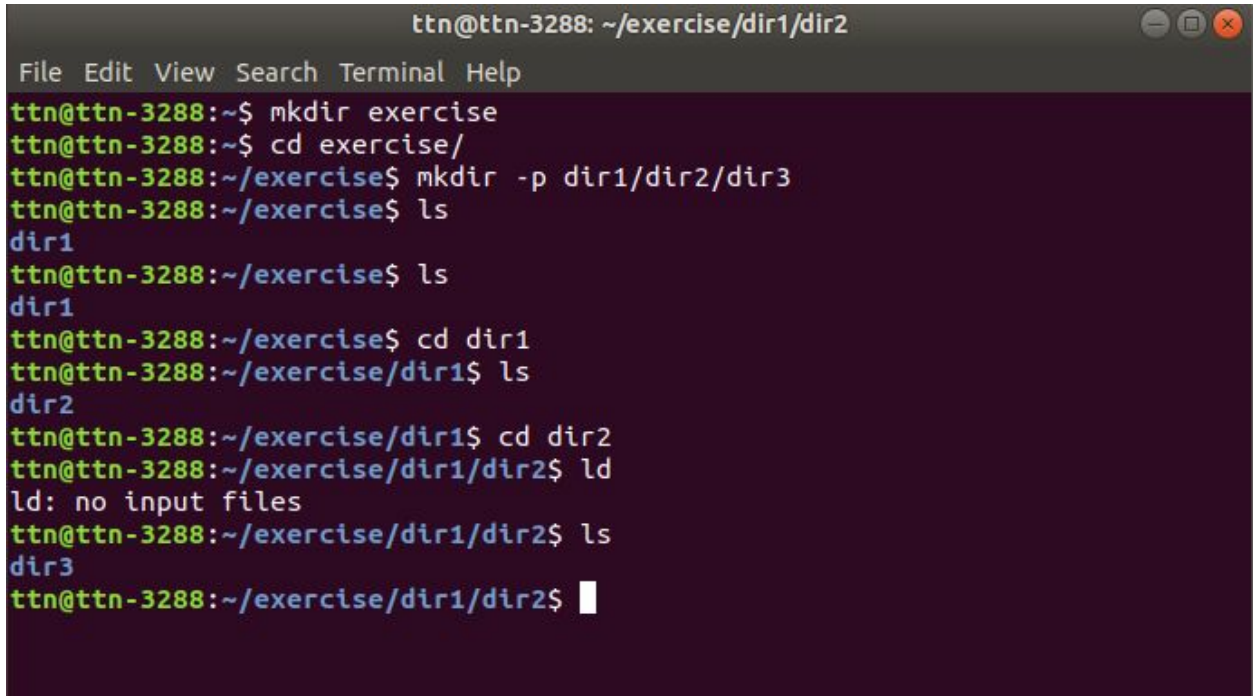


### Exercise - Introuction to Linux

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

**Ans.**

A terminal window titled 'ttn@ttn-3288: ~/exercise/dir1/dir2' with a menu bar (File, Edit, View, Search, Terminal, Help). The terminal shows the following commands and output:

```
ttn@ttn-3288:~$ mkdir exercise
ttn@ttn-3288:~$ cd exercise/
ttn@ttn-3288:~/exercise$ mkdir -p dir1/dir2/dir3
ttn@ttn-3288:~/exercise$ ls
dir1
ttn@ttn-3288:~/exercise$ ls
dir1
ttn@ttn-3288:~/exercise$ cd dir1
ttn@ttn-3288:~/exercise/dir1$ ls
dir2
ttn@ttn-3288:~/exercise/dir1$ cd dir2
ttn@ttn-3288:~/exercise/dir1/dir2$ ld
ld: no input files
ttn@ttn-3288:~/exercise/dir1/dir2$ ls
dir3
ttn@ttn-3288:~/exercise/dir1/dir2$
```

