

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

Command: `sudo mkdir -p exercise/{dir1,dir2,dir3}`

```
abhi@ubuntu:~$ sudo mkdir -p exercise/{dir1,dir2,dir3}
abhi@ubuntu:~$ ls
Desktop  Documents  Downloads  exercise  Music  Pictures  Public  Templates  Videos
$ cd exercise
$ ls
dir1  dir2  dir3
```

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

Command: `cd exercise/dir`

`Sudo touch emptyFile1 emptyFile2`

```
abhi@ubuntu:~$ cd exercise/dir2
abhi@ubuntu:~/exercise/dir2$ touch emptyFile1 emptyFile2
touch: cannot touch 'emptyFile1': Permission denied
touch: cannot touch 'emptyFile2': Permission denied
abhi@ubuntu:~/exercise/dir2$ sudo touch emptyFile1 emptyFile2
abhi@ubuntu:~/exercise/dir2$ ls
emptyFile1  emptyFile2
abhi@ubuntu:~/exercise/dir2$
```

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

Command: `cat > file1.txt`

```
root@ubuntu:~# cat > file1.txt
hello world
^C
root@ubuntu:~# cat file1.txt
hello world
root@ubuntu:~#
```

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

a. Command: `find /etc -name passwd`

```
root@ubuntu:~# find /etc -name passwd
/etc/pam.d/passwd
/etc/passwd
root@ubuntu:~#
```

```
c. mv passwd_copy passwd_backup
```

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

```
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:/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:/usr/sbin/nologin
systemd-resolve:x:101:103:systemd Resolver,,,:/run/systemd:/usr/sbin/nologin
systemd-timesync:x:102:104:systemd Time Synchronization,,,:/run/systemd:/usr/sbin/nologin
messagebus:x:103:106::/nonexistent:/usr/sbin/nologin
syslog:x:104:110::/home/syslog:/usr/sbin/nologin
_apt:x:105:65534::/nonexistent:/usr/sbin/nologin
tss:x:106:111:TPM software stack,,,:/var/lib/tpm:/bin/false
uuidd:x:107:114::/run/uuidd:/usr/sbin/nologin
tcpdump:x:108:115::/nonexistent:/usr/sbin/nologin
avahi-autoipd:x:109:116:Avahi autoip daemon,,,:/var/lib/avahi-autoipd:/usr/sbin/nologin
usbmux:x:110:46:usbmux daemon,,,:/var/lib/usbmux:/usr/sbin/nologin
rtkit:x:111:117:RealtimeKit,,/:proc:/usr/sbin/nologin
dnsmasq-x:112:65534:dnsmasq,,,:/var/lib/misc:/usr/sbin/nologin
cups-pk-helper:x:113:120:user for cups-pk-helper service,,:/home/cups-pk-helper:/usr/sbin/nologin
speech-dispatcher:x:114:29:Speech Dispatcher,,,:/run/speech-dispatcher:/bin/false
avahi:x:115:121:Avahi mDNS daemon,,,:/var/run/avahi-daemon:/usr/sbin/nologin
kerneloops:x:116:65534:Kernel Oops Tracking Daemon,,,:/usr/sbin/nologin
saned:x:117:123:/var/lib/saned:/usr/sbin/nologin
nm-openvpn:x:118:124:NetworkManager OpenVPN,,,:/var/lib/openvpn/chroot:/usr/sbin/nologin
hplip:x:119:7:HPLIP system user,,,:/run/hplip:/bin/false
whoopsie:x:120:125:/nonexistent:/bin/false
colord:x:121:126:colord colour management daemon,,,:/var/lib/colord:/usr/sbin/nologin
geoclue:x:122:127:/var/lib/geoclue:/usr/sbin/nologin
pulse:x:123:128:PulseAudio daemon,,,:/var/run/pulse:/usr/sbin/nologin
gnome-initial-setup:x:124:65534:/run/gnome-initial-setup:/bin/false
gdm:x:125:130:Gnome Display Manager:/var/lib/gdm3:/bin/false
abhi:x:1000:1000:abhishhek,,:/home/abhi:/bin/bash
systemd-coredump:x:999:999:systemd Core Dumper:/usr/sbin/nologin
~
~
~
~
~
~
```

(END)

