Linux Exercise

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

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

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

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

```
                                ttn@ttn: ~
File  Edit  View  Search  Terminal  Help
ttn@ttn:~$ find /etc -name "passwd"
find: '/etc/polkit-1/localauthority': Permission denied
find: '/etc/cups/ssl': Permission denied
/etc/pam.d/passwd
find: '/etc/ssl/private': Permission denied
/etc/cron.daily/passwd
/etc/passwd
ttn@ttn:~$ cp /etc/passwd passwd_copy
ttn@ttn:~$ mv passwd_copy passwd_backup
ttn@ttn:~$
```

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

cat Command

```
                                ttn@ttn: ~
File  Edit  View  Search  Terminal  Help
ttn@ttn:~$ 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/nologi
n
```
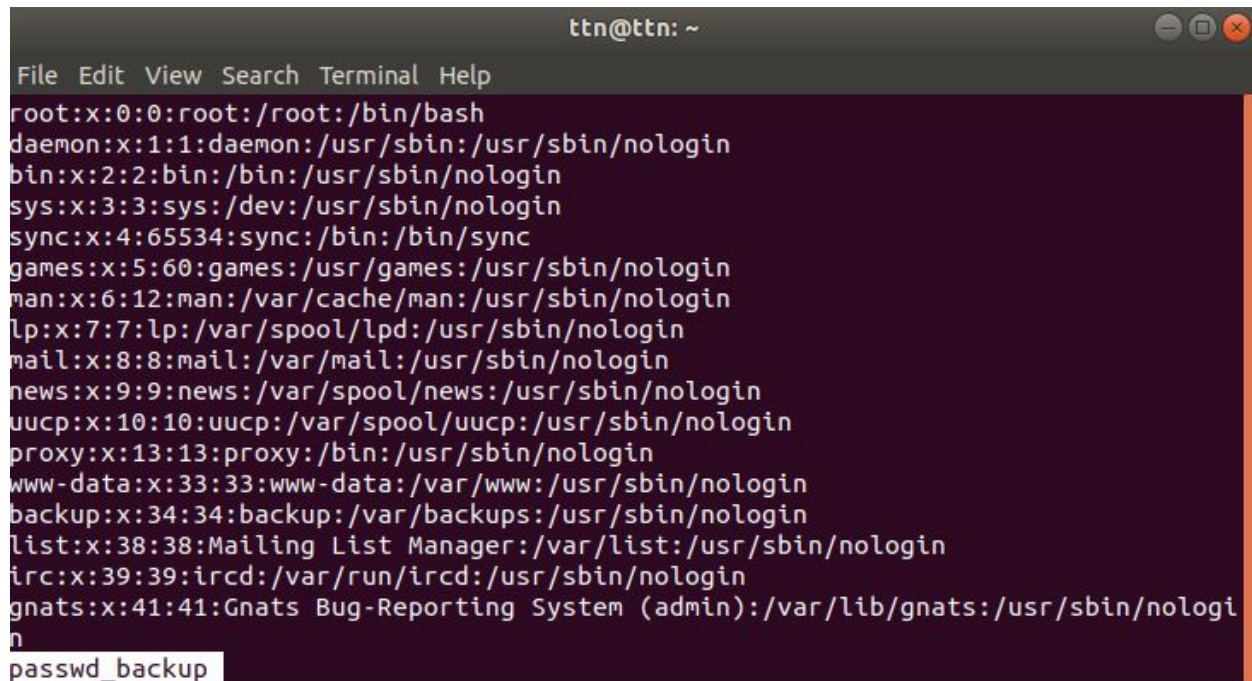
more Command

```
                                  ttn@ttn: ~

File  Edit  View  Search  Terminal  Help
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/nologi
n
--More--(33%)
```

strings Command

```
                                  ttn@ttn: ~

File  Edit  View  Search  Terminal  Help
ttn@ttn:~$ 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
```

