

**NETWORKING & SYSTEM ADMINISTRATION
LAB RECORD**

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BASIC LINUX COMMANDS

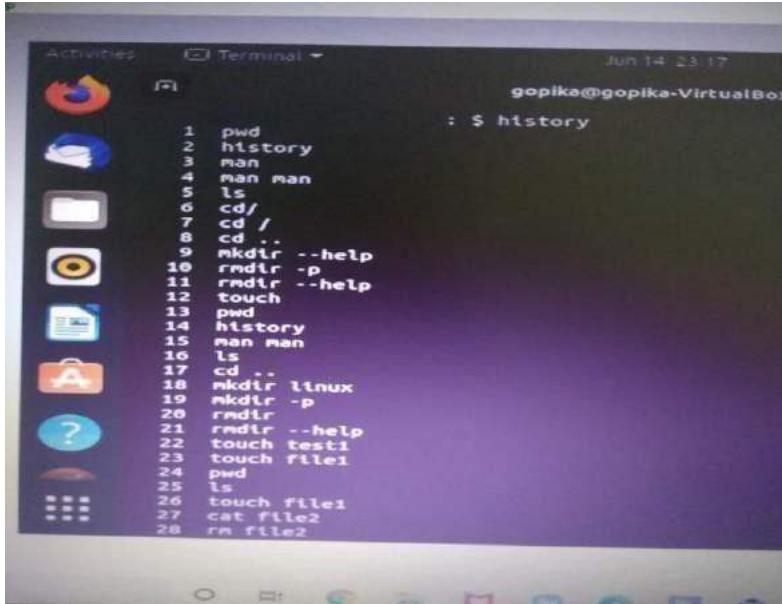
Pwd: It prints the path of the working directory, starting from the root. pwd is shell built-in command(pwd). \$PWD is an [environment variable](#) which stores path of the current directory.

A screenshot of a Linux desktop environment showing a terminal window. The terminal title is "Terminal". The date and time at the top right are "Jun 14 23:16". The user name is "gopika@gopika-VirtualBox: ~". Below the title, there is a message: "To run a command as administrator (user \"root\"), use \"sudo <command\"". The command "pwd" is run, and the output is "/home/gopika". The terminal window has a dark background with light-colored text. The desktop interface includes icons for a browser, file manager, and other applications in the background.

History: history command is used to view the previously executed command. Linux's shell saves a history of the commands you run, and you can search it to repeat commands you've run in the past. It works by treating every single command as a separate event. Then it associates each event with a number which is used to recall or modify a command when required.

This list of previously executed commands is stored in a history file at `~/bash_history` on your machine.

The history command is used for any operation related to the commands which were used in the command line on your machine. It can list all the commands from the history file and repeat or modify any previously used commands.

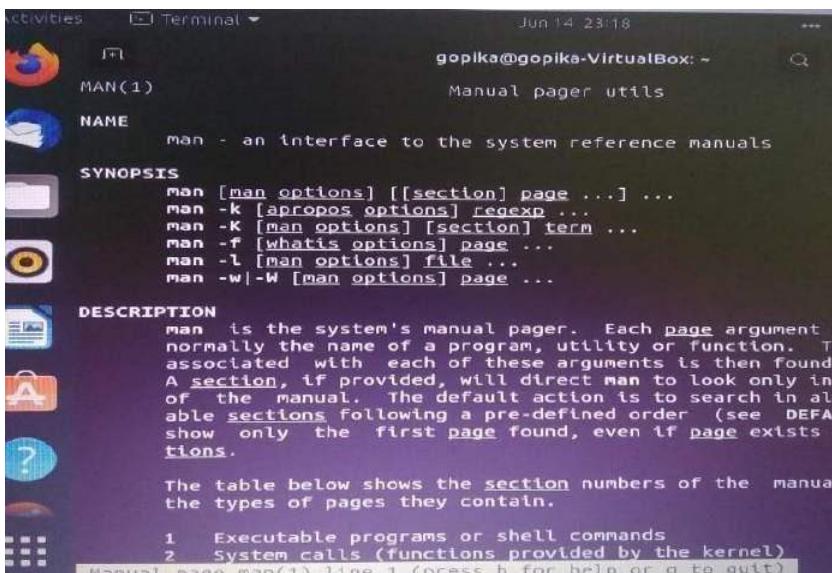


A screenshot of a Linux desktop environment showing a terminal window titled "Terminal". The terminal shows a command-line session with the user "gopika" at "gopika@gopika-VirtualBox". The session starts with the command "history" and lists 28 previous commands. The commands include basic shell operations like pwd, history, man, ls, cd, mkdir, rmdir, touch, and file manipulation (cat, rm). The desktop interface includes a dock with icons for various applications like a browser, file manager, and system tools.

```
Activities Terminal Jun 14 23:17
gopika@gopika-VirtualBox: ~

1 pwd
2 history
3 man
4 man man
5 ls
6 cd/
7 cd /
8 cd .
9 mkdir --help
10 rmdir -p
11 rmdir --help
12 touch
13 pwd
14 history
15 man man
16 ls
17 cd ..
18 mkdir linux
19 mkdir -p
20 rmdir
21 rmdir --help
22 touch test1
23 touch file1
24 pwd
25 ls
26 touch file1
27 cat file2
28 rm file2
```

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 which includes NAME, SYNOPSIS, DESCRIPTION, OPTIONS, EXIT STATUS, RETURN VALUES, ERRORS, FILES, VERSIONS, EXAMPLES, AUTHORS and SEE ALSO.



A screenshot of a Linux desktop environment showing a terminal window titled "Terminal". The terminal shows the output of the command "man(1)". The output is the manual page for the "man" command, titled "MAN(1)". It includes sections for NAME, SYNOPSIS, and DESCRIPTION. The SYNOPSIS section shows the command syntax. The DESCRIPTION section provides a detailed explanation of what "man" does and how it finds manual pages. The terminal window also shows the desktop environment with its dock and icons.

```
Activities Terminal Jun 14 23:18
gopika@gopika-VirtualBox: ~

MAN(1)
Manual pager utils

NAME
      man - an interface to the system reference manuals

SYNOPSIS
      man [man options] [[section] page ...]
      man -k [apropos options] regexp ...
      man -K [man options] [section] term ...
      man -f [whatis options] page ...
      man -l [man options] file ...
      man -w|-W [man options] page ...

DESCRIPTION
      man  is the system's manual pager.  Each  page  argument  is
      normally the name of a program, utility or function.  The
      associated with each of these arguments is then found.
      A  section, if provided, will direct man to look only in
      that section of the manual.  The default action is to search in all
      available sections following a pre-defined order (see  DEFAULT_SECTIONS).
      man  will show only the first page found, even if page exists in
      other sections.

      The table below shows the section numbers of the manual
      and the types of pages they contain.

      1 Executable programs or shell commands
      2 System calls (functions provided by the kernel)
      3 Library functions
      4 Special files (device drivers, etc.)
      5 File formats
      6 Games
      7 Information for users
      8 System administration
      9 Kernel routines (for developers)

      Manual pager man(1) Line 1 (press h for help or q to quit)
```

Ls: The ls command is used to list the directory contents in Linux. This is a very common task for every Linux power users and system administrators. You can

list the contents of your current working directory with ls. This is the most common usage of ls.

