

Linux Lab 1

1. Install Ubuntu [Dual-boot, VM, Multipass]

DONE

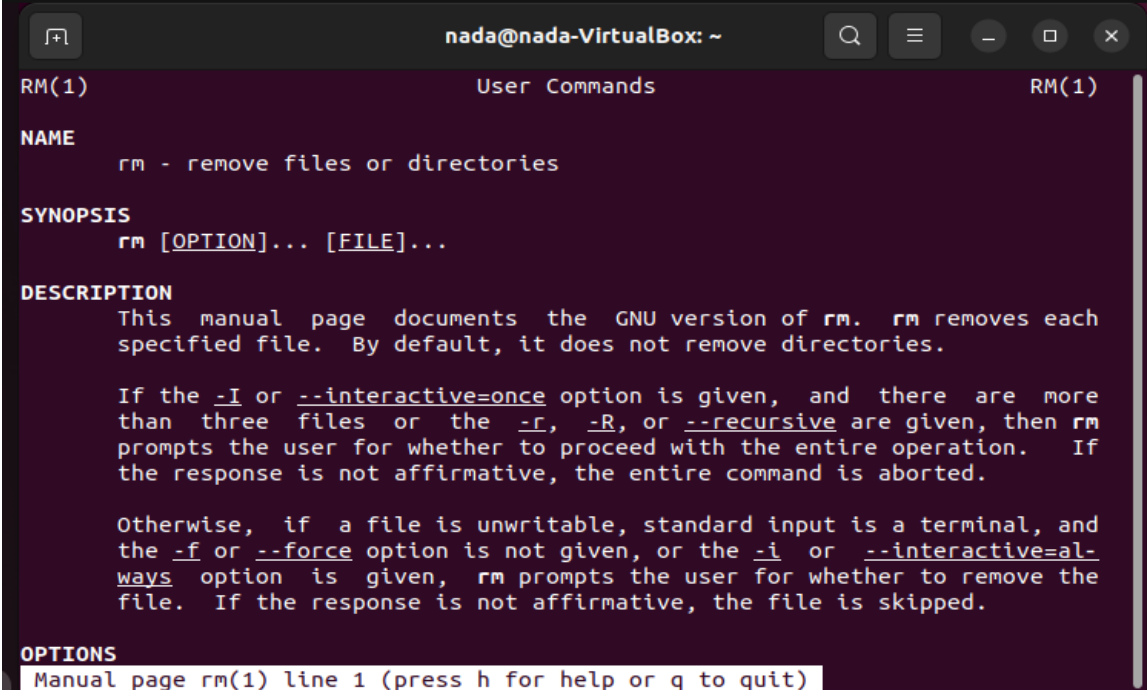
2. What is the difference between cat and more command?

Use the more or page command to display continuous text one screen at a time. Use the cat command to read each File parameter in sequence and writes it to standard output.

It means: cat will display the entire contents of a file onto the terminal screen at once, while more/page pauses when it fills the screen, then waits for you to press a key to continue so it shows the contents one screen at a time.

3. What is difference between rm and rmdir using man?

Command: nada@nada-VirtualBox:~\$ man rm



```
nada@nada-VirtualBox: ~
RM(1)                                User Commands                                RM(1)
NAME
    rm - remove files or directories

SYNOPSIS
    rm [OPTION]... [FILE]...

DESCRIPTION
    This manual page documents the GNU version of rm.  rm removes each
    specified file.  By default, it does not remove directories.

    If the -I or --interactive=once option is given, and there are more
    than three files or the -r, -R, or --recursive are given, then rm
    prompts the user for whether to proceed with the entire operation.  If
    the response is not affirmative, the entire command is aborted.

    Otherwise, if a file is unwritable, standard input is a terminal, and
    the -f or --force option is not given, or the -i or --interactive=al-
ways option is given, rm prompts the user for whether to remove the
    file.  If the response is not affirmative, the file is skipped.

OPTIONS
Manual page rm(1) line 1 (press h for help or q to quit)
```

