

Introduction to Linux - Exercise Solutions

February 4, 2019

Question 1:

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

```
ttn@TTN: ~  
File Edit View Search Terminal Help  
To run a command as administrator (user "root"), use "sudo <command>".  
See "man sudo_root" for details.  
  
ttn@TTN:~$ mkdir -p ~/exercise/dir1/dir2/dir3  
ttn@TTN:~$ ls -l ~  
total 52  
drwxr-xr-x 2 ttn ttn 4096 Feb  3 22:07 Desktop  
drwxr-xr-x 2 ttn ttn 4096 Feb  2 09:42 Documents  
drwxr-xr-x 2 ttn ttn 4096 Feb  3 15:33 Downloads  
-rw-r--r-- 1 ttn ttn 8980 Jan 28 12:12 examples.desktop  
drwxr-xr-x 3 ttn ttn 4096 Feb  4 14:42 exercise  
drwxr-xr-x 2 ttn ttn 4096 Feb  2 09:42 Music  
drwxr-xr-x 2 ttn ttn 4096 Feb  2 22:10 Pictures  
drwxr-xr-x 2 ttn ttn 4096 Feb  2 09:42 Public  
drwxr-xr-x 3 ttn ttn 4096 Feb  2 18:00 snap  
drwxr-xr-x 2 ttn ttn 4096 Feb  2 09:42 Templates  
drwxr-xr-x 2 ttn ttn 4096 Feb  2 09:42 Videos  
ttn@TTN:~$ ls -l ~/exercise/dir1/dir2  
total 4  
drwxr-xr-x 2 ttn ttn 4096 Feb  4 14:42 dir3  
ttn@TTN:~$
```

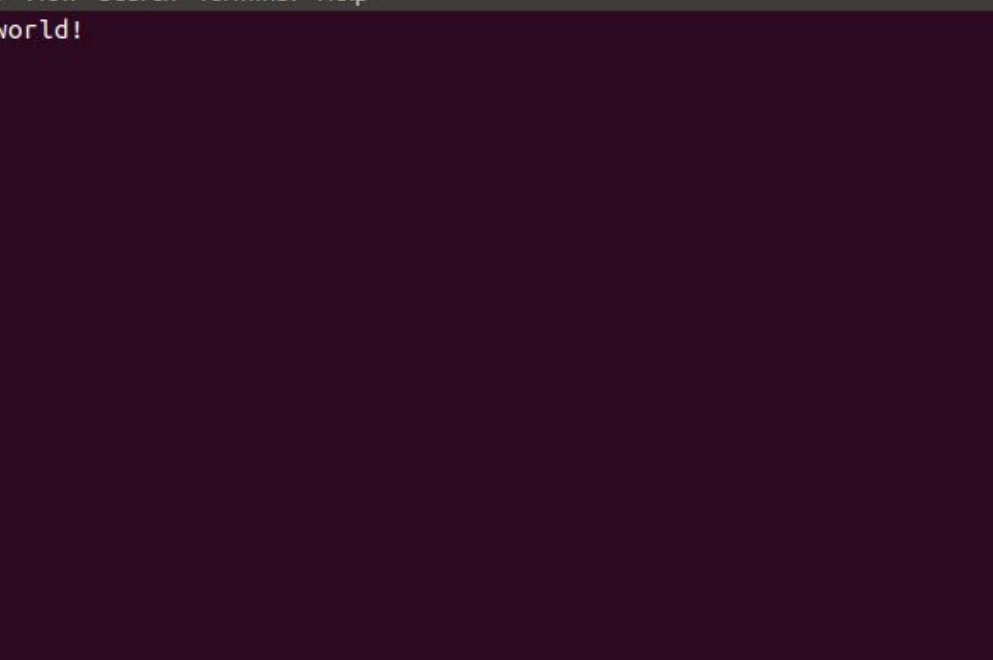
Question 2:

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

```
ttn@TTN: ~/exercise/dir1/dir2  
File Edit View Search Terminal Help  
ttn@TTN:~$ pwd  
/home/ttn  
ttn@TTN:~$ cd ~/exercise/dir1/dir2  
ttn@TTN:~/exercise/dir1/dir2$ touch emptyFile1 emptyFile2  
ttn@TTN:~/exercise/dir1/dir2$ ls -l  
total 4  
drwxr-xr-x 2 ttn ttn 4096 Feb  4 14:42 dir3  
-rw-r--r-- 1 ttn ttn    0 Feb  4 14:49 emptyFile1  
-rw-r--r-- 1 ttn ttn    0 Feb  4 14:49 emptyFile2  
ttn@TTN:~/exercise/dir1/dir2$
```

Question 3:

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

A screenshot of a terminal window. The title bar at the top reads "ttn@TTN: ~/exercise/dir1/dir2". Below the title bar is a menu bar with the options "File", "Edit", "View", "Search", "Terminal", and "Help". The main area of the terminal is dark purple. The text "Hello, world!" is displayed in a light green monospace font. On the left side of the terminal, there is a vertical column of small, light green tilde characters (~). At the bottom left, a prompt character ":" is followed by the text "wq!" and a white cursor block.

```
ttn@TTN: ~/exercise/dir1/dir2
File Edit View Search Terminal Help
ttn@TTN:~/exercise/dir1/dir2$ vi file1.txt
ttn@TTN:~/exercise/dir1/dir2$ cat file1.txt
Hello, world!

ttn@TTN:~/exercise/dir1/dir2$
```

Question 4:

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

```
root@TTN: ~  
File Edit View Search Terminal Help  
ttn@TTN:/$ sudo -i  
root@TTN:~# find /etc -name passwd  
/etc/passwd  
/etc/pam.d/passwd  
/etc/cron.daily/passwd  
root@TTN:~# cp /etc/passwd /etc/passwd_copy  
root@TTN:~# find /etc -name passwd_copy  
/etc/passwd_copy  
root@TTN:~# mv /etc/passwd_copy /etc/passwd_backup  
root@TTN:~# find /etc -name passwd_backup  
/etc/passwd_backup  
root@TTN:~#
```

Question 5:

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

cat

```
Activities Terminal Mon 15:08  
root@TTN: ~  
File Edit View Search Terminal Help  
root@TTN:~# cat /etc/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/netif:/usr/sbin/nologin  
systemd-resolve:x:101:103:systemd Resolver,,,:/run/systemd/resolve:/usr/sbin/nologin  
syslog:x:102:106:/home/syslog:/usr/sbin/nologin  
messagebus:x:103:107:/nonexistent:/usr/sbin/nologin  
_apt:x:104:65534:/nonexistent:/usr/sbin/nologin  
uuidd:x:105:111:/run/uuidd:/usr/sbin/nologin  
avahi-autoipd:x:106:112:Avahi autoip daemon,,,:/var/lib/avahi-autoipd:/usr/sbin/nologin  
usbmux:x:107:46:usbmux daemon,,,:/var/lib/usbmux:/usr/sbin/nologin  
dnsmasq:x:108:65534:dnsmasq,,,:/var/lib/misc:/usr/sbin/nologin  
rtkit:x:109:114:RealtimeKit,,,:/proc:/usr/sbin/nologin  
cups-pk-helper:x:110:116:user for cups-pk-helper service,,,:/home/cups-pk-helper:/usr/sbin/nologin  
speech-dispatcher:x:111:29:Speech Dispatcher,,,:/var/run/speech-dispatcher:/bin/false  
whoopsie:x:112:117:/nonexistent:/bin/false  
kernoops:x:113:65534:Kernel Oops Tracking Daemon,,,:/usr/sbin/nologin  
saned:x:114:119:/var/lib/saned:/usr/sbin/nologin  
pulse:x:115:120:PulseAudio daemon,,,:/var/run/pulse:/usr/sbin/nologin  
avahi:x:116:122:Avahi mDNS daemon,,,:/var/run/avahi-daemon:/usr/sbin/nologin  
colord:x:117:123:colord colour management daemon,,,:/var/lib/colord:/usr/sbin/nologin  
hplip:x:118:7:HPLIP system user,,,:/var/run/hplip:/bin/false
```


more

```
root@TTN:~# more /etc/passwd_backup
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/var/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-network:x:100:102:systemd Network Management,,,:/run/systemd/netif:/usr/sbin/nologin
systemd-resolve:x:101:103:systemd Resolver,,,:/run/systemd/resolve:/usr/sbin/nologin
--More-- (43%)
```

less

```
root@TTN: ~
File Edit View Search Terminal Help
root@TTN:~# less /etc/passwd_backup
root@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/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-network:x:100:102:systemd Network Management,,,:/run/systemd/netif:/usr/sbin/nologin
systemd-resolve:x:101:103:systemd Resolver,,,:/run/systemd/resolve:/usr/sbin/nologin
/etc/passwd backup
```

strings

```
Activities Terminal Mon 15:15 root@TTN: ~
File Edit View Search Terminal Help
root@TTN:~# strings /etc/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:Mail Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/var/run/ircd:/usr/sbin/nologin
gnats:x:41:41:Gnats Bug-Reporting System (admin):/var/lib/gnats:/usr/sbin/nologin
nobody:x:65534:65534:nobody:/nonexistent:/usr/sbin/nologin
systemd-network:x:100:102:systemd Network Management,,,:/run/systemd/netif:/usr/sbin/nologin
systemd-resolve:x:101:103:systemd Resolver,,,:/run/systemd/resolve:/usr/sbin/nologin
syslog:x:102:106:/home/syslog:/usr/sbin/nologin
messagebus:x:103:107:/nonexistent:/usr/sbin/nologin
_apt:x:104:65534:/nonexistent:/usr/sbin/nologin
uuldd:x:105:111:/run/uuldd:/usr/sbin/nologin
avahi-autoipd:x:106:112:Avahi autoip daemon,,,:/var/lib/avahi-autoipd:/usr/sbin/nologin
usbmux:x:107:46:usbmux daemon,,,:/var/lib/usbmux:/usr/sbin/nologin
dnsmasq:x:108:65534:dnsmasq,,,:/var/lib/misc:/usr/sbin/nologin
rtkit:x:109:114:RealtimeKit,,,:/proc:/usr/sbin/nologin
cups-pk-helper:x:110:116:user for cups-pk-helper service,,,:/home/cups-pk-helper:/usr/sbin/nologin
speech-dispatcher:x:111:29:Speech Dispatcher,,,:/var/run/speech-dispatcher:/bin/false
whoopsie:x:112:117:/nonexistent:/bin/false
kernoops:x:113:65534:Kernel Oops Tracking Daemon,,,:/usr/sbin/nologin
saned:x:114:119:/var/lib/saned:/usr/sbin/nologin
pulse:x:115:120:PulseAudio daemon,,,:/var/run/pulse:/usr/sbin/nologin
avahi:x:116:122:Avahi mDNS daemon,,,:/var/run/avahi-daemon:/usr/sbin/nologin
colord:x:117:123:colord colour management daemon,,,:/var/lib/colord:/usr/sbin/nologin
hplip:x:118:7:HPLIP system user,,,:/var/run/hplip:/bin/false
```