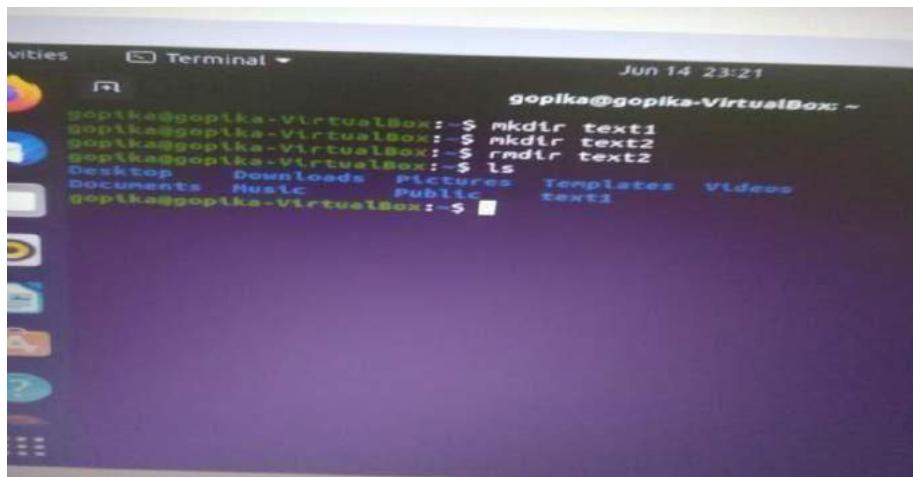
Cd: Command cd is used to navigate between directories in Linux. In fact, cd stands for ‘change directory’. It enables you to change the working directory from the current directory to the desired directory that you wish to navigate to.

The `cd` (“change directory”) command is used to change the current working directory in Linux and other Unix-like operating systems. It is one of the most basic and frequently used commands when working on the Linux terminal.

The `current working directory` is the directory (folder) in which the user is currently working in. Each time you interact with your command prompt, you are working within a directory.

Mkdir: The mkdir command is used to create new directories. A directory, referred to as a folder in some operating systems, appears to the user as a container for other directories and files.

Rmdir: rmdir is a command line tool used to remove an empty directory in Linux-based operating systems. rmdir command removes each directory specified with rmdir command only if these directories are empty. If there is any file in the specified directory then rmdir can not delete the directory. rmdir is very similar to the command rm -d.



A screenshot of a Linux desktop environment showing a terminal window. The terminal window title is "Terminal". The date and time "Jun 14 23:21" are displayed at the top right. The terminal session shows the following commands being run:

```
gopika@gopika-VirtualBox:~$ mkdir text1
gopika@gopika-VirtualBox:~$ mkdir text2
gopika@gopika-VirtualBox:~$ rmdir text2
gopika@gopika-VirtualBox:~$ ls
Desktop  Downloads  Pictures  Templates  Videos
Documents  Music  Public  text1
gopika@gopika-VirtualBox:~$
```

The terminal window is part of a desktop interface with icons for Home, Applications, and Dash visible on the left.

Touch: Touch command in Linux is used for changing file timestamps however one of the most common usages of touch command includes creating a new empty file. With the touch command, you can change access, modify and change time of files and folders in Linux. You can update the timestamps or modify them to a date in the past.

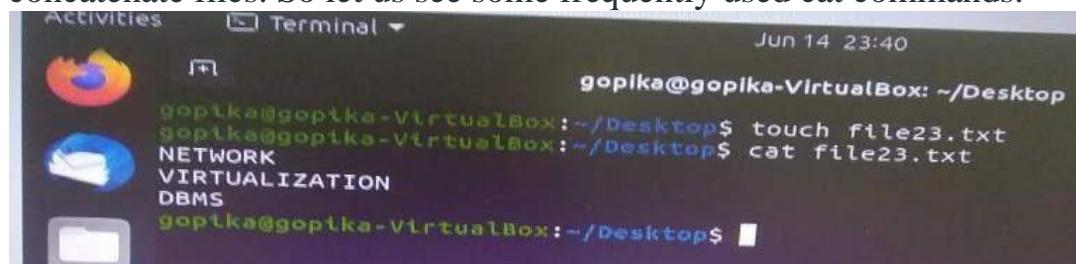
Rm: In computing, rm (short for remove) is a basic command on Unix and Unixlike operating systems used to remove objects such as computer files, directories and symbolic links from file systems and also special files such as device nodes, pipes and sockets, similar to the del command in MS-DOS, OS/2, and Microsoft Windows.



A screenshot of a Linux desktop environment. On the left, there is a dock with icons for a web browser, email, file manager, terminal, and other applications. The main area shows a terminal window titled 'gopika@gopika-VirtualBox: ~/Desktop'. The terminal history is as follows:

```
gopika@gopika-VirtualBox:~/Desktop$ cd ..
gopika@gopika-VirtualBox:~/Desktop$ ls
Desktop  Downloads  Pictures  Templates  Videos
Documents  Music    Public    text1
gopika@gopika-VirtualBox:~/Desktop$ cd Desktop
gopika@gopika-VirtualBox:~/Desktop$ touch file23
gopika@gopika-VirtualBox:~/Desktop$ touch file23.txt
gopika@gopika-VirtualBox:~/Desktop$ rm file23.txt
```