Command: more passwd_backup

```
root@ubuntu:/home/abhi# 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
llist:x:38:38:MailList Manager:/var/llist:/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:/usr/sbin/nologin
systemd-resolve:x:101:103:systemd Resolver,,,:/run/systemd:/usr/sbin/nologin
systemd-timesync:x:102:104:systemd Time Synchronization,,,:/run/systemd:/usr/sbin/nologin
messagebus:x:103:106:/:/nonexistent:/usr/sbin/nologin
syslog:x:104:110:/:/home/syslog:/usr/sbin/nologin
_apt:x:105:65534:/:/nonexistent:/usr/sbin/nologin
tss:x:106:111:TPM software stack,,,:/var/lib/tpm:/bin/false
uuidd:x:107:114:/:/run/uuidd:/usr/sbin/nologin
tcpdump:x:108:115:/:/nonexistent:/usr/sbin/nologin
avahi-autoipd:x:109:116:Avahi autoip daemon,,,:/var/lib/avahi-autoipd:/usr/sbin/nologin
usbmux:x:110:46:usbmux daemon,,,:/var/lib/usbmux:/usr/sbin/nologin
rtkit:x:111:117:RealtimeKit,,,:/proc:/usr/sbin/nologin
dnsmasq:x:112:65534:dnsmasq,,,:/var/lib/misc:/usr/sbin/nologin
cups-pk-helper:x:113:120:user for cups-pk-helper service,,,:/home/cups-pk-helper:/usr/sbin/nologin
speech-dispatcher:x:114:29:Speech Dispatcher,,,:/run/speech-dispatcher:/bin/false
avahi:x:115:121:Avahi mDNS daemon,,,:/var/run/avahi-daemon:/usr/sbin/nologin
kernoops:x:116:65534:Kernel Oops Tracking Daemon,,,:/usr/sbin/nologin
saned:x:117:123:/:/var/lib/saned:/usr/sbin/nologin
nm-openvpn:x:118:124:NetworkManager OpenVPN,,,:/var/lib/openvpn/chroot:/usr/sbin/nologin
hplip:x:119:7:HPLIP system user,,,:/run/hplip:/bin/false
whoopsie:x:120:125:/:/nonexistent:/bin/false
colord:x:121:126:colord colour management daemon,,,:/var/lib/colord:/usr/sbin/nologin
geoclue:x:122:127:/:/var/lib/geoclue:/usr/sbin/nologin
pulse:x:123:128:PulseAudio daemon,,,:/var/run/pulse:/usr/sbin/nologin
gnome-initial-setup:x:124:65534:/:/run/gnome-initial-setup:/bin/false
gdm:x:125:130:Gnome Display Manager:/var/lib/gdm3:/bin/false
abhi:x:1000:1000:abhishek,,,:/home/abhi:/bin/bash
systemd-coredump:x:999:999:systemd Core Dumper:/:/usr/sbin/nologin
root@ubuntu:/home/abhi#
```


Command: cat passwd_backup

```
root@ubuntu:/home/abhi# 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:/usr/sbin/nologin
systemd-resolve:x:101:103:systemd Resolver,,,:/run/systemd:/usr/sbin/nologin
systemd-timesync:x:102:104:systemd Time Synchronization,,,:/run/systemd:/usr/sbin/nologin
messagebus:x:103:106:/:/nonexistent:/usr/sbin/nologin
syslog:x:104:110:/:/home/syslog:/usr/sbin/nologin
_apt:x:105:65534:/:/nonexistent:/usr/sbin/nologin
tss:x:106:111:TPM software stack,,,:/var/lib/tpm:/bin/false
uuidd:x:107:114:/:/run/uuidd:/usr/sbin/nologin
tcpdump:x:108:115:/:/nonexistent:/usr/sbin/nologin
avahi-autoipd:x:109:116:Avahi autoip daemon,,,:/var/lib/avahi-autoipd:/usr/sbin/nologin
usbmux:x:110:46:usbmux daemon,,,:/var/lib/usbmux:/usr/sbin/nologin
rtkit:x:111:117:RealtimeKit,,,:/proc:/usr/sbin/nologin
dnsmasq:x:112:65534:dnsmasq,,,:/var/lib/misc:/usr/sbin/nologin
cups-pk-helper:x:113:120:user for cups-pk-helper service,,,:/home/cups-pk-helper:/usr/sbin/nologin
speech-dispatcher:x:114:29:Speech Dispatcher,,,:/run/speech-dispatcher:/bin/false
avahi:x:115:121:Avahi mDNS daemon,,,:/var/run/avahi-daemon:/usr/sbin/nologin
kernoops:x:116:65534:Kernel Oops Tracking Daemon,,,:/usr/sbin/nologin
saned:x:117:123:/:/var/lib/saned:/usr/sbin/nologin
nm-openvpn:x:118:124:NetworkManager OpenVPN,,,:/var/lib/openvpn/chroot:/usr/sbin/nologin
hplip:x:119:7:HPLIP system user,,,:/run/hplip:/bin/false
whoopste:x:120:125:/:/nonexistent:/bin/false
colord:x:121:126:colord colour management daemon,,,:/var/lib/colord:/usr/sbin/nologin
geoclue:x:122:127:/:/var/lib/geoclue:/usr/sbin/nologin
pulse:x:123:128:PulseAudio daemon,,,:/var/run/pulse:/usr/sbin/nologin
gnome-initial-setup:x:124:65534:/:/run/gnome-initial-setup:/bin/false
gdm:x:125:130:Gnome Display Manager:/var/lib/gdm3:/bin/false
abhi:x:1000:1000:abhishek,,,:/home/abhi:/bin/bash
systemd-coredump:x:999:999:systemd Core Dumper:/:/usr/sbin/nologin
root@ubuntu:/home/abhi#
```