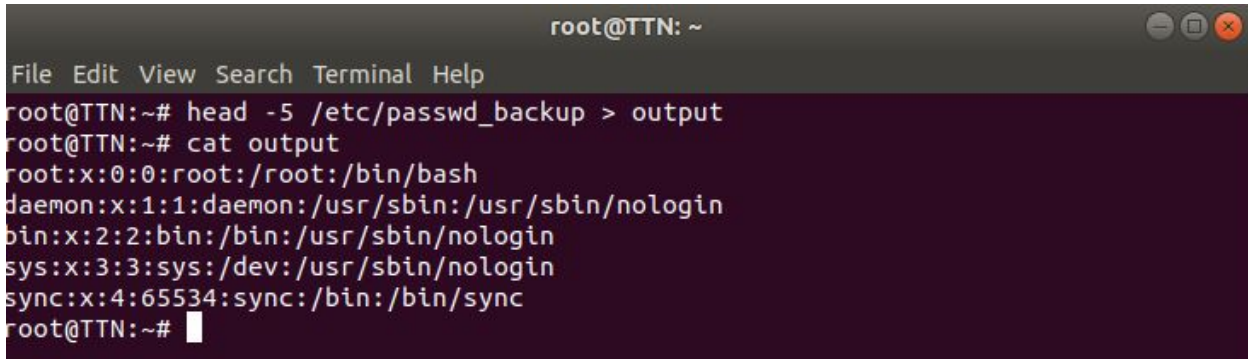
Question 6:

Find out the number of line in passwd_backup containing "/bin/false"

```
root@TTN: ~
File Edit View Search Terminal Help
root@TTN:~# grep /bin/false /etc/passwd_backup | wc -l
5
root@TTN:~# grep /bin/false /etc/passwd_backup
speech-dispatcher:x:111:29:Speech Dispatcher,,,:/var/run/speech-dispatcher:/bin/
false
whoopsie:x:112:117:/nonexistent:/bin/false
hplip:x:118:7:HPLIP system user,,,:/var/run/hplip:/bin/false
gnome-initial-setup:x:120:65534:/run/gnome-initial-setup:/bin/false
gdm:x:121:125:Gnome Display Manager:/var/lib/gdm3:/bin/false
root@TTN:~#
```

Question 7:

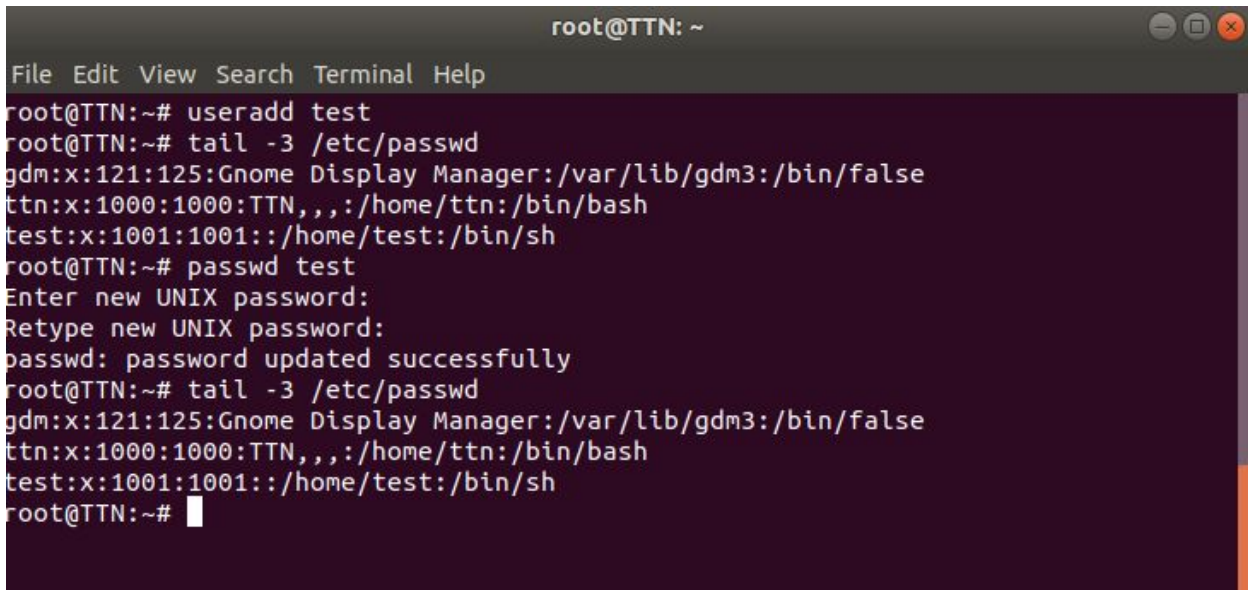
Get the first 5 lines of a file "passwd_backup" and redirect the output of the above commands into file "output".



```
root@TTN: ~  
File Edit View Search Terminal Help  
root@TTN:~# head -5 /etc/passwd_backup > output  
root@TTN:~# 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@TTN:~#
```

Question 8:

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

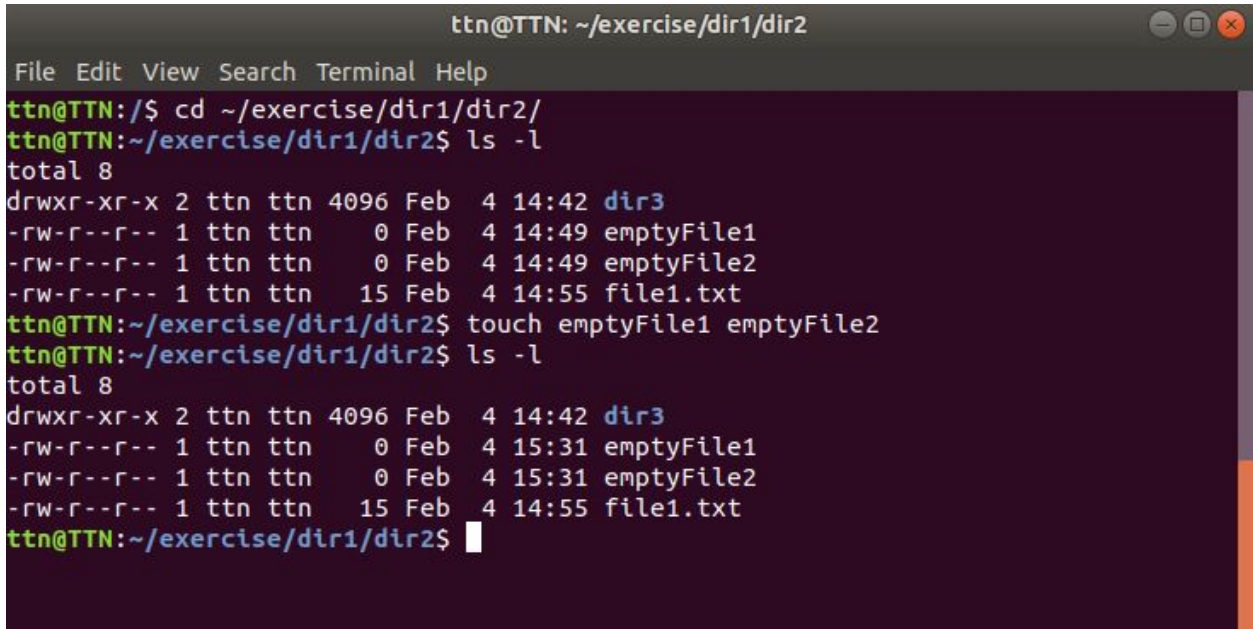


```
root@TTN: ~  
File Edit View Search Terminal Help  
root@TTN:~# useradd test  
root@TTN:~# tail -3 /etc/passwd  
gdm:x:121:125:Gnome Display Manager:/var/lib/gdm3:/bin/false  
ttn:x:1000:1000:TTN,,,:/home/ttn:/bin/bash  
test:x:1001:1001:./home/test:/bin/sh  
root@TTN:~# passwd test  
Enter new UNIX password:  
Retype new UNIX password:  
passwd: password updated successfully  
root@TTN:~# tail -3 /etc/passwd  
gdm:x:121:125:Gnome Display Manager:/var/lib/gdm3:/bin/false  
ttn:x:1000:1000:TTN,,,:/home/ttn:/bin/bash  
test:x:1001:1001:./home/test:/bin/sh  
root@TTN:~#
```

(UID: 1001, GID: 1001)

Question 9:

Change the timestamp of emptyFile1, emptyFile2 which exist in dir2

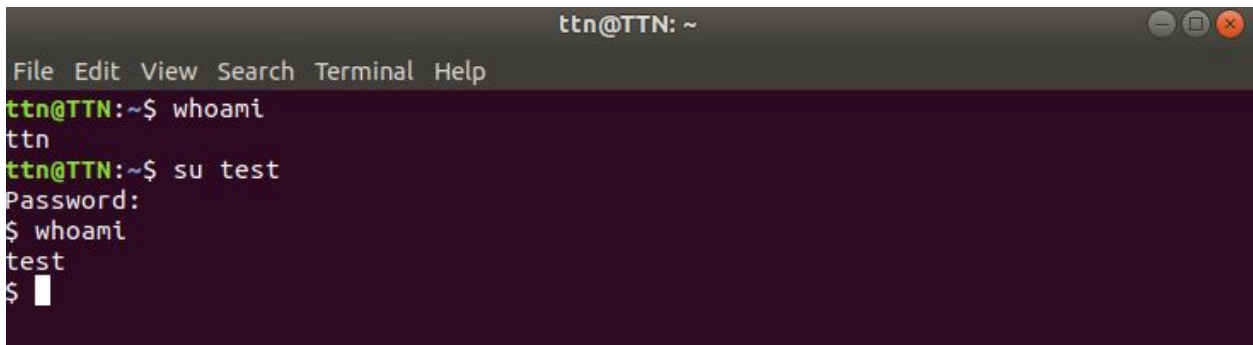


```
ttn@TTN: ~/exercise/dir1/dir2
File Edit View Search Terminal Help
ttn@TTN:/$ cd ~/exercise/dir1/dir2/
ttn@TTN:~/exercise/dir1/dir2$ ls -l
total 8
drwxr-xr-x 2 ttn ttn 4096 Feb  4 14:42 dir3
-rw-r--r-- 1 ttn ttn  0 Feb  4 14:49 emptyFile1
-rw-r--r-- 1 ttn ttn  0 Feb  4 14:49 emptyFile2
-rw-r--r-- 1 ttn ttn 15 Feb  4 14:55 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 14:42 dir3
-rw-r--r-- 1 ttn ttn  0 Feb  4 15:31 emptyFile1
-rw-r--r-- 1 ttn ttn  0 Feb  4 15:31 emptyFile2
-rw-r--r-- 1 ttn ttn 15 Feb  4 14:55 file1.txt
ttn@TTN:~/exercise/dir1/dir2$
```