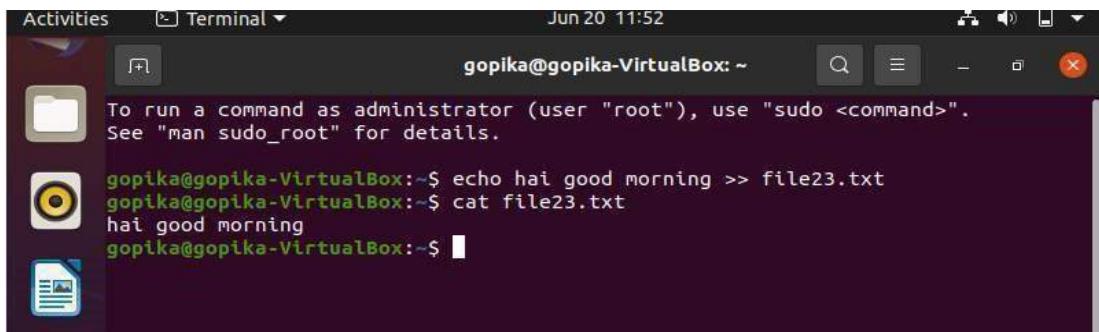
Cat: Cat(concatenate) command is very frequently used in Linux. It reads data from the file and gives their content as output. It helps us to create, view, concatenate files. So let us see some frequently used cat commands.



A screenshot of a Linux desktop environment. On the left, there is a dock with icons for a web browser, email, file manager, terminal, and other applications. The main area shows a terminal window titled 'gopika@gopika-VirtualBox: ~/Desktop'. The terminal history is as follows:

```
Jun 14 23:40
gopika@gopika-VirtualBox:~/Desktop$ touch file23.txt
gopika@gopika-VirtualBox:~/Desktop$ cat file23.txt
NETWORK
VIRTUALIZATION
DBMS
gopika@gopika-VirtualBox:~/Desktop$
```

Echo : echo is one of the most commonly and widely used built-in command for Linux bash and C shells, that typically used in scripting language and batch files to display a line of text/string on standard output or a file.

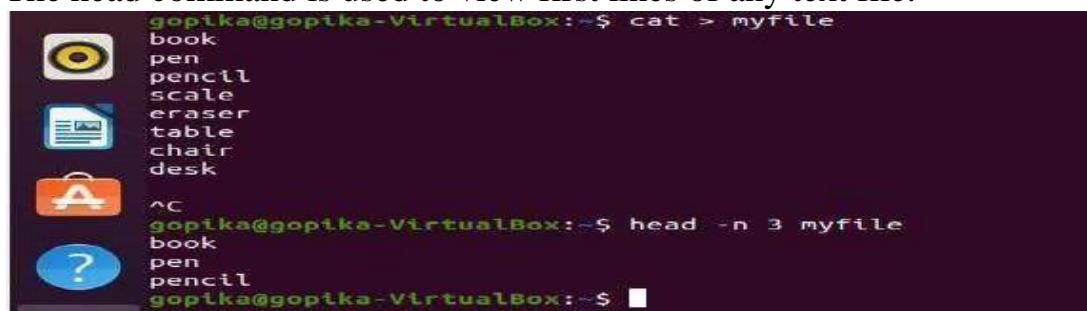


The screenshot shows a terminal window titled "Terminal" with the command "gopika@gopika-VirtualBox: ~". The terminal displays the following text:

```
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

gopika@gopika-VirtualBox:~$ echo hai good morning >> file23.txt
gopika@gopika-VirtualBox:~$ cat file23.txt
hai good morning
gopika@gopika-VirtualBox:~$
```

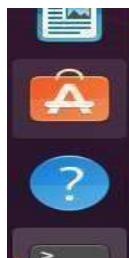
Head : The head command is used to view first lines of any text file.



The screenshot shows a terminal window titled "Terminal" with the command "gopika@gopika-VirtualBox: ~". The terminal displays the following text:

```
gopika@gopika-VirtualBox:~$ cat > myfile
book
pen
pencil
scale
eraser
table
chair
desk
^C
gopika@gopika-VirtualBox:~$ head -n 3 myfile
book
pen
pencil
gopika@gopika-VirtualBox:~$
```

Tail: The tail command is used to display the last lines of a text file.



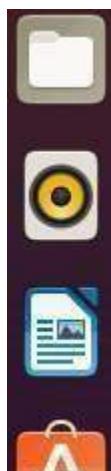
```
gopika@gopika-VirtualBox:~$ cat myfile1
python
computer network
c
c++
java
php
gopika@gopika-VirtualBox:~$ tail -n 3 myfile1
c++
java
php
```

Read: The command read in the Linux is used to read the input from the keyboard. It can be used with and without arguments.



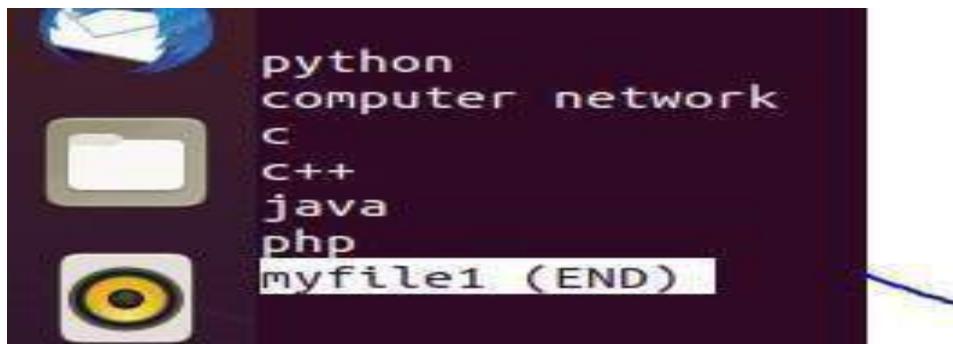
```
gopika@gopika-VirtualBox:~$ read v1 v2 v3
hi hlo good
gopika@gopika-VirtualBox:~$ echo ["$v1"]["$v2"]["$v3"]
[hi][hlo][good]
gopika@gopika-VirtualBox:~$
```

More: more command is used to view the text files in the command prompt, displaying one screen at a time in case the file is large (For example log files). The more command also allows the user do scroll up and down through the page.



```
gopika@gopika-VirtualBox:~$ more myfile1
python
computer network
c
c++
java
php
gopika@gopika-VirtualBox:~$ more -3 myfile1
book
pen
pencil
--More-- (35%)
```

