

# **20MCA136 - Networking & System Administration Lab**

**ASHA S**

**S2**

**Rollno:26**

**Batch- A**

**REGULAR MCA**

## ASSIGNMENT:1

### pwd

pwd stands for Print Working Directory. It prints the path of the working directory, starting from the root.

```
Labex:asha/ $ pwd  
/home/labex/asha  
Labex:asha/ $ █
```

### history

history command is particularly useful if you want to review the commands you have entered before.

```
Labex:asha/ $ history  
1  pwd  
2  cd asha  
3  pwd  
4  history  
5  man cat  
6  cd asha  
7  pwd
```

### man

**man command in Linux** is used to display the user manual of any command that we can run on the terminal. It provides a detailed view of the command

```
CAT(1)                               User Commands                               CAT(1)  
NAME  
      cat - concatenate files and print on the standard output  
SYNOPSIS  
      cat [OPTION]... [FILE]...  
DESCRIPTION  
      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
```

## **cd**

To navigate through the Linux files and directories, use the cd .

- cd .. (With two dots) to move one directory up
- cd to go straight to the home folder
- cd- (with a hyphen) to move to your previous directory

```
labex:asha/ $ cd music  
labex:music/ $ cd ..  
labex:asha/ $ █
```

## **ls**

The ls command is used to view the contents of a directory. By default, this command will display the contents of your current working directory.

```
/home/labex/asha/music  
labex:music/ $ ls  
a.text b.text
```

## **mkdir**

**mkdir command in Linux** allows the user to create directories (also referred to as folders in some operating systems).

```
labex:asha/ $ mkdir music
```

## **rmdir**

If you need to delete a directory, use the rmdir command. However, rmdir only allows you to delete empty directories.

```
labex:music/ $ mkdir sound  
labex:music/ $ rmdir sound
```

## **touch**

The touch command allows you to create a blank new file through the Linux command line.

```
labex:music/ $ touch a.text
labex:music/ $ touch b.text
labex:music/ $ pwd
/home/labex/asha/music
labex:music/ $ ls
a.text b.text
```

## **rm**

The rm command is used to delete files.

- **rm -i** will ask before deleting each file. Some people will have rm aliased to do this automatically (type "alias" to check). Consider using **rm -I** instead, which will only ask once and only if you are trying to delete three or more files.
- **rm -r** will recursively delete a directory and all its contents (normally rm will not delete directories, while rmdir will only delete empty directories).
- **rm -f** will forcibly delete files without asking; this is mostly useful if you have rm aliased to ``rm -i" but want to delete lots of files without confirming each one.

```
labex:music/ $ touch a.text
labex:music/ $ touch b.text
labex:music/ $ pwd
/home/labex/asha/music
labex:music/ $ ls
a.text b.text
```

## cat

cat (short for concatenate) is one of the most frequently used commands in Linux. It is used to list the contents of a file on the standard output stdout

cat > filename creates a new file

- cat filename1 filename2>filename3 joins two files (1 and 2) and stores the output of them in a new file (3)
- to convert a file to upper or lower case use, cat filename | tr a-z A-Z >output.txt
- cat >>myfile insert data to a file

```
labex:~/ $ mkdir ash
labex:~/ $ cd ash
labex:ash/ $ cat >new1.text
ammu
anju
appu
^Z
[1] + 204 suspended  cat > new1.text
labex:ash/ $ cat >new2.text
green
yello
red
black
^Z
[2] + 209 suspended  cat > new2.text
labex:ash/ $ cat >>new1
anu
^Z
[3] + 214 suspended  cat >> new1
labex:ash/ $ cat new1.text new2.text >output.text
labex:ash/ $ cat output.text
ammu
anju
appu
green
yello
red
black
labex:ash/ $ █
```

## ASSIGNMENT:2

### echo

echo command is used to move some data into a file

```
labex:~/ $ echo hello,I am asha,how are you???. >>msg.text
labex:~/ $ cat msg.text
hello,I am asha,how are you???.
```

### head

- The head command is used to view the first lines of any text file.
- By default, it will show the first ten lines, but you can change this number to your liking.(using -n option)

```
labex:~/ $ head headtrial.text
line 1.
line 2.
line 3.
line 4.
line 5.
line 6.line 7.
line 8.
line 9.
line 10.
labex:~/ $ head -n 2 headtrial.text
line 1.
line 2.
labex:~/ $
```

### tail

This one has a similar function to the head command, but instead of showing the first lines, the tail command will display the last ten lines of a text file.

```
labex:~/ $ tail headtrial.text
line 1.
line 2.
line 3.
line 4.
line 5.
line 6.line 7.
line 8.
line 9.
line 10.
labex:~/ $ tail -n 3 headtrial.text
line 8.
line 9.
line 10.
labex:~/ $
```

## read

- read the contents of a line into a variable.
- The read command can be used with and without arguments
- read command is used to read [options] [name...]
- \$read • \$read var1 var2 var3 • \$echo "[\\$var1] [\\${var2}] [\\${var3}]"

```
labex:~/ $ read var1 var2 var3
hello good morning
labex:~/ $ echo "[\$var1] [\${var2}] [\${var3}]"
[hello] [good] [morning]
labex:~/ $
```

## more

- Like cat command, more command displays the content of a file. Only difference is that, incase of larger files, 'cat' command output will scroll off your screen while 'more' command displays output one screenful at a time.
- Enter key: To scroll down page line by line.
- Space bar: To go to next page.
- b key: To go to the backward page
- / key: Lets you search the string.
- Syntax: more

```
labex:~/ $ more /etc/passwd
```

```
root:x:0:0::/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin/nologin
bin:x:2:2:bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev/usr/sbin/nologin
sync:x:4:65534:sync:/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-timesync:x:100:102:systemd Time Synchronization,,,:/run/systemd:/bin/false
systemd-network:x:101:103:systemd Network Management,,,:/run/systemd/netif:/bin/false
systemd-resolve:x:102:104:systemd Resolver,,,:/run/systemd/resolve:/bin/false
systemd-bus-proxy:x:103:105:systemd Bus Proxy,,,:/run/systemd:/bin/false
_apt:x:104:65534:/:nonexistent:/bin/false
messagebus:x:105:108:/:/var/run/dbus:/bin/false
colord:x:106:112:colord colour management daemon,,,:/var/lib/colord:/bin/false
sshd:x:107:65534:/:/var/run/sshd:/usr/sbin/nologin
pulse:x:108:113:PulseAudio daemon,,,:/var/run/pulse:/bin/false
rtkit:x:109:115:RealtimeKit,,,:/proc:/bin/false
usbmux:x:110:46:usbmux daemon,,,:/var/lib/usbmux:/bin/false
shiyanolou:x:5000:5000:/:/home/shiyanolou:/usr/bin/zsh
labex:x:6000:6000:/:/home/labex:/usr/bin/zsh
mysql:x:111:116:MySQL Server,,,:/bin/false
--More-- (95%)
```

## less

- The 'less' command is same as 'more' command but include some more features.
- It automatically adjust with the width and height of the terminal window, while 'more' command cuts the content as the width of the terminal window get shorter.

```
labex:~/ $ less /etc/passwd
```

```
root:x:0:0:root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/usr/sbin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/sync
games:x:5:60:games:/usr/sbin:/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-timesync:x:100:102:systemd Time Synchronization,,,:/run/systemd:/bin/false
systemd-network:x:101:103:systemd Network Management,,,:/run/systemd/netif:/bin/false
systemd-resolve:x:102:104:systemd Resolver,,,:/run/systemd/resolve:/bin/false
systemd-bus-proxy:x:103:105:systemd Bus Proxy,,,:/run/systemd:/bin/false
_apt:x:104:65534:/:nonexistent:/bin/false
messagebus:x:105:108:/:var/run/dbus:/bin/false
colord:x:106:112:colord colour management daemon,,,:/var/lib/colord:/bin/false
sshd:x:107:65534:/:var/run/sshd:/usr/sbin:/nologin
pulse:x:108:113:PulseAudio daemon,,,:/var/run/pulse:/bin/false
rtkit:x:109:115:RealtimeKit,,,:/proc:/bin/false
usbmux:x:110:46:usbmux daemon,,,:/var/lib/usbmux:/bin/false
shiyanolou:x:5000:5000:/:home/shiyanolou:/usr/bin/zsh
labex:x:6000:6000:/:home/labex:/usr/bin/zsh
mysql:x:111:116:MySQL Server,,,:/bin/false
/etc/passwd
```

## cut

- The cut command is used for cutting out the sections from each line of files and writing the result to standard output. It can be used to cut parts of a line by byte position, character and field
- cut OPTION... [FILE]...

```
labex:~/ $ cut -b 1,2,3 a.text
www
aaa
fff
tyy
hhh
jjj
jjj
eee
rrr
www
ttt
rea
app
app
yel
gol
sal
lio
labex:~/ $
```

## **paste**

- It is used to join files horizontally (parallel merging) by outputting lines consisting of lines from each file specified, separated by tab as delimiter, to the standard output.
- **paste [OPTION]... [FILES]...**

```
labex:~/ $ cut -b 1,2,3 a.text
www
aaa
fff
tYY
hhh
jjj
jjj
eee
rrr
www
ttt
rea
app
app
yel
gol
sal
lio
labex:~/ $ █
```

## **uname**

- The **uname** command, short for Unix Name, will print detailed information about your Linux system like the machine name, operating system, kernel, and so on.

```
labex:~/ $ uname -r
4.4.0-93-generic
labex:~/ $ █
```

## **cp**

- **cp** command is used to copy files from the current directory to a different directory. For instance, the command **cp scenery.jpg /home/username/Pictures** would create a copy of **scenery.jpg** (from your current directory) into the **Pictures** directory.

- **cp -i** will ask for user's consent in case of a potential file overwrite.
- **cp -p** will preserve source files' mode, ownership and timestamp.
- **cp -r** will copy directories recursively

```
labex:~/ $ cp a.text /home/labex/asha
labex:~/ $ █
```

- **cp -u** copies files only if the destination file is not existing or the source file is newer than the destination file

## **mv**

The primary use of the mv command is to move files, it can also be used to rename files. arguments in mv are similar to the cp command. You need to type mv, the file's name, and the destination's directory.

To rename files, the Linux is mv oldname.ext newname.ext/

```
labex:~/ $ mv b.text /home/labex/asha  
labex:~/ $ █
```

```
labex:asha/ $ mv a.text z.text  
labex:asha/ $ █
```

## **locate**

- To locate a file, just like the search command in Windows.
- What's more, using the -i argument along with this command will make it caseinsensitive, so you can search for a file even if you don't remember its exact name.
- To search for a file that contains two or more words, use an asterisk (\*)

## 2. find

- Similar to the locate command, using find also searches for files and directories.
- The difference is, you use the find command to locate files within a given directory
- As an example, find /home/ -name notes.txt command will search for a file called notes.txt within the home directory and its subdirectories.
- Other variations when using the find are:
- To find files in the current directory use, find . -name notes.txt
- To look for directories use,
- / -type d -name notes. Txt

```
labex:asha/ $ find /home/labex/asha -name a.text  
labex:asha/ $ █
```

## **grep**

- Another basic Linux command that is undoubtedly helpful for everyday use is grep. It lets you search through all the text in a given file
- To illustrate, grep blue notepad.txt will search for the word blue in the notepad file. Lines that contain the searched word will be displayed fully. Usually output of a previous command is piped into the grep command. For example ls -l | grep "kernel"

## df

- Use df command to get a report on the system's disk space usage, shown in percentage and KBs. If

```
labex:~/ + cd ..
labex:~/ $ grep red a.text
red green blue
labex:~/ $ █
```

you want to see the report in megabytes, type df -m

```
labex:~/ $ df -m
[22:57:03]
Filesystem      1M-blocks  Used Available Use% Mounted on
/dev/mapper/docker-253:17-8912897-6db5f8e4e9c3527a8771f29d16793385b8905c83b1ed695526ea51d6f
dfee3a8        11968     6592      4746   59% /
tmpfs           3992      0       3992   0% /dev
tmpfs           3992      0       3992   0% /sys/fs/cgroup
/dev/vdb1      302251  150309    136567  53% /etc/hosts
shm              64      1       64   1% /dev/shm
tmpfs           3992      0       3992   0% /sys/firmware
labex:~/ $ █
[22:58:20]
```

## .. du

- If you want to check how much space a file or a directory takes, the du (Disk Usage) command is the answer. However, the disk usage summary will show disk block numbers instead of the usual size format.
- If you want to see it in bytes, kilobytes, and megabytes, add the -h argument to the command line.

```
labex:~/ $ du -h
[22:58:20]
4.0K  ./oh-my-zsh/log
8.0K  ./oh-my-zsh/templates
44K   ./oh-my-zsh/.git/hooks
612K  ./oh-my-zsh/.git/objects/pack
4.0K  ./oh-my-zsh/.git/objects/info
620K  ./oh-my-zsh/.git/objects
8.0K  ./oh-my-zsh/.git/logs/refs/heads
8.0K  ./oh-my-zsh/.git/logs/refs/remotes/origin
12K   ./oh-my-zsh/.git/logs/refs/remotes
24K   ./oh-my-zsh/.git/logs/refs
32K   ./oh-my-zsh/.git/logs
4.0K   ./oh-my-zsh/.git/refs/tags
8.0K  ./oh-my-zsh/.git/refs/heads
8.0K  ./oh-my-zsh/.git/refs/remotes/origin
12K   ./oh-my-zsh/.git/refs/remotes
28K   ./oh-my-zsh/.git/refs
4.0K   ./oh-my-zsh/.git/branches
[22:58:20]
```

## 17. useradd

- This is available only to system admins
- Since Linux is a multi-user system, this means more than one person can interact with the same system at the same time.
- useradd is used to create a new user, while passwd is adding a password to that user's account. To add a new person named John type, useradd John and then to add his password type, passwd123456789

```
Labex:~/ $ useradd appu  
useradd: Permission denied.  
useradd: cannot lock /etc/passwd; try again later.
```

## userdel

- Remove a user is very similar to adding a new user. To delete the users account type, userdel UserName

```
labex:~/ $ userdel ammu  
userdel: Permission denied.  
userdel: cannot lock /etc/passwd; try again later.  
labex:~/ $ █
```

## sudo

- Short for “SuperUser Do”, this command enables you to perform tasks that require administrative or root permissions. You must have sufficient permissions to use this command

```
$ sudo useradd appu  
$ sudo passwd appu  
Enter new UNIX password:  
Retype new UNIX password:  
passwd: password updated successfully  
$ █
```

```
$ sudo userdel appu  
$ sudo passwd appu  
passwd: user 'appu' does not exist  
$ █
```

## passwd

- Changes passwords for user accounts.
- A normal user may only change the password for their own account, while the superuser may change the password for any account.
- passwd[option] [username]
- passwd
- passwd user1

```
$ passwd  
Enter new UNIX password:  
Retype new UNIX password:  
passwd: password updated successfully  
$
```

## ASSIGNMENT:3

### Usermod

- usermod command is used to change the properties of a user in Linux through the command line .
- command-line utility that allows you to modify a user's login information

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ usermod --help  
Usage: usermod [options] LOGIN  
  
Options:  
-c, --comment COMMENT      new value of the GECOS field  
-d, --home HOME_DIR        new home directory for the user account  
-e, --expiredate EXPIRE_DATE set account expiration date to EXPIRE_DATE  
-f, --inactive INACTIVE    set password inactive after expiration  
                           to INACTIVE  
-g, --gid GROUP            force use GROUP as new primary group  
-G, --groups GROUPS       new list of supplementary GROUPS  
-a, --append                append the user to the supplemental GROUPS  
                           mentioned by the -G option without removing  
                           him/her from other groups  
-h, --help                  display this help message and exit  
-l, --login NEW_LOGIN       new value of the login name  
-L, --lock                   lock the user account  
-m, --move-home             move contents of the home directory to the  
                           new location (use only with -d)  
-o, --non-unique            allow using duplicate (non-unique) UID  
-p, --password PASSWORD    use encrypted password for the new password  
-R, --root CHROOT_DIR       directory to chroot into  
-s, --shell SHELL           new login shell for the user account
```

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ sudo usermod -u 2000 achu
```

### groupadd

- groupadd command creates a new group account using the values specified on the command line and the default values from the system.

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ usermod --help
Usage: usermod [options] LOGIN

Options:
  -c, --comment COMMENT      new value of the GECOS field
  -d, --home HOME_DIR        new home directory for the user account
  -e, --expiredate EXPIRE_DATE set account expiration date to EXPIRE_DATE
  -f, --inactive INACTIVE    set password inactive after expiration
                             to INACTIVE
  -g, --gid GROUP            force use GROUP as new primary group
  -G, --groups GROUPS       new list of supplementary GROUPS
  -a, --append                append the user to the supplemental GROUPS
                               mentioned by the -G option without removing
                               him/her from other groups
  -h, --help                  display this help message and exit
  -l, --login NEW_LOGIN      new value of the login name
  -L, --lock                  lock the user account
  -m, --move-home             move contents of the home directory to the
                             new location (use only with -d)
  -o, --non-unique            allow using duplicate (non-unique) UID
  -p, --password PASSWORD    use encrypted password for the new password
  -R, --root CHROOT_DIR      directory to chroot into
  -s, --shell SHELL           new login shell for the user account
```

## groups

- print the groups a user is in

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ groups achu
achu : achu
```

## groupdel

- groupdel command modifies the system account files, deleting all entries that refer to group. The named group must exist

```
root:x:0:
daemon:x:1:
bin:x:2:
sys:x:3:
adm:x:4:syslog, onworks
tty:x:5:
disk:x:6:
lp:x:7:
mail:x:8:
```

```
netdev:x:109:
messagebus:x:110:
uiddd:x:111:
sst-cert:x:112:
slpadmtn:x:113:onworks
lightdm:x:114:
nogresswdlogin:x:115:
ssh:x:116:
whoopsie:x:117:
mlocate:x:118:
avahi-autolpd:x:119:
avahi:x:120:
bluetooth:x:121:
scanner:x:122: sane
colord:x:123:
pulse:x:124:
pulse-access:x:125:
rtkit:x:126:
sane:x:127:
onworks:x:1000:
sambashare:x:128: onworks
achu:x:1001:
plants:x:1003:
```

## groupmod

- The groupmod command modifies the definition of the specified group by modifying the appropriate entry in the group database.