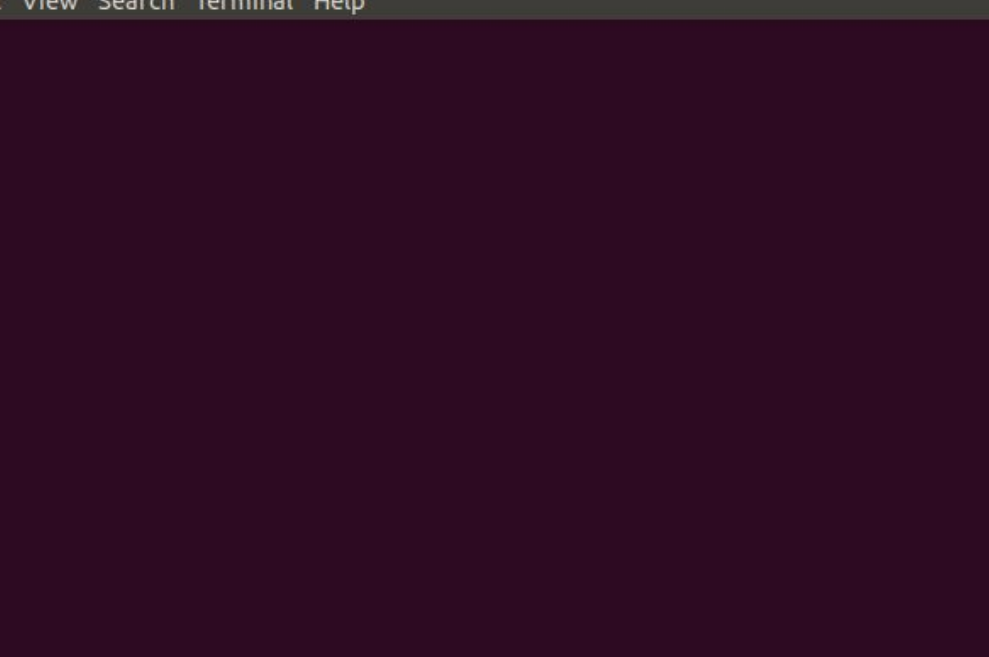
Question 10:

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 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.



```
ttn@TTN: ~
File Edit View Search Terminal Help
ttn@TTN:~$ whoami
ttn
ttn@TTN:~$ su test
Password:
$ whoami
test
$
```



The screenshot shows a terminal window with a dark gray title bar containing the text "ttn@TTN: ~" and standard window control buttons. The menu bar includes "File", "Edit", "View", "Search", "Terminal", and "Help". The terminal area has a black background with white text. It displays a series of empty lines, each preceded by a tilde (~) character, indicating a root shell. At the bottom, the command `"/root/output"` has been entered, and the output is `[Permission Denied]`.

```
root@TTN: ~  
File Edit View Search Terminal Help  
$ ls -l /etc | grep output  
-rw-r--r-- 1 root root      189 Feb  4 15:21 output  
$ exit  
ttn@TTN:~$ sudo -i  
root@TTN:~# chown :1001 /etc/output  
root@TTN:~# ls -l /etc/output  
-rw-r--r-- 1 root test 189 Feb  4 15:21 /etc/output  
root@TTN:~# chmod g+w /etc/output  
root@TTN:~# ls -l /etc/output  
-rw-rw-r-- 1 root test 189 Feb  4 15:21 /etc/output  
root@TTN:~#
```

```
root@TTN:~# ls -l /etc/output
-rw-rw-r-- 1 root test 189 Feb  4 15:21 /etc/output
root@TTN:~# chmod g-w /etc/output
root@TTN:~# chown :root /etc/output
root@TTN:~# ls -l /etc/output
-rw-r--r-- 1 root root 189 Feb  4 15:21 /etc/output
root@TTN:~#
```



```
root@TTN: ~
File Edit View Search Terminal Help
root@TTN:~# ls -l /etc/output
-rw-r--r-- 1 root root 189 Feb  4 15:21 /etc/output
root@TTN:~# chmod o+rw /etc/output
root@TTN:~# ls -l /etc/output
-rw-r--rwx 1 root root 189 Feb  4 15:21 /etc/output
root@TTN:~# chmod o-w /etc/output
root@TTN:~# ls -l /etc/output
-rw-r--r-- 1 root root 189 Feb  4 15:21 /etc/output
root@TTN:~#
```

```
root@TTN: ~
File Edit View Search Terminal Help
root@TTN:~# ls -l /etc/output
-rw-r--r-- 1 root root 189 Feb  4 15:21 /etc/output
root@TTN:~# chown test /etc/output
root@TTN:~# ls -l
total 0
root@TTN:~# ls -l /etc/output
-rw-r--r-- 1 test root 189 Feb  4 15:21 /etc/output
root@TTN:~#
```

Question 11:

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

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

# colored GCC warnings and errors
#export GCC_COLORS='error=01;31:warning=01;35:note=01;36:caret=01;32:locus=01:quote=01'