Command: nada@nada-VirtualBox:~\$ man rmdir

```
nada@nada-VirtualBox: ~
RMDIR(1)                                User Commands                                RMDIR(1)

NAME
    rmdir - remove empty directories

SYNOPSIS
    rmdir [OPTION]... DIRECTORY...

DESCRIPTION
    Remove the DIRECTORY(ies), if they are empty.

    --ignore-fail-on-non-empty
        ignore each failure that is solely because a directory
        is non-empty

    -p, --parents
        remove DIRECTORY and its ancestors; e.g., 'rmdir -p a/b/c' is
        similar to 'rmdir a/b/c a/b a'

    -v, --verbose
        output a diagnostic for every directory processed

Manual page rmdir(1) line 1 (press h for help or q to quit)
```

4. Create the following hierarchy under your home directory

```
nada@nada-VirtualBox: ~/docs

nada@nada-VirtualBox:~$ mkdir dir1
nada@nada-VirtualBox:~$ ls
Desktop  Documents  Music      Public  Templates  x-tools
dir1     Downloads  Pictures   snap    Videos
nada@nada-VirtualBox:~$ cd dir1
nada@nada-VirtualBox:~/dir1$ mkdir dir11
nada@nada-VirtualBox:~/dir1$ mkdir dir12
nada@nada-VirtualBox:~/dir1$
nada@nada-VirtualBox:~/dir1$ cd dir11
nada@nada-VirtualBox:~/dir1/dir11$ touch file1
nada@nada-VirtualBox:~/dir1/dir11$
nada@nada-VirtualBox:~/dir1/dir11$ cd ../../
nada@nada-VirtualBox:~$ pwd
/home/nada
nada@nada-VirtualBox:~$
nada@nada-VirtualBox:~$ mkdir docs
nada@nada-VirtualBox:~$ touch docs/mycv
nada@nada-VirtualBox:~$ ls
Desktop  docs      Downloads  Pictures   snap    Videos
dir1     Documents Music      Public     Templates x-tools
nada@nada-VirtualBox:~$ cd dir1
nada@nada-VirtualBox:~/dir1$ ls
dir11  dir12
nada@nada-VirtualBox:~/dir1$ cd ..
nada@nada-VirtualBox:~$ cd docs
nada@nada-VirtualBox:~/docs$ ls
mycv
nada@nada-VirtualBox:~/docs$
```

4. a. Remove dir11 in one-step. What did you notice? And how did you overcome that?

```
nada@nada-VirtualBox: ~/dir1
nada@nada-VirtualBox:~/docs$ cd ../dir1
nada@nada-VirtualBox:~/dir1$
nada@nada-VirtualBox:~/dir1$ rmdir dir11
rmdir: failed to remove 'dir11': Directory not empty
nada@nada-VirtualBox:~/dir1$
nada@nada-VirtualBox:~/dir1$ rm -r dir11
nada@nada-VirtualBox:~/dir1$ ls
dir12
nada@nada-VirtualBox:~/dir1$
```

Cannot use rmdir since it is not an empty directory, so use rm command with option -r = recursive that deletes the folder and everything inside it

4. b. Then remove dir12 using rmdir -p command. State what happened to the hierarchy (Note: you are in your home directory).

```
nada@nada-VirtualBox: ~
nada@nada-VirtualBox:~/dir1$ cd ..
nada@nada-VirtualBox:~$ pwd
/home/nada
nada@nada-VirtualBox:~$ rmdir -p dir12
rmdir: failed to remove 'dir12': No such file or directory
nada@nada-VirtualBox:~$ rmdir -p dir1/dir12
nada@nada-VirtualBox:~$ ls
Desktop  Documents  Music      Public  Templates  x-tools
docs     Downloads  Pictures   snap    Videos
nada@nada-VirtualBox:~$
```

Cannot remove dir12 while I am in the home directory. So when used rmdir -p dir1/dir12 since the dir12 is in dir1, it deleted the whole dir1, consequently the dir12 is deleted.