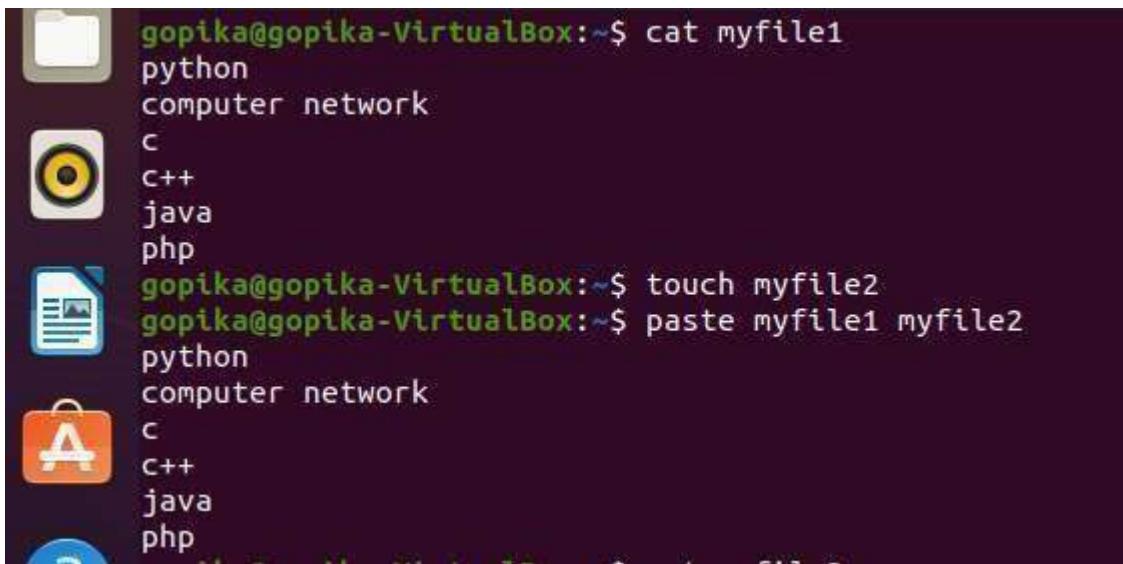
Less: Less command is linux utility which can be used to read contents of text file one page (one screen) per time. It has faster access because if file is large, it don't access complete file, but access it page by page.



Cut: cut is a command-line utility that allows you to cut parts of lines from specified files or piped data and print the result to standard output. It can be used to cut parts of a line by delimiter, byte position, and character.

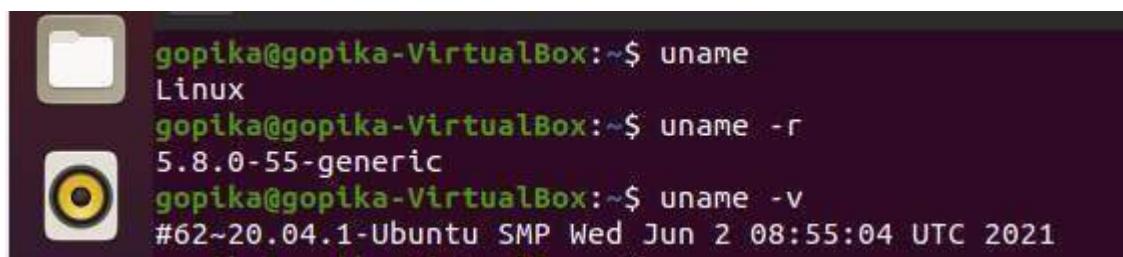
A screenshot of a terminal window titled 'Terminal'. The window shows two command-line sessions. The first session starts with 'gopika@gopika-VirtualBox:~\$ cat myfile1' followed by the contents of the 'myfile1' file: 'python', 'computer network', 'c', 'c++', 'java', and 'php'. The second session starts with 'gopika@gopika-VirtualBox:~\$ cut -b 1,2,3 myfile1' followed by the output: 'pyt', 'com', 'c', 'c++', 'jav', and 'php'. To the left of the terminal window, there are five icons: a yellow target icon, a blue document icon, an orange document icon, a red document icon, and a blue question mark icon.

Paste: The paste command can also be used to merge N consecutive lines from a file into a... 2. Combination with other commands.



```
gopiika@gopiika-VirtualBox:~$ cat myfile1
python
computer network
c
c++
java
php
gopiika@gopiika-VirtualBox:~$ touch myfile2
gopiika@gopiika-VirtualBox:~$ paste myfile1 myfile2
python
computer network
c
c++
java
php
```

Uname: uname command is used to display the software and hardware information in current running Linux system. uname command is default shell command in Linux.



```
gopiika@gopiika-VirtualBox:~$ uname
Linux
gopiika@gopiika-VirtualBox:~$ uname -r
5.8.0-55-generic
gopiika@gopiika-VirtualBox:~$ uname -v
#62~20.04.1-Ubuntu SMP Wed Jun 2 08:55:04 UTC 2021
```

Cp: cp stands for copy. This command is used to copy files or group of files or directory. It creates an exact image of a file on a disk with different file name.

```
gopika@gopika-VirtualBox:~$ touch text1.txt text2.txt
gopika@gopika-VirtualBox:~$ cp text1.txt Desktop/
gopika@gopika-VirtualBox:~$ cp text1.txt text2.txt Desktop/
gopika@gopika-VirtualBox:~$
```



Mv: mv is used to move one or more files or directories from one place to another in a file system like UNIX. It has two distinct functions: (i) It renames a file or folder.

```
gopika@gopika-VirtualBox:~$ mv text1.txt Documents/
```



Locate: locate command in Linux is used to find the files by name. There are two most widely used file searching utilities accessible to users are called find and locate.

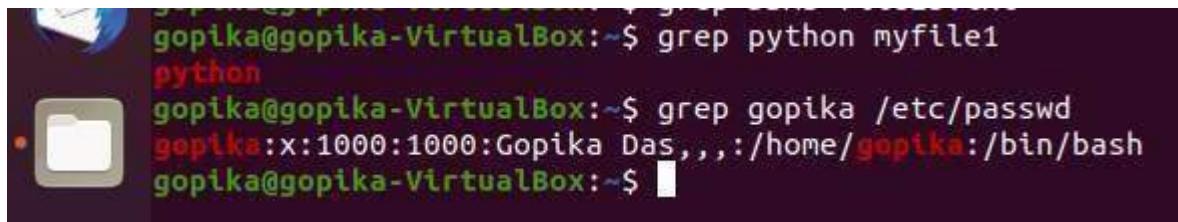
```
gopika@gopika-VirtualBox:~$ locate myfile1
Command 'locate' not found, but can be installed with:
sudo apt install mlocate
```

Find: Find command is used to search and locate the list of files and directories based on conditions you specify for files that match the arguments.

```
gopika@gopika-VirtualBox:~$ find /home/ -name da1.txt
/home/gopika/da1.txt
/home/gopika/Desktop/da1.txt
```