Command: strings passwd_backup

```
root@ubuntu:/home/abhi# 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:Mailng 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:/usr/sbin/nologin
systemd-resolve:x:101:103:systemd Resolver,,,:/run/systemd:/usr/sbin/nologin
systemd-timesync:x:102:104:systemd Time Synchronization,,,:/run/systemd:/usr/sbin/nologin
messagebus:x:103:106:/:nonexistent:/usr/sbin/nologin
syslog:x:104:110:/:home/syslog:/usr/sbin/nologin
_apt:x:105:65534:/:nonexistent:/usr/sbin/nologin
tss:x:106:111:TPM software stack,,,:/var/lib/tpm:/bin/false
uidd:x:107:114:/:run/uidd:/usr/sbin/nologin
tcpdump:x:108:115:/:nonexistent:/usr/sbin/nologin
avahi-autoipd:x:109:116:Avahi autoip daemon,,,:/var/lib/avahi-autoipd:/usr/sbin/nologin
usbmux:x:110:46:usbmux daemon,,,:/var/lib/usbmux:/usr/sbin/nologin
rtkit:x:111:117:RealtimeKit,,,:/proc:/usr/sbin/nologin
dnsmasq:x:112:65534:dnsmasq,,,:/var/lib/misc:/usr/sbin/nologin
cups-pk-helper:x:113:120:user for cups-pk-helper service,,,:/home/cups-pk-helper:/usr/sbin/nologin
speech-dispatcher:x:114:29:Speech Dispatcher,,,:/run/speech-dispatcher:/bin/false
avahi:x:115:121:Avahi mDNS daemon,,,:/var/run/avahi-daemon:/usr/sbin/nologin
kernoops:x:116:65534:Kernel Oops Tracking Daemon,,,:/usr/sbin/nologin
saned:x:117:123:/:var/lib/saned:/usr/sbin/nologin
nm-openvpn:x:118:124:NetworkManager OpenVPN,,,:/var/lib/openvpn/chroot:/usr/sbin/nologin
hplip:x:119:7:HPLIP system user,,,:/run/hplip:/bin/false
whoopste:x:120:125:/:nonexistent:/bin/false
colord:x:121:126:colord colour management daemon,,,:/var/lib/colord:/usr/sbin/nologin
geoclue:x:122:127:/:var/lib/geoclue:/usr/sbin/nologin
pulse:x:123:128:PulseAudio daemon,,,:/var/run/pulse:/usr/sbin/nologin
gnome-initial-setup:x:124:65534:/:run/gnome-initial-setup:/bin/false
gdm:x:125:130:Gnome Display Manager:/var/lib/gdm3:/bin/false
abhi:x:1000:1000:abhishek,,,:/home/abhi:/bin/bash
systemd-coredump:x:999:999:systemd Core Dumper:/:usr/sbin/nologin
root@ubuntu:/home/abhi#
```

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

Command: cat passwd_backup | grep -wc /bin/false

```
root@ubuntu:/home/abhi# cat passwd_backup | grep /bin/false
tss:x:106:111:TPM software stack,,,:/var/lib/tpm:/bin/false
speech-dispatcher:x:114:29:Speech Dispatcher,,,:/run/speech-dispatcher:/bin/false
hplip:x:119:7:HPLIP system user,,,:/run/hplip:/bin/false
whoopste:x:120:125:/:nonexistent:/bin/false
gnome-initial-setup:x:124:65534:/:run/gnome-initial-setup:/bin/false
gdm:x:125:130:Gnome Display Manager:/var/lib/gdm3:/bin/false
root@ubuntu:/home/abhi# cat passwd_backup | grep -wc /bin/false
6
```


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

Command: head -n 5 passwd_backup | cat > output

```
root@ubuntu:/home/abhi# head -n 5 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
root@ubuntu:/home/abhi# head -n 5 passwd_backup | cat > output
root@ubuntu:/home/abhi# 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
root@ubuntu:/home/abhi#
```

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

Command: useradd test, passwd test, id test

```
root@ubuntu:/home/abhi# useradd test
root@ubuntu:/home/abhi# passwd test
New password:
Retype new password:
passwd: password updated successfully
root@ubuntu:/home/abhi# id -u test
1001
root@ubuntu:/home/abhi# id -g test
1001
root@ubuntu:/home/abhi# id test
uid=1001(test) gid=1001(test) groups=1001(test)
root@ubuntu:/home/abhi#
```

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

Command: touch emptyFile1 emptyFile2

```
root@ubuntu:/home/abhi/exercise/dir2# ls -l
total 0
-rw-r--r-- 1 root root 0 Feb  2 02:04 emptyFile1
-rw-r--r-- 1 root root 0 Feb  2 02:04 emptyFile2
root@ubuntu:/home/abhi/exercise/dir2# touch emptyFile1 emptyFile2
root@ubuntu:/home/abhi/exercise/dir2# ls -l
total 0
-rw-r--r-- 1 root root 0 Feb  2 02:51 emptyFile1
-rw-r--r-- 1 root root 0 Feb  2 02:51 emptyFile2
root@ubuntu:/home/abhi/exercise/dir2#
```

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.