# some more ls aliases
alias ll='ls -alF'
alias la='ls -A'
alias l='ls -CF'
alias deepika='touch /tmp/aliastesting'

# Add an "alert" alias for long running commands.  Use like so:
# sleep 10; alert
alias alert='notify-send --urgency=low -i "${[ $? = 0 ]} && echo terminal || echo error" "${history|tail -n1|sed -e '\''s/^\s*[0-9]\+\s*//;s/[:;&]\s*alert$//'\`'}'"

# Alias definitions.
# You may want to put all your additions into a separate file like
```

```
ttn@TTN: ~  
File Edit View Search Terminal Help  
ttn@TTN:~$ vi ~/.bashrc  
ttn@TTN:~$ deepika  
deepika: command not found  
ttn@TTN:~$ source ~/.bashrc  
ttn@TTN:~$ deepika  
ttn@TTN:~$ ls -l /tmp | grep alias  
-rw-r--r-- 1 ttn ttn      0 Feb  4 16:11 alias testing  
ttn@TTN:~$
```

Question 12:

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

```
test@TTN: ~  
File Edit View Search Terminal Help  
  
# Alias definitions.  
# You may want to put all your additions into a separate file like  
# ~/.bash_aliases, instead of adding them here directly.  
# See /usr/share/doc/bash-doc/examples in the bash-doc package.  
  
if [ -f ~/.bash_aliases ]; then  
    . ~/.bash_aliases  
fi  
  
# enable programmable completion features (you don't need to enable  
# this, if it's already enabled in /etc/bash.bashrc and /etc/profile  
# sources /etc/bash.bashrc).  
if ! shopt -oq posix; then  
    if [ -f /usr/share/bash-completion/bash_completion ]; then  
        . /usr/share/bash-completion/bash_completion  
    elif [ -f /etc/bash_completion ]; then  
        . /etc/bash_completion  
    fi  
fi  
  
clear  
echo "welcome"  
:wq!
```

```
test@TTN: ~  
File Edit View Search Terminal Help  
welcome  
test@TTN:~$
```

Question 13:

Install “zip” package

```
ttn@TTN: ~  
File Edit View Search Terminal Help  
ttn@TTN:~$ sudo apt-get install zip  
[sudo] password for ttn:  
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 430 not upgraded.  
ttn@TTN:~$
```

Question 14:

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

```
ttn@TTN: /etc
File Edit View Search Terminal Help
ttn@TTN:/etc$ sudo tar cvf ball.tar output passwd_backup
output
passwd_backup
ttn@TTN:/etc$
```

Question 15:

scp this file to test user

```
ttn@TTN: ~
File Edit View Search Terminal Tabs Help
ttn@TTN: ~ x test@TTN: /home/ttn x ttn@TTN: ~ x
ttn@TTN:~$ systemctl status openssh
Unit openssh.service could not be found.
ttn@TTN:~$ systemctl status openssh-server
Unit openssh-server.service could not be found.
ttn@TTN:~$ systemctl status ssh
● ssh.service - OpenBSD Secure Shell server
   Loaded: loaded (/lib/systemd/system/ssh.service; enabled; vendor preset: enab
   Active: active (running) since Mon 2019-02-04 17:47:30 IST; 46s ago
   Main PID: 2067 (sshd)
     Tasks: 1 (limit: 4915)
    CGroup: /system.slice/ssh.service
            └─2067 /usr/sbin/sshd -D

Feb 04 17:47:30 TTN systemd[1]: Starting OpenBSD Secure Shell server...
Feb 04 17:47:30 TTN sshd[2067]: Server listening on 0.0.0.0 port 22.
Feb 04 17:47:30 TTN sshd[2067]: Server listening on :: port 22.
Feb 04 17:47:30 TTN systemd[1]: Started OpenBSD Secure Shell server.
lines 1-12/12 (END)
```



```
test@TTN: /home/ttn
File Edit View Search Terminal Tabs Help
ttn@TTN: ~ x test@TTN: /home/ttn x ttn@TTN: ~ x
welcome

test@TTN:/home/ttn$ systemctl status ssh
● ssh.service - OpenBSD Secure Shell server
   Loaded: loaded (/lib/systemd/system/ssh.service; enabled; vendor preset: enab
   Active: active (running) since Mon 2019-02-04 17:47:30 IST; 1min 11s ago
   Main PID: 2067 (sshd)
     Tasks: 1 (limit: 4915)
    CGroup: /system.slice/ssh.service
            └─2067 /usr/sbin/sshd -D
lines 1-7/7 (END)
```

```
ttn@TTN: ~
File Edit View Search Terminal Tabs Help
ttn@TTN: ~ x test@TTN: /home/ttn x ttn@TTN: ~ x
ttn@TTN:~$ scp /etc/ball.tar test@localhost:~/
The authenticity of host 'localhost (127.0.0.1)' can't be established.
ECDSA key fingerprint is SHA256:rWCXk/Hh4K7hY00a1KgY5y5850G2EHTJskPuQQzHGUs.
Are you sure you want to continue connecting (yes/no)? y
Please type 'yes' or 'no': yes
Warning: Permanently added 'localhost' (ECDSA) to the list of known hosts.
test@localhost's password:
ball.tar                               100% 10KB 35.4MB/s 00:00
ttn@TTN:~$
```

```
test@TTN: ~
File Edit View Search Terminal Tabs Help
ttn@TTN: ~ x test@TTN: /hom... x ttn@TTN: ~ x test@TTN: ~ x
welcome

test@TTN:/home/ttn$ cd ~
test@TTN:~$ ls -l | grep ball
-rw-r--r-- 1 test test 10240 Feb  4 17:49 ball.tar
test@TTN:~$
```

Question 16:

Unzip this tar bar by logging into the remote server