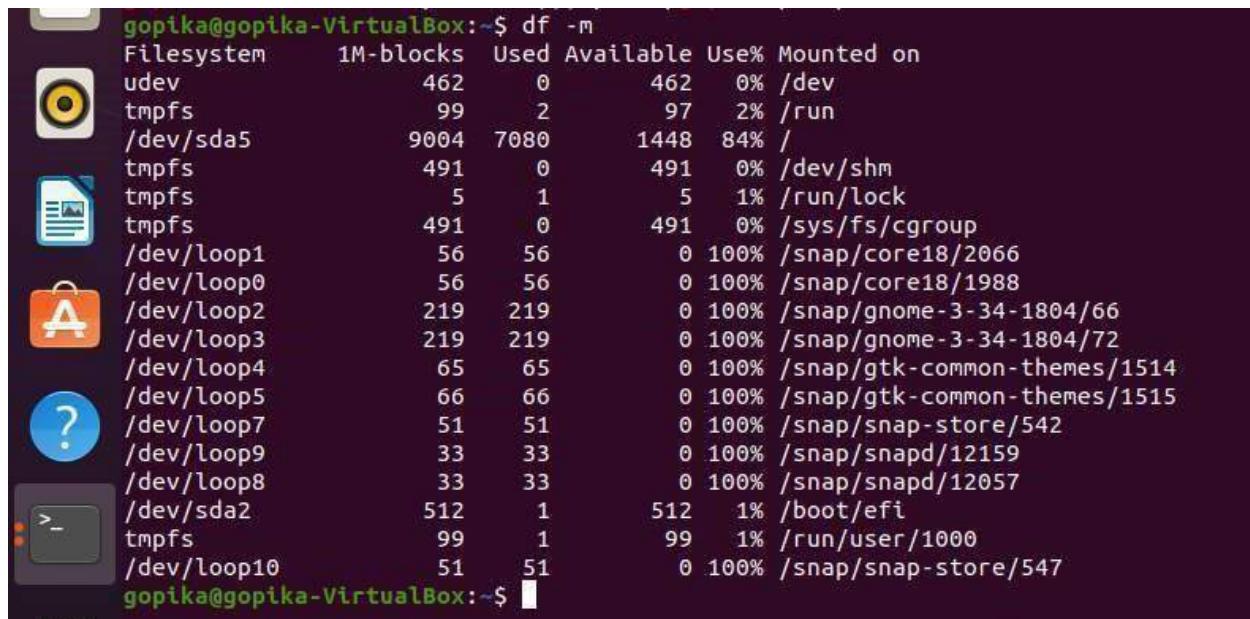
```
gopika@gopika-VirtualBox:~$ find /home/ -name text1
/home/gopika/text1
gopika@gopika-VirtualBox:~$
```

Grep: Grep is an essential Linux and Unix command. It is used to search text and strings in a given file. In other words, grep command searches the given file for lines containing a match to the given strings or words.



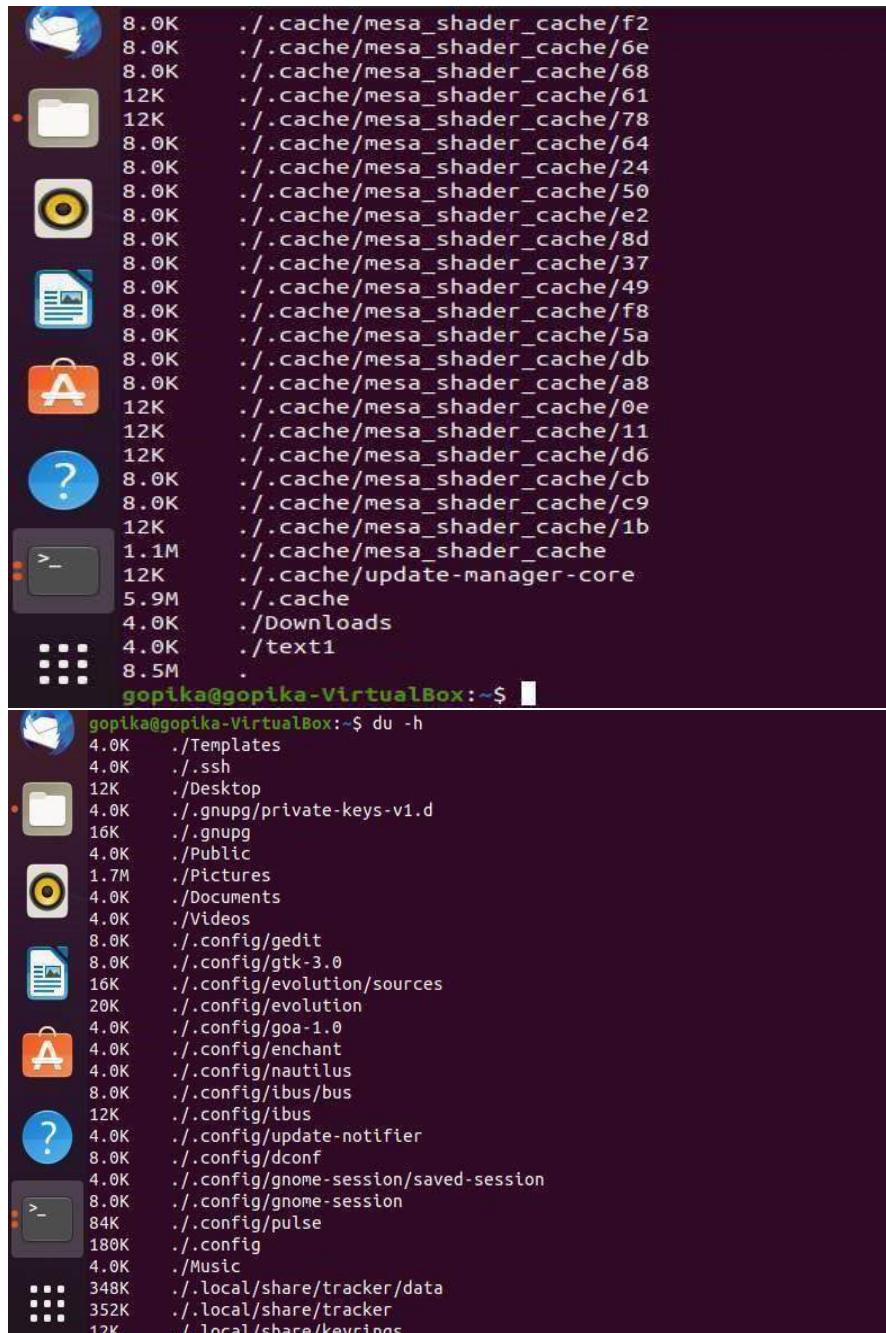
```
gopika@gopika-VirtualBox:~$ grep python myfile1
python
gopika@gopika-VirtualBox:~$ grep gopika /etc/passwd
gopika:x:1000:1000:Gopika Das,,,:/home/gopika:/bin/bash
gopika@gopika-VirtualBox:~$
```