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

Command: (Adding test to the group root) `usermod -a -G root test`

(giving write permission to group of output file) `chmod g=rw output`

(reverting changes after verification) `chmod g=r output`

```
Activities Terminal Feb 2 04:07 root@ubuntu: /home/abhi
$ su -t
su: invalid option -- 't'
Try 'su --help' for more information.
$ su -root
su: invalid option -- 'r'
Try 'su --help' for more information.
$ su - root
Password:
su: Authentication failure
$ su -t
su: invalid option -- 't'
Try 'su --help' for more information.
$ su -
Password:
su: Authentication failure
$ sudo -l
[sudo] password for test:
test is not in the sudoers file. This incident will be reported.
$ su -abhi
su: invalid option -- 'a'
Try 'su --help' for more information.
$ su - abhi
Password:
abhi@ubuntu:~$ sudo -l
[sudo] password for abhi:
root@ubuntu:~# cd /home/abhi/exercise
-bash: cd: /home/abhi/exercise: No such file or directory
root@ubuntu:~# cd /home
-bash: cd: /home: No such file or directory
root@ubuntu:~# ls
file1.txt
root@ubuntu:~# cd /
root@ubuntu:~# ls
bin boot cdrom dev etc home lib lib32 lib64 libx32 lost+found media mnt opt proc root run sbin snap srv swapfile sys usr var
root@ubuntu:/home/abhi# ls
Desktop Documents Downloads exercise Music output passwd_backup Pictures Public Templates Videos
root@ubuntu:/home/abhi# usermod -a -G root test
root@ubuntu:/home/abhi# groups test
test : test root
root@ubuntu:/home/abhi# ls -l
ls -l: command not found
root@ubuntu:/home/abhi# ls -l
total 44
drwxr-xr-x 2 abhi abhi 4096 Feb 2 01:49 Desktop
drwxr-xr-x 2 abhi abhi 4096 Feb 2 01:49 Documents
drwxr-xr-x 2 abhi abhi 4096 Feb 2 01:49 Downloads
drwxr-xr-x 5 root root 4096 Feb 2 01:57 exercise
drwxr-xr-x 2 abhi abhi 4096 Feb 2 01:49 Music
-rw-r--r-- 1 root root 189 Feb 2 02:45 output
-rw-r--r-- 1 root root 2739 Feb 2 02:26 passwd_backup
drwxr-xr-x 2 abhi abhi 4096 Feb 2 03:53 Pictures
drwxr-xr-x 2 abhi abhi 4096 Feb 2 01:49 Public
drwxr-xr-x 2 abhi abhi 4096 Feb 2 01:49 Templates
drwxr-xr-x 2 abhi abhi 4096 Feb 2 01:49 Videos
root@ubuntu:/home/abhi#
```

```
Activities Terminal Feb 2 04:13 root@ubuntu: /home/abhi

su: invalid option -- 'l'
Try 'su --help' for more information.
$ su -root
su: invalid option -- 'r'
Try 'su --help' for more information.
$ su - root
Password:
su: Authentication failure
$ su -l
su: invalid option -- 'l'
Try 'su --help' for more information.
$ su -
Password:
su: Authentication failure
[sudo] password for test:
test is not in the sudoers file. This incident will be reported.
$ su -abhi
su: invalid option -- 'a'
Try 'su --help' for more information.
$ su - abhi
Password:
abhi@ubuntu:~$ sudo -l
[sudo] password for abhi:
root@ubuntu:~# cd /home/abhi/exercise
-bash: cd: /home/abhi/exercise: No such file or directory
root@ubuntu:~# cd /home
-bash: cd: /home: No such file or directory
root@ubuntu:~# ls
file1.txt
root@ubuntu:~# cd /
root@ubuntu:~# ls
bin boot cdrom dev etc home lib lib32 lib64 libx32 lost+found media mnt opt proc
root@ubuntu:~# cd /home/abhi
root@ubuntu:~# ls
Desktop Documents Downloads exercise Music output passwd_backup Pictures Public Templates Videos
root@ubuntu:~# usermod -a -G root test
root@ubuntu:~# groups test
test : test root
root@ubuntu:~# ls -l
ls -l: command not found
root@ubuntu:~# ls -l
total 44
drwxr-xr-x 2 abhi abhi 4096 Feb 2 01:49 Desktop
drwxr-xr-x 2 abhi abhi 4096 Feb 2 01:49 Documents
drwxr-xr-x 2 abhi abhi 4096 Feb 2 01:49 Downloads
drwxr-xr-x 5 root root 4096 Feb 2 01:57 exercise
drwxr-xr-x 2 abhi abhi 4096 Feb 2 01:49 Music
-rw-r--r-- 1 root root 189 Feb 2 02:45 output
-rw-r--r-- 1 root root 2739 Feb 2 02:26 passwd_backup
drwxr-xr-x 2 abhi abhi 4096 Feb 2 03:53 Pictures
drwxr-xr-x 2 abhi abhi 4096 Feb 2 01:49 Public
drwxr-xr-x 2 abhi abhi 4096 Feb 2 01:49 Templates
drwxr-xr-x 2 abhi abhi 4096 Feb 2 01:49 Videos
root@ubuntu:~# chmod g+rw output
root@ubuntu:~# cat output
from test
^Z[1] + Stopped
cat 1>output
$ []
```

```
Activities Terminal Feb 2 04:14 root@ubuntu: /home/abhi

$ su -root
su: invalid option -- 'r'
Try 'su --help' for more information.
$ su - root
Password:
su: Authentication failure
$ su -l
su: invalid option -- 'l'
Try 'su --help' for more information.
$ su -
Password:
su: Authentication failure
[sudo] password for test:
test is not in the sudoers file. This incident will be reported.
$ su -abhi
su: invalid option -- 'a'
Try 'su --help' for more information.
$ su - abhi
Password:
abhi@ubuntu:~$ sudo -l
[sudo] password for abhi:
root@ubuntu:~# cd /home/abhi/exercise
-bash: cd: /home/abhi/exercise: No such file or directory
root@ubuntu:~# cd /home
-bash: cd: /home: No such file or directory
root@ubuntu:~# ls
file1.txt
root@ubuntu:~# cd /
root@ubuntu:~# ls
bin boot cdrom dev etc home lib lib32 lib64 libx32 lost+found media mnt opt proc
root@ubuntu:~# cd /home/abhi
root@ubuntu:~# ls
Desktop Documents Downloads exercise Music output passwd_backup Pictures Public Templates Videos
root@ubuntu:~# usermod -a -G root test
root@ubuntu:~# groups test
test : test root
root@ubuntu:~# ls -l
ls -l: command not found
root@ubuntu:~# ls -l
total 44
drwxr-xr-x 2 abhi abhi 4096 Feb 2 01:49 Desktop
drwxr-xr-x 2 abhi abhi 4096 Feb 2 01:49 Documents
drwxr-xr-x 2 abhi abhi 4096 Feb 2 01:49 Downloads
drwxr-xr-x 5 root root 4096 Feb 2 01:57 exercise
drwxr-xr-x 2 abhi abhi 4096 Feb 2 01:49 Music
-rw-r--r-- 1 root root 189 Feb 2 02:45 output
-rw-r--r-- 1 root root 2739 Feb 2 02:26 passwd_backup
drwxr-xr-x 2 abhi abhi 4096 Feb 2 03:53 Pictures
drwxr-xr-x 2 abhi abhi 4096 Feb 2 01:49 Public
drwxr-xr-x 2 abhi abhi 4096 Feb 2 01:49 Templates
drwxr-xr-x 2 abhi abhi 4096 Feb 2 01:49 Videos
root@ubuntu:~# chmod g+rw output
root@ubuntu:~# cat output
from test
root@ubuntu:~#
```