```
ttn@TTN: ~  
File Edit View Search Terminal Tabs Help  
ttn@TTN: ~ x test@TTN: /... x ttn@TTN: ~ x test@TTN: ~ x ttn@TTN: ~ x  
ttn@TTN:~$ ssh test@localhost  
test@localhost's password: 
```

```
test@TTN: ~  
File Edit View Search Terminal Tabs Help  
ttn@TTN: ~ x test@TTN: /... x ttn@TTN: ~ x test@TTN: ~ x test@TTN: ~ x  
welcome  
test@TTN:~$ ls -l | grep ball  
-rw-r--r-- 1 test test 10240 Feb  4 17:49 ball.tar  
test@TTN:~$ tar xvf ball.tar  
output  
passwd_backup  
test@TTN:~$ ls -l  
total 32  
-rw-r--r-- 1 test test 10240 Feb  4 17:49 ball.tar  
-rw-r--r-- 1 test test  8980 Feb  4 17:27 examples.desktop  
-rw-r--r-- 1 test test   189 Feb  4 15:21 output  
-rw-r--r-- 1 test test  2398 Feb  4 15:05 passwd_backup  
test@TTN:~$ 
```

Question 17:

Download any image from web and move to desktop

```
ttn@TTN: ~  
File Edit View Search Terminal Tabs Help  
ttn@TTN: /etc x ttn@TTN: ~ x  
ttn@TTN:~$ wget https://upload.wikimedia.org/wikipedia/commons/thumb/a/af/Tux.png/220px-Tux.png -O ~/Desktop/penguin.png  
--2019-02-04 17:05:04-- https://upload.wikimedia.org/wikipedia/commons/thumb/a/af/Tux.png/220px-Tux.png  
Resolving upload.wikimedia.org (upload.wikimedia.org)... 103.102.166.240, 2001:d  
f2:e500:ed1a::2:b  
Connecting to upload.wikimedia.org (upload.wikimedia.org)|103.102.166.240|:443..  
. connected.  
HTTP request sent, awaiting response... 200 OK  
Length: 39594 (39K) [image/png]  
Saving to: '/home/ttn/Desktop/penguin.png'  
  
/home/ttn/Desktop/p 100%[=====] 38.67K --.-KB/s in 0.1s  
2019-02-04 17:05:05 (406 KB/s) - '/home/ttn/Desktop/penguin.png' saved [39594/39594]  
  
ttn@TTN:~$ ls -l ~/Desktop/  
total 44  
-rw-r--r-- 1 ttn ttn 39594 Mar 22 2016 penguin.png  
ttn@TTN:~$
```

Question 18:

How to get help of commands usages

```
ttn@TTN: ~  
File Edit View Search Terminal Tabs Help  
ttn@TTN: /etc x ttn@TTN: ~ x  
prefix. This might seem superfluous---if the default for an affirmative option is to not do something, then why provide a way to explicitly turn it off? But the startup file may in fact change the default. For instance, using "follow_ftp = on" in .wgetrc makes Wget follow FTP links by default, and using --no-follow-ftp is the only way to restore the factory default from the command line.  
  
Basic Startup Options  
-V  
--version  
Display the version of Wget.  
  
-h  
--help  
Print a help message describing all of Wget's command-line options.  
  
-b  
--background  
Go to background immediately after startup. If no output file is specified via the -o, output is redirected to wget-log.  
  
-e command  
--execute command  
Manual page wget(1) line 85 (press h for help or q to quit)
```



```
Activities Terminal Mon 17:07
ttn@TTN: ~

File Edit View Search Terminal Tabs Help

ttn@TTN: /etc
ttn@TTN:~$ man wget
ttn@TTN:~$ wget --help
GNU Wget 1.19.4, a non-interactive network retriever.
Usage: wget [OPTION]... [URL]...

Mandatory arguments to long options are mandatory for short options too.

Startup:
  -V, --version          display the version of Wget and exit
  -h, --help             print this help
  -b, --background       go to background after startup
  -e, --execute=COMMAND  execute a '.wgetrc'-style command

Logging and input file:
  -o, --output-file=FILE log messages to FILE
  -a, --append-output=FILE append messages to FILE
  -d, --debug            print lots of debugging information
  -q, --quiet            quiet (no output)
  -v, --verbose          be verbose (this is the default)
  -nv, --no-verbose      turn off verbosity, without being quiet
  --report-speed=TYPE    output bandwidth as TYPE. TYPE can be bits
                        download URLs found in local or external FILE
  -i, --input-file=FILE  treat input file as HTML
  -F, --force-html       resolves HTML input-file links (-i -F)
                        relative to URL
  -B, --base=URL         specify config file to use
                        do not read any config file
                        log reasons for URL rejection to FILE

Download:
  -t, --tries=NUMBER     set number of retries to NUMBER (0 unlimits)
                        retry even if connection is refused
  -O, --output-document=FILE write documents to FILE
  -nc, --no-clobber      skip downloads that would download to
                        existing files (overwriting them)
  --no-netrc             don't try to obtain credentials from .netrc
  --continue             resume getting a partially-downloaded file
```

```
Activities Terminal Mon 17:08
ttn@TTN: ~

File Edit View Search Terminal Tabs Help

ttn@TTN: /etc
ttn@TTN:~$ wget -h
GNU Wget 1.19.4, a non-interactive network retriever.
Usage: wget [OPTION]... [URL]...