Df: The df command tells the amount of space used and available on the file system. A filesystem is nothing but a hierarchy of directories.



```
gopika@gopika-VirtualBox:~$ df -m
Filesystem      1M-blocks  Used Available Use% Mounted on
udev              462     0      462   0% /dev
tmpfs              99     2      97   2% /run
/dev/sda5        9004  7080    1448  84% /
tmpfs              491     0      491   0% /dev/shm
tmpfs                  5     1       5   1% /run/lock
tmpfs              491     0      491   0% /sys/fs/cgroup
/dev/loop1            56     56      0 100% /snap/core18/2066
/dev/loop0            56     56      0 100% /snap/core18/1988
/dev/loop2            219    219      0 100% /snap/gnome-3-34-1804/66
/dev/loop3            219    219      0 100% /snap/gnome-3-34-1804/72
/dev/loop4              65     65      0 100% /snap/gtk-common-themes/1514
/dev/loop5              66     66      0 100% /snap/gtk-common-themes/1515
/dev/loop7              51     51      0 100% /snap/snap-store/542
/dev/loop9              33     33      0 100% /snap/snapd/12159
/dev/loop8              33     33      0 100% /snap/snapd/12057
/dev/sda2             512     1      512   1% /boot/efi
tmpfs              99     1      99   1% /run/user/1000
/dev/loop10             51     51      0 100% /snap/snap-store/547
gopika@gopika-VirtualBox:~$
```

Du: The Linux “ du ” (Disk Usage) is a standard Unix /Linux command, used to check the information of disk usage of files and directories on a machine. The du command has many parameter options that can be used to get the results in many formats. The du command also displays the files and directory sizes in a recursively manner.



```

8.0K   ./cache/mesa_shader_cache/f2
8.0K   ./cache/mesa_shader_cache/6e
8.0K   ./cache/mesa_shader_cache/68
12K    ./cache/mesa_shader_cache/61
12K    ./cache/mesa_shader_cache/78
8.0K   ./cache/mesa_shader_cache/64
8.0K   ./cache/mesa_shader_cache/24
8.0K   ./cache/mesa_shader_cache/50
8.0K   ./cache/mesa_shader_cache/e2
8.0K   ./cache/mesa_shader_cache/8d
8.0K   ./cache/mesa_shader_cache/37
8.0K   ./cache/mesa_shader_cache/49
8.0K   ./cache/mesa_shader_cache/f8
8.0K   ./cache/mesa_shader_cache/5a
8.0K   ./cache/mesa_shader_cache/db
8.0K   ./cache/mesa_shader_cache/a8
12K    ./cache/mesa_shader_cache/0e
12K    ./cache/mesa_shader_cache/11
12K    ./cache/mesa_shader_cache/d6
8.0K   ./cache/mesa_shader_cache/cb
8.0K   ./cache/mesa_shader_cache/c9
12K    ./cache/mesa_shader_cache/1b
1.1M   ./cache/mesa_shader_cache
12K    ./cache/update-manager-core
5.9M   ./cache
4.0K   ./Downloads
4.0K   ./text1
8.5M   .

gopika@gopika-VirtualBox:~$ du -h
4.0K   ./Templates
4.0K   ./ssh
12K    ./Desktop
4.0K   ./gnupg/private-keys-v1.d
16K    ./gnupg
4.0K   ./Public
1.7M   ./Pictures
4.0K   ./Documents
4.0K   ./Videos
8.0K   ./config/gedit
8.0K   ./config/gtk-3.0
16K    ./config/evolution/sources
20K    ./config/evolution
4.0K   ./config/goa-1.0
4.0K   ./config/enchant
4.0K   ./config/nautilus
8.0K   ./config/ibus/bus
12K    ./config/ibus
4.0K   ./config/update-notifier
8.0K   ./config/dconf
4.0K   ./config/gnome-session/saved-session
8.0K   ./config/gnome-session
84K    ./config/pulse
180K   ./config
4.0K   ./Music
348K   ./local/share/tracker/data
352K   ./local/share/tracker
12K    ./local/share/kevringos

```

Useradd: The useradd Command The useradd command is used on Linux and other Unix -like operating systems both to add new users (also referred

to as accounts), inclusive of their user names, passwords and other data, and to update default new user information.

```
gopika@gopika-VirtualBox:~$ sudo su -
root@gopika-VirtualBox:~# useradd gopu
root@gopika-VirtualBox:~# tail /etc/passwd
hplip:x:119:7:HPLIP system user,,,:/run/hplip:/bin/false
whoopsie:x:120:125::/nonexistent:/bin/false
colord:x:121:126:colord colour management daemon,,,:/var/lib/colord:/usr/sbin/n
ologin
geoclue:x:122:127::/var/lib/geoclue:/usr/sbin/nologin
pulse:x:123:128:PulseAudio daemon,,,:/var/run/pulse:/usr/sbin/nologin
gnome-initial-setup:x:124:65534::/run/gnome-initial-setup/:/bin/false
gdm:x:125:130:Gnome Display Manager:/var/lib/gdm3:/bin/false
gopika:x:1000:1000:Gopika Das,,,:/home/gopika:/bin/bash
systemd-coredump:x:999:999:systemd Core Dumper:/:/usr/sbin/nologin
gopu:x:1001:1001::/home/gopu:/bin/sh
root@gopika-VirtualBox:~#
```

Userdel: userdel command in Linux system is used to delete a user account and related files. This command basically modifies the system account files, deleting all the entries which refer to the username LOGIN. It is a low-level utility for removing the users.

```
root@gopika-VirtualBox:~# userdel gopu
root@gopika-VirtualBox:~#
```