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ sudo groupmod -n group3 group2
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ █
```

## chmod

- To change directory permissions of file/ Directory in Linux
- chmod +rwx filename to add permissions.
- chmod -rwx directoryname to remove permissions.
- chmod +x filename to allow executable permissions.
- chmod -wx filename to take out write and executable permissions.

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ groups
onworks adm cdrom sudo dip plugdev lpadmin sambashare
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ mkdir books
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ ls -ld books
drwxrwxr-x 2 onworks onworks 4096 Aug 13 08:35 books
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ chmod g -w books
chmod: cannot access 'g': No such file or directory
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ ls -ld books
dr-xr-xr-x 2 onworks onworks 4096 Aug 13 08:35 books
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ chmod o+w books
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ ls -ld books
dr-xr-xrwx 2 onworks onworks 4096 Aug 13 08:35 books
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ █
```

## chown

- The chown command allows you to change the user and/or group ownership of a given file, directory.

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ mkdir test
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ sudo chown ammu test
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ █
```

## id

- id command in Linux is used to find out user and group names and numeric ID's (UID or group ID) of the current user

```
uid=1001(achu) gid=1001(achu) groups=1001(achu)
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$
```

## ps

- The ps command, short for Process Status, is a command line utility that is used to display or view information related to the processes running in a Linux system.
- **PID – This is the unique process ID**
- TTY – This is the type of terminal that the user is logged in to
- **TIME – This is the time in minutes and seconds that the process has been running**
- CMD – The command that launched the process

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ ps -a
  PID TTY      TIME CMD
24915 pts/1    00:00:00 ps
```

## ASSIGNMENT:4

### wc

- wc stands for word count.
- Used for counting purpose.
- It is used to find out number of lines, word count, byte and characters count in the files specified in the file arguments.

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ cat >> book.txt
ammu
anu
appu
^Z
[1]+  Stopped                  cat >> book.txt
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ wc book.txt
 3 3 14 book.txt
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$
```

## **tar**

- The Linux ‘tar’ stands for tape archive, is used to create Archive and extract the Archive files
- Linux tar command to create compressed or uncompressed Archive files
- Options:

**-c** : Creates Archive –x :

Extract the archive

    -f : creates archive with given filename

    -t : displays or lists files in archived file

**-u** : archives and adds to an existing archive file

    -v : Displays Verbose Information

    -A : Concatenates the archive files

    -z : zip, tells tar command that creates tar file using gzip

    -j : filter archive tar file using tbzip

    -W : Verify a archive file

    -r : update or add file or directory in already existed .tar file

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ tar cf archive.tar book.txt
```

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ tar xvf archive.tar  
book.txt
```

## **expr**

- The expr command evaluates a given expression and displays its corresponding output. It is used for:
- Basic operations like addition, subtraction, multiplication, division, and modulus on integers.
- Evaluating regular expressions, string operations like substring, length of strings etc.

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ expr 10+2
```

- Performing operations on variables inside a shell script

## **Redirections & Piping**

- A pipe is a form of redirection to send the output of one command/program/process to another command/program/process for further processing.
- Pipe is used to combine two or more commands, the output of one command acts as input to another command, and this command's output may act as input to the next command and so on.

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ ls -l |more
total 72
-rw-rw-r-- 1 onworks onworks 10240 Aug 13 16:09 achieve.tar
drwxrwxr-x 2 onworks onworks 4096 Aug 13 16:05 backup
-rw-rw-r-- 1 onworks onworks 10 Aug 13 16:08 book1
-rw-rw-r-- 1 onworks onworks 15 Aug 13 16:08 book2
-rw-rw-r-- 1 onworks onworks 14 Aug 13 15:56 book.txt
drwxr-xr-x 2 onworks onworks 4096 Mai 5 2019 Desktop
drwxr-xr-x 2 onworks onworks 4096 Mai 5 2019 Documents
drwxr-xr-x 2 onworks onworks 4096 Mai 5 2019 Downloads
-rw-r--r-- 1 onworks onworks 8980 Mai 5 2019 examples.desktop
drwxr-xr-x 2 onworks onworks 4096 Mai 5 2019 Music
drwxr-xr-x 2 onworks onworks 4096 Mai 5 2019 Pictures
drwxr-xr-x 2 onworks onworks 4096 Mai 5 2019 Public
drwxr-xr-x 2 onworks onworks 4096 Mai 5 2019 Templates
drwxr-xr-x 2 onworks onworks 4096 Mai 5 2019 Videos
```

## **ssh**

- ssh stands for “Secure Shell”.
  - It is a protocol used to securely connect to a remote server/system.
  - ssh is secure in the sense that it transfers the data in encrypted form between the host and the client.
  - It transfers inputs from the client to the host and relays back the output.
- ssh runs at TCP/IP port 22.

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ ssh mca@192.168.6.91
```

## **scp**

- SCP (secure copy) is a command-line utility that allows you to securely copy files and directories between two locations.
- With scp, you can copy a file or directory:

- From your local system to a remote system.
  - From a remote system to your local system.  
  - Between two remote systems from your local system.
  - Remote file system locations are specified in format

```
[user@]host:/path           Syntax:  scp  [OPTION]  
                                [user@]SRC_HOST:]file1  
[user@]DEST_HOST:]file2
```

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ scp -pv mesg.txt mca@192.168.6.91
I
Executing: cp '-p' '--' 'mesg.txt' 'mca@192.168.6.91'
```

## ssh-keygen

- ssh-keygen command to generate a public/private authentication key pair. Authentication keys allow a user to connect to a remote system without supplying a password. Keys must be generated for each user separately. If you generate key pairs as the root user, only the root can use the keys. \$ssh-keygen -t rsa

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ ssh-keygen -t rsa
Generating public/private rsa key pair.
Enter file in which to save the key (/home/onworks/.ssh/id_rsa): rsa
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in rsa.
Your public key has been saved in rsa.pub.
The key fingerprint is:
SHA256:ooDHvu05q03N8x5Ca3Lqd1X7U7SLSGT25wga3XpqX0w onworks@onworks-Standard-PC-i
440FX-PIIX-1996
The key's randomart image is:
+---[RSA 2048]----+
| . .
| o . . o * .
| . = . = S +E. .
| o o + = =oo o
| . = . o + +o+ .
| B.*.o o ..= .
| *+0o+oo . .
+---[SHA256]----+
```

## ssh-copy-id

- The ssh-copy-id command allows you to install an SSH key on a remote server's authorized keys.
  - This command facilitates SSH key login, which removes the need for a password for each login, thus ensuring a password-less, automatic login process.
  - \$ssh-copy-id username@remote host

```

onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ cat >> book.txt
ammu
anu
appu
^Z
[1]+  Stopped                  cat >> book.txt
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ wc book.txt
      3    3   14 book.txt
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$
```

## ASSIGNMENT:5

1. a. Create six files with name of the form songX.mp3
- b. Create six files with name of the form snapX.mp3
- c. Create six files with name of the form

```

onworks@onworks-Standard-PC-i440FX-PIIX-1996:~ 
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ touch song1.mp3 song2.mp3 song3.mp3 song4.mp3 song5.mp3 song6.mp3
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ touch snap1.mp3 snap2.mp3 snap3.mp3 snap4.mp3 snap5.mp3 snap6.mp3
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ touch filim1.mp3 filim2.mp3 filim3.mp3 filim4.mp3 filim5.mp3 filim6.mp3
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ ls
Desktop          filim1.mp3 filim5.mp3  Public       snap4.mp3  song2.mp3  song6.mp3
Documents         filim2.mp3 filim6.mp3  snap1.mp3  snap5.mp3  song3.mp3  Templates
Downloads         filim3.mp3 Music        snap2.mp3  snap6.mp3  song4.mp3  Videos
examples.desktop filim4.mp3 Pictures     snap3.mp3  song1.mp3  song5.mp3
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$
```

2. From your home directory, move the song files into your music subdirectory, the snapshotfiles into your pictures subdirectory, and the movie files into videos subdirectory.

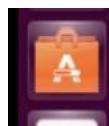
```

onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ mv song1.mp3 song2.mp3 song4.mp3 song5.mp3 song6.mp3 ./Music/
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ ls
Desktop          filim1.mp3 filim5.mp3  Public       snap4.mp3  Templates
Documents         filim2.mp3 filim6.mp3  snap1.mp3  snap5.mp3  Videos
Downloads         filim3.mp3 Music        snap2.mp3  snap6.mp3
examples.desktop filim4.mp3 Pictures     snap3.mp3  song3.mp3
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ ls -R Music
Music:
song1.mp3  song2.mp3  song4.mp3  song5.mp3  song6.mp3
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$
```

```

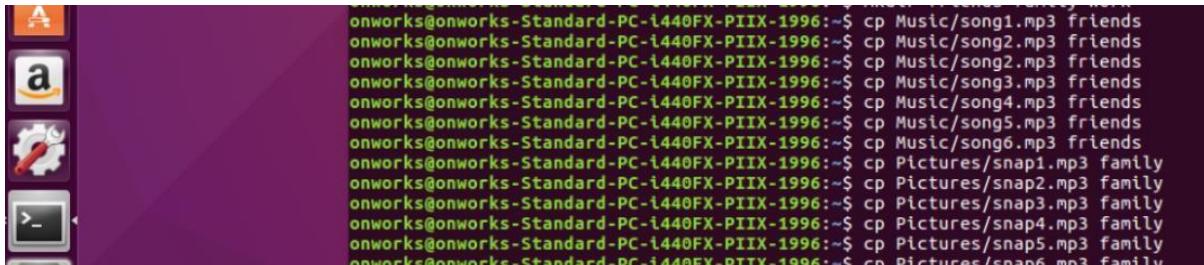
snap5.mp3 snap6.mp3
mv: target 'snap6.mp3' is not a directory
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ mv filim1.mp3 filim2.mp3 filim4.mp3 filim5.mp3 filim6.mp3 ./Videos
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ ls -R Videos
Videos:
filim1.mp3  filim2.mp3  filim3.mp3  filim4.mp3  filim5.mp3  filim6.mp3
```

3. In your home directory, create three subdirectories for organizing your files. Call these directories friends, family, and work. Create all three with one command.



```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ mkdir friends family work
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ ls
Desktop  Downloads   family  Music  Public  Templates  work
Documents examples.desktop  friends  Pictures  song3.mp3  Videos
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$
```

4. Copy song files to the friends folder and snap files to family folder.

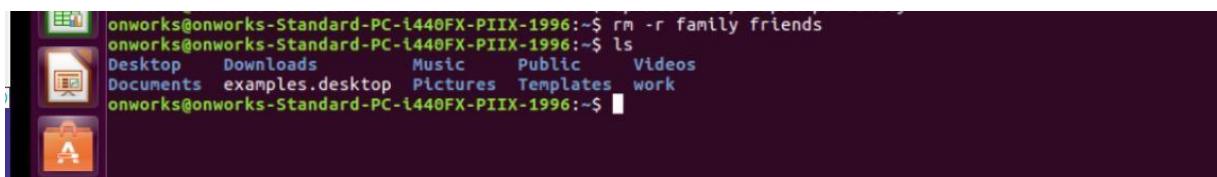


```

onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ cp Music/song1.mp3 friends
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ cp Music/song2.mp3 friends
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ cp Music/song2.mp3 friends
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ cp Music/song3.mp3 friends
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ cp Music/song4.mp3 friends
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ cp Music/song5.mp3 friends
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ cp Music/song6.mp3 friends
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ cp Pictures/snap1.mp3 family
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ cp Pictures/snap2.mp3 family
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ cp Pictures/snap3.mp3 family
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ cp Pictures/snap4.mp3 family
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ cp Pictures/snap5.mp3 family
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ cp Pictures/snap6.mp3 family

```

5. Attempt to delete both family and friends projects with a single rmdir command

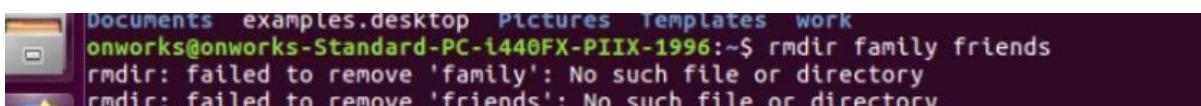


```

onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ rm -r family friends
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ ls
Desktop Downloads Music Public Videos
Documents examples.desktop Pictures Templates work
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ 

```

. 6. Use another command that will succeed in deleting both the family and friends folder.

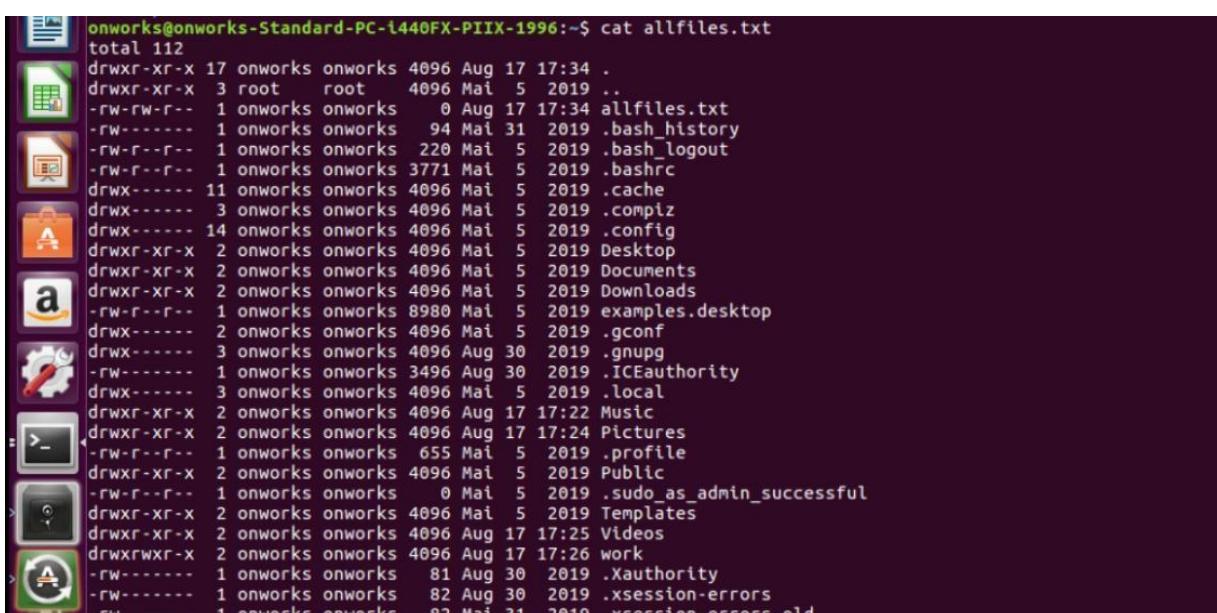


```

Documents examples.desktop Pictures Templates work
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ rmdir family friends
rmdir: failed to remove 'family': No such file or directory
rmdir: failed to remove 'friends': No such file or directory

```

7. Redirect a long listing of all home directory files, including hidden, into a file named allfiles.txt. Confirm that the file contains the listing.

