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

```
ttn@ttn:~$ mkdir exercise
ttn@ttn:~$ mkdir -p dir1/dir2/dir3
ttn@ttn:~$ touch emptyFile1 emptyFile2
ttn@ttn:~$ ls
a.txt      Documents    emptyFile2        mozilla.pdf  Public
Desktop    Downloads    examples.desktop  Music        Templates
dir1       emptyFile1   exercise          Pictures     Videos
ttn@ttn:~$ rm -rf exercise/
ttn@ttn:~$ mkdir -p exercise/dir1/dir2/dir3
ttn@ttn:~$ ls
a.txt      Documents    emptyFile2        mozilla.pdf  Public
Desktop    Downloads    examples.desktop  Music        Templates
dir1       emptyFile1   exercise          Pictures     Videos
ttn@ttn:~$ mkdir -p exercise/dir1/dir2/dir3
ttn@ttn:~$ ls
a.txt      dir1         Downloads         exercise     Music      Public    Videos
Desktop    Documents    examples.desktop  mozilla.pdf  Pictures   Templates
```

First, I used **mkdir** command to make the directory.

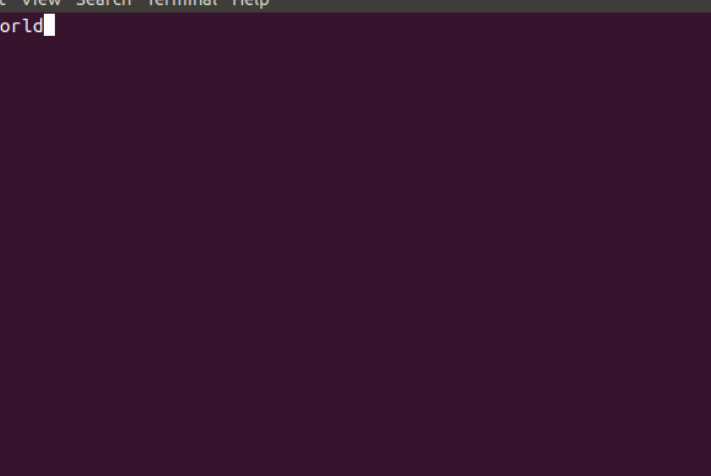-p to specify complete nested path.

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

```
ttn@ttn:~$ touch emptyFile1 emptyFile2
ttn@ttn:~$ ls
a.txt      Documents    emptyFile2        mozilla.pdf  Public
Desktop    Downloads    examples.desktop  Music        Templates
dir1       emptyFile1   exercise          Pictures     Videos
```

touch command is used to create empty files.

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

```
ttn@ttn:~$ vim file1.txt
ttn@ttn:~$ cat file1.txt
hello world
```


Vim is the editor used to edit the file contentts(if the user has the permission to edit them).

We can use vi also instead of vim

First i created file1.txt using touch command. Then I opened it using vim.

By pressing i, the mode is changed to Insert mode. So I added "hello world" into the file.

Then I pressed ESC and then :wq! To save all written changes and quit from vim.

Then caty command is used to display the content of file1.txt, i.e. "hello world"

4. 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:~$ cd /etc
ttn@ttn:/etc$ find passwd
passwd
ttn@ttn:/etc$ cp passwd passwd_copy
cp: cannot create regular file 'passwd_copy': Permission denied
```

```
ttn@ttn:/etc$ cp passwd passwd_copy
cp: cannot create regular file 'passwd_copy': Permission denied
ttn@ttn:/etc$ sudo cp passwd passwd_copy
[sudo] password for ttn:
ttn@ttn:/etc$ ls
acpi                    hosts           polkit-1
adduser.conf            hosts.allow     popularity-contest.conf
alternatives            hosts.deny      ppp
anacrontab              hp              profile
apg.conf                ifplugd         profile.d
apm                     ImageMagick-6   protocols
apparmor                init            pulse
apparmor.d              init.d          python2.7
apport                  initramfs-tools python3
appstream.conf          inputrc         python3.6
apt                     insserv.conf.d  rc0.d
avahi                   iproute2        rc1.d
bash.bashrc             issue           rc2.d
bash_completion         issue.net       rc3.d
bash_completion.d       kernel          rc4.d
bindresvport.blacklist  kernel-img.conf rc5.d
binfmt.d                kerneloops.conf rc6.d
bluetooth               ldap            rcS.d
brlapi.key              ld.so.cache     resolvconf
brltty                  ld.so.conf      resolv.conf
brltty.conf             ld.so.conf.d    rmt
ca-certificates         legal           rpc
ca-certificates.conf    libao.conf      rsyslog.conf
calendar                libaudit.conf   rsyslog.d
chatscripts             libblockdev     sane.d
console-setup           libnl-3         securetty
cracklib                libpaper.d      security
cron.d                  libreoffice     selinux
cron.daily              lintianrc       sensors3.conf
cron.hourly             locale.alias    sensors.d
cron.monthly            locale.gen      services
```