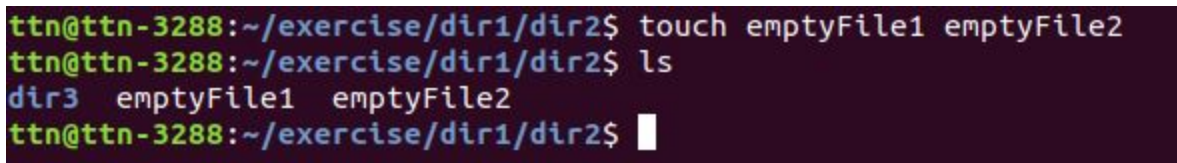
**Mkdir-** used to make directory/folder

**ls** - to list items(files/folders) in current directory

**Cd** - to change directory

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

**Ans.**

A terminal window showing the following commands and output:

```
ttn@ttn-3288:~/exercise/dir1/dir2$ touch emptyFile1 emptyFile2
ttn@ttn-3288:~/exercise/dir1/dir2$ ls
dir3 emptyFile1 emptyFile2
ttn@ttn-3288:~/exercise/dir1/dir2$
```

**Touch-** used to make file

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

**Ans.**

```
ttn@ttn-3288:~/exercise$ touch file1.txt | echo "hello world" >> file1.txt
ttn@ttn-3288:~/exercise$ ls
dir1  file1.txt
ttn@ttn-3288:~/exercise$ cat file1.txt
hello world
ttn@ttn-3288:~/exercise$
```

**Echo - used to print content on screen**

**>> - this operator is used to shift/copy content to file next to to it written**

**Cat - used to print content of the file**

**Ques 4. Find a "passwd" file using find command inside /etc. copy this files as passwd\_copy and then rename this file as passwd\_backup.**

**Ans.**

```
ttn@ttn-3288://etc$ find passwd
passwd
ttn@ttn-3288://etc$ sudo cp passwd passwd_copy
[sudo] password for ttn:
ttn@ttn-3288://etc$ find passwd_copy
passwd_copy
ttn@ttn-3288://etc$ mv passwd_copy passwd_backup
mv: cannot move 'passwd_copy' to 'passwd_backup': Permission denied
ttn@ttn-3288://etc$ sudo mv passwd_copy passwd_backup
ttn@ttn-3288://etc$ find passwd_backup
passwd_backup
ttn@ttn-3288://etc$ find passwd_copy
find: 'passwd_copy': No such file or directory
ttn@ttn-3288://etc$
```

**Find - its used to find file with specific path**

**Sudo - super user permission**

**Mv - used to rename file**

**Ques 5. Try reading passwd\_backup file in multiple tools: less,more,cat,strings etc and find the difference in their usage.**

**Ans. less tool - it is used to show the whole file at once and leaves you at end**



**More tool** - this tool is used to show the part of file with current % we have to press enter to further read the file

```
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/sb
in/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
--More--(77%)
```



**Cat tool - its used for string manipulation and used to show all the data as well and cat takes you to bash but less doesnt you have to exit there.**

```
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/sb
in/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/nolog
in
colord:x:117:123:colord colour management daemon,,,:/var/lib/colord:/usr/s
bin/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:Kunark Khewal 3288:/home/ttn:/bin/bash
ttn@ttn-3288:~/etc$
```

**String tool** - it is similar to cat and also used for string manipulation cat whereas means to concatenation but string can perform other string manipulation tasks as well.

```
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/sb
in/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/nolog
in
colord:x:117:123:colord colour management daemon,,,:/var/lib/colord:/usr/s
bin/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:Kunark Khewal 3288:/home/ttn:/bin/bash
ttn@ttn-3288:~/etc$
```



**Ques 6. Find out the number of line in password\_backup containing "/bin/false".**

**Ans.**

```
ttn@ttn-3288://etc$ grep -n "/bin/false" passwd_backup
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@ttn-3288://etc$
```