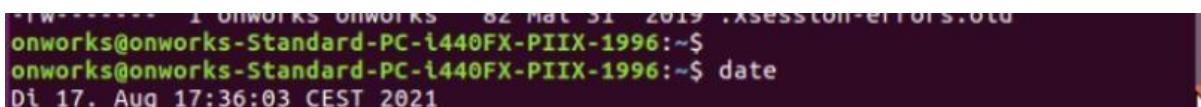


```

onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ cat allfiles.txt
total 112
drwxr-xr-x 17 onworks onworks 4096 Aug 17 17:34 .
drwxr-xr-x  3 root   root  4096 Mai  5 2019 ..
-rw-rw-r--  1 onworks onworks  0 Aug 17 17:34 allfiles.txt
-rw-----  1 onworks onworks  94 Mai 31 2019 .bash_history
-rw-r--r--  1 onworks onworks 220 Mai  5 2019 .bash_logout
-rw-r--r--  1 onworks onworks 3771 Mai  5 2019 .bashrc
drwx----- 11 onworks onworks 4096 Mai  5 2019 .cache
drwx-----  3 onworks onworks 4096 Mai  5 2019 .compiz
drwx----- 14 onworks onworks 4096 Mai  5 2019 .config
drwxr-xr-x  2 onworks onworks 4096 Mai  5 2019 Desktop
drwxr-xr-x  2 onworks onworks 4096 Mai  5 2019 Documents
drwxr-xr-x  2 onworks onworks 4096 Mai  5 2019 Downloads
-rw-r--r--  1 onworks onworks 8980 Mai  5 2019 examples.desktop
drwx-----  2 onworks onworks 4096 Mai  5 2019 .gconf
drwx-----  3 onworks onworks 4096 Aug  30 2019 .gnupg
-rw-----  1 onworks onworks 3496 Aug  30 2019 .ICEauthority
drwx-----  3 onworks onworks 4096 Mai  5 2019 .local
drwxr-xr-x  2 onworks onworks 4096 Aug 17 17:22 Music
drwxr-xr-x  2 onworks onworks 4096 Aug 17 17:24 Pictures
-rw-r--r--  1 onworks onworks  655 Mai  5 2019 .profile
drwxr-xr-x  2 onworks onworks 4096 Mai  5 2019 Public
-rw-r--r--  1 onworks onworks  0 Mai  5 2019 .sudo_as_admin_successful
drwxr-xr-x  2 onworks onworks 4096 Mai  5 2019 Templates
drwxr-xr-x  2 onworks onworks 4096 Aug 17 17:25 Videos
drwxrwxr-x  2 onworks onworks 4096 Aug 17 17:26 work
-rw-----  1 onworks onworks  81 Aug 30 2019 .Xauthority
-rw-----  1 onworks onworks  82 Aug 30 2019 .xsession-errors
-rw-----  1 onworks onworks  82 Mai 31 2019 .xsession-errors.old

```

8. In the command window, display today's date with day of the week, month, date and year

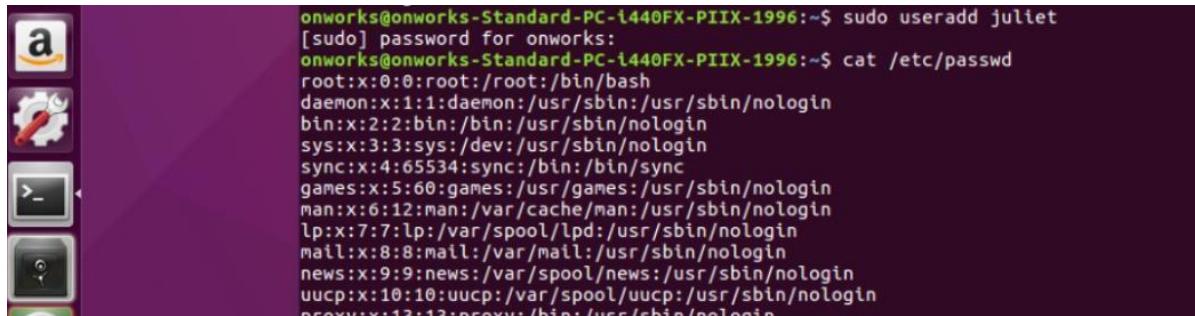


```

onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ date
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ date
Di 17. Aug 17:36:03 CEST 2021

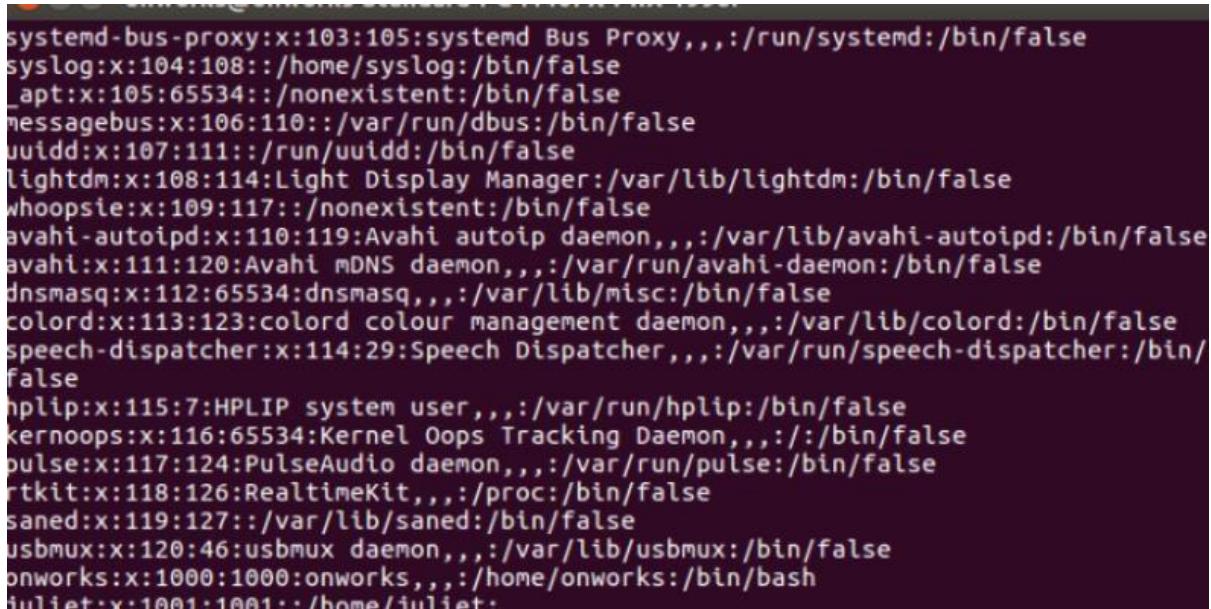
```

9. Add the user Juliet



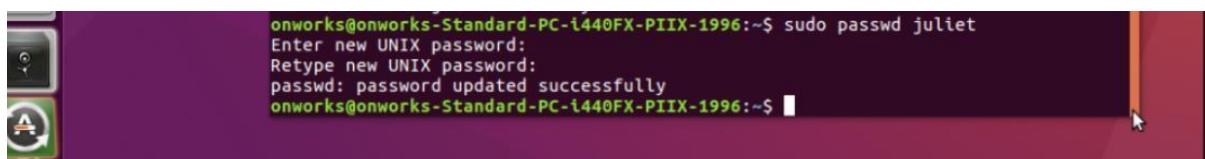
```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ sudo useradd juliet
[sudo] password for onworks:
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ cat /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin/nologin
bin:x:2:2:bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/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:/var/run/procmail:/nologin
```

10. Confirm that Juliet has been added by examining the /etc/passwd file



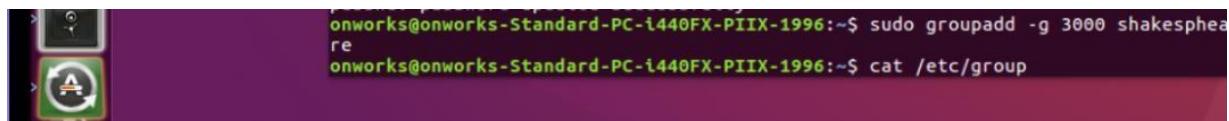
```
systemd-bus-proxy:x:103:105:systemd Bus Proxy,,,,:/run/systemd:/bin/false
syslog:x:104:108::/home/syslog:/bin/false
_apt:x:105:65534::/nonexistent:/bin/false
messagebus:x:106:110::/var/run/dbus:/bin/false
uuidd:x:107:111::/run/uuidd:/bin/false
lightdm:x:108:114:Light Display Manager:/var/lib/lightdm:/bin/false
whoopsie:x:109:117::/nonexistent:/bin/false
avahi-autoipd:x:110:119:Avahi autoip daemon,,,,:/var/lib/avahi-autoipd:/bin/false
avahi:x:111:120:Avahi mDNS daemon,,,,:/var/run/avahi-daemon:/bin/false
dnsmasq:x:112:65534:dnsmasq,,,,:/var/lib/misc:/bin/false
colord:x:113:123:colord colour management daemon,,,,:/var/lib/colord:/bin/false
speech-dispatcher:x:114:29:Speech Dispatcher,,,,:/var/run/speech-dispatcher:/bin/false
hplip:x:115:7:HPLIP system user,,,,:/var/run/hplip:/bin/false
kernoops:x:116:65534:Kernel Oops Tracking Daemon,,,,:/bin/false
pulse:x:117:124:PulseAudio daemon,,,,:/var/run/pulse:/bin/false
rtkit:x:118:126:RealtimeKit,,,,:/proc:/bin/false
saned:x:119:127::/var/lib/saned:/bin/false
usbmux:x:120:46:usbmux daemon,,,,:/var/lib/usbmux:/bin/false
onworks:x:1000:1000:onworks,,,,:/home/onworks:/bin/bash
juliet:x:1001:1001::/home/juliet:
```

11. Use the passwd command to initialize Juliet's password



```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ sudo passwd juliet
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$
```

12. Create a supplementary group called Shakespeare with a group id of 30000



```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ sudo groupadd -g 30000 shakespeare
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ cat /etc/group
```

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996: ~
systemd-bus-proxy:x:105:
input:x:106:
crontab:x:107:
syslog:x:108:
netdev:x:109:
messagebus:x:110:
uuid:x:111:
ssl-cert:x:112:
lpadmin:x:113:onworks
lightdm:x:114:
nopasswdlogin:x:115:
ssh:x:116:
whoopsie:x:117:
mlocate:x:118:
avahi-autoipd:x:119:
avahi:x:120:
bluetooth:x:121:
scanner:x:122:saned
colord:x:123:
pulse:x:124:
pulse-access:x:125:
rtkit:x:126:
saned:x:127:
onworks:x:1000:
sambashare:x:128:onworks
juliet:x:1001:
shakespheare:x:3000:
```

13. Create a supplementary group called artists.

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ sudo groupadd artists
[sudo] password for onworks:
Sorry, try again.
```

14. Confirm that Shakespeare and artists have been added by examining the /etc/group file.

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996: ~
pulse:x:124:
pulse-access:x:125:
rtkit:x:126:
saned:x:127:
onworks:x:1000:
sambashare:x:128:onworks
juliet:x:1001:
shakespheare:x:3000:juliet
artists:x:3001:
```

15. Add the Juliet user to the Shakespeare group as a supplementary group.

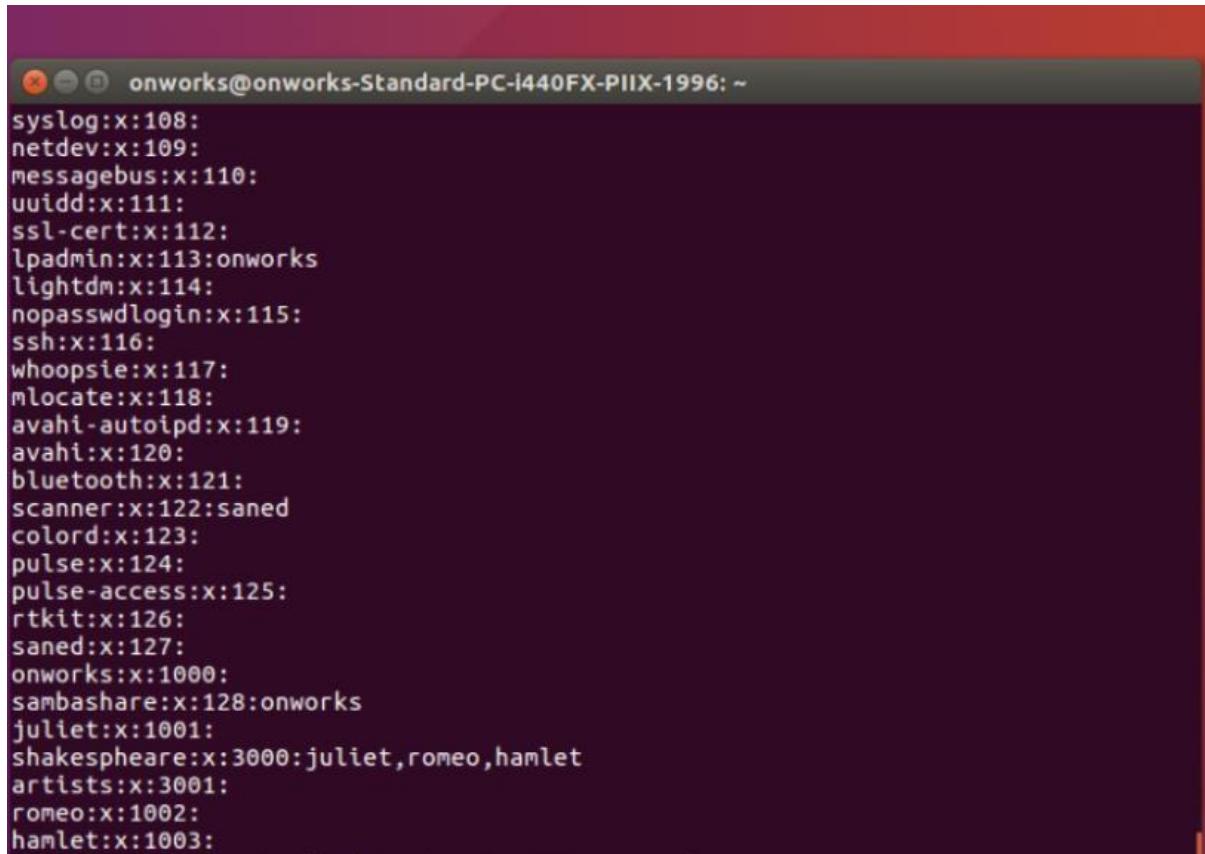
```
artists:x:3001:
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ sudo usermod -G shakespheare juliet
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ cat /etc/group
```

16. Confirm that Juliet has been added using the id command.

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ id -u juliet
1001
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ id -g juliet
1001
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ sudo usermod -G romeo
```

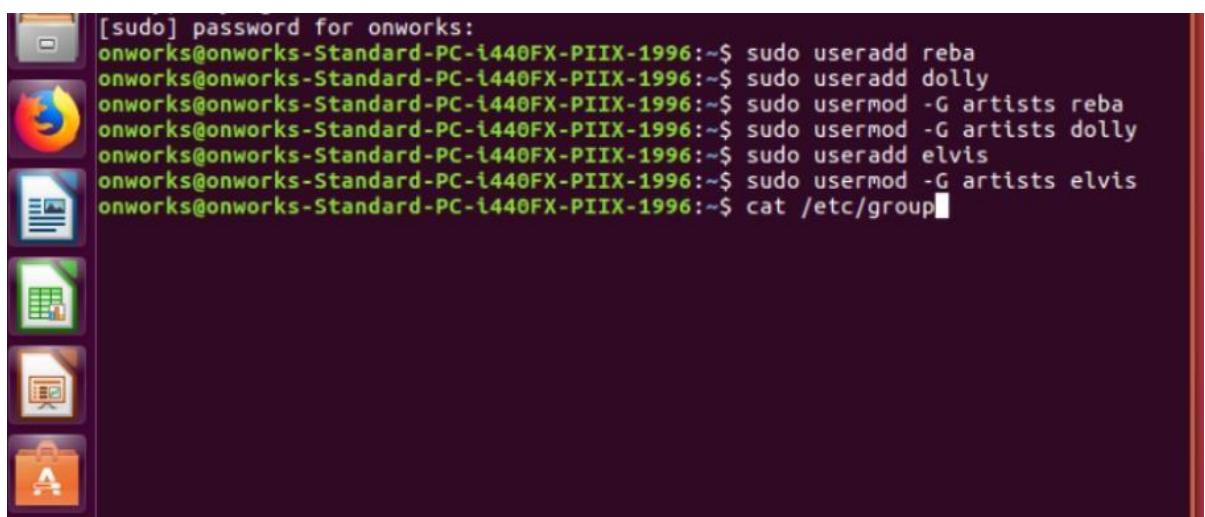
17. Add Romeo and Hamlet to the Shakespeare group.

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$  
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ sudo useradd romeo  
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ sudo usermod -G shakespeare romeo
```



```
onworks@onworks-Standard-PC-i440FX-PIIX-1996: ~  
syslog:x:108:  
netdev:x:109:  
messagebus:x:110:  
uuidd:x:111:  
ssl-cert:x:112:  
lpadmin:x:113:onworks  
lightdm:x:114:  
nopasswdlogin:x:115:  
ssh:x:116:  
whoopsie:x:117:  
mlocate:x:118:  
avahi-autoipd:x:119:  
avahi:x:120:  
bluetooth:x:121:  
scanner:x:122:saned  
colord:x:123:  
pulse:x:124:  
pulse-access:x:125:  
rtkit:x:126:  
saned:x:127:  
onworks:x:1000:  
sambashare:x:128:onworks  
juliet:x:1001:  
shakespheare:x:3000:juliet,romeo,hamlet  
artists:x:3001:  
romeo:x:1002:  
hamlet:x:1003:
```

7.  onworks@onworks-Standard-PC-i440FX-PIIX-1996:~\$

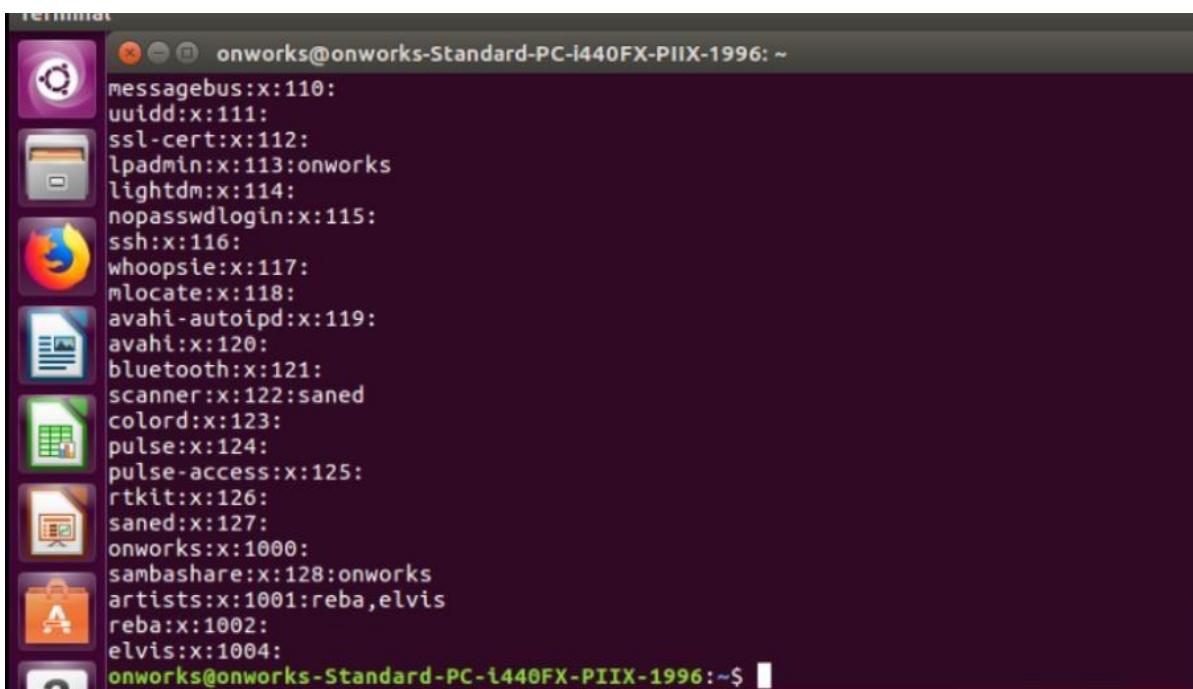


```
[sudo] password for onworks:  
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ sudo useradd reba  
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ sudo useradd dolly  
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ sudo usermod -G artists reba  
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ sudo usermod -G artists dolly  
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ sudo useradd elvis  
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ sudo usermod -G artists elvis  
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ cat /etc/group
```

8. Verify the supplemental group memberships by examining the /etc/group file.