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

Command:

(giving permission to other/world to write on file) `chmod o=rw output`

```
(reverting changes after verification) chmod o=r output
```

The screenshot displays a Kali Linux desktop environment with two terminal windows open.

The primary terminal window, titled "root@ubuntu:~#", shows a sequence of commands and their outputs:

```
root@ubuntu:~# cd /home/abhi
root@ubuntu:/home/abhi# ls
Desktop Documents Downloads exercise Music output passed_backup Pictures Public Templates Videos
root@ubuntu:/home/abhi# usermod -s /bin/bash root
root@ubuntu:/home/abhi# groups test
test : test root
root@ubuntu:/home/abhi# ls -l
ls: cannot found
root@ubuntu:/home/abhi# ls -l
total 44
drwxr-xr-x 2 abhi abhi 4096 Feb  2 01:49 Desktop
drwxr-xr-x 2 abhi abhi 4096 Feb  2 01:49 Documents
drwxr-xr-x 2 abhi abhi 4096 Feb  2 01:49 Downloads
drwxr-xr-x 5 root root 4096 Feb  2 01:57 exercise
drwxr-xr-x 2 abhi abhi 4096 Feb  2 01:49 Music
-rw-r--r- 1 root root 189 Feb  2 02:45 output
-rw-r--r- 1 root root 2739 Feb  2 02:26 passwd_backup
drwxr-xr-x 2 abhi abhi 4096 Feb  2 01:53 Pictures
drwxr-xr-x 2 abhi abhi 4096 Feb  2 01:49 Public
drwxr-xr-x 2 abhi abhi 4096 Feb  2 01:49 Templates
drwxr-xr-x 2 abhi abhi 4096 Feb  2 01:49 Videos
root@ubuntu:/home/abhi# chnod orw output
root@ubuntu:/home/abhi# cat output
from test
root@ubuntu:/home/abhi# chnod orw output
root@ubuntu:/home/abhi# ls -l
total 44
drwxr-xr-x 2 abhi abhi 4096 Feb  2 01:49 Desktop
drwxr-xr-x 2 abhi abhi 4096 Feb  2 01:49 Documents
drwxr-xr-x 2 abhi abhi 4096 Feb  2 01:49 Downloads
drwxr-xr-x 5 root root 4096 Feb  2 01:57 exercise
drwxr-xr-x 2 abhi abhi 4096 Feb  2 01:49 Music
-rw-r--r- 1 root root 10 Feb  2 04:13 output
-rw-r--r- 1 root root 2739 Feb  2 02:26 passwd_backup
drwxr-xr-x 2 abhi abhi 4096 Feb  2 04:14 Pictures
drwxr-xr-x 2 abhi abhi 4096 Feb  2 01:49 Public
drwxr-xr-x 2 abhi abhi 4096 Feb  2 01:49 Templates
drwxr-xr-x 2 abhi abhi 4096 Feb  2 01:49 Videos
root@ubuntu:/home/abhi#
root@ubuntu:/home/abhi#
root@ubuntu:/home/abhi# chnod orw output
root@ubuntu:/home/abhi# ls -l
total 44
drwxr-xr-x 2 abhi abhi 4096 Feb  2 01:49 Desktop
drwxr-xr-x 2 abhi abhi 4096 Feb  2 01:49 Documents
drwxr-xr-x 2 abhi abhi 4096 Feb  2 01:49 Downloads
drwxr-xr-x 5 root root 4096 Feb  2 01:57 exercise
drwxr-xr-x 2 abhi abhi 4096 Feb  2 01:49 Music
-rw-r--r- 1 root root 10 Feb  2 04:13 output
-rw-r--r- 1 root root 2739 Feb  2 02:26 passwd_backup
drwxr-xr-x 2 abhi abhi 4096 Feb  2 04:14 Pictures
drwxr-xr-x 2 abhi abhi 4096 Feb  2 01:49 Public
drwxr-xr-x 2 abhi abhi 4096 Feb  2 01:49 Templates
drwxr-xr-x 2 abhi abhi 4096 Feb  2 01:49 Videos
root@ubuntu:/home/abhi#
```