**Grep - it is to find specified string in the specified file mentioned  
-n is used in grep to point out line nos.**

**Ques 7. Get the first 5 lines of a file "password\_backup" and Redirect the output of the above commands into file "output".**

**Ans.**

```
ttn@ttn-3288://etc$ chmod 777 output.txt
chmod: changing permissions of 'output.txt': Operation not permitted
ttn@ttn-3288://etc$ sudo chmod 777 output.txt
ttn@ttn-3288://etc$
```

```
ttn@ttn-3288://etc$ head -n 5 passwd_backup > output.txt
ttn@ttn-3288://etc$ cat output
cat: output: No such file or directory
ttn@ttn-3288://etc$ cat output.txt
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-3288://etc$
```

**Chmod - to change permission ( 777 is used to give read, write, execute permission to user, group and others)**

**Head -n 5 - its used to pick top 5 lines of the file**

**> - this operator is used to send data to file**

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

**Ans.**

```
ttn@ttn-3288:~$ useradd test
useradd: Permission denied.
useradd: cannot lock /etc/passwd; try again later.
ttn@ttn-3288:~$ sudo useradd test
ttn@ttn-3288:~$ passwd test
passwd: You may not view or modify password information for test.
ttn@ttn-3288:~$ sudo passwd test
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
```

```
ttn@ttn-3288:~$ id test
uid=1001(test) gid=1001(test) groups=1001(test)
ttn@ttn-3288:~$
```

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

**Ans.**

```
ttn@ttn-3288:~/exercise/dir1/dir2$ touch emptyFile1 emptyFile2
ttn@ttn-3288:~/exercise/dir1/dir2$ ls -l
total 4
drwxr-xr-x 2 ttn ttn 4096 Feb  4 14:55 dir3
-rw-r--r-- 1 ttn ttn    0 Feb  4 17:01 emptyFile1
-rw-r--r-- 1 ttn ttn    0 Feb  4 17:01 emptyFile2
ttn@ttn-3288:~/exercise/dir1/dir2$ touch emptyFile1 emptyFile2
ttn@ttn-3288:~/exercise/dir1/dir2$ ls -l
total 4
drwxr-xr-x 2 ttn ttn 4096 Feb  4 14:55 dir3
-rw-r--r-- 1 ttn ttn    0 Feb  4 17:02 emptyFile1
-rw-r--r-- 1 ttn ttn    0 Feb  4 17:02 emptyFile2
ttn@ttn-3288:~/exercise/dir1/dir2$
```

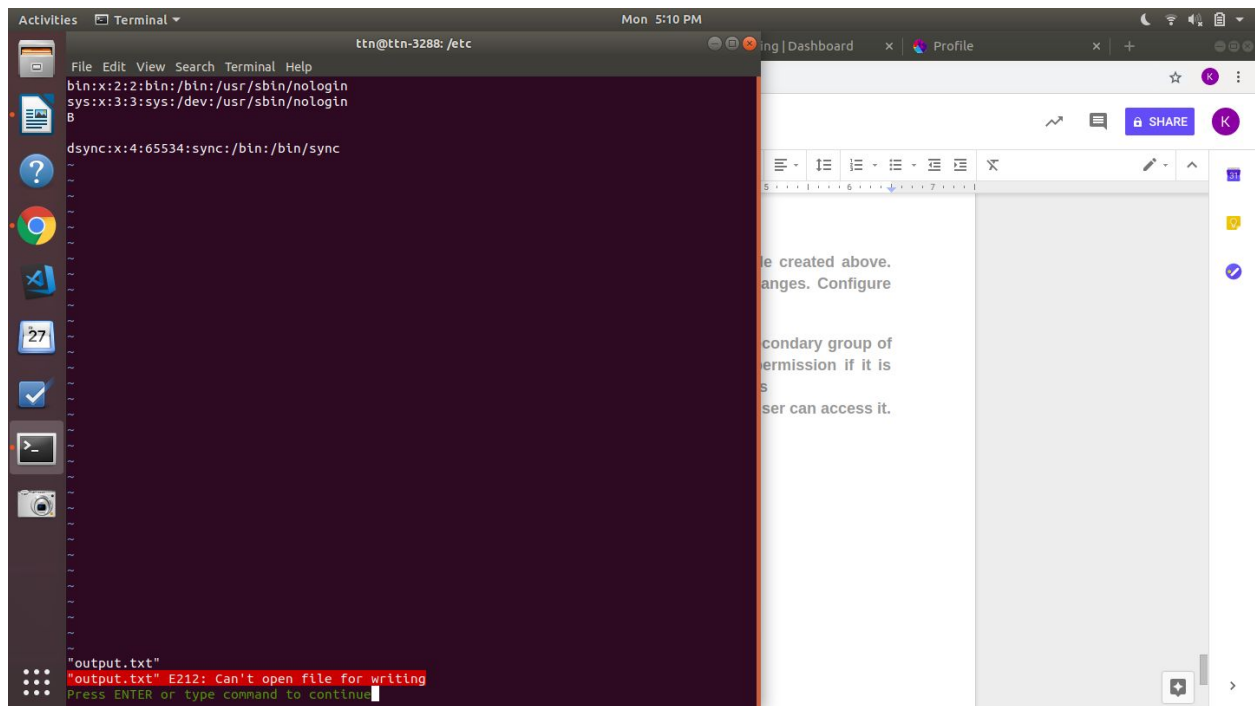
**Touch - changes timestamp if file is made already**