Sudo: Sudo stands for SuperUser DO and is used to access restricted files and operations. By default, Linux restricts access to certain parts of the system preventing sensitive files from being compromised.

```
[sudo] password for gopika:
gopika@gopika-VirtualBox:~$ useradd gopu
useradd: user 'gopu' already exists
```

```
root@gopika-VirtualBox:~# tail /etc/passwd
hplip:x:119:7:HPLIP system user,,,,:/run/hplip:/bin/false
whoopsie:x:120:125::/nonexistent:/bin/false
colord:x:121:126:colord colour management daemon,,,:/var/lib/colord:/usr/sbin/n
ologin
geoclue:x:122:127::/var/lib/geoclue:/usr/sbin/nologin
pulse:x:123:128:PulseAudio daemon,,,,:/var/run/pulse:/usr/sbin/nologin
gnome-initial-setup:x:124:65534::/run/gnome-initial-setup/:/bin/false
gdm:x:125:130:Gnome Display Manager:/var/lib/gdm3:/bin/false
gopika:x:1000:1000:Gopika Das,,,,:/home/gopika:/bin/bash
systemd-coredump:x:999:999:systemd Core Dumper:/:/usr/sbin/nologin
gopu:x:1001:1001::/home/gopu:/bin/sh
root@gopika-VirtualBox:~#
```

```
root@gopika-VirtualBox:~# userdel gopu
root@gopika-VirtualBox:~#
```

Passwd: On Unix-like operating systems, the passwd command is used to change the password of a user account. A normal user can run passwd to change their password, and a system administrator (the superuser) can use passwd to change another user's password, or define how that account's password can be used or changed.

```
root@gopika-VirtualBox:~# passwd gopika
New password:
Retype new password:
passwd: password updated successfully
root@gopika-VirtualBox:~#
```

usermod:

usermod command or modify user is a command in Linux that is used to change the properties of a user in Linux through the command line. After creating a user we have to sometimes change their attributes like password

```
root@gopika-VirtualBox:/home/gopika# usermod -G spiderman superman
root@gopika-VirtualBox:/home/gopika# cat /etc/group
root:x:0:
daemon:x:1:
bin:x:2:
sys:x:3:
adm:x:4:syslog,gopika
tty:x:5:syslog
disk:x:6:
lp:x:7:
mail:x:8:
news:x:9:
uucp:x:10:
man:x:12:
proxy:x:13:
gopika:x:100:
sambashare:x:132:gopika
systemd-coredump:x:999:
gopu:x:1001:
superman:x:1002:
spiderman:x:1003:ironman,superman
ironman:x:1004:
```

or login directory etc. so in order to do that we use the Usermod command.

groupadd

groupadd command is used to create a new user group. groupadd command creates a new group account using the values specified on the command line and the default values from the system. The new group will be entered into the system files as needed. The new group will be entered into the system files as needed.

```
root@gopika-VirtualBox:/home/gopika# groupadd spiderman
root@gopika-VirtualBox:/home/gopika# cat /etc/group
root:x:0:
daemon:x:1:
bin:x:2:
sys:x:3:
adm:x:4:syslog,gopika
tty:x:5:syslog
disk:x:6:
lp:x:7:
mail:x:8:
```

3.groups

In linux, there can be multiple users(those who use/operate the system), and groups are nothing but the collection of users. Groups make it easy to manage users with the same security and access privileges. A user can be part of different groups.

```
gopika@gopika-VirtualBox:~$ groups gopika
gopika : gopika adm cdrom sudo dip plugdev lpadmin lxd sambashare
gopika@gopika-VirtualBox:~$
```

4.groupdel

groupdel command is used to delete a existing group. It will delete all entry that refers to the group, modifies the system account files, and it is handled by superuser or root user.

```
root@gopika-VirtualBox:/home/gopika# groupdel avengers
root@gopika-VirtualBox:/home/gopika# cat /etc/group
root:x:0:
daemon:x:1:
bin:x:2:
sys:x:3:
adm:x:4:syslog,gopika
tty:x:5:syslog
sambashare:x:132:gopika
systemd-coredump:x:999:
gopu:x:1001:
superman:x:1002:superman
spiderman:x:1003:ironman,superman
ironman:x:1004:
```

groupmod -command in Linux is used to modify or change the existing group on Linux system. It can be handled by superuser or root user. Basically, it modifies a group definition on the

system by modifying the right entry in the database of the group.

```
root@gopika-VirtualBox:/home/gopika# groupmod -n superheros spiderman
root@gopika-VirtualBox:/home/gopika# cat /etc/group
root:x:0:
daemon:x:1:
bin:x:2:
sys:x:3:
adm:x:4:syslog,gopika
tty:x:5:syslog
disk:x:6:
lp:x:7:
mail:x:8:
news:x:9:
uucp:x:10:
gdm:x:130:
lxd:x:131:gopika
gopika:x:1000:
sambashare:x:132:gopika
systemd-coredump:x:999:
gopu:x:1001:
superman:x:1002:superman
ironman:x:1004:
superheros:x:1003:ironman,superman
```

6 chmod

In Unix-like operating systems, the **chmod** command is used to change the access mode of a file.

The name is an abbreviation of **change mode**.

```
gopika@gopika-VirtualBox:~$ touch sample1.txt
gopika@gopika-VirtualBox:~$ ls -l sample1.txt
-rw-rw-r-- 1 gopika gopika 0 Aug 12 12:17 sample1.txt
gopika@gopika-VirtualBox:~$ chmod u+x sample1.txt
gopika@gopika-VirtualBox:~$ ls -l sample1.txt
-rwxrw-r-- 1 gopika gopika 0 Aug 12 12:17 sample1.txt
```

7.chown

chown command is used to change the file Owner or group. Whenever you want to change ownership you can use chown command.

```
root@gopika-VirtualBox:~# chown gopika snap
root@gopika-VirtualBox:~# ll
total 28
drwx----- 4 root    root 4096 Jun 21 13:21 .
drwxr-xr-x 20 root    root 4096 Jun 14 11:36 ../
-rw------- 1 root    root  252 Aug 12 11:28 .bash_history
-rw-r--r-- 1 root    root 3106 Dec  5  2019 .bashrc
drwx----- 2 root    root 4096 Feb  9  2021 .cache/
-rw-r--r-- 1 root    root  161 Dec  5  2019 .profile
drwxr-xr-x  3 gopika root 4096 Jun 14 13:22 snap/
root@gopika-VirtualBox:~#
```

8.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 or any other user in the server.

```
root@gopika-VirtualBox:/home/gopika# id superman
uid=1002(superman) gid=1002(superman) groups=1002(superman),1003(spiderman),1005(avengers)
```