```
uuidd:x:111:  
ssl-cert:x:112:  
lpadmin:x:113:onworks  
lightdm:x:114:  
nopasswdlogin:x:115:  
ssh:x:116:  
whoopsie:x:117:  
mlocate:x:118:  
avahi-autoipd:x:119:  
avahi:x:120:  
bluetooth:x:121:  
scanner:x:122:saned  
colord:x:123:  
pulse:x:124:  
pulse-access:x:125:  
rtkit:x:126:  
saned:x:127:  
onworks:x:1000:  
sambashare:x:128:onworks  
artists:x:1001:reba,dolly,elvis  
reba:x:1002:  
dolly:x:1003:  
elvis:x:1004:
```

9. Attempt to remove user Dolly.



## ASSIGNMENT:6

1. Try out these network commands in Window as well as in Linux and perform at least 4options with each command: ping route traceroute, nslookup,Ip Config, NetStat.

### UBUNTU

#### Ping

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ ping www.google.com
PING www.google.com (142.250.184.196) 56(84) bytes of data.
```

#### Route

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ route
Kernel IP routing table
Destination      Gateway          Genmask        Flags Metric Ref  Use Iface
default         10.0.2.2        0.0.0.0        UG    100    0      0 ens3
10.0.2.0        *               255.255.255.0  U     100    0      0 ens3
link-local      *               255.255.0.0   U     1000   0      0 ens3
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ route -n
Kernel IP routing table
Destination      Gateway          Genmask        Flags Metric Ref  Use Iface
0.0.0.0         10.0.2.2        0.0.0.0        UG    100    0      0 ens3
10.0.2.0        0.0.0.0         255.255.255.0  U     100    0      0 ens3
169.254.0.0     0.0.0.0         255.255.0.0   U     1000   0      0 ens3
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ route -C
Kernel IP routing cache
Source          Destination      Gateway          Flags Metric Ref  Use Iface
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ ip route
default via 10.0.2.2 dev ens3 proto static metric 100
10.0.2.0/24 dev ens3 proto kernel scope link src 10.0.2.15 metric 100
169.254.0.0/16 dev ens3 scope link metric 1000
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$
```

#### Traceroute

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ traceroute google.com
The program 'traceroute' can be found in the following packages:
 * inetutils-traceroute
 * traceroute
```

#### Nslookup

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ nslookup google.com
Server:       127.0.1.1
Address:      127.0.1.1#53

Non-authoritative answer:
Name:  google.com
Address: 142.250.181.238
```

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ nslookup -q=MX google.com
Server:      127.0.1.1
Address:     127.0.1.1#53

Non-authoritative answer:
google.com      mail exchanger = 20 alt1.aspmx.l.google.com.
google.com      mail exchanger = 40 alt3.aspmx.l.google.com.
google.com      mail exchanger = 30 alt2.aspmx.l.google.com.
google.com      mail exchanger = 10 aspmx.l.google.com.
google.com      mail exchanger = 50 alt4.aspmx.l.google.com.

Authoritative answers can be found from:
alt2.aspmx.l.google.com internet address = 142.251.9.26
alt2.aspmx.l.google.com has AAAA address 2a00:1450:4025:c03::1a
aspmx.l.google.com      internet address = 142.250.13.27
aspmx.l.google.com      has AAAA address 2a00:1450:400c:c08::1b
alt4.aspmx.l.google.com internet address = 74.125.200.26
alt4.aspmx.l.google.com has AAAA address 2a04:6800:4003:c00::1b
alt1.aspmx.l.google.com internet address = 142.250.153.26
alt1.aspmx.l.google.com has AAAA address 2a00:1450:4013:c16::1b
alt3.aspmx.l.google.com internet address = 142.250.150.27
alt3.aspmx.l.google.com has AAAA address 2a00:1450:4010:c1c::1a
```

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ nslookup -type=soa facebook.com
Server:      127.0.1.1
Address:     127.0.1.1#53

Non-authoritative answer:
facebook.com
    origin = a.ns.facebook.com
    mail addr = dns.facebook.com
    serial = 1631505598
    refresh = 14400
    retry = 1800
    expire = 604800
    minimum = 300

Authoritative answers can be found from:
```

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ nslookup -type=a redhat.com
Server:      127.0.1.1
Address:     127.0.1.1#53

Non-authoritative answer:
Name:   redhat.com
Address: 209.132.183.105
```

## Ifconfig

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ ifconfig
ens3      Link encap:Ethernet  HWaddr 52:54:00:12:34:56
          inet  addr: 192.168.1.100  Mask: 255.255.255.0
                  inet6 addr: fe80::ae8:44ad:baf7:10fd%0/64 Scope:Link
                      inet6 addr: fec0::e319:1b8b:5ce5:c3e1%64 Scope:Site
                          inet6 addr: fec0::794a:6ae2:1411:54a5%64 Scope:Site
                          UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
                          RX packets:95417 errors:175 dropped:0 overruns:0 frame:175
                          TX packets:33388 errors:0 dropped:0 overruns:0 carrier:0
                          collisions:0 txqueuelen:1000
                          RX bytes:290535795 (290.5 MB)  TX bytes:2053250 (2.0 MB)

lo       Link encap:Local Loopback
          inet  addr:127.0.0.1  Mask:255.0.0.0
                  inet6 addr: ::1/128 Scope:Host
                      UP LOOPBACK RUNNING MTU:65536 Metric:1
                      RX packets:312 errors:0 dropped:0 overruns:0 frame:0
                      TX packets:312 errors:0 dropped:0 overruns:0 carrier:0
                      collisions:0 txqueuelen:1000
                      RX bytes:27438 (27.4 KB)  TX bytes:27438 (27.4 KB)

onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$
```

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ ifconfig -v
ens3      Link encap:Ethernet HWaddr 52:54:00:12:34:56
          inet addr:10.0.2.15 Bcast:10.0.2.255 Mask:255.255.255.0
          inet6 addr: fe80::ae8:44ad:baf7:10fd/64 Scope:Link
          inet6 addr: fec0::794a:6ae2:1411:54a5/64 Scope:Site
          inet6 addr: fec0::e319:1b8b:5ce5:c3e1/64 Scope:Site
          UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
          RX packets:195488 errors:189 dropped:0 overruns:0 frame:189
          TX packets:33384 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:290549083 (290.5 MB) TX bytes:2059442 (2.0 MB)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1 Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING MTU:65536 Metric:1
          RX packets:336 errors:0 dropped:0 overruns:0 frame:0
          TX packets:336 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:30140 (30.1 KB) TX bytes:30140 (30.1 KB)
```

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ ifconfig -s
Iface   MTU Met RX-OK RX-ERR RX-DRP RX-OVR   TX-OK TX-ERR TX-DRP TX-OVR Flg
ens3     1500 0    195513 189      0 0       33409 0      0 0      0 B
MRU
lo      65536 0     336      0      0 0       336 0      0 0      0 L
RU
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$
```

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ ifconfig -a
ens3      Link encap:Ethernet HWaddr 52:54:00:12:34:56
          inet addr:10.0.2.15 Bcast:10.0.2.255 Mask:255.255.255.0
          inet6 addr: fe80::ae8:44ad:baf7:10fd/64 Scope:Link
          inet6 addr: fec0::794a:6ae2:1411:54a5/64 Scope:Site
          inet6 addr: fec0::e319:1b8b:5ce5:c3e1/64 Scope:Site
          UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
          RX packets:195526 errors:189 dropped:0 overruns:0 frame:189
          TX packets:33422 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:290553243 (290.5 MB) TX bytes:2062682 (2.0 MB)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1 Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING MTU:65536 Metric:1
          RX packets:336 errors:0 dropped:0 overruns:0 frame:0
          TX packets:336 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:30140 (30.1 KB) TX bytes:30140 (30.1 KB)
```

## Netstat

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ netstat
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type      State         I-Node      Path
unix  15      [ ]        DGRAM                    12787      /run/systemd/journal/
dev-log
unix  2      [ ]        DGRAM                    18518      /run/user/1000/system
d/notify
unix  7      [ ]        DGRAM                    12789      /run/systemd/journal/
socket
unix  2      [ ]        DGRAM                    12803      /run/systemd/journal/
syslog
unix  3      [ ]        DGRAM                    12782      /run/systemd/notify
unix  3      [ ]        STREAM     CONNECTED    22109      @/tmp/dbus-pQQgmRubwm
unix  3      [ ]        STREAM     CONNECTED    20867
unix  3      [ ]        STREAM     CONNECTED    18785
unix  3      [ ]        STREAM     CONNECTED    16880      /var/run/dbus/system_
bus_socket
```

```

onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ netstat -a
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address          Foreign Address        State
tcp      0      0 localhost:ipp           *:*
tcp      0      0 onworks-Standard:domain  *:*
tcp6     0      0 ip6-localhost:ipp       [::]:*
udp      0      0 *:45223                *:*
udp      0      0 *:mdns                 *:*
udp      0      0 onworks-Standard:domain  *:*
udp      0      0 *:bootpc               *:*
udp      0      0 *:45653                *:*
udp      0      0 *:54916                *:*
udp6     0      0 [::]:mdns              [::]:*
udp6     0      0 [::]:58737              [::]:*
udp6     0      0 [::]:52190              [::]:*
raw6     0      0 [::]:ipv6-icmp         [::]:*          7
Active UNIX domain sockets (servers and established)
Proto RefCnt Flags       Type      State          I-Node      Path

```

## WINDOWS

### Ping

```

C:\Users\HP>ping google.com

Pinging google.com [142.250.182.142] with 32 bytes of data:
Reply from 142.250.182.142: bytes=32 time=118ms TTL=112
Reply from 142.250.182.142: bytes=32 time=49ms TTL=112
Reply from 142.250.182.142: bytes=32 time=161ms TTL=112
Reply from 142.250.182.142: bytes=32 time=67ms TTL=112

Ping statistics for 142.250.182.142:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 49ms, Maximum = 161ms, Average = 98ms

C:\Users\HP>

```

```

C:\Users\HP>ping -t google.com

Pinging google.com [142.250.182.142] with 32 bytes of data:
Reply from 142.250.182.142: bytes=32 time=52ms TTL=112
Reply from 142.250.182.142: bytes=32 time=158ms TTL=112
Reply from 142.250.182.142: bytes=32 time=100ms TTL=112
Reply from 142.250.182.142: bytes=32 time=163ms TTL=112
Reply from 142.250.182.142: bytes=32 time=78ms TTL=112
Reply from 142.250.182.142: bytes=32 time=62ms TTL=112

```

```
C:\Users\HP>ping -j google.com
Pinging google.com [142.250.194.46] with 32 bytes of data:
General failure.
General failure.
General failure.
General failure.

Ping statistics for 142.250.194.46:
  Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\Users\HP>
```

```
C:\Users\HP>ping -a google.com
Pinging google.com [142.250.182.142] with 32 bytes of data:
Reply from 142.250.182.142: bytes=32 time=63ms TTL=112
Reply from 142.250.182.142: bytes=32 time=47ms TTL=112
Reply from 142.250.182.142: bytes=32 time=80ms TTL=112
Reply from 142.250.182.142: bytes=32 time=58ms TTL=112

Ping statistics for 142.250.182.142:
  Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
  Minimum = 47ms, Maximum = 80ms, Average = 62ms
```

## Route

```
C:\Users\HP>route print
=====
Interface List
6...9c 7b ef 1e 44 ac ....Realtek PCIe GbE Family Controller
4...0a 00 27 00 00 04 ....VirtualBox Host-Only Ethernet Adapter
18...82 91 33 99 17 9d ....Microsoft Wi-Fi Direct Virtual Adapter #3
17...80 91 33 99 17 9d ....Microsoft Wi-Fi Direct Virtual Adapter #4
20...80 91 33 99 17 9d ....Realtek RTL8723DE 802.11b/g/n PCIe Adapter
1.....Software Loopback Interface 1

IPv4 Route Table
=====
Active Routes:
Network Destination      Netmask         Gateway       Interface Metric
          0.0.0.0          0.0.0.0   192.168.101.108  192.168.101.145    55
        127.0.0.0          255.0.0.0        On-link      127.0.0.1     331
       127.0.0.1          255.255.255.255        On-link      127.0.0.1     331
  127.255.255.255        255.255.255.255        On-link      127.0.0.1     331
 192.168.0.0          255.255.255.0        On-link      192.168.56.1     281
 192.168.56.1          255.255.255.255        On-link      192.168.56.1     281
 192.168.56.255        255.255.255.255        On-link      192.168.56.1     281
 192.168.101.145        255.255.255.255        On-link      192.168.101.145    311
 192.168.101.255        255.255.255.255        On-link      192.168.101.145    311
 224.0.0.0            240.0.0.0        On-link      192.168.56.1     281
 224.0.0.0            240.0.0.0        On-link      192.168.56.1     281
 224.0.0.0            240.0.0.0        On-link      192.168.101.145    311
 224.0.0.0            240.0.0.0        On-link      192.168.101.145    311

C:\Users\HP>route print -4
=====
Interface List
6...9c 7b ef 1e 44 ac ....Realtek PCIe GbE Family Controller
4...0a 00 27 00 00 04 ....VirtualBox Host-Only Ethernet Adapter
18...82 91 33 99 17 9d ....Microsoft Wi-Fi Direct Virtual Adapter #3
17...80 91 33 99 17 9d ....Microsoft Wi-Fi Direct Virtual Adapter #4
20...80 91 33 99 17 9d ....Realtek RTL8723DE 802.11b/g/n PCIe Adapter
1.....Software Loopback Interface 1

IPv4 Route Table
=====
Active Routes:
Network Destination      Netmask         Gateway       Interface Metric
          0.0.0.0          0.0.0.0   192.168.101.108  192.168.101.145    55
        127.0.0.0          255.0.0.0        On-link      127.0.0.1     331
       127.0.0.1          255.255.255.255        On-link      127.0.0.1     331
  127.255.255.255        255.255.255.255        On-link      127.0.0.1     331
 192.168.56.0          255.255.255.0        On-link      192.168.56.1     281
 192.168.56.1          255.255.255.255        On-link      192.168.56.1     281
 192.168.56.255        255.255.255.255        On-link      192.168.56.1     281
 192.168.101.0          255.255.255.0        On-link      192.168.101.145    311
 192.168.101.145        255.255.255.255        On-link      192.168.101.145    311
 192.168.101.255        255.255.255.255        On-link      192.168.101.145    311
 224.0.0.0            240.0.0.0        On-link      127.0.0.1     331
 224.0.0.0            240.0.0.0        On-link      192.168.56.1     281
 224.0.0.0            240.0.0.0        On-link      192.168.101.145    311
 224.0.0.0            240.0.0.0        On-link      192.168.101.145    311

C:\Users\HP>route print -6
=====
Interface List
6...9c 7b ef 1e 44 ac ....Realtek PCIe GbE Family Controller
4...0a 00 27 00 00 04 ....VirtualBox Host-Only Ethernet Adapter
18...82 91 33 99 17 9d ....Microsoft Wi-Fi Direct Virtual Adapter #3
17...80 91 33 99 17 9d ....Microsoft Wi-Fi Direct Virtual Adapter #4
20...80 91 33 99 17 9d ....Realtek RTL8723DE 802.11b/g/n PCIe Adapter
1.....Software Loopback Interface 1

IPv6 Route Table
=====
Active Routes:
If Metric Network Destination      Gateway
 1    331 ::1/128        On-link
 4    281 fe80::/64        On-link
 20   311 fe80::/64        On-link
           On link
 4    281 fe80::6d6a:fcfa:143a:e31f/128
           On-link
 1    331 ff00::/8        On-link
 4    281 ff00::/8        On-link
 20   311 ff00::/8        On-link

Persistent Routes:
  None

C:\Users\HP>
```

## Traceroute

```
C:\Users\HP>tracert www.google.com

Tracing route to www.google.com [142.250.194.36]
over a maximum of 30 hops:

 1   2 ms    4 ms    3 ms  192.168.101.108
 2   *         *         *      Request timed out.
 3  131 ms   66 ms   47 ms  56.8.126.49
 4  1103 ms  444 ms  49 ms  172.26.104.197
 5   45 ms    39 ms   37 ms  172.26.104.211
 6   86 ms    58 ms   40 ms  192.168.14.36
 7   49 ms    54 ms   52 ms  192.168.14.37
 8   62 ms    62 ms   55 ms  172.16.21.21
 9   53 ms    60 ms   52 ms  172.16.81.4
10   53 ms    70 ms   62 ms  172.16.3.91
11  496 ms   182 ms  659 ms  172.16.3.15
12  309 ms   61 ms   108 ms  172.16.5.70
13   70 ms    73 ms   73 ms  108.170.253.105
14   67 ms    71 ms   94 ms  172.253.73.149
15   67 ms    53 ms   77 ms  172.253.72.136
16  103 ms   107 ms  273 ms  172.253.77.14
17  302 ms   333 ms  92 ms  108.170.251.113
18  107 ms   105 ms  307 ms  142.251.52.231
19  623 ms   428 ms  160 ms  del12s02-in-f4.1e100.net [142.250.194.36]

Trace complete.
```

```
C:\Users\HP>tracert 22.110.0.1

Tracing route to 22.110.0.1 over a maximum of 30 hops

 1   2 ms    3 ms    2 ms  192.168.101.108
 2   *         *         *
```

```
C:\Users\HP>tracert 192.168.1.1

Tracing route to 192.168.1.1 over a maximum of 30 hops

 1   4 ms    3 ms    2 ms  192.168.101.108
 2   *         *         *      Request timed out.
 3   51 ms   55 ms   42 ms  56.8.126.81
```

```
C:\Users\HP>tracert -d www.yahoo.com

Tracing route to new-fp-shed.wg1.b.yahoo.com [202.165.107.50]
over a maximum of 30 hops:

  1   3 ms    3 ms    2 ms  192.168.101.108
  2   *         *         *      Request timed out.
  3   36 ms   51 ms   37 ms  56.8.126.77
  4   59 ms   38 ms   55 ms  172.26.104.197
  5   44 ms   44 ms   39 ms  172.26.104.211
  6   44 ms   60 ms   38 ms  192.168.14.34
  7   44 ms   36 ms   71 ms  192.168.14.33
  8   73 ms   56 ms   59 ms  172.16.3.14
  9   53 ms   52 ms   36 ms  172.16.81.0
 10   59 ms   39 ms   47 ms  172.16.0.159
 11   61 ms   48 ms   46 ms  172.16.3.15
 12   70 ms   106 ms   76 ms  172.16.5.70
 13   91 ms   83 ms   107 ms  103.198.140.15
 14   106 ms  110 ms   98 ms  103.16.102.37
 15   102 ms   90 ms  183 ms  203.84.209.89
 16   84 ms   98 ms  101 ms  106.10.128.9
 17   480 ms  336 ms  227 ms  106.10.131.214
 18   82 ms   99 ms  111 ms  106.10.128.247
 19   133 ms  112 ms  109 ms  202.165.107.50

Trace complete.
```

## Nslookup

```
C:\Users\HP>nslookup google.com
Server: UnKnown
Address: 192.168.101.108

Non-authoritative answer:
Name: google.com
Addresses: 2404:6800:4002:81f::200e
           142.250.183.238

C:\Users\HP>
```

```
C:\Users\HP>nslookup -q=MX google.com
Server: UnKnown
Address: 192.168.101.108

Non-authoritative answer:
google.com      MX preference = 50, mail exchanger = alt4.aspmx.l.google.com
google.com      MX preference = 10, mail exchanger = aspmx.l.google.com
google.com      MX preference = 30, mail exchanger = alt2.aspmx.l.google.com
google.com      MX preference = 40, mail exchanger = alt3.aspmx.l.google.com
google.com      MX preference = 20, mail exchanger = alt1.aspmx.l.google.com

C:\Users\HP>
```

```
C:\Users\HP>nslookup -type=ns google.com
Server: UnKnown
Address: 192.168.101.108

Non-authoritative answer:
google.com      nameserver = ns2.google.com
google.com      nameserver = ns4.google.com
google.com      nameserver = ns3.google.com
google.com      nameserver = ns1.google.com

C:\Users\HP>
```

```
C:\Users\HP>nslookup
Default Server: UnKnown
Address: 192.168.101.108
```

## Ipconfig

```
C:\Users\HP>ipconfig/release

Windows IP Configuration

No operation can be performed on Ethernet while it has its media disconnected.
No operation can be performed on Local Area Connection* 1 while it has its media disconnected.
No operation can be performed on Local Area Connection* 2 while it has its media disconnected.

Ethernet adapter Ethernet:

  Media State . . . . . : Media disconnected
  Connection-specific DNS Suffix . :

Ethernet adapter VirtualBox Host-Only Network:

  Connection-specific DNS Suffix . :
  Link-local IPv6 Address . . . . . : fe80::6d6a:fcfa:143a:e31f%4
  IPv4 Address. . . . . : 192.168.56.1
  Subnet Mask . . . . . : 255.255.255.0
  Default Gateway . . . . . :

Wireless LAN adapter Local Area Connection* 1:

  Media State . . . . . : Media disconnected
  Connection-specific DNS Suffix . :

Wireless LAN adapter Local Area Connection* 2:

  Media State . . . . . : Media disconnected
  Connection-specific DNS Suffix . :

Wireless LAN adapter Wi-Fi:

  Connection-specific DNS Suffix . :
  Link-local IPv6 Address . . . . . : fe80::c6af:d421:ef3c:1157%20
```

```
C:\Users\HP>ipcofig  
'ipcofig' is not recognized as an internal or external command,  
operable program or batch file.  
  
C:\Users\HP>ipconfig  
  
Windows IP Configuration  
  
Ethernet adapter Ethernet:  
  
    Media State . . . . . : Media disconnected  
    Connection-specific DNS Suffix . :  
  
Ethernet adapter VirtualBox Host-Only Network:  
  
    Connection-specific DNS Suffix . :  
    Link-local IPv6 Address . . . . : fe80::6d6a:fcfa:143a:e31f%4  
    IPv4 Address. . . . . : 192.168.56.1  
    Subnet Mask . . . . . : 255.255.255.0  
    Default Gateway . . . . . :  
  
Wireless LAN adapter Local Area Connection* 1:  
  
    Media State . . . . . : Media disconnected  
    Connection-specific DNS Suffix . :  
  
Wireless LAN adapter Local Area Connection* 2:  
  
    Media State . . . . . : Media disconnected  
    Connection-specific DNS Suffix . :  
  
Wireless LAN adapter Wi-Fi:  
  
    Connection-specific DNS Suffix . :  
    Link-local IPv6 Address . . . . : fe80::cef:d421:ef3c:1157%20  
    IPv4 Address. . . . . : 192.168.101.145  
    Subnet Mask . . . . . : 255.255.255.0  
    Default Gateway . . . . . : 192.168.101.108
```

C:\Users\HP>

## Netstat

```
C:\Users\HP>netstat -a  
  
Active Connections  
  
Proto  Local Address          Foreign Address        State  
TCP    0.0.0.0:80              0:0                LISTENING  
TCP    0.0.0.0:135             0:0                LISTENING  
TCP    0.0.0.0:445             0:0                LISTENING  
TCP    0.0.0.0:2222            0:0                LISTENING  
TCP    0.0.0.0:2226            0:0                LISTENING  
TCP    0.0.0.0:2383            0:0                LISTENING  
TCP    0.0.0.0:5040            0:0                LISTENING  
TCP    0.0.0.0:7680            0:0                LISTENING  
TCP    0.0.0.0:49664           0:0                LISTENING  
TCP    0.0.0.0:49665           0:0                LISTENING  
TCP    0.0.0.0:49666           0:0                LISTENING  
TCP    0.0.0.0:49667           0:0                LISTENING  
TCP    0.0.0.0:49668           0:0                LISTENING  
TCP    0.0.0.0:49670           0:0                LISTENING  
TCP    0.0.0.0:49786           0:0                LISTENING  
TCP    127.0.0.1:1434          0:0                LISTENING  
TCP    127.0.0.1:2228          0:0                LISTENING
```

```
C:\Users\HP>netstat -n
```

Active Connections

Proto	Local Address	Foreign Address	State
TCP	127.0.0.1:2226	127.0.0.1:49351	TIME_WAIT
TCP	127.0.0.1:2226	127.0.0.1:49352	TIME_WAIT
TCP	127.0.0.1:2226	127.0.0.1:49353	TIME_WAIT
TCP	127.0.0.1:2226	127.0.0.1:49354	TIME_WAIT
TCP	127.0.0.1:2226	127.0.0.1:49355	TIME_WAIT
TCP	127.0.0.1:2226	127.0.0.1:49356	TIME_WAIT
TCP	127.0.0.1:2226	127.0.0.1:49357	TIME_WAIT
TCP	127.0.0.1:2226	127.0.0.1:49358	TIME_WAIT
TCP	127.0.0.1:2226	127.0.0.1:49359	TIME_WAIT
TCP	127.0.0.1:2226	127.0.0.1:49360	TIME_WAIT
TCP	127.0.0.1:2226	127.0.0.1:56127	ESTABLISHED
TCP	127.0.0.1:49353	127.0.0.1:2226	TIME_WAIT
TCP	127.0.0.1:55428	127.0.0.1:55429	ESTABLISHED
TCP	127.0.0.1:55429	127.0.0.1:55428	ESTABLISHED
TCP	127.0.0.1:55430	127.0.0.1:55431	ESTABLISHED
TCP	127.0.0.1:55431	127.0.0.1:55430	ESTABLISHED
TCP	127.0.0.1:55432	127.0.0.1:55433	ESTABLISHED
TCP	127.0.0.1:55433	127.0.0.1:55432	ESTABLISHED
TCP	127.0.0.1:55434	127.0.0.1:55435	ESTABLISHED
TCP	127.0.0.1:55435	127.0.0.1:55434	ESTABLISHED
TCP	127.0.0.1:56127	127.0.0.1:2226	ESTABLISHED
TCP	192.168.101.145:49350	172.217.167.3:443	TIME_WAIT
TCP	192.168.101.145:49684	142.250.77.142:443	TIME_WAIT
TCP	192.168.101.145:50618	172.217.160.142:443	ESTABLISHED
TCP	192.168.101.145:51163	20.44.229.112:443	ESTABLISHED
TCP	192.168.101.145:51524	142.250.77.142:443	TIME_WAIT
TCP	192.168.101.145:52496	142.250.195.238:443	TIME_WAIT
TCP	192.168.101.145:54492	20.198.162.76:443	ESTABLISHED
TCP	192.168.101.145:55436	172.217.167.3:443	TIME_WAIT
TCP	192.168.101.145:55601	172.217.167.3:443	TIME_WAIT
TCP	192.168.101.145:56126	216.58.200.173:443	ESTABLISHED
TCP	192.168.101.145:56255	142.250.195.238:443	TIME_WAIT
TCP	192.168.101.145:57317	172.67.38.66:443	TIME_WAIT
TCP	192.168.101.145:58820	172.217.167.10:443	ESTABLISHED
TCP	192.168.101.145:58340	172.217.194.189:443	TIME_WAIT
TCP	192.168.101.145:60282	172.217.160.229:443	TIME_WAIT
TCP	192.168.101.145:61901	20.198.162.76:443	ESTABLISHED

```
C:\Users\HP>netstat -n
```

Active Connections

Proto	Local Address	Foreign Address	State
TCP	127.0.0.1:55429	127.0.0.1:55429	ESTABLISHED
TCP	127.0.0.1:55429	127.0.0.1:55428	ESTABLISHED
TCP	127.0.0.1:55430	127.0.0.1:55431	ESTABLISHED
TCP	127.0.0.1:55431	127.0.0.1:55430	ESTABLISHED
TCP	127.0.0.1:55432	127.0.0.1:55433	ESTABLISHED
TCP	127.0.0.1:55433	127.0.0.1:55432	ESTABLISHED
TCP	127.0.0.1:55434	127.0.0.1:55435	ESTABLISHED
TCP	127.0.0.1:55435	127.0.0.1:55434	ESTABLISHED
TCP	192.168.101.145:50289	74.125.200.188:443	ESTABLISHED
TCP	192.168.101.145:51691	20.44.229.112:443	TIME_WAIT
TCP	192.168.101.145:54492	20.198.162.76:443	ESTABLISHED
TCP	192.168.101.145:54939	142.250.195.238:443	TIME_WAIT
TCP	192.168.101.145:56787	84.39.152.33:80	LAST_ACK
TCP	192.168.101.145:57023	142.250.195.238:443	TIME_WAIT
TCP	192.168.101.145:57317	172.67.38.66:443	ESTABLISHED
TCP	192.168.101.145:58068	172.217.160.229:443	TIME_WAIT
TCP	192.168.101.145:58086	142.250.195.238:443	SYN_SENT
TCP	192.168.101.145:58340	172.217.194.189:443	ESTABLISHED
TCP	192.168.101.145:59918	142.250.195.238:443	TIME_WAIT
TCP	192.168.101.145:61901	20.198.162.76:443	ESTABLISHED
TCP	192.168.101.145:61924	84.39.152.33:80	CLOSE_WAIT
TCP	192.168.101.145:62324	142.250.77.142:443	TIME_WAIT
TCP	192.168.101.145:62325	20.44.229.112:443	ESTABLISHED
TCP	192.168.101.145:62368	142.250.77.142:443	TIME_WAIT
TCP	192.168.101.145:65301	142.250.77.142:443	TIME_WAIT

```
C:\Users\HP>netstat

Active Connections

Proto Local Address          Foreign Address          State
TCP   127.0.0.1:55428        LAPTOP-0K1HGDSE:55429 ESTABLISHED
TCP   127.0.0.1:55429        LAPTOP-0K1HGDSE:55428 ESTABLISHED
TCP   127.0.0.1:55430        LAPTOP-0K1HGDSE:55431 ESTABLISHED
TCP   127.0.0.1:55431        LAPTOP-0K1HGDSE:55430 ESTABLISHED
TCP   127.0.0.1:55432        LAPTOP-0K1HGDSE:55433 ESTABLISHED
TCP   127.0.0.1:55433        LAPTOP-0K1HGDSE:55432 ESTABLISHED
TCP   127.0.0.1:55434        LAPTOP-0K1HGDSE:55435 ESTABLISHED
TCP   127.0.0.1:55435        LAPTOP-0K1HGDSE:55434 ESTABLISHED
TCP   192.168.101.145:50289  sa-in-f188:https      ESTABLISHED
TCP   192.168.101.145:51691  20.44.229.112:https  ESTABLISHED
TCP   192.168.101.145:52463  maa05s16-in-f14:https TIME_WAIT
TCP   192.168.101.145:54014  maa05s16-in-f14:https TIME_WAIT
```

(2.) Identify and perform 5 more network commands and it's working.

#### i. ARP

The ARP command corresponds to the Address Resolution Protocol. Although it is easy to think of network communications in terms of IP addressing, packet delivery is ultimately dependent on the Media Access Control (MAC) address of the device's network adapter. This is where the Address Resolution Protocol comes into play. Its job is to map IP addresses to MAC addresses. Windows devices maintain an ARP cache, which contains the results of recent ARP queries. You can see the contents of this cache by using the ARP -A command. If you are having problems communicating with one specific host, you can append the remote host's IP address to the ARP -A command.

```
C:\Users\HP>arp -a

Interface: 192.168.56.1 --- 0x4
  Internet Address        Physical Address      Type
  192.168.56.255          ff-ff-ff-ff-ff-ff    static
  224.0.0.22               01-00-5e-00-00-16    static
  224.0.0.251              01-00-5e-00-00-fb    static
  224.0.0.252              01-00-5e-00-00-fc    static
  224.0.1.60               01-00-5e-00-01-3c    static
  239.255.255.250          01-00-5e-7f-ff-fa    static

Interface: 192.168.101.145 --- 0x14
  Internet Address        Physical Address      Type
  192.168.101.108          9e-83-7b-61-76-9b    dynamic
  192.168.101.255          ff-ff-ff-ff-ff-ff    static
  224.0.0.2                 01-00-5e-00-00-02    static
  224.0.0.22                01-00-5e-00-00-16    static
  224.0.0.251              01-00-5e-00-00-fb    static
  224.0.0.252              01-00-5e-00-00-fc    static
  239.255.255.250          01-00-5e-7f-ff-fa    static
  255.255.255.255          ff-ff-ff-ff-ff-ff    static
```

C:\Users\HP>

## ii. NbtStat

As I am sure you probably know, computers that are running a Windows operating system are assigned a computer name. Oftentimes, there is a domain name or a workgroup name that is also assigned to the computer. The computer name is sometimes referred to as the NetBIOS name. Windows uses several different methods to map NetBIOS names to IP addresses, such as broadcast, LMHost lookup, or even using the nearly extinct method of querying a WINS server. Of course, NetBIOS over TCP/IP can occasionally break down. The NbtStat command can help you to diagnose and correct such problems. The NbtStat -n command for example, shows the NetBIOS names that are in use by a device. The NbtStat -r command shows how many NetBIOS names the device has been able to resolve recently.

```
C:\Users\HP>nbtstat -r

NetBIOS Names Resolution and Registration Statistics
-----
Resolved By Broadcast      = 0
Resolved By Name Server    = 0

Registered By Broadcast   = 48
Registered By Name Server = 0
```

## iii. Hostname

The previously discussed NbtStat command can provide you with the host name that has been assigned to a Windows device, if you know which switch to use with the command. However, if you're just looking for a fast and easy way of verifying a computer's name, then try using the Hostname command. Typing Hostname at the command prompt returns the local computer name.

```
C:\Users\HP>hostname
LAPTOP-0K1HGDSE
```

## iv. PathPing

Earlier, I talked about the Ping utility and the Tracert utility, and the similarities between them. As you might have guessed, the PathPing tool is a utility that combines the best aspects of Tracert and Ping. Entering the PathPing command followed by a host name initiates what looks like a somewhat standard Tracert process. Once this process completes however, the tool takes 300 seconds (five minutes) to gather statistics, and then reports latency and packet loss statistics that are more detailed than those provided by Ping or Tracert.

```
C:\Users\HP>pathping www.google.com

Tracing route to www.google.com [142.250.195.196]
over a maximum of 30 hops:
  0  LAPTOP-0K1HGDSE [192.168.101.145]
  1  192.168.101.108
  2  *       *       *
Computing statistics for 25 seconds...
```

#### v. getmac

Another very simple command that shows the MAC address of your network interfaces.