**Ques 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
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.

**Ans.**



**Cant change read only file**

```
ttn@ttn-3288:/etc$ chmod 777 output.txt
chmod: changing permissions of 'output.txt': Operation not permitted
ttn@ttn-3288:/etc$ sudo chmod 777 output.txt
ttn@ttn-3288:/etc$ su test
Password:
$ █
```

## Changing permission

```
ttn@ttn-3288:/etc$ su test
Password:
$ vi output.txt
$ cat output.txt
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
kunark has done changes
$ █
```

## Changes done

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

**Ans.**

```
ttn@ttn-3288:/etc$ alias kunark="touch /tmp/aliastesting.txt"
ttn@ttn-3288:/etc$ kunark
ttn@ttn-3288:/etc$
```

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

**Ans.**

```
ttn@kunark:~$ su - test
Password:
test@kunark:~$ echo clear >> .bashrc
test@kunark:~$ echo "Welcome" >> .bashrc
test@kunark:~$ exit
logout
ttn@kunark:~$
```

**Required commands were appended to bashrc file**

```
Welcome: command not found
test@kunark:~$ exit
logout
ttn@kunark:~$
```

**Welcome is printed and screen is cleared**



**Ques 13.Install “zip” package.**

**Ans**

```
ttn@ttn-3288:/etc$ sudo apt-get install zip
Reading package lists... Done
Building dependency tree
Reading state information... Done
zip is already the newest version (3.0-11build1).
0 upgraded, 0 newly installed, 0 to remove and 427 not upgraded.
ttn@ttn-3288:/etc$
```

**Ques 14. Compress "output" and "password\_backup" files into a tar ball. List the files present inside the tar created.**

```
ttn@ttn-3288:/etc$ sudo tar czf kk.tar.gz output.txt passwd_backup
ttn@ttn-3288:/etc$ tar -ztfv kk.tar.gz
-rwxrwxrwx root/root      213 2019-02-04 17:15 output.txt
-rw-r--r-- root/root     2410 2019-02-04 15:34 passwd_backup
ttn@ttn-3288:/etc$ find kk.tar.gz
kk.tar.gz
ttn@ttn-3288:/etc$
```

**Ques 15. scp this file to test user**

**Ans.**

```
ttn@ttn-3288:/etc$ scp kk.tar.gz test@home
cp: cannot create regular file 'test@home': Permission denied
ttn@ttn-3288:/etc$ sudo scp kk.tar.gz test@home
ttn@ttn-3288:/etc$
```