c. The output of the command `pwd` was `/home/user`. Write the absolute and relative path for the file `mycv`.

```
nada@nada-VirtualBox:~$ pwd
/home/nada
nada@nada-VirtualBox:~$ cd docs
nada@nada-VirtualBox:~/docs$ readlink -f mycv
/home/nada/docs/mycv
nada@nada-VirtualBox:~/docs$
```

Absolute path of `mycv`: `/home/nada/docs/mycv`

Relative path of `mycv`: `docs/mycv`

5. Copy the `/etc/passwd` file to your home directory making its name is `mypasswd`.

```
nada@nada-VirtualBox: ~
nada@nada-VirtualBox:~$ pwd
/home/nada
nada@nada-VirtualBox:~$ cd ../../
nada@nada-VirtualBox:/ $ ls
bin  cdrom  etc  lib  lib64  lost+found  mnt  proc  run  snap  swapfile  tmp  var
boot  dev  home  lib32  libx32  media  opt  root  sbin  srv  sys  usr
nada@nada-VirtualBox:/ $ cp ./etc/passwd ~/mypasswd
nada@nada-VirtualBox:/ $
nada@nada-VirtualBox:/ $ cd home
nada@nada-VirtualBox:/home $ ls
nada  passwd
nada@nada-VirtualBox:/home $ cd
nada@nada-VirtualBox:~$ ls
Desktop  docs  Documents  Downloads  Music  mypasswd  Pictures  Public  snap  Templates  Videos  x-tools
nada@nada-VirtualBox:~$
```

6. Rename this new file to be `oldpasswd`.

`mv`: moves or renames files

```
nada@nada-VirtualBox:~$ mv mypasswd oldpasswd
nada@nada-VirtualBox:~$ ls
Desktop  docs  Documents  Downloads  Music  oldpasswd  Pictures
nada@nada-VirtualBox:~$
```

7. You are in /usr/bin, list four ways to go to your home directory.

```
nada@nada-VirtualBox: /home
nada@nada-VirtualBox:/home$ pwd
/home
nada@nada-VirtualBox:/home$ cd
nada@nada-VirtualBox:~$ pwd
/home/nada
nada@nada-VirtualBox:~$ cd ../../
nada@nada-VirtualBox:/$ ls
bin  cdrom  etc  lib  lib64  lost+found  mnt  proc  run  snap  swapfile  tmp  var
boot  dev  home  lib32  libx32  media  opt  root  sbin  srv  sys  usr
nada@nada-VirtualBox:/$ cd usr/bin
nada@nada-VirtualBox:/usr/bin$
```

Way1: nada@nada-VirtualBox:/usr/bin\$ cd ../../home

Way2: nada@nada-VirtualBox:/usr/bin\$ cd /home/nada

Way3: nada@nada-VirtualBox:/usr/bin\$ cd ~

Way4: nada@nada-VirtualBox:/usr/bin\$ cd \$HOME

8. List Linux commands in /usr/bin that start with letter w

```
nada@nada-VirtualBox: /usr/bin
nada@nada-VirtualBox:/usr/bin$ compgen -c | grep '^w'
while
wait
whoopsie-preferences
write.ul
wdctl
whereis
w
watch
which.debianutils
wc
whoopsie
word-list-compress
whiptail
wpa_passphrase
wget
wall
watchgnupg
who
whatis
which
write
whoami
wpa_action
wipefs
wpa_suppllicant
wpa_cli
whoopsie-preferences
write.ul
wdctl
whereis
w
watch
```

9. Display the first 4 lines of /etc/passwd

```
nada@nada-VirtualBox:/etc$ head -n 4 passwd
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
nada@nada-VirtualBox:/etc$
```

10. Display the last 7 lines of /etc/passwd

```
nada@nada-VirtualBox:/etc$ tail -n 7 passwd
hplip:x:127:7:HPLIP system user,,,:/run/hplip:/bin/false
gdm:x:128:134:Gnome Display Manager:/var/lib/gdm3:/bin/false
nada:x:1000:1000:Nada,,,:/home/nada:/bin/bash
vboxadd:x:999:1::/var/run/vboxadd:/bin/false
tftp:x:129:138:tftp daemon,,,:/srv/tftp:/usr/sbin/nologin
_rpc:x:130:65534::/run/rpcbind:/usr/sbin/nologin
statd:x:131:65534::/var/lib/nfs:/usr/sbin/nologin
nada@nada-VirtualBox:/etc$
```