```
C:\Users\HP>getmac

Physical Address      Transport Name
=====  =====
80-91-33-99-17-9D  \Device\Tcpip_{E7C5A315-C186-429B-939C-81362308BBB3}
9C-7B-EF-1E-44-AC  Media disconnected
0A-00-27-00-00-04  \Device\Tcpip_{0822F22E-6F0F-4403-83B5-A972D5EC9E0A}

C:\Users\HP>
```

### ASSIGNMENT:7 -> LAMP

The name LAMP is an acronym of the following programs:  
Linux Operating System  
Apache HTTP Server  
MySQL database management system  
PHP programming language

#### Install Apache

- **Update your system**
  - sudo apt update
- **Install Apache using apt:**
  - sudo apt install apache2
- **Confirm that Apache is now running with the following command:**
  - sudo systemctl status apache2
- **if it is not working**
  - sudo systemctl start apache2
- **Once installed, test by accessing your server's IP in your browser:**
  - http://youripaddress
    - (*find out your ip address using ifconfig*)

```

nx12#/client/REVGQVVMVABjAGRIZmF1bHQ=?username=guest02&password=server0102

Machine View
Terminal
onworks@onworks-Standard-PC-i440FX-PIIX-1996: ~
Enabling conf serve-cgi-bin.
Enabling site 000-default.
Processing triggers for libc-bin (2.23-0ubuntu11) ...
Processing triggers for systemd (229-4ubuntu21.21) ...
Processing triggers for ureadahead (0.100.0-19) ...
Processing triggers for ufw (0.35-0ubuntu2) ...
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ sudo systemctl status apache2
● apache2.service - LSB: Apache2 web server
  Loaded: loaded (/etc/init.d/apache2; bad; vendor preset: enabled)
  Drop-In: /lib/systemd/system/apache2.service.d
            └─apache2-systemd.conf
    Active: active (running) since Do 2021-09-30 03:05:09 CEST; 1min 10s ago
      Docs: man:systemd-sysv-generator(8)
   CGroup: /system.slice/apache2.service
           ├─26473 /usr/sbin/apache2 -k start
           ├─26476 /usr/sbin/apache2 -k start
           └─26477 /usr/sbin/apache2 -k start

Sep 30 03:05:08 onworks-Standard-PC-i440FX-PIIX-1996 systemd[1]: Starting LSB: A
Sep 30 03:05:08 onworks-Standard-PC-i440FX-PIIX-1996 apache2[26451]: * Starting
Sep 30 03:05:08 onworks-Standard-PC-i440FX-PIIX-1996 apache2[26451]: AH00558: ap
Sep 30 03:05:09 onworks-Standard-PC-i440FX-PIIX-1996 apache2[26451]: *
Sep 30 03:05:09 onworks-Standard-PC-i440FX-PIIX-1996 systemd[1]: Started LSB: Ap
lines 1-16/16 (END)

```

## Install MariaDB

- MariaDB is a fork of MySQL from some of the original MySQL team and is a drop-in replacement.

**sudo apt install mariadb-server mariadb-client**

- Check mariadb Installation

**sudo systemctl status mysql**

(if it is not working sudo systemctl start mysql )

- Secure your newly installed MariaDB service:

**sudo mysql\_secure\_installation**

- (This will set password for mariadb, and strengthen the security by asking some questions like disallow root login remotely? Remove test database? Etc)

```
nx12/#/client/REVGQVVMVABjAGRIZmF1bHQ=?username=guest02&password=server0102
```

Machine View

### Ubuntu Desktop



```
Processing triggers for libc-bin (2.23-0ubuntu11) ...
Processing triggers for systemd (229-4ubuntu21.21) ...
Processing triggers for ureadahead (0.100.0-19) ...
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ sudo systemctl status mysql
● mysql.service - LSB: Start and stop the mysql database server daemon
  Loaded: loaded (/etc/init.d/mysql; bad; vendor preset: enabled)
  Active: active (running) since Do 2021-09-30 03:15:09 CEST; 1min 20s ago
    Docs: man:systemd-sysv-generator(8)
   CGroup: /system.slice/mysql.service
           ├─31158 /bin/bash /usr/bin/mysqld_safe
           ├─31302 /usr/sbin/mysqld --basedir=/usr --datadir=/var/lib/mysql --lo...
```

## Install PHP and commonly used modules

- sudo apt install php libapache2-mod-php php-opcache php-cli php-gd php-curl
- php-mysql

- **Restart apache2**

- sudo systemctl restart apache2

- **Now you can check php installation**

- sudo echo "<?php phpinfo(); ?>" | sudo tee -a /var/www/html/phpinfo.php >

- /dev/null
- **Open a browser**
- http://127.0.0.1/phpinfo.php

## **Install phpmyadmin**

- **Install phpmyadmin**
- sudo apt install phpmyadmin php-mbstring php-zip php-gd php-json  
php-curl
- ( It ask for webserver select apache2, select db configuration and set password  
)
- **Restart apache2**
- sudo systemctl restart apache2
- **Check phpmyadmin**
- **Open a browser**
- http://localhost/phpmyad

minIf “phpmyadmin is not found  
error”

- **sudo -H gedit /etc/apache2/apache2.conf**

Then add the following line to the end of the file:

- **Include /etc/phpmyadmin/apache.conf**

Then restart apache:

- **sudo systemctl restart apache2**

Then install phpmyadmin again

- **sudo apt install phpmyadmin php-mbstring php-zip php-gd  
php-json php-curl**

If “phpmyadmin is not found error”

- **sudo -H gedit /etc/apache2/apache2.conf**

Then add the following line to the end of the file:

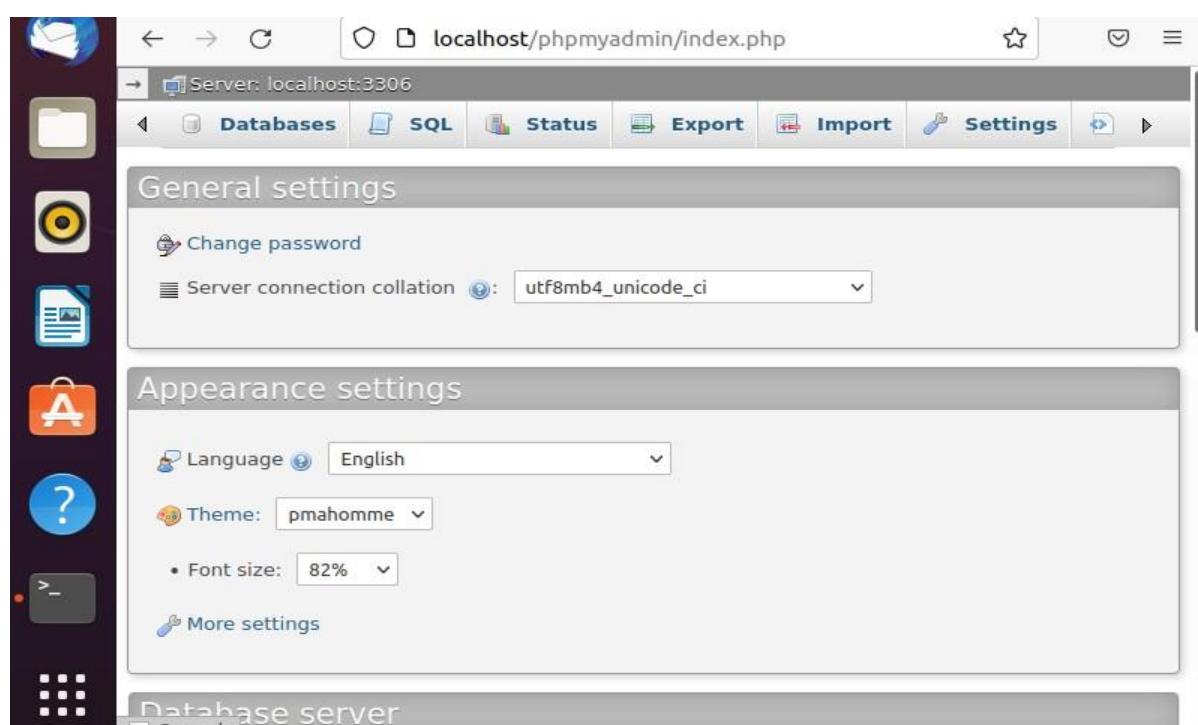
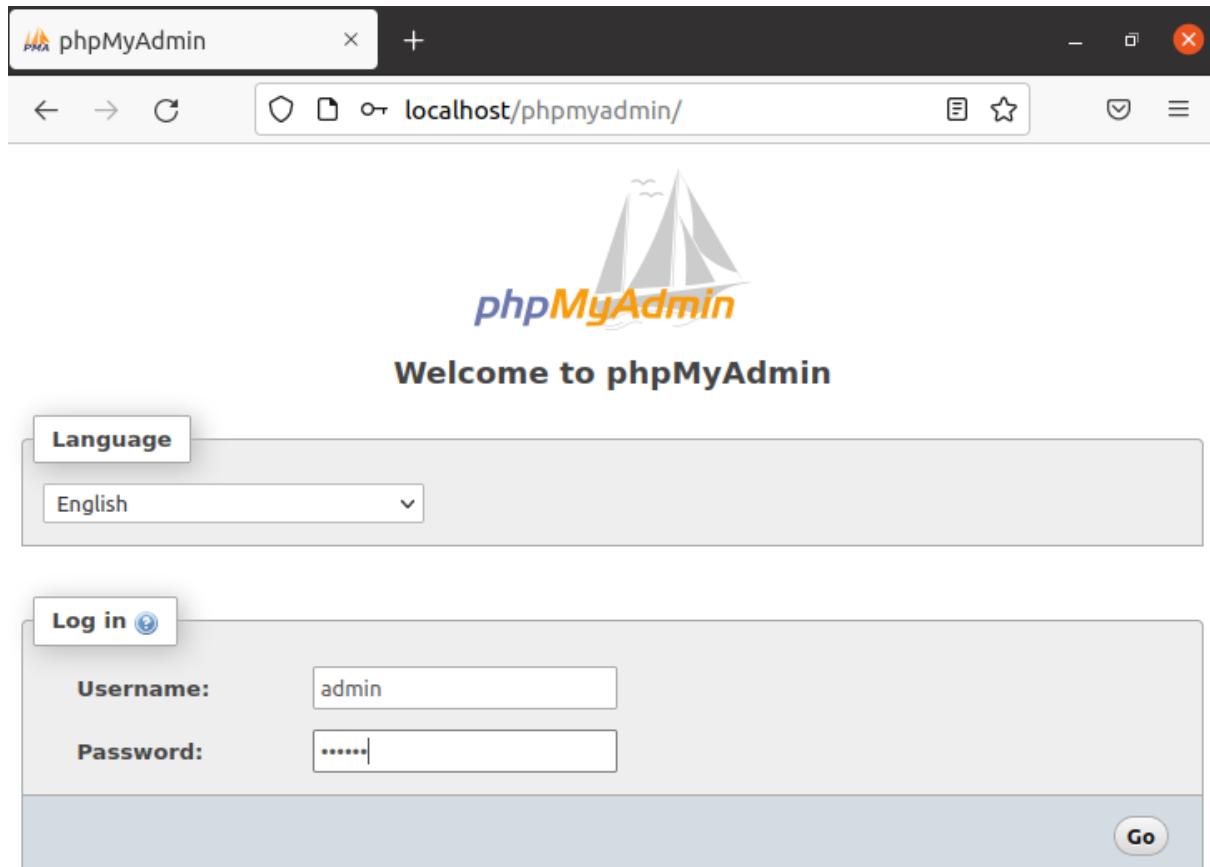
- **Include /etc/phpmyadmin/apache.conf**

Then restart apache:

- **sudo systemctl restart apache2**

Then install phpmyadmin again

- **sudo apt install phpmyadmin php-mbstring php-zip php-gd  
php-json php-curl**



## ASSIGNMENT :8-> ANSIBLE

[sudo] password for onworks:  
E: Command line option 'g' [from -get] is not understood in combination with the other options.  
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~\$ sudo apt install ansible  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
The following packages were automatically installed and are no longer required:  
  linux-headers-4.15.0-45 linux-headers-4.15.0-45-generic  
  linux-image-4.15.0-45-generic linux-modules-4.15.0-45-generic  
  linux-modules-extra-4.15.0-45-generic  
Use 'sudo apt autoremove' to remove them.  
The following additional packages will be installed:  
  ieee-data python-crypto python-ecdsa python-httpplib2 python-jinja2  
  python-markupsafe python-netaddr python-paramiko python-pkg-resources  
  python-selinux python-six python-yaml  
Suggested packages:  
  sshpss python-crypto-dbg python-crypto-doc python-jinja2-doc ipython  
  python-netaddr-docs python-setuptools  
The following NEW packages will be installed:  
  ansible ieee-data python-crypto python-ecdsa python-httpplib2 python-jinja2  
  python-markupsafe python-netaddr python-paramiko python-pkg-resources  
  python-selinux python-six python-yaml  
0 upgraded, 13 newly installed, 0 to remove and 395 not upgraded.

```
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ ansible --version
ansible 2.0.0.2
  config file = /etc/ansible/ansible.cfg
  configured module search path = Default w/o overrides
onworks@onworks-Standard-PC-i440FX-PIIX-1996:~$ █
```

## ASSIGNMENT:10-> DOCKER

### Step-I

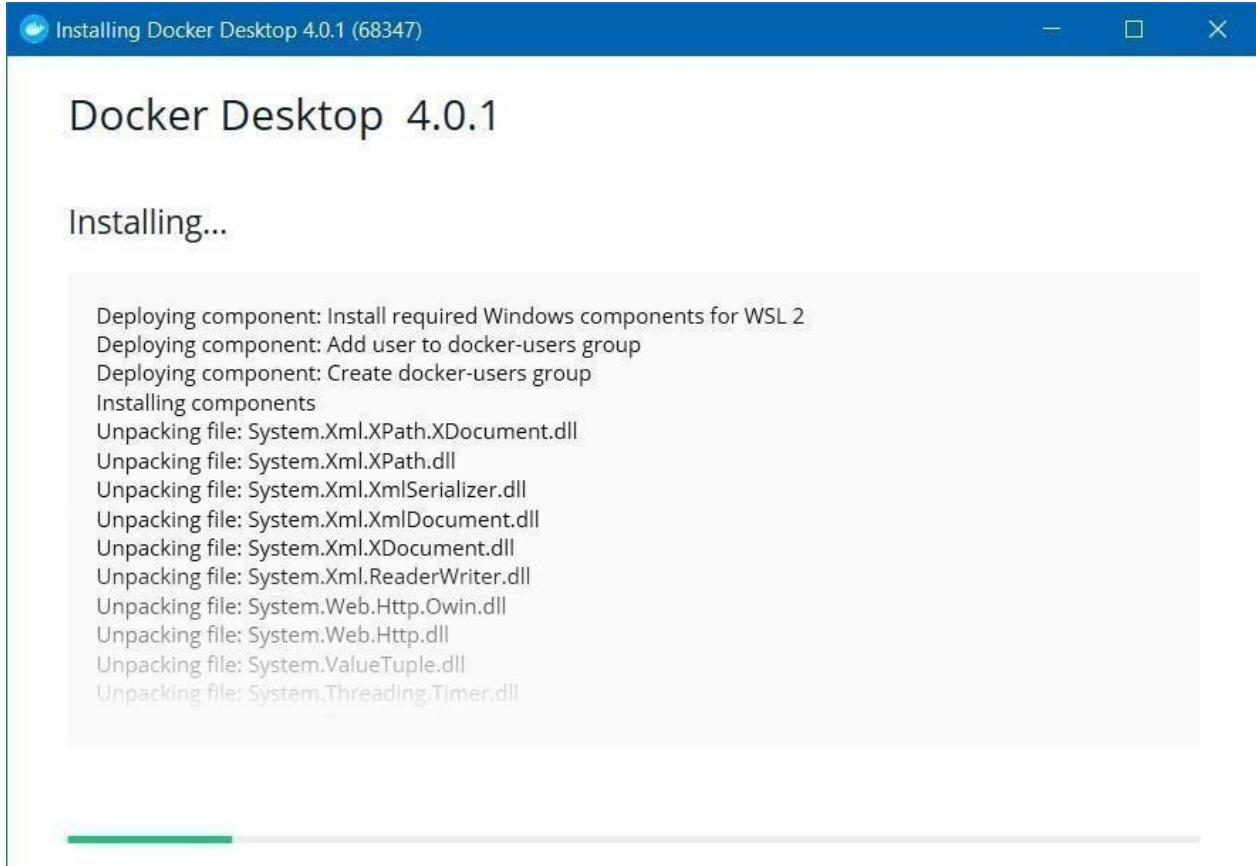
Download Docker Desktop installer for Windows from

<https://desktop.docker.com/win/main/amd64/Docker%20Desktop%20Installer.exe>



### Step-II

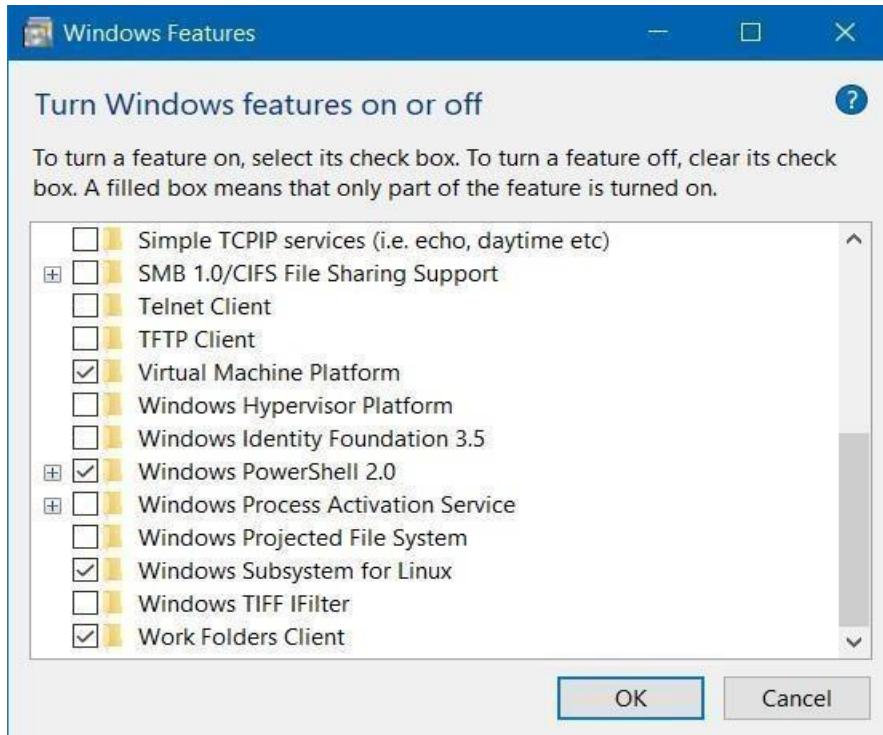
Open the .exe file and follow the steps after clicking install button.



### Step-III

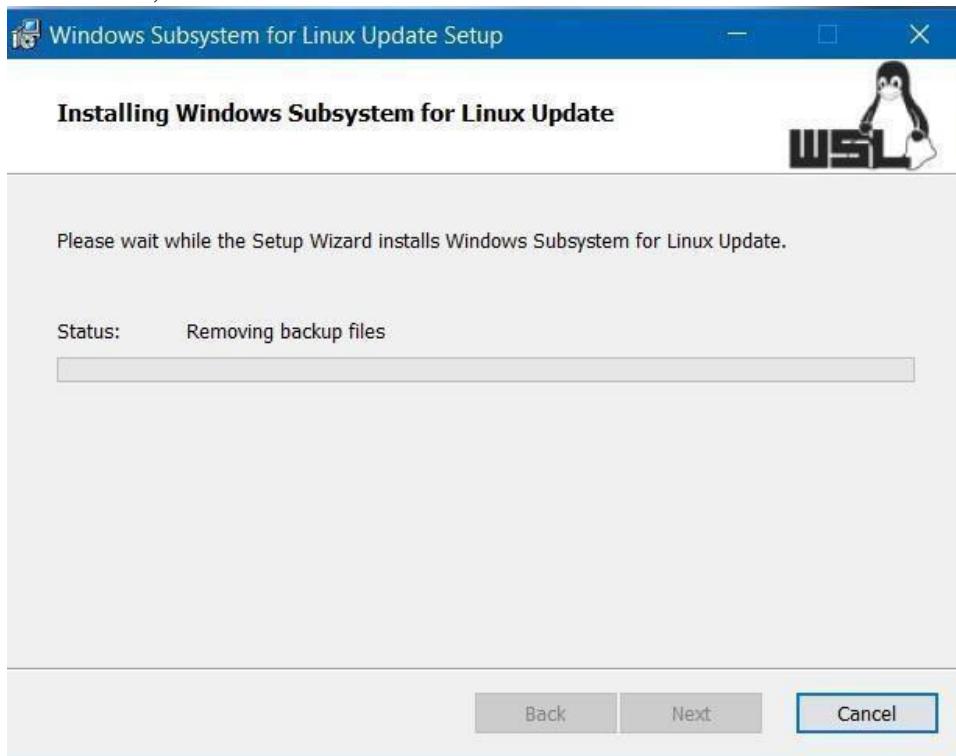
Once installed go to programs and features and click turn on windowsfeatureson or off

Scroll to the bottom and select windows subsystem for Linux



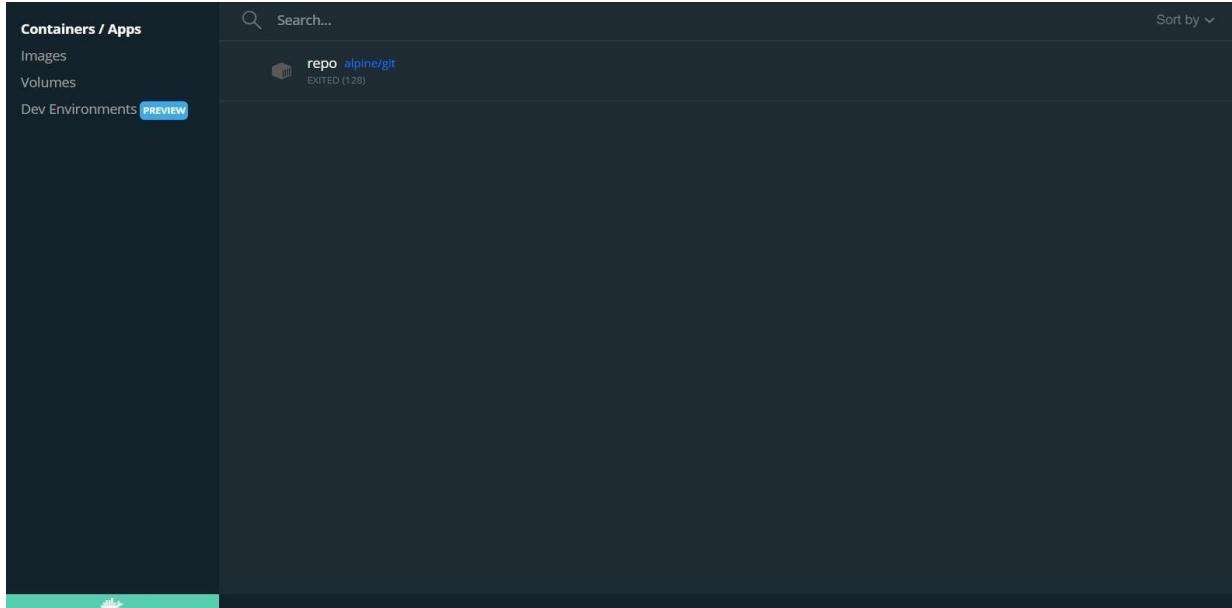
#### Step-IV

If any WSL 2 error occurs download windows subsystem for linux update package and install the .exe file, after the installation restart the windows device.



## Step-V

Once installed, open the docker desktop app, and signin using thedockerID



## Step-VI

Now pull any image from docker hub using the docker pull command inthecommand prompt (eg: docker pull ubuntu)