The image shows a Linux terminal window with a dark background. The title bar at the top reads "Activities" and "Feb 2 04:33". The terminal prompt is "root@ubuntu: /home/abhi". The user has run the command "ls -l" to list the contents of the directory. The output shows a list of files and directories with their permissions, ownership, size, and date. The files are: Desktop, Documents, Downloads, exercise, music, output, passwd_backup, Pictures, Public, Templates, and Videos. The user has then run the command "chmod o-rw output" to remove read and write permissions for others on the "output" file. The user has then run the command "ls -l" again to verify the changes. The output shows that the permissions for the "output" file are now "drwxr-xr-x", which means that the file is now owned by root and has no permissions for others. The user has then run the command "cat > output" to create a new file named "output" in the current directory. The user has then run the command "cat < output" to read the contents of the "output" file. The output shows that the file is now empty.

```
root@ubuntu: /home/abhi# ls -l
total 44
drwxr-xr-x 2 abhi abhi 4096 Feb 2 01:49 Desktop
drwxr-xr-x 2 abhi abhi 4096 Feb 2 01:49 Documents
drwxr-xr-x 2 abhi abhi 4096 Feb 2 01:49 Downloads
drwxr-xr-x 5 root root 4096 Feb 2 01:57 exercise
drwxr-xr-x 2 abhi abhi 4096 Feb 2 01:49 music
-rw-r--r- 1 root root 10 Feb 2 04:13 output
-rw-r--r- 1 root root 2739 Feb 2 02:26 passwd_backup
drwxr-xr-x 2 abhi abhi 4096 Feb 2 04:21 Pictures
drwxr-xr-x 2 abhi abhi 4096 Feb 2 01:49 Public
drwxr-xr-x 2 abhi abhi 4096 Feb 2 01:49 Templates
drwxr-xr-x 2 abhi abhi 4096 Feb 2 01:49 Videos
root@ubuntu: /home/abhi#
root@ubuntu: /home/abhi#
root@ubuntu: /home/abhi#
root@ubuntu: /home/abhi# chmod o-rw output
root@ubuntu: /home/abhi#
root@ubuntu: /home/abhi# ls -l
total 44
drwxr-xr-x 2 abhi abhi 4096 Feb 2 01:49 Desktop
drwxr-xr-x 2 abhi abhi 4096 Feb 2 01:49 Documents
drwxr-xr-x 2 abhi abhi 4096 Feb 2 01:49 Downloads
drwxr-xr-x 5 root root 4096 Feb 2 01:57 exercise
drwxr-xr-x 2 abhi abhi 4096 Feb 2 01:49 music
-rw-r--r- 1 root root 10 Feb 2 04:13 output
-rw-r--r- 1 root root 2739 Feb 2 02:26 passwd_backup
drwxr-xr-x 2 abhi abhi 4096 Feb 2 04:21 Pictures
drwxr-xr-x 2 abhi abhi 4096 Feb 2 01:49 Public
drwxr-xr-x 2 abhi abhi 4096 Feb 2 01:49 Templates
drwxr-xr-x 2 abhi abhi 4096 Feb 2 01:49 Videos
root@ubuntu: /home/abhi#
root@ubuntu: /home/abhi# cat > output
root@ubuntu: /home/abhi#
root@ubuntu: /home/abhi# cat < output
$
```


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

Command: alias abhishek = "touch ../tmp/aliastesting"

```
root@ubuntu:/# alias abhishek="touch ../tmp/aliastesting"
root@ubuntu:/# cd tmp
root@ubuntu:/tmp# ls
abhi
config-err-6VB2LX
ssh-BL8LUK08Ipuu
systemd-private-58ac0fe550a04b1a996fa4843504908b-color.service-e78J8f
systemd-private-58ac0fe550a04b1a996fa4843504908b-ModemManager.service-81ZV1f
systemd-private-58ac0fe550a04b1a996fa4843504908b-switcheroo-control.service-YbKMTe
root@ubuntu:/tmp# cd /
root@ubuntu:/#
root@ubuntu:/# abhishek
root@ubuntu:/# cd tmp
root@ubuntu:/tmp# ls
abhi
aliastesting
config-err-6VB2LX
ssh-BL8LUK08Ipuu
systemd-private-58ac0fe550a04b1a996fa4843504908b-color.service-e78J8f
systemd-private-58ac0fe550a04b1a996fa4843504908b-ModemManager.service-81ZV1f
systemd-private-58ac0fe550a04b1a996fa4843504908b-switcheroo-control.service-YbKMTe
systemd-private-58ac0fe550a04b1a996fa4843504908b-systemd-logind.service-4Drsif
systemd-private-58ac0fe550a04b1a996fa4843504908b-systemd-resolved.service-PVctvj
root@ubuntu:/tmp#
```