11. Display the man pages of passwd the command and the file sequentially in one command.

Command: nada@nada-VirtualBox:/etc\$ man passwd && cat passwd

```
nada@nada-VirtualBox:/etc$ man passwd && cat passwd
PASSWD(1)                                User Commands
NAME
passwd - change user password

SYNOPSIS
passwd [options] [LOGIN]

DESCRIPTION
The passwd command changes passwords for user accounts. A normal user may only change the password for their own account, w
superuser may change the password for any account. passwd also changes the account or associated password validity period.

Password Changes
The user is first prompted for their old password, if one is present. This password is then encrypted and compared against
stored password. The user has only one chance to enter the correct password. The superuser is permitted to bypass this step
forgotten passwords may be changed.

After the password has been entered, password aging information is checked to see if the user is permitted to change the pa
at this time. If not, passwd refuses to change the password and exits.

The user is then prompted twice for a replacement password. The second entry is compared against the first and both are req
match in order for the password to be changed.

Then, the password is tested for complexity. As a general guideline, passwords should consist of 6 to 8 characters includin
more characters from each of the following sets:

• lower case alphabets
• digits 0 thru 9
• punctuation marks
```

```
nada@nada-VirtualBox:/etc$ man passwd && cat passwd
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
messagebus:x:102:105:/:/nonexistent:/usr/sbin/nologin
systemd-timesync:x:103:106:systemd Time Synchronization,,,:/run/systemd:/usr/sbin/nologin
syslog:x:104:111:/:/home/syslog:/usr/sbin/nologin
_apt:x:105:65534:/:/nonexistent:/usr/sbin/nologin
tss:x:106:112:TPM software stack,,,:/var/lib/tpm:/bin/false
uidd:x:107:115:/:/run/uidd:/usr/sbin/nologin
systemd-oom:x:108:116:systemd Userspace OOM Killer,,,:/run/systemd:/usr/sbin/nologin
tcpdump:x:109:117:/:/nonexistent:/usr/sbin/nologin
avahi-autoipd:x:110:119:Avahi autoip daemon,,,:/var/lib/avahi-autoipd:/usr/sbin/nologin
usbmux:x:111:46:usbmux daemon,,,:/var/lib/usbmux:/usr/sbin/nologin
dnsmasq:x:112:65534:dnsmasq,,,:/var/lib/misc:/usr/sbin/nologin
```

12. Display the man page of the passwd file.

Command: nada@nada-VirtualBox:/etc\$ man 5 passwd

```
nada@nada-VirtualBox:/etc$ man 5 passwd
PASSWD(5)                                File Formats and Conversions                                PASSWD(5)

NAME
    passwd - the password file

DESCRIPTION
    /etc/passwd contains one line for each user account, with seven fields delimited by colons (":"). These fields are:

    • login name

    • optional encrypted password

    • numerical user ID

    • numerical group ID

    • user name or comment field

    • user home directory

    • optional user command interpreter

    If the password field is a lower-case "x", then the encrypted password is actually stored in the shadow(5) file instead; there must be a corresponding line in the /etc/shadow file, or else the user account is invalid.

    The encrypted password field may be empty, in which case no password is required to authenticate as the specified login name. However, some applications which read the /etc/passwd file may decide not to permit any access at all if the password field is blank.

    A password field which starts with an exclamation mark means that the password is locked. The remaining characters on the line represent the password field before the password was locked.

Manual page passwd(5) line 1/62 46% (press h for help or q to quit)
```