```
Administrator: Command Prompt
Microsoft Windows [Version 10.0.19042.1081]
(c) Microsoft Corporation. All rights reserved.

C:\Windows\system32>docker run -d -p 80:80 docker/getting-started
Unable to find image 'docker/getting-started:latest' locally
docker: Error response from daemon: Get "https://registry-1.docker.io/v2/": dial tcp: lookup registry-1.docker.io on 192.168.65.5:53: no such host.
See 'docker run --help'.

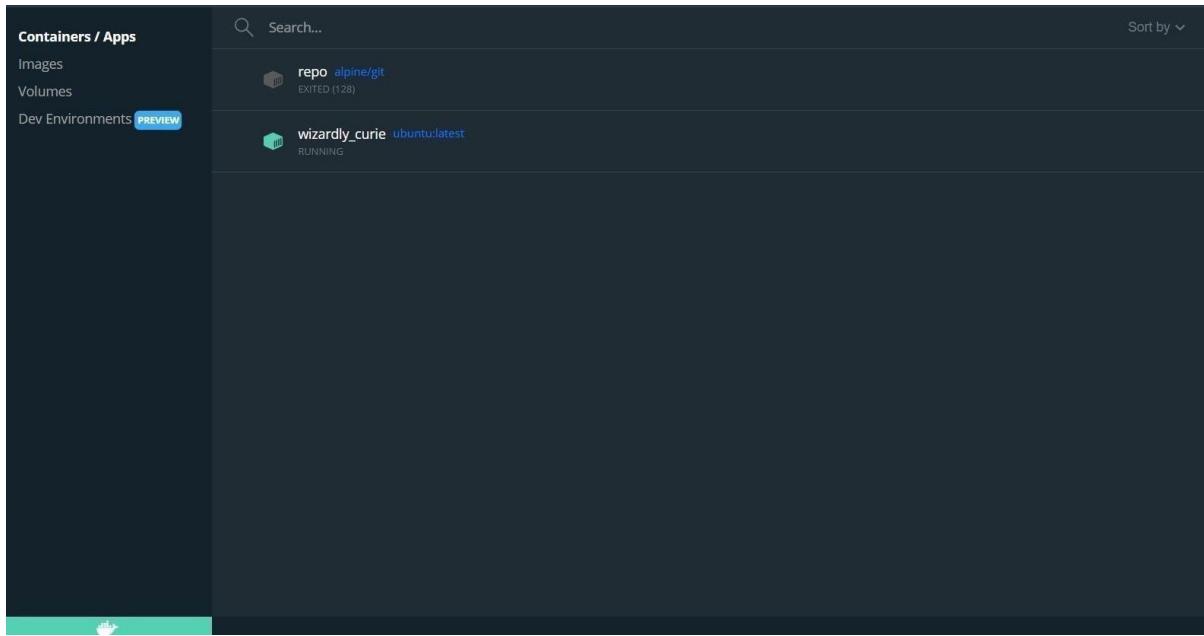
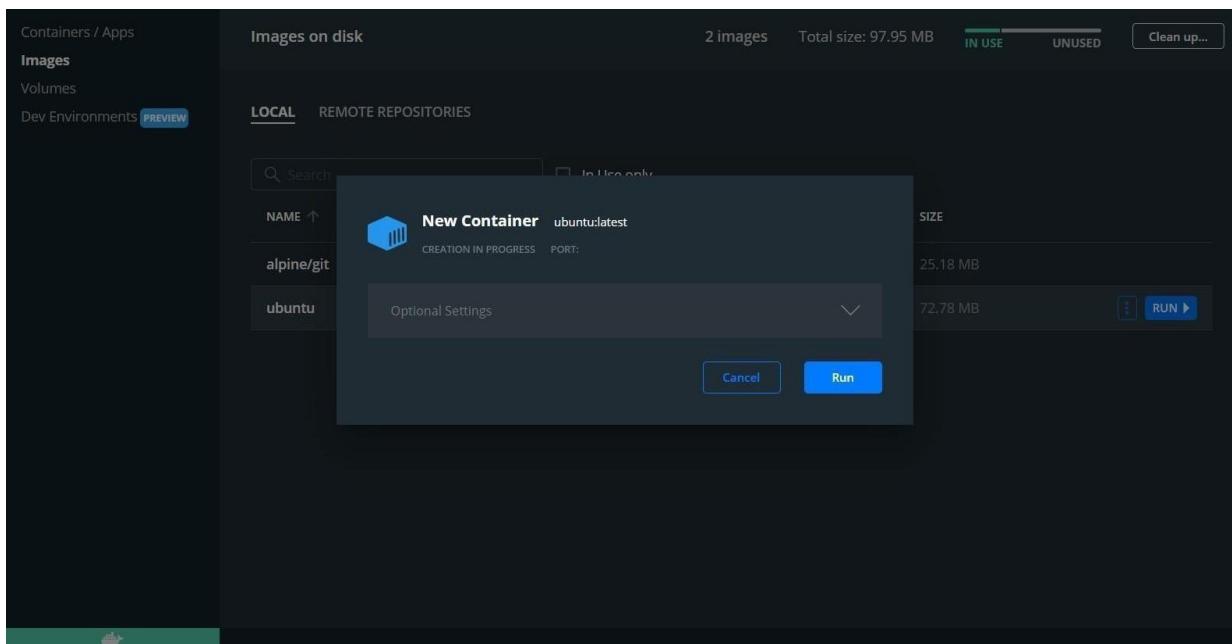
C:\Windows\system32>docker pull ubuntu
Using default tag: latest
latest: Pulling from library/ubuntu
f3ef4ff62e0d: Pull complete
Digest: sha256:65de08a8dabf289ef114053ab32f79e0c333a4fbfa1fe3778bb13ae921a7849b
Status: Downloaded newer image for ubuntu:latest
docker.io/library/ubuntu:latest

C:\Windows\system32>
```

Now in the images tab an image of ubuntu will be displayed, we can run the ubuntu instance using the cli.

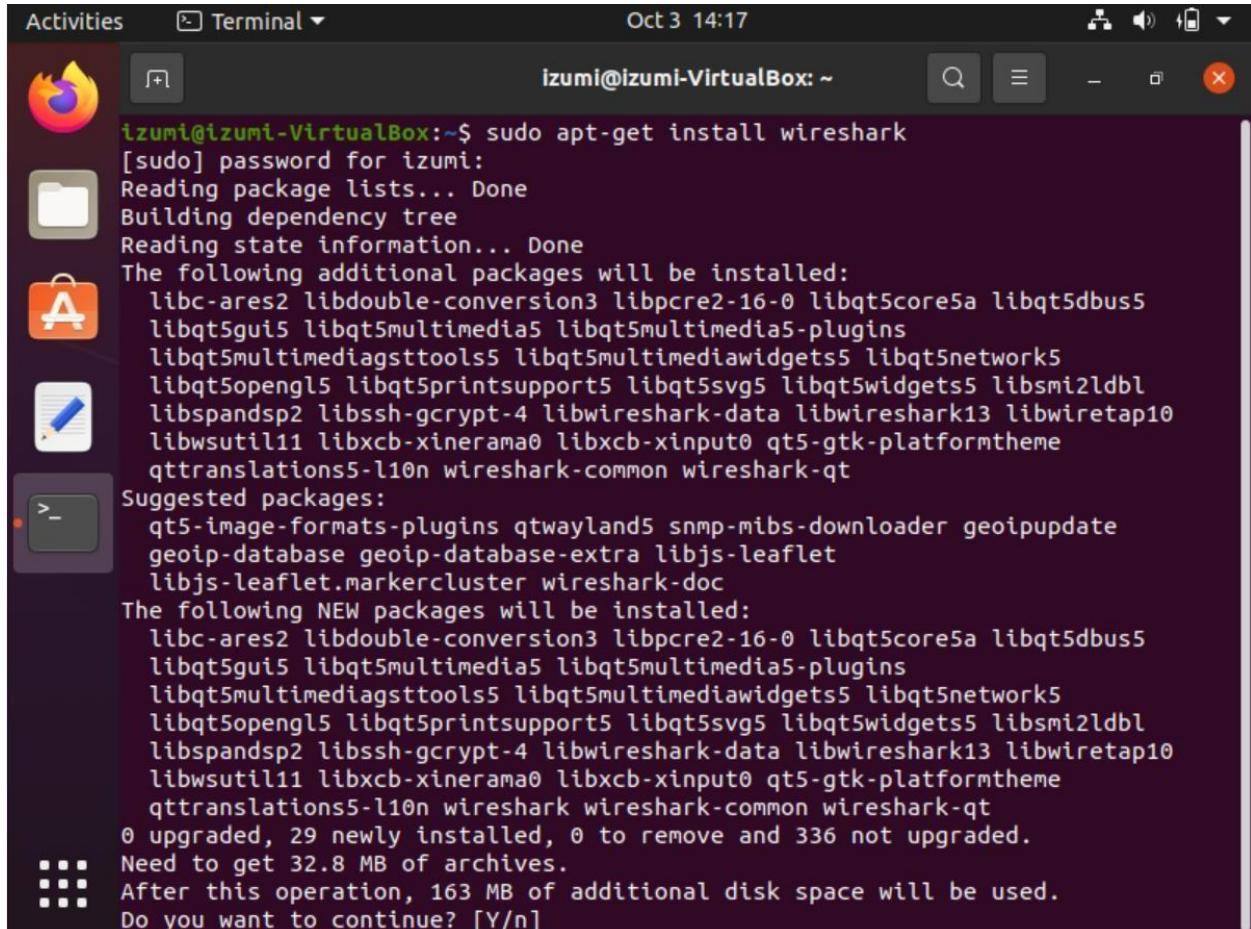
The screenshot shows the Docker desktop application's interface. On the left, there's a sidebar with options: Containers / Apps, Images (which is selected and highlighted in blue), Volumes, and Dev Environments (with a 'PREVIEW' button). The main area is titled 'Images on disk' and shows '2 images' with a total size of '97.95 MB'. There are two tabs at the top of this section: 'LOCAL' (which is selected) and 'REMOTE REPOSITORIES'. Below this, there's a search bar and a checkbox for 'In Use only'. A table lists the images:

NAME	TAG	IMAGE ID	CREATED	SIZE
alpine/git	IN USE	latest	37ca3b12dde9	6 days ago 25.18 MB
ubuntu	latest	597ce1600cf4	2 days ago	72.78 MB



## ASSIGNMENT:11->WIRESHARK

**sudo apt-get install wireshark**

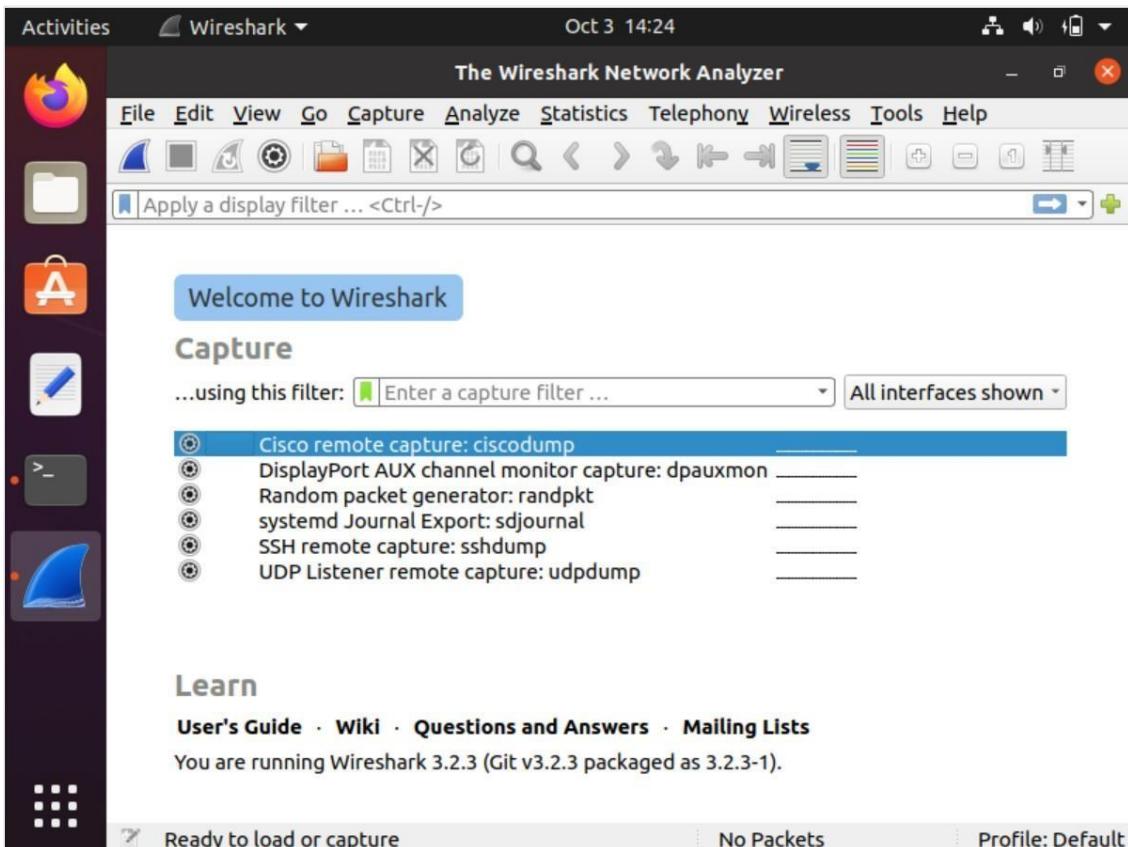


A screenshot of an Ubuntu desktop environment. On the left is a dock with icons for the Dash, Home, File Manager, Terminal, and a browser. The main area shows a terminal window titled 'Terminal' with the command 'sudo apt-get install wireshark' running. The terminal output lists the packages being installed, including Wireshark and its dependencies like libqt5core5a, libqt5dbus5, and libqt5multimedia5. It also shows suggested packages and the space requirements for the operation.