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

Command: cat >> .bashrc

clear

echo "welcome\${USER}"

```
$ cat >>.bashrc
clear
echo "Welcome ${USER}"
echo^Z[1] + Stopped
cat 1>>.bashrc
```

13. Install "zip" package.

Command: sudo apt install zip

```
root@ubuntu:~# sudo apt install zip
Reading package lists... Done
Building dependency tree
Reading state information... Done
zip is already the newest version (3.0-11build1).
zip set to manually installed.
0 upgraded, 0 newly installed, 0 to remove and 425 not upgraded.
```


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

Command: tar -czvf archive.tar.gz output passwd_backup

tar -tvf archive.tar.gz

```
root@ubuntu:/home/abhi# tar -czvf archive.tar.gz output passwd_backup
output
passwd_backup
root@ubuntu:/home/abhi# ls -l
total 48
-rw-r--r-- 1 root root 1163 Feb  2 06:11 archive.tar.gz
drwxr-xr-x 2 abhi abhi 4096 Feb  2 01:49 Desktop
drwxr-xr-x 2 abhi abhi 4096 Feb  2 01:49 Documents
drwxr-xr-x 2 abhi abhi 4096 Feb  2 01:49 Downloads
drwxr-xr-x 5 root root 4096 Feb  2 01:57 exercise
drwxr-xr-x 2 abhi abhi 4096 Feb  2 01:49 Music
-rw-r--r-- 1 test root   6 Feb  2 04:36 output
-rw-r--r-- 1 root root 2739 Feb  2 02:26 passwd_backup
drwxr-xr-x 2 abhi abhi 4096 Feb  2 06:06 Pictures
drwxr-xr-x 2 abhi abhi 4096 Feb  2 01:49 Public
drwxr-xr-x 2 abhi abhi 4096 Feb  2 01:49 Templates
drwxr-xr-x 2 abhi abhi 4096 Feb  2 01:49 Videos
root@ubuntu:/home/abhi# cat archive.tat.gz
cat: archive.tat.gz: No such file or directory
root@ubuntu:/home/abhi# tar -tvf archive.tar.gz
-rw-r--r-- test/root      6 2021-02-02 04:36 output
-rw-r--r-- root/root    2739 2021-02-02 02:26 passwd_backup
root@ubuntu:/home/abhi#
```

15. scp this file to test user

Command: scp root@192.168.139.129:/home/abhi/archive.tar.gz /home/test/

```
$ scp root@192.168.139.129:/home/abhi/archive.tar.gz /home/test/
root@192.168.139.129's password:
archive.tar.gz          100% 1163   802.1KB/s   00:00
$ ls
archive.tar.gz
$
```

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

Command: `ssh test@192.168.139.129`

`tar -xvf archive.tar.gz`

```
$ ssh test@192.168.139.129
test@192.168.139.129's password:
Permission denied, please try again.
test@192.168.139.129's password:
Permission denied, please try again.
test@192.168.139.129's password:
Welcome to Ubuntu 20.04 LTS (GNU/Linux 5.8.0-41-generic x86_64)

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

```
$ cd home
$ ls
abhi  test
$ cd abhi
$ ls
archive.tar.gz  Documents  exercise  output  Pictures  Templates
Desktop         Downloads  Music     passwd_backup  Public    Videos
$ tar -xvf archive.tar.gz
output
tar: output: Cannot open: File exists
passwd_backup
tar: passwd_backup: Cannot open: File exists
tar: Exiting with failure status due to previous errors
$
```

17. Download any image from web and move to desktop

Command: `wget <image link address>`

`mv /tmp/13209.jpg /home/abhi/Desktop/123`

```
root@ubuntu:/tmp# wget https://d13dtqinv406lk.cloudfront.net/company/images/13209.jpg
--2021-02-02 06:28:27-- https://d13dtqinv406lk.cloudfront.net/company/images/13209.jpg
Resolving d13dtqinv406lk.cloudfront.net (d13dtqinv406lk.cloudfront.net)... 13.35.221.2,
Connecting to d13dtqinv406lk.cloudfront.net (d13dtqinv406lk.cloudfront.net)|13.35.221.2|
HTTP request sent, awaiting response... 200 OK
Length: 68164 (67K) [image/jpeg]
Saving to: '13209.jpg'

13209.jpg                               100%[=====]

2021-02-02 06:28:29 (184 KB/s) - '13209.jpg' saved [68164/68164]

root@ubuntu:/tmp# ls
13209.jpg      systemd-private-
abhi           systemd-private-
aliastesting   systemd-private-
config-err-6VB2LX systemd-private-
ports-info     systemd-private-
snap.snap-store systemd-private-
ssh-8L8LUK08Ipus systemd-private-
systemd-private-58ac0fe550a04b1a996fa4843504908b-colord.service-e7838f Temp-15cfd2dd-e2
root@ubuntu:/tmp# mv /tmp/13209.jpg /home/abhi/Desktop/123
root@ubuntu:/tmp#
```

18. How to get help of commands usages.

Command: `cat -h`


```
root@ubuntu:/tmp# cat --h
Usage: cat [OPTION]... [FILE]...
Concatenate FILE(s) to standard output.