**Scp- it is used to copy file securely attributes are 1. Source location 2. destination**

```
$ su ttn
Password:
ttn@ttn-3288:/etc$ su test
Password:
$ find kk.tar.gz
kk.tar.gz
$
```

**Here we see that file actually copied**

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

Ans.

```
$ tar -xzf kk.tar.gz
tar: output.txt: Cannot open: File exists
tar: passwd_backup: Cannot open: File exists
tar: Exiting with failure status due to previous errors
$
```

## Ques 17. Download any image from web and move to desktop

```
ttn@ttn-3288:~$ wget https://wallpaperbrowse.com/media/images/3848765-wallpaper-images-download.jpg
--2019-02-04 22:28:41-- https://wallpaperbrowse.com/media/images/3848765-wallpaper-images-download.j
pg
Resolving wallpaperbrowse.com (wallpaperbrowse.com)... 104.31.65.186, 104.31.64.186, 2606:4700:30::68
1f:41ba, ...
Connecting to wallpaperbrowse.com (wallpaperbrowse.com)|104.31.65.186|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 1087534 (1.0M) [image/jpeg]
Saving to: '3848765-wallpaper-images-download.jpg'

3848765-wallpaper-i 100%[=====] 1.04M 554KB/s in 1.9s

2019-02-04 22:28:44 (554 KB/s) - '3848765-wallpaper-images-download.jpg' saved [1087534/1087534]

ttn@ttn-3288:~$ ls
3848765-wallpaper-images-download.jpg  Downloads  Music  snap
Desktop  examples.desktop  Pictures  Templates
Documents  exercise  Public  Videos
ttn@ttn-3288:~$ mv 3848765-wallpaper-images-download.jpg Desktop/
ttn@ttn-3288:~$ cd Desktop/
ttn@ttn-3288:~/Desktop$ ls
3848765-wallpaper-images-download.jpg  abcd.txt
ttn@ttn-3288:~/Desktop$
```



## Ques 18. How to get help of commands usages.

```
WHICH(1)                                General Commands Manual                                WHICH(1)

NAME
    which - locate a command

SYNOPSIS
    which [-a] filename ...

DESCRIPTION
    which returns the pathnames of the files (or links) which would be executed in the current
    environment, had its arguments been given as commands in a strictly POSIX-conformant shell.
    It does this by searching the PATH for executable files matching the names of the argu-
    ments. It does not canonicalize path names.

OPTIONS
    -a      print all matching pathnames of each argument

EXIT STATUS
    0       if all specified commands are found and executable

    1       if one or more specified commands is nonexistent or not executable

    2       if an invalid option is specified

Debian                                29 Jun 2016                                WHICH(1)
~
~
~
~
~
~
~
~
~
~
~
~
```

Result for command=> man which

Where man stands for manual and which is some other command to locate filename

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

```
ttn@ttn-3288:~/Desktop$ ln -s /etc/services /tmp/ports-info
ttn@ttn-3288:~/Desktop$ sudo ln -s /etc/services /tmp/ports-info
[sudo] password for ttn:
ln: failed to access '/tmp/ports-info': Permission denied
ttn@ttn-3288:~/Desktop$ ln -s /etc/services /tmp/ports-info
ln: failed to create symbolic link '/tmp/ports-info': File exists
ttn@ttn-3288:~/Desktop$
```

A soft link has been made and when try to make the soft link again terminal denied because the link has already been made earlier

**Ques 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?**

```
ttn@ttn-3288:~/Desktop$ cd ~
ttn@ttn-3288:~$ whereis xyz
xyz:
ttn@ttn-3288:~$ locate xyz
ttn@ttn-3288:~$ which xyz
ttn@ttn-3288:~$ find xyz
find: 'xyz': No such file or directory
ttn@ttn-3288:~$
```

Whereis is used to locate file of any type with given name

Locate is less accurate search but faster

Which locates executable files

Find is used to file in specified location in this above example its /home