Less Command

```
                              ttn@ttn: ~                        ⊖ ⊡ ⊗
 File  Edit  View  Search  Terminal  Help
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/nologi
n
passwd_backup
```
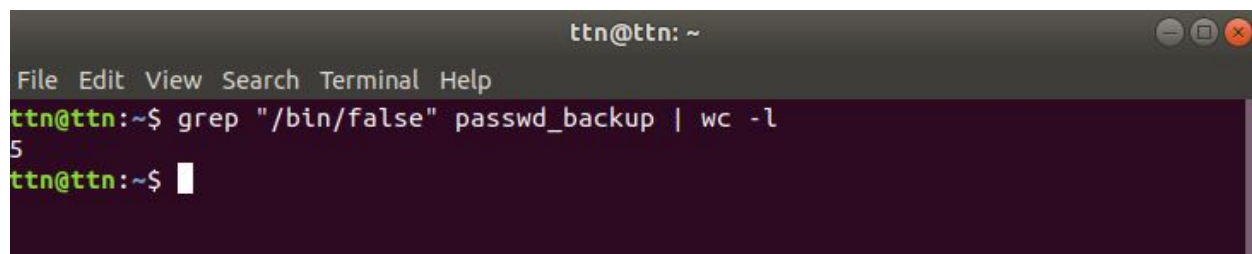
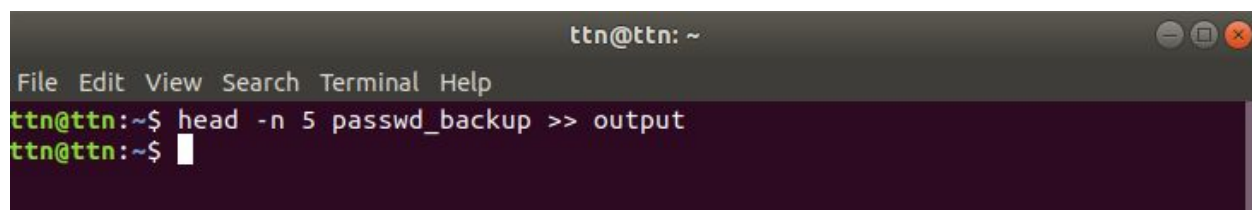**Q6. Find out the number of line in password_backup containing "/bin/false".**
<u>Solution:</u>

```
                              ttn@ttn: ~                        ⊖ ⊡ ⊗
 File  Edit  View  Search  Terminal  Help
ttn@ttn:~$ grep "/bin/false" passwd_backup | wc -l
5
ttn@ttn:~$ ▊
```

Q7. Get the first 5 lines of a file "password_backup" and Redirect the output of the above commands into file "output".
<u>Solution:</u>

```
                              ttn@ttn: ~                        ⊖ ⊡ ⊗
 File  Edit  View  Search  Terminal  Help
ttn@ttn:~$ head -n 5 passwd_backup >> output
ttn@ttn:~$ ▊
```

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

```
                                    ttn@ttn: ~                          ⊖ ⊡ ⊗
File  Edit  View  Search  Terminal  Help

ttn@ttn:~$ sudo 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 []: test
        Work Phone []:
        Home Phone []:
        Other []:
Is the information correct? [Y/n] y
ttn@ttn:~$ id test
uid=1001(test) gid=1001(test) groups=1001(test)
ttn@ttn:~$
```

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

```
                        ttn@ttn: ~/exercise/dir1/dir2                    ⊖ ⊡ ⊗
File  Edit  View  Search  Terminal  Help
ttn@ttn:~/exercise/dir1/dir2$ ls -l
total 8
drwxr-xr-x 2 ttn ttn 4096 Feb  4 14:04 dir3
-rw-r--r-- 1 ttn ttn    0 Feb  4 14:09 emptyFile1
-rw-r--r-- 1 ttn ttn    0 Feb  4 14:09 emptyFile2
-rw-r--r-- 1 ttn ttn   12 Feb  4 14:14 file1.txt
ttn@ttn:~/exercise/dir1/dir2$ touch emptyFile1 emptyFile2
ttn@ttn:~/exercise/dir1/dir2$ ls -l
total 8
drwxr-xr-x 2 ttn ttn 4096 Feb  4 14:04 dir3
-rw-r--r-- 1 ttn ttn    0 Feb  4 15:55 emptyFile1
-rw-r--r-- 1 ttn ttn    0 Feb  4 15:55 emptyFile2
-rw-r--r-- 1 ttn ttn   12 Feb  4 14:14 file1.txt
ttn@ttn:~/exercise/dir1/dir2$
```

Q10. 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.

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 change.

