ttn 4096 Feb  4 15:29 dir1
-rw-r--r-- 1 ttn ttn  12 Feb  4 15:37 file1.txt
-rwxrwxrwx 1 test test 193 Feb  4 17:25 output
-rw-r--r-- 1 ttn ttn 2398 Feb  4 15:44 passwd_backup
ttn@ttn:~/exercise$ ls
archive1.tar.gz back1 dir1 file1.txt output passwd_backup
ttn@ttn:~/exercise$
ttn@ttn:~/exercise$ man scp
ttn@ttn:~/exercise$
ttn@ttn:~/exercise$
ttn@ttn:~/exercise$ pwd
/home/ttn/exercise
ttn@ttn:~/exercise$ scp /home/ttn/exercise/archive1.tar.gz test@ttn
ttn@ttn:~/exercise$ su test
Password:
test@ttn:/home/ttn/exercise$ ls
archive1.tar.gz back1 dir1 file1.txt output passwd_backup test@ttn
test@ttn:/home/ttn/exercise$
```

```
ttn@ttn:~/exercise$ sudo apt install openssh-server
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  ncurses-term openssh-sftp-server ssh-import-id
Suggested packages:
  molly-guard monkeysphere rssh 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 331 not upgraded.
Need to get 637 kB of archives.
After this operation, 5,316 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu bionic-updates/main amd64 ncurses-term all 6.1-1ubuntu1.18.04 [248 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu bionic-updates/main amd64 openssh-sftp-server amd64 1:7.6p1-4ubuntu0.1 [45.5 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu bionic-updates/main amd64 openssh-server amd64 1:7.6p1-4ubuntu0.1 [332 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu bionic-updates/main amd64 ssh-import-id all 5.7-0ubuntu1.1 [10.9 kB]
Fetched 637 kB in 4s (154 kB/s)
Preconfiguring packages ...
Selecting previously unselected package ncurses-term.
(Reading database ... 127526 files and directories currently installed.)
Preparing to unpack .../ncurses-term_6.1-1ubuntu1.18.04_all.deb ...
Unpacking ncurses-term (6.1-1ubuntu1.18.04) ...
Selecting previously unselected package openssh-sftp-server.
Preparing to unpack .../openssh-sftp-server_1%3a7.6p1-4ubuntu0.1_amd64.deb ...
```

```
ttn@ttn:~/exercise$ sudo service sshd start
ttn@ttn:~/exercise$ sudo service sshd status
● ssh.service - OpenBSD Secure Shell server
   Loaded: loaded (/lib/systemd/system/ssh.service; enabled; vendor preset: enabled)
   Active: active (running) since Mon 2019-02-04 20:56:25 IST; 2min 54s ago
 Main PID: 7501 (sshd)
    Tasks: 1 (limit: 4915)
   CGroup: /system.slice/ssh.service
           └─7501 /usr/sbin/sshd -D

Feb 04 20:56:25 ttn systemd[1]: Starting OpenBSD Secure Shell server...
Feb 04 20:56:25 ttn sshd[7501]: Server listening on 0.0.0.0 port 22.
Feb 04 20:56:25 ttn sshd[7501]: Server listening on :: port 22.
Feb 04 20:56:25 ttn systemd[1]: Started OpenBSD Secure Shell server.
ttn@ttn:~/exercise$
```

```
ttn@ttn:~/exercise$ su test
Password:
test@ttn:/home/ttn/exercise$ ls
archive1.tar.gz  back1  dir1  file1.txt  output  passwd_backup  test@ttn
test@ttn:/home/ttn/exercise$ su ttn
Password:
ttn@ttn:~/exercise$ scp archive1.tar.gz test@127.0.0.1:/home/test
test@127.0.0.1's password:
archive1.tar.gz
ttn@ttn:~/exercise$ su test
```

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

```
ttn@ttn:/tmp$ ssh test@127.0.0.1
test@127.0.0.1's password:
Welcome to Ubuntu 18.04.1 LTS (GNU/Linux 4.15.0-29-generic x86_64)

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

 * Canonical Livepatch is available for installation.
   - Reduce system reboots and improve kernel security. Activate at:
     https://ubuntu.com/livepatch

329 packages can be updated.
73 updates are security updates.

Last login: Mon Feb  4 21:13:35 2019 from 127.0.0.1
test@ttn:~$ ls
archive1.tar.gz  examples.desktop
test@ttn:~$ tar xvzf archive1.tar.gz
output
passwd_backup
test@ttn:~$ ls
archive1.tar.gz  examples.desktop  output  passwd_backup
test@ttn:~$ ls -l
total 24
-rw-rw-r-- 1 test test 1038 Feb  4 21:20 archive1.tar.gz
-rw-r--r-- 1 test test 8980 Feb  4 16:28 examples.desktop
-rwxrwxr-x 1 test test  193 Feb  4 17:25 output
-rw-r--r-- 1 test test 2398 Feb  4 15:44 passwd_backup
```

Q17. Download any image from web and move to desktop

```
ttn@ttn:~/exercise$ wget -O pic7.jpeg https://images.pexels.com/photos/248797/pexels-photo-248797.jpeg?auto=compress&cs=tinysrgb&dpr=1&w=500
[1] 9158
[2] 9159
[3] 9160
ttn@ttn:~/exercise$
Redirecting output to 'wget-log'.