13. Display a list of all the commands that contain the keyword passwd in their man page.

```
nada@nada-VirtualBox: /etc
nada@nada-VirtualBox:/etc$ man ls | grep passwd
nada@nada-VirtualBox:/etc$ man -k passwd
chpasswd (8)          - update group passwords in batch mode
chpasswd (8)          - update passwords in batch mode
fgetpwent_r (3)       - get passwd file entry reentrantly
getpwent_r (3)        - get passwd file entry reentrantly
gpaswd (1)            - administer /etc/group and /etc/gshadow
grub-mkpasswd-pbkdf2 (1) - generate hashed password for GRUB
openssl-passwd (1ssl) - compute password hashes
pam_localuser (8)     - require users to be listed in /etc/passwd
passwd (1)            - change user password
passwd (1ssl)         - OpenSSL application commands
passwd (5)            - the password file
passwd2des (3)        - RFS password encryption
update-passwd (8)     - safely update /etc/passwd, /etc/shadow and /etc/group
nada@nada-VirtualBox:/etc$
```

14. Using vi write your CV in the file mycv. Your CV should include your name, age, school, college, experience...

```
nada@nada-VirtualBox:/etc$ cd ../home
nada@nada-VirtualBox:/home$ pwd
/home
nada@nada-VirtualBox:/home$ cd docs
bash: cd: docs: No such file or directory
nada@nada-VirtualBox:/home$ cd
nada@nada-VirtualBox:~$ pwd
/home/nada
nada@nada-VirtualBox:~$ cd docs
nada@nada-VirtualBox:~/docs$ ls
mycv
nada@nada-VirtualBox:~/docs$ vi mycv
```

To insert the data:

```
nada@nada-VirtualBox: ~/docs  
Name: Nada Ashraf Mahmoud  
Age: 22  
School: Atef Barakat  
College: Cairo university  
Experience:Fresh Graduate in Computer Science
```

"mycv" 0 lines, 0 bytes

To save and quit the editing mode and go back to the command mode,
type :wq

A terminal window with a dark purple background. The prompt is '~'. The command ':wq' is entered, followed by a white cursor block.

15. Open mycv file using vi command then: Without using arrows state how to:

Command: nada@nada-VirtualBox:~/docs\$ vi mycv

a. Move the cursor down one line at time.

>> Press j

b. Move the cursor up one line at time.

>> Press k

c. Search for word age

>> Type /age

d. Step to line 5 (assuming that you are in line 1 and file is more than 5 lines).

>> Type 5G

e. Delete the line you are on and line 5.

>> To delete the line I'm on: Type dd

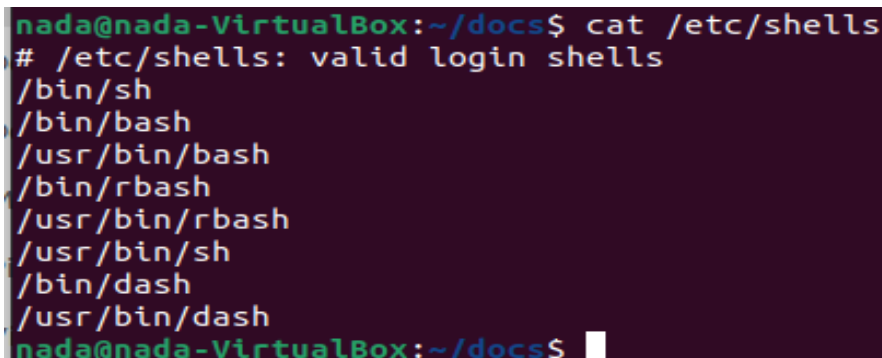
>> To delete line 5: Type 5dd

f. How to step to the end of line and change to writing mode in one-step.

>> Press A

If you want to return from insert mode after using A, press Esc.

16. st the available shells in your system.

A terminal window with a dark purple background. The command 'cat /etc/shells' is entered. The output lists valid login shells: /bin/sh, /bin/bash, /usr/bin/bash, /bin/rbash, /usr/bin/rbash, /usr/bin/sh, /bin/dash, and /usr/bin/dash. The prompt is 'nada@nada-VirtualBox:~/docs\$'.