<u>Solution:</u>

```
                              ttn@ttn: ~

 File  Edit  View  Search  Terminal  Help

ttn@ttn:~$ ls -l output
---------- 1 ttn test 378 Feb  4 15:46 output
ttn@ttn:~$ su test
Password:
$ cat < output
sh: 1: cannot open output: Permission denied
$ exit
ttn@ttn:~$ sudo chgrp test output
ttn@ttn:~$ sudo chmod g+rw output
ttn@ttn:~$ su test
Password:
$ 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: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
$ exit
ttn@ttn:~$ ls -l output
----rw---- 1 ttn test 378 Feb  4 15:46 output
ttn@ttn:~$ sudo chmod g-rw output
ttn@ttn:~$ ls -l output
---------- 1 ttn test 378 Feb  4 15:46 output
ttn@ttn:~$
```

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

Solution:

```
                              ttn@ttn: ~                          ⊖ ▢ ✕

 File  Edit  View  Search  Terminal  Help
ttn@ttn:~$ sudo chmod u+rw output
ttn@ttn:~$ sudo chmod g+rw output
ttn@ttn:~$ sudo chmod o+rw output
ttn@ttn:~$ ls -l output
-rw-rw-rw- 1 ttn test 378 Feb  4 15:46 output
ttn@ttn:~$ su test
Password:
$ 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: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
$ exit
ttn@ttn:~$ sudo chmod g-rw output
ttn@ttn:~$ sudo chmod o-rw output
ttn@ttn:~$ ls -l output
-rw------- 1 ttn test 378 Feb  4 15:46 output
ttn@ttn:~$ █
```

3. **Change the ownership to edit the file.**

Solution:

```
                              ttn@ttn: ~                          ⊖ ▢ ✕

 File  Edit  View  Search  Terminal  Help
ttn@ttn:~$ ls -l output
-rw------- 1 test test 378 Feb  4 15:46 output
ttn@ttn:~$ sudo chown ttn output
ttn@ttn:~$ ls -l output
-rw------- 1 ttn test 378 Feb  4 15:46 output
ttn@ttn:~$ █
```

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

Solution:

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

Solution:

```
test@ttn: /home/ttn
File  Edit  View  Search  Terminal  Help
Welcome
test@ttn:/home/ttn$
```

Q13. Install "zip" package.
Solution:


```
ttn@ttn: ~
File  Edit  View  Search  Terminal  Help
ttn@ttn:~$ sudo apt install zip
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following NEW packages will be installed:
  zip
0 upgraded, 1 newly installed, 0 to remove and 12 not upgraded.
Need to get 167 kB of archives.
After this operation, 638 kB of additional disk space will be used.
Get:1 http://in.archive.ubuntu.com/ubuntu bionic/main amd64 zip amd64 3.0-11buil
d1 [167 kB]
Fetched 167 kB in 3s (66.1 kB/s)
Selecting previously unselected package zip.
(Reading database ... 166149 files and directories currently installed.)
Preparing to unpack .../zip_3.0-11build1_amd64.deb ...
Unpacking zip (3.0-11build1) ...
Setting up zip (3.0-11build1) ...
Processing triggers for man-db (2.8.3-2ubuntu0.1) ...
ttn@ttn:~$
```

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


```
ttn@ttn: ~
File  Edit  View  Search  Terminal  Help
ttn@ttn:~$ tar -cvf tar_compress.tar passwd_backup output
passwd_backup
output
ttn@ttn:~$ tar -tvf tar_compress.tar
-rw-r--r-- ttn/ttn          2451 2019-02-04 14:34 passwd_backup
-rw------- ttn/test           378 2019-02-04 15:46 output
ttn@ttn:~$
```

Q15. scp this file to test user.
Solution:

```
                              ttn@ttn: ~

File  Edit  View  Search  Terminal  Help
ttn@ttn:~$ pwd
/home/ttn
ttn@ttn:~$ sudo scp tar_compress.tar test@ttn:/home/test
The authenticity of host 'ttn (127.0.1.1)' can't be established.
ECDSA key fingerprint is SHA256:q0b0Feftc3FQ/+Y8He7LkuNu9KkgpEJghU6N+xwtp7A.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'ttn' (ECDSA) to the list of known hosts.
test@ttn's password:
TERM environment variable not set.
Welcome
ttn@ttn:~$ 
```

Q16. Download any image from web and move to desktop.
Solution:

```
                              test@ttn: ~

File  Edit  View  Search  Terminal  Help
ttn@ttn:~$ ssh test@localhost
test@localhost's password:
Welcome to Ubuntu 18.04.1 LTS (GNU/Linux 4.15.0-45-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

1 package can be updated.
0 updates are security updates.

Last login: Tue Feb  5 00:18:35 2019 from 127.0.0.1
test@ttn:~$ tar -xvf tar_compress.tar
passwd_backup
output
test@ttn:~$ ls -l
total 32
-rw-r--r-- 1 test test  8980 Feb  4 22:58 examples.desktop
-rw------- 1 test test   378 Feb  4 15:46 output
-rw-r--r-- 1 test test  2451 Feb  4 14:34 passwd_backup
-rw-r--r-- 1 root root 10240 Feb  5 00:16 tar_compress.tar
test@ttn:~$ 
```