```
izumi@izumi-VirtualBox:~$ sudo apt-get install wireshark
[sudo] password for izumi:
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  libc-ares2 libdouble-conversion3 libpcre2-16-0 libqt5core5a libqt5dbus5
  libqt5gui5 libqt5multimedia5 libqt5multimedia5-plugins
  libqt5multimediasupports5 libqt5multimediawidgets5 libqt5network5
  libqt5opengl5 libqt5printsupport5 libqt5svg5 libqt5widgets5 libsmi2l
  libspandsp2 libssh-gcrypt-4 libwireshark-data libwireshark13 libwiretap10
  libwsutil11 libxcb-xinerama0 libxcb-xinput0 qt5-gtk-platformtheme
  qttranslations5-l10n wireshark-common wireshark-qt
Suggested packages:
  qt5-image-formats-plugins qtwayland5 snmp-mibs-downloader geoipupdate
  geoip-database geoip-database-extra libjs-leaflet
  libjs-leaflet.markercluster wireshark-doc
The following NEW packages will be installed:
  libc-ares2 libdouble-conversion3 libpcre2-16-0 libqt5core5a libqt5dbus5
  libqt5gui5 libqt5multimedia5 libqt5multimedia5-plugins
  libqt5multimediasupports5 libqt5multimediawidgets5 libqt5network5
  libqt5opengl5 libqt5printsupport5 libqt5svg5 libqt5widgets5 libsmi2l
  libspandsp2 libssh-gcrypt-4 libwireshark-data libwireshark13 libwiretap10
  libwsutil11 libxcb-xinerama0 libxcb-xinput0 qt5-gtk-platformtheme
  qttranslations5-l10n wireshark wireshark-common wireshark-qt
0 upgraded, 29 newly installed, 0 to remove and 336 not upgraded.
Need to get 32.8 MB of archives.
After this operation, 163 MB of additional disk space will be used.
Do you want to continue? [Y/n]
```

**Sudo dpkg-reconfigure wireshark-common**

```
izumi@izumi-VirtualBox:~$ sudo dpkg-reconfigure wireshark-common
izumi@izumi-VirtualBox:~$
```



No.	Time	Source	Destination	Protocol	Length
70	3.212089622	13.33.146.52	10.0.2.15	TCP	62
71	3.212090189	13.33.146.52	10.0.2.15	TCP	62
72	3.212090260	13.33.146.52	10.0.2.15	TCP	62
73	3.212090325	13.33.146.52	10.0.2.15	TCP	62
74	3.212090388	13.33.146.52	10.0.2.15	TCP	62

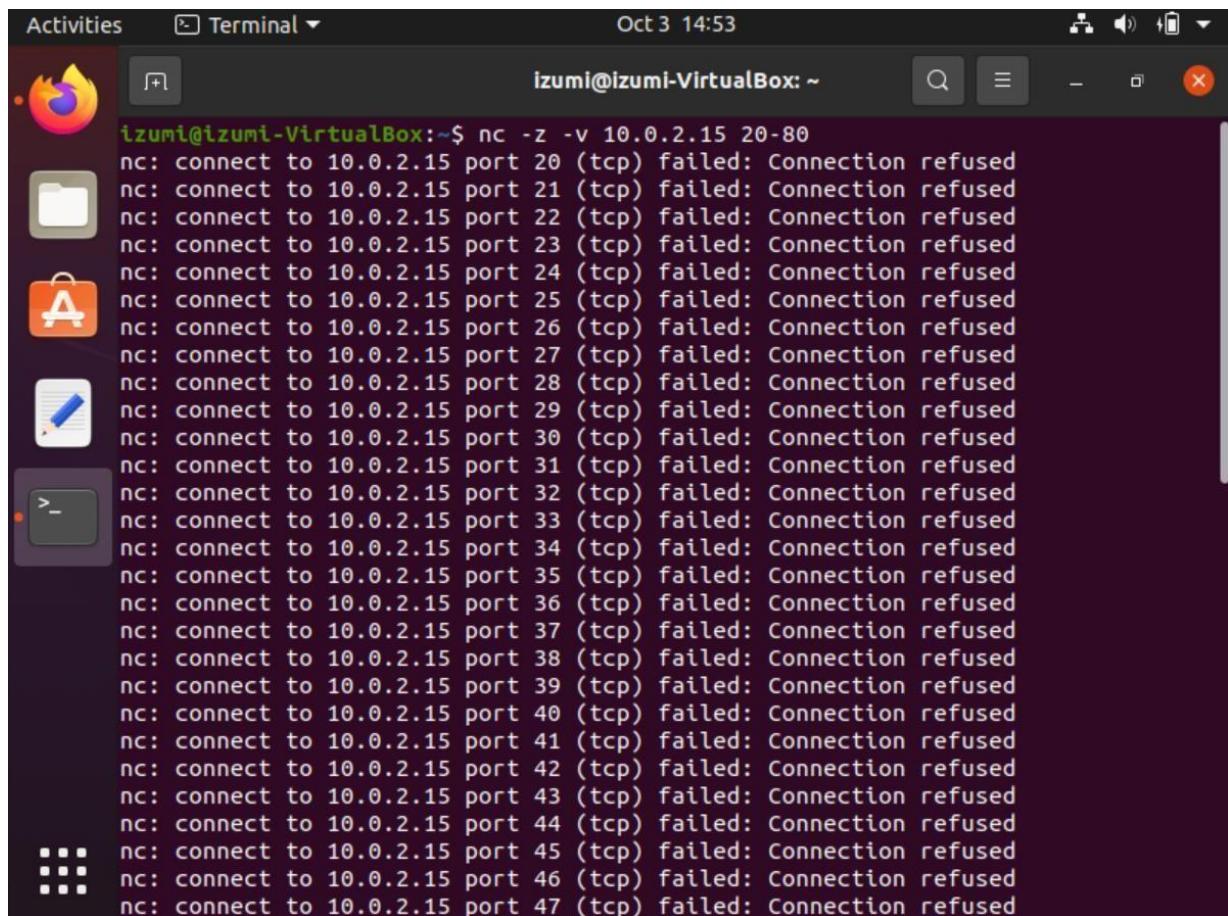
Capturing from enp0s3, Loopback: lo, and any Oct 3 14:38

Frame 1: 74 bytes on wire (592 bits), 74 bytes captured (592 bits) on interface enp0s3  
Ethernet II, Src: PcsCompu\_41:eb:01 (08:00:27:41:eb:01), Dst: RealtekU\_12:35:00 (10:00:21:12:35:00)  
Internet Protocol Version 4, Src: 10.0.2.15, Dst: 103.102.166.224  
Transmission Control Protocol, Src Port: 38654, Dst Port: 443, Seq: 0, Len: 0

0000	52 54 00 12 35 02 08 00	27 41 eb 01 08 00 45 00	RT .. 5 .. 'A .. E ..
0010	00 3c 0c e3 40 00 40 06	13 84 0a 00 02 0f 67 66	< .. @ .. g .. f ..
0020	a6 e0 96 fe 01 bb fc 16	08 25 00 00 00 00 a0 02	.. .. .. .. .. .. .. ..
0030	fa f0 1a 84 00 00 02 04	05 b4 04 02 08 0a b2 4b	..... K .. .. .. .. ..
0040	3a 9c 00 00 00 00 01 03	03 07	: .. .. .. .. .. .. ..

enp0s3, Loopback: lo...apture in progress: Packets: 74 · Displayed: 74 (100.0%) Profile: Default

## Netcat



A screenshot of an Ubuntu desktop environment. In the top left, there's a dock with icons for the Dash, Home, Activities, and Terminal. The terminal window is open and shows the command `nc -z -v 10.0.2.15 20-80` being run. The output of the command is displayed, showing numerous failed connection attempts to ports 20 through 47 on the host 10.0.2.15, with each attempt failing due to a connection refused.

```
izumi@izumi-VirtualBox:~$ nc -z -v 10.0.2.15 20-80
nc: connect to 10.0.2.15 port 20 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 21 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 22 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 23 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 24 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 25 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 26 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 27 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 28 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 29 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 30 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 31 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 32 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 33 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 34 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 35 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 36 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 37 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 38 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 39 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 40 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 41 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 42 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 43 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 44 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 45 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 46 (tcp) failed: Connection refused
nc: connect to 10.0.2.15 port 47 (tcp) failed: Connection refused
```

## ASSIGNMENT :12-> SHELL SCRIPT

1. Write a shell script to ask your name, and collegenameand print it on the screen.

Code:

```
#!/bin/bash
echo Enter Details
echo -+++++-
echo Enter name:
read name
echo Enter college name:
read college
clear
echo Details echo -
++++ echo Name:
$name
echo College: $college
```

Output:

```
izumi@izumi-VirtualBox:~/Desktop/shell$ bash 1.sh
Enter Details
-+++++-
Enter name:
```

**2.** Write a shell script to set a value for a variable and display it on command line interface.

Code:

```
#!/bin/bash
echo Display the value of a variable
echo +-
+++++-----+-----+
echo $a
```

Output:

```
izumi@izumi-VirtualBox:~/Desktop/shell$ bash 2.sh
Display the value of a variable
+-----+
11
```

**3.** Write a shell script to perform addition, subtraction, multiplication, division with two numbers that is accepted from user.

Code:

```
#!/bin/bash
echo Arithmetic Operations
echo +-----+
opr=0
echo Read a number:
read a
echo Read another number:
read b
while [ $opr -ne 5 ]do
echo Choose an operation:
printf "\n1.Addition\n2.Subtraction\n3.Multiplication\n4.Division\n5.Exit\nChoice"
:
read opr case
$opr in
```

```
1)echo "a+b=\"$((a+b))";;
2)echo "a-b=\"$((a-b))";;
3)echo "a*b=\"$((a*b))";;
4)echo "a/b=\"$((a/b))";;
5)break
esac
done
```

### Output:

```
izumi@izumi-VirtualBox:~/Desktop/shell$ bash 3.sh
Arithmetic Operations
+++++-----+
Read a number:
12
Read another number:
11
Choose an operation:

1.Addition
2.Subtraction
3.Multiplication
4.Division
5.Exit
Choice:3
a*b=132
Choose an operation:

1.Addition
2.Subtraction
3.Multiplication
4.Division
5.Exit
Choice:5
izumi@izumi-VirtualBox:~/Desktop/shell$
```

4. Write a shell script to check the value of a given number and display whether the number is found or not.

### Code:

```
echo "Finding a number"
echo +-----+
echo Enter a number:
```

```
read a
if [ $a == 10 ];then
echo "Number found!"else
echo "Number not found!"fi
```

### Output:

```
izumi@izumi-VirtualBox:~/Desktop/shell$ bash 4.sh
Finding a number
+++++
Enter a number:
10
Number found!
izumi@izumi-VirtualBox:~/Desktop/shell$ bash 4.sh
Finding a number
+++++
Enter a number:
12
Number not found!
izumi@izumi-VirtualBox:~/Desktop/shell$
```

### **5.** Write a shell script to display current date,calendar. Code:

```
echo "Time and calendar"
echo ++++++-
echo "Today is $(date)"
echo "Calendar:-"
--1
```

Output:

```
izumi@izumi-VirtualBox:~/Desktop/shell$ bash 5.sh
Time and calendar
+---+---+---+---+---+
Today is Saturday 02 October 2021 05:31:50 PM IST
Calendar:-
    October 2021
Su Mo Tu We Th Fr Sa
        1 2
3 4 5 6 7 8 9
10 11 12 13 14 15 16
17 18 19 20 21 22 23
24 25 26 27 28 29 30
31
```

**6.** Write a shell script to check a number is even or odd. Code:

```
echo Odd or Even?
echo Enter number
read a
if [ $(($a%2)) -eq 0 ];then echo It
is even!
else
echo It is odd!fi
```

Output:

```
izumi@izumi-VirtualBox:~/Desktop/shell$ bash 6.sh
Odd or Even?
Enter number
12
It is even!
izumi@izumi-VirtualBox:~/Desktop/shell$ bash 6.sh
Odd or Even?
Enter number
13
It is odd!
izumi@izumi-VirtualBox:~/Desktop/shell$
```

**7.** Write a shell script to check a number is greaterthan, less than or equal to another number.

Code:

```
echo Enter a number
read a
echo Enter another number
read b
if [ $a -lt $b ];then echo $a is
lesser than $belif [ $a -gt $b
];then
echo $a is greater than $belse
echo They are equalfi
```

Output:

```
izumi@izumi-VirtualBox:~/Desktop/shell$ bash 7.sh
Enter a number
12
Enter another number
13
12 is lesser than 13
izumi@izumi-VirtualBox:~/Desktop/shell$ bash 7.sh
Enter a number
13
Enter another number
12
13 is greater than 12
izumi@izumi-VirtualBox:~/Desktop/shell$ bash 7.sh
Enter a number
12
Enter another number
12
They are equal
```

**8.** Write a shell script to find the sum of first 10 numbers. Code:

```
s=0
for (( i=1;i<=10;i++ ))do
s=`expr $s + $i`
done
echo Sum of first 10 numbers is $s
```

Output:

```
izumi@izumi-VirtualBox:~/Desktop/shell$ bash 8.sh
Sum of first 10 numbers is 55
```

**9.** Write a shell script to find the sum, the average and the product of the four integers entered.

Code:

```
echo Enter 4 numbers
read a
read b
read c
read d
s=$((a+b+c+d))
prod=$((a * b * c * d))
avg=$(echo $s/4 | bc -l) echo
Sum is $s
echo Product is $prod
echo Average is $avg
```

Output:

```
izumi@izumi-VirtualBox:~/Desktop/shell$ bash 9.sh
Enter 4 numbers
1
2
3
4
Sum is 10
Product is 24
Average is 2.5000000000000000000000000000000
izumi@izumi-VirtualBox:~/Desktop/shell$
```

10. Write a shell script to find the smallest of three numbers.

Code:

```
echo Enter 3 numbers:
read a
read b
read c
if [ $a -lt $b ];then if [ $a -lt
$c ];then echo $a is the
smallestelse
echo $c is the smallestfi
elif [ $b -lt $c ];thenecho $b
is the smallestelse
echo $c is the smallestfi
```

Output:

```
izumi@izumi-VirtualBox:~/Desktop/shell$ bash 10.sh
Enter 3 numbers:
1
2
34
1 is the smallest
```

**11.** Write a shell program to find factorial of given number. Code:

```
echo Enter a number
read a
f=1
while((a>0))
do f=$((a*f))
a=$((a-1))
done
echo Factorial is $f
```

Output:

```
izumi@izumi-VirtualBox:~/Desktop/shell$ bash 11.sh
Enter a number
6
Factorial is 720
izumi@izumi-VirtualBox:~/Desktop/shell$
```

**12.** Write a shell program to check a number is palindrome or not.

Code:

```
echo Enter a number:
read a
rev=$(echo $a| rev)
if [ $a -eq $rev ];then echo
It is palindrome! else
echo "It isn't Palindrome!"fi
```

### Output:

```
izumi@izumi-VirtualBox:~/Desktop/shell$ bash 12.sh
Enter a number:
12321
It is palindrome!
izumi@izumi-VirtualBox:~/Desktop/shell$ bash 12.sh
Enter a number:
123
It isn't Palindrome!
izumi@izumi-VirtualBox:~/Desktop/shell$
```

13. Write a shell script to find the average of the numbers entered in command line.

### Code:

```
echo Enter size:
read n
echo Enter $n numbers:
s=0
for((i=0;i<n;i++))
{
    read a
    s=$((s+$a))
}
avg=$(echo $s/$n |bc -l)echo
Average is $avg
```

### Output:

```
izumi@izumi-VirtualBox:~/Desktop/shell$ bash 13.sh
Enter size:
4
Enter 4 numbers:
2
7
4
6
Average is 4.750000000000000000000000000000
izumi@izumi-VirtualBox:~/Desktop/shell$
```

**14.** Write a shell program to find the sum of all the digits in a number.

Code:

```
echo Enter a number:  
read n  
r=0  
s=0  
while((n>0))  
do  
r=$((n%10))  
n=$((n/10))  
s=$((s+r))  
done  
echo Sum of digits is $s
```

Output:

```
izumi@izumi-VirtualBox:~/Desktop/shell$ bash 14.sh  
Enter a number:  
12345  
Sum of digits is 15  
izumi@izumi-VirtualBox:~/Desktop/shell$ █
```

**15.** Write a shell Script to check whether given year is leap year or not.

Code:

```
echo Enter a year:  
read y  
a=$((y%400))  
if [ $a -eq 0 ];then echo It  
is a leap year  
exit  
fi  
a=$((y%100))
```

```
b=$((y%4))
if [ $a -ne 0 ] && [ $b -eq 0 ];then echo It is
a leap year
else
echo It is not a leap yearfi
```

### Output:

```
izumi@izumi-VirtualBox:~/Desktop/shell$ bash 15.sh
Enter a year:
2020
It is a leap year
izumi@izumi-VirtualBox:~/Desktop/shell$ bash 15.sh
Enter a year:
2000
It is a leap year
izumi@izumi-VirtualBox:~/Desktop/shell$ bash 15.sh
Enter a year:
1996
It is a leap year
izumi@izumi-VirtualBox:~/Desktop/shell$ bash 15.sh
Enter a year:
1997
It is not a leap year
izumi@izumi-VirtualBox:~/Desktop/shell$ █
```