Mandatory arguments to long options are mandatory for short options too.

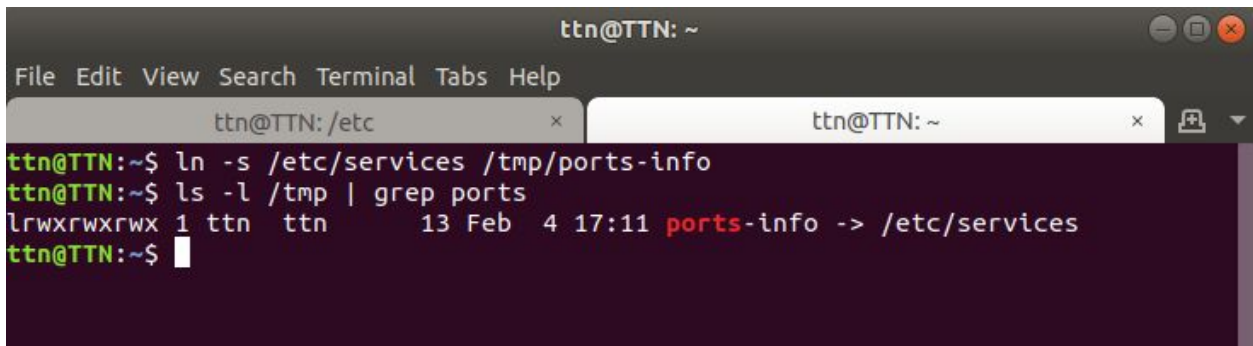
Startup:
  -V, --version          display the version of Wget and exit
  -h, --help             print this help
  -b, --background       go to background after startup
  -e, --execute=COMMAND  execute a '.wgetrc'-style command

Logging and input file:
  -o, --output-file=FILE log messages to FILE
  -a, --append-output=FILE append messages to FILE
  -d, --debug            print lots of debugging information
  -q, --quiet            quiet (no output)
  -v, --verbose          be verbose (this is the default)
  -nv, --no-verbose      turn off verbosity, without being quiet
  --report-speed=TYPE    output bandwidth as TYPE. TYPE can be bits
                        download URLs found in local or external FILE
  -i, --input-file=FILE  treat input file as HTML
  -F, --force-html       resolves HTML input-file links (-i -F)
                        relative to URL
  --config=FILE          specify config file to use
  --no-config            do not read any config file
  --rejected-log=FILE    log reasons for URL rejection to FILE

Download:
  -t, --tries=NUMBER     set number of retries to NUMBER (0 unlimits)
                        retry even if connection is refused
  -O, --output-document=FILE write documents to FILE
  -nc, --no-clobber      skip downloads that would download to
                        existing files (overwriting them)
  --no-netrc             don't try to obtain credentials from .netrc
  -c, --continue         resume getting a partially-downloaded file
  --start-pos=OFFSET     start downloading from zero-based position OFFSET
```


Question 19:

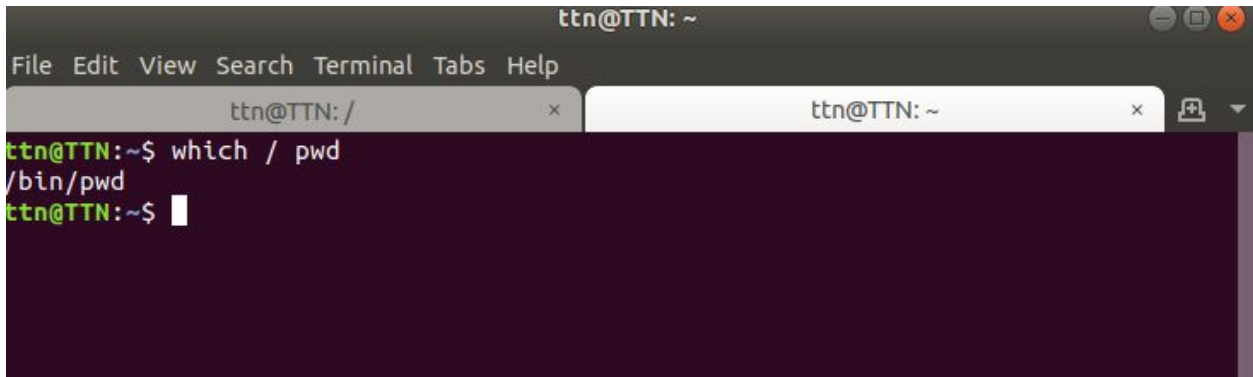
Create a symlink of /etc/services into /tmp/ports-info

A terminal window titled 'ttn@TTN: ~' with a menu bar (File, Edit, View, Search, Terminal, Tabs, Help) and two tabs. The first tab is 'ttn@TTN: /etc' and the second is 'ttn@TTN: ~'. The terminal shows the following commands and output:

```
ttn@TTN:~$ ln -s /etc/services /tmp/ports-info
ttn@TTN:~$ ls -l /tmp | grep ports
lrwxrwxrwx 1 ttn ttn      13 Feb  4 17:11 ports-info -> /etc/services
ttn@TTN:~$
```

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

A terminal window titled 'ttn@TTN: ~' with a menu bar (File, Edit, View, Search, Terminal, Tabs, Help) and two tabs. The first tab is 'ttn@TTN: /' and the second is 'ttn@TTN: ~'. The terminal shows the following commands and output:

```
ttn@TTN:~$ which / pwd
/bin/pwd
ttn@TTN:~$
```