Q17. Download any image from web and move to desktop.
Solution:

```
                              ttn@ttn: ~

File  Edit  View  Search  Terminal  Help
ttn@ttn:~$ wget https://iscolto.com/resources/images/icons/IscoltoLatest.png
--2019-02-05 00:34:57--  https://iscolto.com/resources/images/icons/IscoltoLates
t.png
Resolving iscolto.com (iscolto.com)... 206.189.137.28
Connecting to iscolto.com (iscolto.com)|206.189.137.28|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 122070 (119K) [image/png]
Saving to: 'IscoltoLatest.png'

IscoltoLatest.png   100%[===================>] 119.21K   395KB/s    in 0.3s

2019-02-05 00:34:58 (395 KB/s) - 'IscoltoLatest.png' saved [122070/122070]

ttn@ttn:~$ mv IscoltoLatest.png /home/ttn/Desktop
ttn@ttn:~$ ls -l /home/ttn/Desktop
total 124
-rw-rw-r-- 1 ttn ttn 122070 Oct 15 22:38 IscoltoLatest.png
ttn@ttn:~$
```

Q18. How to get help of commands usages.
Solution:

```
                              ttn@ttn: ~

File  Edit  View  Search  Terminal  Help
ttn@ttn:~$ cat --help
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 -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.

GNU coreutils online help: <http://www.gnu.org/software/coreutils/>
Full documentation at: <http://www.gnu.org/software/coreutils/cat>
or available locally via: info '(coreutils) cat invocation'
ttn@ttn:~$
```

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

```
                          ttn@ttn: ~

File  Edit  View  Search  Terminal  Help
ttn@ttn:~$ ln -s /etc/services /tmp/ports-info
```

```
                         ttn@ttn: /tmp

File  Edit  View  Search  Terminal  Help
ttn@ttn:~$ cd /tmp
ttn@ttn:/tmp$ ls -l
total 40
-rw-r--r-- 1 ttn   ttn      0 Feb  4 17:12 aliastesting
-rw------- 1 ttn   ttn      0 Feb  4 10:06 config-err-Kp4mhs
drwx------ 2 ttn   ttn   4096 Feb  5 00:28 mozilla_ttn0
lrwxrwxrwx 1 ttn   ttn     13 Feb  5 00:40 ports-info -> /etc/services
drwx------ 2 ttn   ttn   4096 Feb  4 10:06 ssh-f7fpMJ766N6P
drwx------ 3 root root 4096 Feb  4 10:07 systemd-private-e8a3cae18a104811ad98c46
215ea7f63-bolt.service-mOXQpQ
drwx------ 3 root root 4096 Feb  4 10:06 systemd-private-e8a3cae18a104811ad98c46
215ea7f63-colord.service-6RaZWQ
drwx------ 3 root root 4096 Feb  4 10:07 systemd-private-e8a3cae18a104811ad98c46
215ea7f63-fwupd.service-wQTyAD
drwx------ 3 root root 4096 Feb  4 10:06 systemd-private-e8a3cae18a104811ad98c46
215ea7f63-rtkit-daemon.service-lvRzKL
drwx------ 3 root root 4096 Feb  4 10:06 systemd-private-e8a3cae18a104811ad98c46
215ea7f63-systemd-resolved.service-vDTUHi
drwx------ 3 root root 4096 Feb  4 10:06 systemd-private-e8a3cae18a104811ad98c46
215ea7f63-systemd-timesyncd.service-M1XoRf
drwx------ 2 ttn   ttn   4096 Feb  4 10:09 Temp-703450ab-3cb0-47ac-af6a-1c885fc9a4
f6
drwx------ 3 ttn   ttn   4096 Feb  5 00:29 Temp-d475c878-6e84-40e0-a4ed-f0833c2791
a8
ttn@ttn:/tmp$
```

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

```
                          ttn@ttn: ~

File  Edit  View  Search  Terminal  Help
ttn@ttn:~$ which cat
/bin/cat
ttn@ttn:~$ which rm
/bin/rm
ttn@ttn:~$ which whoami
/usr/bin/whoami
ttn@ttn:~$
```

<u>Solution:</u>