With no FILE, or when FILE is -, read standard input.

  -A, --show-all           equivalent to -vE
  -b, --number-nonblank     number nonempty output lines, overrides -n
  -e                        equivalent to -vE
  -E, --show-ends          display $ at end of each line
  -n, --number             number all output lines
  -s, --squeeze-blank      suppress repeated empty output lines
  -t                        equivalent to -vT
  -T, --show-tabs          display TAB characters as ^I
  -u                        (ignored)
  -v, --show-nonprinting   use ^ and M- notation, except for LFD and TAB
  --help                  display this help and exit
  --version               output version information and exit

Examples:
  cat f - g  Output f's contents, then standard input, then g's contents.
  cat        Copy standard input to standard output.

GNU coreutils online help: <https://www.gnu.org/software/coreutils/>
Full documentation at: <https://www.gnu.org/software/coreutils/cat>
or available locally via: info '(coreutils) cat invocation'
root@ubuntu:/tmp#
root@ubuntu:/tmp# man cat
root@ubuntu:/tmp#
```

Command: man cat

```
CAT(1) User Commands
NAME
    cat - concatenate files and print on the standard output

SYNOPSIS
    cat [OPTION]... [FILE]...

DESCRIPTION
    Concatenate FILE(s) to standard output.

    With no FILE, or when FILE is -, read standard input.

    -A, --show-all
        equivalent to -vET

    -b, --number-nonblank
        number nonempty output lines, overrides -n

    -e
        equivalent to -vE

    -E, --show-ends
        display $ at end of each line

    -n, --number
        number all output lines

    -s, --squeeze-blank
        suppress repeated empty output lines

    -t
        equivalent to -vT

    -T, --show-tabs
        display TAB characters as ^I

    -u
        (ignored)

    -v, --show-nonprinting
        use ^ and M- notation, except for LFD and TAB

    --help
        display this help and exit

    --version
        output version information and exit

EXAMPLES
    cat f - g
        Output f's contents, then standard input, then g's contents.

    cat
        Copy standard input to standard output.

AUTHOR
    Written by Torbjorn Granlund and Richard M. Stallman.

REPORTING BUGS
    Manual page cat(1) line 1 (press h for help or q to quit)
```

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

In -s /etc/services /tmp/ports-info

```
root@ubuntu:/# ln -s /etc/services /tmp/ports-info
root@ubuntu:/#
root@ubuntu:/# cd tmp
root@ubuntu:/tmp# ls -l
total 560
-rw-r--r-- 1 root root      0 Feb  2 05:28 abhi
-rw-r--r-- 1 root root      0 Feb  2 05:29 aliastesting
-rw----- 1 abhi abhi      0 Feb  2 01:49 config-err-6VB2LX
lrwxrwxrwx 1 root root    13 Feb  2 06:22 ports-info -> /etc/services
drwx----- 3 root root 4096 Feb  2 05:49 snap.snap-store
drwx----- 2 abhi abhi 4096 Feb  2 01:49 ssh-B1BLUKDBIpu
drwx----- 3 root root 4096 Feb  2 01:49 systemd-private-58ac0fe550a04b1a996fa4843504908b-color.service-e78J8f
drwx----- 3 root root 4096 Feb  2 01:47 systemd-private-58ac0fe550a04b1a996fa4843504908b-ModemManager.service-81ZV1f
drwx----- 3 root root 4096 Feb  2 01:47 systemd-private-58ac0fe550a04b1a996fa4843504908b-switcheroo-control.service-YbKMTe
drwx----- 3 root root 4096 Feb  2 01:47 systemd-private-58ac0fe550a04b1a996fa4843504908b-systemd-logind.service-40rsif
drwx----- 3 root root 4096 Feb  2 01:47 systemd-private-58ac0fe550a04b1a996fa4843504908b-systemd-resolved.service-PVctvj
drwx----- 3 root root 4096 Feb  2 01:47 systemd-private-58ac0fe550a04b1a996fa4843504908b-systemd-timesyncd.service-yB0x8h
drwx----- 3 root root 4096 Feb  2 01:49 systemd-private-58ac0fe550a04b1a996fa4843504908b-upower.service-emDTmg
drwx----- 2 abhi abhi 4096 Feb  2 01:53 Temp-15cfd2dd-e246-43a1-aced-e447d4e0bf1c
drwx----- 2 abhi abhi 4096 Feb  2 01:53 Temp-ef379bd1-9e57-4e25-8909-873ca269437e
-rw----- 1 abhi abhi 511815 Feb  2 01:54 tmpaddon
drwx----- 2 abhi abhi 4096 Feb  2 06:17 tracker-extract-files.1000
drwx----- 2 gdm gdm 4096 Feb  2 01:49 tracker-extract-files.125
drwxrwxrwt 2 root root 4096 Feb  2 01:49 VMwareDns
drwx----- 2 root root 4096 Feb  2 01:49 vmware-root_2107-2125739014
root@ubuntu:/tmp#
```

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?

Command: whereis cat

type cat

```
root@ubuntu:/home/abhi/Desktop# whereis cat
cat: /usr/bin/cat /usr/share/man/man1/cat.1.gz
root@ubuntu:/home/abhi/Desktop# type cat
cat is hashed (/usr/bin/cat)
root@ubuntu:/home/abhi/Desktop#
```