```
ttn@ttn:/etc$ mv passwd_copy passwd_backup
mv: cannot move 'passwd_copy' to 'passwd_backup': Permission denied
ttn@ttn:/etc$ sudo mv passwd_copy passwd_backup
ttn@ttn:/etc$ ls
acpi                    hosts           polkit-1
adduser.conf            hosts.allow     popularity-contest.conf
alternatives            hosts.deny      ppp
anacrontab              hp              profile
apg.conf                ifplugd         profile.d
apm                     ImageMagick-6   protocols
apparmor                init            pulse
apparmor.d              init.d          python2.7
apport                  initramfs-tools python3
appstream.conf          inputrc         python3.6
apt                     insserv.conf.d  rc0.d
avahi                   iproute2        rc1.d
bash.bashrc             issue           rc2.d
bash_completion         issue.net       rc3.d
bash_completion.d       kernel          rc4.d
bindresvport.blacklist  kernel-img.conf rc5.d
binfmt.d                kerneloops.conf rc6.d
bluetooth               ldap            rcS.d
brlapi.key              ld.so.cache     resolvconf
brltty                  ld.so.conf      resolv.conf
brltty.conf             ld.so.conf.d    rmt
ca-certificates         legal           rpc
ca-certificates.conf    libao.conf      rsyslog.conf
calendar                libaudit.conf   rsyslog.d
chatscripts             libblockdev     sane.d
console-setup           libnl-3         securetty
cracklib                libpaper.d      security
cron.d                  libreoffice     selinux
cron.daily              lintianrc       sensors3.conf
cron.hourly             locale.alias    sensors.d
cron.monthly            locale.gen      services
crontab                 localtime       shadow
```

First, go to /etc.

Find passwd location

Then copy contents using cp command to passwd_copy

Rename the passwd_copy to passwd_backup using mv command

Use sudo as inside etc folder it requires root access.

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

```
_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/no
login
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:TTN,,,:/home/ttn:/bin/bash
(END)
```

File output using less command is opened in a different screen atop of the previous screen

```
ttn@ttn:/etc$ 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/nologi
n
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/nol
ogin
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
--More--(66%)
```

File output using more command. Press enter key to read more contents.

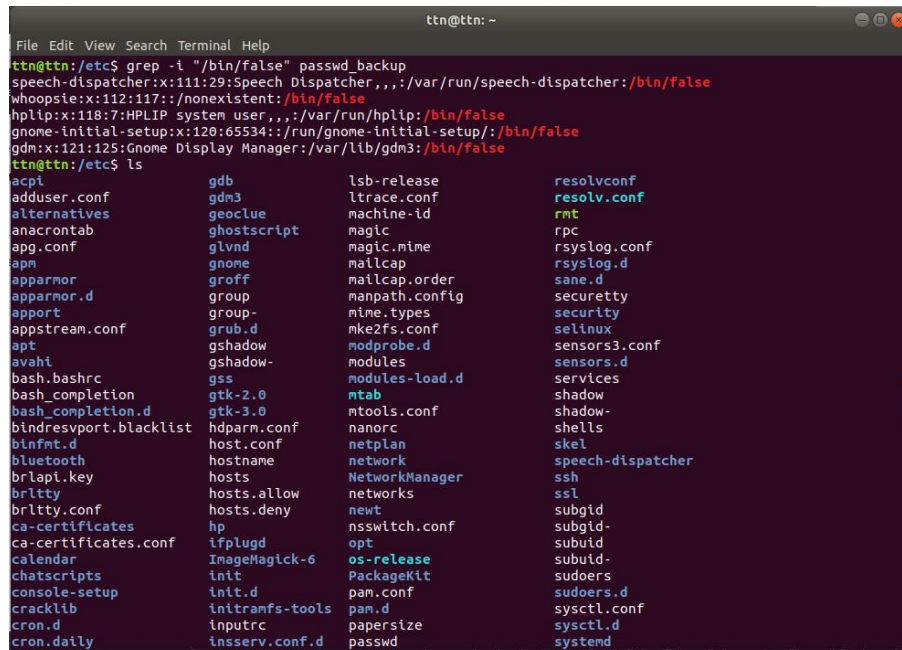File output using cat command

File output using strings command

Difference among them:

less is completely dedicated file reader while cat concatenates multiple files one by one.

More is used to view a text file one page at a time. Press spacebar to go to next page

Strings returns printable character in a file.

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

Grep command is used for pattern matching in a file content

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

First 5 lines can be get using **head -5 password_backup**

> symbol is used to save the commands output into the file

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