[1] Done          wget -O pic7.jpeg https://images.pexels.com/photos/248797/pexels-photo-248797.jpeg?auto=compress
[2]- Done          cs=tinysrgb
[3]+ Done          dpr=1
ttn@ttn:~/exercise$ ls
archive1.tar.gz  back1  Desktop  dir1  file1.txt  output  passwd_backup  pic7.jpeg  test@ttn  wget-log
ttn@ttn:~/exercise$ mv p
passwd_backup  pic7.jpeg
ttn@ttn:~/exercise$ mv pic7.jpeg ~/Desktop/pic7.jpeg
ttn@ttn:~/exercise$ ls
archive1.tar.gz  back1  Desktop  dir1  file1.txt  output  passwd_backup  test@ttn  wget-log
ttn@ttn:~/exercise$ cd ../Desktop/
ttn@ttn:~/Desktop$ ls
pic7.jpeg
ttn@ttn:~/Desktop$
```


Q18. How to get help of commands usages

We can use different commands in order to get help of command

one such command is man command

man ls

ls --help

whatis ls

all these commands help a user to understand the command usage

```
ttn@ttn: /tmp
ttn@ttn: ~/exercise/dir1/dir2
LS(1)
User Commands
LS(1)
NAME
ls - list directory contents
SYNOPSIS
ls [OPTION]... [FILE]...
DESCRIPTION
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 ..
--author
with -l, print the author of each file
-b, --escape
print C-style escapes for nongraphic characters
--block-size=SIZE
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, --ignore-backups
do not list implied entries ending with ~
-c
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
Manual page ls(1) line 1 (press h for help or q to quit)
```

```
ttn@ttn: /tmp$ whatis ls
ls (1) - list directory contents
ttn@ttn: /tmp$
```

```
ttn@ttn: /tmp$ 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 ..
--author
with -l, print the author of each file
-b, --escape
print C-style escapes for nongraphic characters
--block-size=SIZE
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, --ignore-backups
do not list implied entries ending with ~
-c
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
list entries by columns
--color[=WHEN]
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
do not sort, enable -aU, disable -ls --color
-F, --classify
append indicator (one of */=>@|) to entries
likewise, except do not append '*'
--format=WORD
across -x, commas -m, horizontal -x, long -l,
single-column -1, verbose -l, vertical -C
--full-time
like -l --time-style=full-iso
like -l, but do not list super-
```

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

```
ttn@ttn:~/Desktop$ cd ..  
ttn@ttn:~$ ln -s /etc/services /tmp/ports-info  
ttn@ttn:~$ cd /tmp
```

```
ttn@ttn:/tmp$ ls -l  
total 36  
-rw-rw-r-- 1 ttn ttn 0 Feb 4 17:37 aliastesting  
-rw----- 1 ttn ttn 0 Feb 4 14:42 config-err-LyF1El  
lrwxrwxrwx 1 ttn ttn 13 Feb 4 22:25 ports-info -> /etc/services  
drwx----- 2 ttn ttn 4096 Feb 4 14:42 ssh-ZZxeLHDEx1Jh  
drwx----- 3 root root 4096 Feb 4 14:42 systemd-private-7a99661cc75145f386e2489ed82e5cc4-bolt.service-NULVpU  
drwx----- 3 root root 4096 Feb 4 14:42 systemd-private-7a99661cc75145f386e2489ed82e5cc4-colord.service-WP9DOW  
drwx----- 3 root root 4096 Feb 4 14:42 systemd-private-7a99661cc75145f386e2489ed82e5cc4-fwupd.service-1e0DiW  
drwx----- 3 root root 4096 Feb 4 14:42 systemd-private-7a99661cc75145f386e2489ed82e5cc4-rtkit-daemon.service-iN2FB2  
drwx----- 3 root root 4096 Feb 4 14:42 systemd-private-7a99661cc75145f386e2489ed82e5cc4-systemd-resolved.service-fTnHZR  
drwx----- 3 root root 4096 Feb 4 14:42 systemd-private-7a99661cc75145f386e2489ed82e5cc4-systemd-timesyncd.service-AZm1g9  
drwx----- 2 ttn ttn 4096 Feb 4 14:43 Temp-877a9109-dfaf-40d4-8403-bbe05c99d377  
drwx----- 2 ttn ttn 4096 Feb 4 14:43 Temp-df45b1c2-223c-43d2-b537-ecb8f5732402
```

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

ANS: There are different ways to find the command xyz we can use which command

which xyz

another way is to use whereis command

whereis xyz

another way is to use find command in different directories

EXAMPLE:

```
ttn@ttn:/tmp$ whereis cat
cat: /bin/cat /usr/share/man/man1/cat.1.gz
ttn@ttn:/tmp$ which cat
/bin/cat
ttn@ttn:/tmp$
```