```
ttn@ttn:~$ 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
```

User added using adduser command.

Sudo is required to create a new user

```
ttn@ttn:/etc$ id -u test
1001
ttn@ttn:/etc$ id
uid=1000(ttn) gid=1000(ttn) groups=1000(ttn),4(adm),24(cdrom),27(sudo),30(dip),46(plugdev),116(lpadmin),126(
sambashare)
ttn@ttn:/etc$ id -g test
1001
```

id -u test would give UID of test user

Id -g test would give GID of test user

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

```
ttn@ttn:~$ touch emptyFile1 emptyFile2
ttn@ttn:~$ whoami
```

If file is already created, touch is used to update timestamps

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

Unable to understand Question 10.

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

```
ttn@ttn:~$ alias ravi="touch /tmp/aliastesting"
ttn@ttn:~$ ls tmp
ls: cannot access 'tmp': No such file or directory
ttn@ttn:~$ ls /tmp
config-err-V05FYP
ssh-G4iJkiWDh8WR
systemd-private-921aa9b1caee4c76b0f6285788b36319-bolt.service-mjbOSk
systemd-private-921aa9b1caee4c76b0f6285788b36319-colord.service-UBfKQC
systemd-private-921aa9b1caee4c76b0f6285788b36319-fwupd.service-rqkhmQ
systemd-private-921aa9b1caee4c76b0f6285788b36319-rtkit-daemon.service-g9z8E1
systemd-private-921aa9b1caee4c76b0f6285788b36319-systemd-resolved.service-8SypFo
systemd-private-921aa9b1caee4c76b0f6285788b36319-systemd-timesyncd.service-aOb47q
ttn@ttn:~$ ravi
ttn@ttn:~$ ls /tmp
aliastesting
config-err-V05FYP
ssh-G4iJkiWDh8WR
systemd-private-921aa9b1caee4c76b0f6285788b36319-bolt.service-mjbOSk
systemd-private-921aa9b1caee4c76b0f6285788b36319-colord.service-UBfKQC
systemd-private-921aa9b1caee4c76b0f6285788b36319-fwupd.service-rqkhmQ
systemd-private-921aa9b1caee4c76b0f6285788b36319-rtkit-daemon.service-g9z8E1
systemd-private-921aa9b1caee4c76b0f6285788b36319-systemd-resolved.service-8SypFo
systemd-private-921aa9b1caee4c76b0f6285788b36319-systemd-timesyncd.service-aOb47q
```

Alias command creates alias with name "ravi" to perform creation of aliastesting file.

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

```
if [ "$USER" = "test" ]; then
   clear
   echo "Welcome"
fi
-- INSERT --
```

Enter **vim ~/.bashrc** inside the test user. Add the above command. This command would check whether the username is "test" or not. If it is "test", then clear the screen using **clear** command. And then echo "Welcome"

13. Install "zip" package.

```
ttn@ttn:~/Desktop$ sudo apt-get 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 374 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 2s (88.4 kB/s)
Selecting previously unselected package zip.
(Reading database ... 130456 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 (2.8.3-2) ...
ttn@ttn:~/Desktop$
```

Command: **sudo apt-get install zip**

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

```
ttn@ttn:~$ tar -czvf output.tar.gz /etc/output
tar: Removing leading `/' from member names
/etc/output
ttn@ttn:~$ tar -czvf password_backup.tar.gz /etc/password_backup
tar: Removing leading `/' from member names
/etc/password_backup
ttn@ttn:~$ tar -ztvf output.tar.gz
-rw-r--r-- root/root       176 2019-02-04 15:30 etc/output
ttn@ttn:~$ tar -ztvf password_backup.tar.gz
-rw-r--r-- root/root      2398 2019-02-04 14:45 etc/password_backup
ttn@ttn:~$
```

Tar command is used to compress and extract files/directories

-czvf indicates **c**reate, compress using g**z**ip, **v**erbose and allow to specify **f**ilename of the archive

-ztvf indicates g**z**ip, **t** to list content of archive, **v**erbose and **f**ilename of archive

15. scp this file to test user

```
ttn@ttn:~$ scp output.tar.gz test@ttn:/home/test
test@ttn's password:
output.tar.gz                          100%  207   785.3KB/s   00:00
ttn@ttn:~$
```

Scp means secure copy.

It is used to copy files between to remote servers or remote server to local server or vice versa.

Ensure installation of openssh-server first.

Command format: **scp <source-file> <destination-server>**

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

```
test@ttn:~$ ls
examples.desktop  output.tar.gz
test@ttn:~$ tar -xvf output.tar.gz
etc/output
```

tar is also used to extract contents of tar files

-xvf indicates e**x**tract, **v**erbose and **f**ilename

17. Download any image from web and move to desktop

```
ttn@ttn:~/Documents$ wget https://pluralsight.imgix.net/paths/python-7be70baaac.
png
--2019-02-04 21:00:24--  https://pluralsight.imgix.net/paths/python-7be70baaac.p
ng
Resolving pluralsight.imgix.net (pluralsight.imgix.net)... 151.101.10.208, 2a04:
4e42:2::720
Connecting to pluralsight.imgix.net (pluralsight.imgix.net)|151.101.10.208|:443.
.. connected.
HTTP request sent, awaiting response... 200 OK
Length: 8044 (7.9K) [image/png]
Saving to: 'python-7be70baaac.png'

python-7be70baaac.p 100%[===================>]   7.86K  --.-KB/s    in 0s

2019-02-04 21:00:25 (34.2 MB/s) - 'python-7be70baaac.png' saved [8044/8044]
```

```
ttn@ttn:~$ mv Documents/python-7be70baaac.png Desktop
ttn@ttn:~$ cd Desktop
ttn@ttn:~/Desktop$ ls
python-7be70baaac.png
ttn@ttn:~/Desktop$
```

Any publicly accessible file can be downloaded using wget.

Format: wget <url>

Move file using mv command

18. How to get help of commands usages.

```
ttn@ttn:~/Documents$ man find
ttn@ttn:~/Documents$
```

```
FIND(1)                    General Commands Manual                    FIND(1)

NAME
       find - search for files in a directory hierarchy

SYNOPSIS
       find [-H] [-L] [-P] [-D debugopts] [-Olevel] [starting-point...]
       [expression]

DESCRIPTION
       This manual page documents the GNU version of find.  GNU find  searches
       the  directory  tree  rooted at each given starting-point by evaluating
       the given expression from left to right,  according  to  the  rules  of
       precedence  (see  section  OPERATORS),  until the outcome is known (the
       left hand side is false for and operations,  true  for  or),  at  which
       point  find  moves  on  to the next file name.  If no starting-point is
       specified, `.' is assumed.

       If you are using find in an environment  where  security  is  important
       (for  example  if  you  are  using  it  to  search directories that are
       writable by other users), you should read the `Security Considerations'
       chapter  of  the findutils documentation, which is called Finding Files
       and comes with findutils.   That document  also  includes  a  lot  more
       detail  and discussion than this manual page, so you may find it a more
       useful source of information.

OPTIONS
       The -H, -L and -P options control  the  treatment  of  symbolic  links.
       Command-line  arguments  following these are taken to be names of files
       or directories to be examined, up to the  first  argument  that  begins
 Manual page find(1) line 1 (press h for help or q to quit)
```

Help can be possible using **man** command

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

```
ttn@ttn:~$ ln -s /etc/services /tmp/ports-info
ttn@ttn:~$ ▯
```

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?

Ans. I would execute **whereis xyz** on the Terminal. It would provide me the location of that command.