9.ps

Abbreviation for “**Process Status**”. ps command is used to list the currently running processes and their PIDs along with some other information depends on different options. It reads the process information from the virtual files in **/proc** filesystem. /proc contains virtual files, this is the reason it’s referred as a virtual file system.

```
gopika@gopika-VirtualBox:~$ ps
  PID TTY          TIME CMD
 1709 pts/0    00:00:00 bash
 2113 pts/0    00:00:00 bash
 2213 pts/0    00:00:00 bash
 2221 pts/0    00:00:00 ps
gopika@gopika-VirtualBox:~$ ps -a
  PID TTY          TIME CMD
 1068 tty2    00:00:13 Xorg
 1163 tty2    00:00:00 gnome-session-b
 1783 pts/0    00:00:00 sudo
 1896 pts/0    00:00:00 su
 1897 pts/0    00:00:00 bash
 2112 pts/0    00:00:00 su
 2113 pts/0    00:00:00 bash
 2170 pts/0    00:00:00 sudo
 2171 pts/0    00:00:00 su
 2172 pts/0    00:00:00 bash
 2212 pts/0    00:00:00 su
 2213 pts/0    00:00:00 bash
 2223 pts/0    00:00:00 ps
```

10.top

top command is used to show the Linux processes. It provides a dynamic real-time view of the running system. Usually, this command shows the summary information of the system and the list of processes or threads which are currently managed by the Linux Kernel.

```

top - 01:23:33 up 25 min, 1 user, load average: 0.08, 0.76, 1.20
Tasks: 169 total, 2 running, 167 sleeping, 0 stopped, 0 zombie
%Cpu(s): 0.7 us, 0.7 sy, 0.0 ni, 98.6 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
MiB Mem : 980.8 total, 139.4 free, 607.3 used, 234.1 buff/cache
MiB Swap: 424.5 total, 329.6 free, 94.9 used. 229.6 avail Mem

PID USER PR NI VIRT RES SHR S %CPU %MEM TIME+ COMMAND
7092 gopika 20 0 3466800 300108 73412 S 1.0 29.9 0:47.00 gnome-
16072 gopika 20 0 20496 3596 3080 R 0.3 0.4 0:00.04 top
  1 root 20 0 184016 9388 7204 S 0.0 0.9 0:01.68 systemd
  2 root 20 0 0 0 0 S 0.0 0.0 0:00.00 kthrea+
  3 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 rcu_gp
  4 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 rcu_pa+
  6 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker+
  9 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 mm_per+
 10 root 20 0 0 0 0 S 0.0 0.0 0:00.14 ksofti+
 11 root 20 0 0 0 0 R 0.0 0.0 0:00.61 rcu_sc+
 12 root rt 0 0 0 0 S 0.0 0.0 0:00.02 migrat+
 13 root -51 0 0 0 0 S 0.0 0.0 0:00.00 idle_i+
 14 root 20 0 0 0 0 S 0.0 0.0 0:00.00 cpuhp/0
 15 root 20 0 0 0 0 S 0.0 0.0 0:00.00 kdevtm+
 16 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 netns
 17 root 20 0 0 0 0 S 0.0 0.0 0:00.00 rcu_ta+
 18 root 20 0 0 0 0 S 0.0 0.0 0:00.00 rcu_ta+
 19 root 20 0 0 0 0 S 0.0 0.0 0:00.00 rcu_ta+
 20 root 20 0 0 0 0 S 0.0 0.0 0:00.00 kauditd
 21 root 20 0 0 0 0 S 0.0 0.0 0:00.00 khungt+
 22 root 20 0 0 0 0 S 0.0 0.0 0:00.00 oom_re+
 23 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 writeb+

```

wc

- It is used to find out number of lines, word count, byte and characters count in the files specified in the file arguments.
- wc state.txt
- wc state.txt capital.txt
- wc -l state.txt
- wc -w state.txt capital.txt

```
gopika@gopika-VirtualBox:~$ wc file23.txt  
1 3 17 file23.txt
```

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

```
#tar cf archive.tar state.txt capital.txt //create archive file
```

```
#ls archive.tar
```

```
#tar tf /archive.tar // list contents of tar archive file
```

- Extract an archive created with tar

```
#mkdir backup
```

```
#cd backup
```

```
#tar xf /home/kaj/Documents/Kaj_Linux/archive.tar
```

- Compression Types gzip(z), bzip2(j), xz(J)

```
#tar czf /abc.tar.gz /etc
```

```
#tar cjf /abcd.tar.bz2 /etc
```

```
#tar cJf /abcde.tar.xz /etc
```

- Extract an archive #mkdir backup1

```
#cd backup1  
#tar xzf /abc.tar.gz  
#mkdir backup2  
#cd backup2  
#tar xjf /abcd.tar.bz2  
#mkdir backup3  
#cd backup3  
#tar xJf /abcde.tar.xz
```

```
gopika@gopika-VirtualBox:~$ tar cf archive1.tar file23.txt number.txt  
gopika@gopika-VirtualBox:~$ ls  
archive1.tar  Documents  Music    number.txt  sample1.txt  text2.txt  
da1.txt       Downloads  myfile   Pictures   sample.txt   Videos  
da.txt        file23.txt myfile1  Public     Templates  
Desktop      file3     myfile2  sample    text1  
gopika@gopika-VirtualBox:~$ █
```

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.
- Performing operations on variables inside a shell script #expr 10 +

```
gopika@gopika-VirtualBox:~$ expr --version
expr (GNU coreutils) 8.30
Copyright (C) 2018 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <https://gnu.org/licenses/gpl.html>.
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.

Written by Mike Parker, James Youngman, and Paul Eggert.
gopika@gopika-VirtualBox:~$ expr 20 + 5
25
gopika@gopika-VirtualBox:~$ expr 4 - 3
1
gopika@gopika-VirtualBox:~$
```

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.

```
#ls -l | wc -l
```

```
#cat /etc/passwd.txt | head -7 | tail -5
```

```
gopika@gopika-VirtualBox:~$ ls -l|wc -l
23
gopika@gopika-VirtualBox:~$ █
```

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.

```
gopika@gopika-VirtualBox:~$ ssh --help
unknown option -- -
usage: ssh [-46AaCfGgKkMNnqsTtVvXxYy] [-B bind_interface]
           [-b bind_address] [-c cipher_spec] [-D [bind_address:]port]
           [-E log_file] [-e escape_char] [-F configfile] [-I pkcs11]
           [-i identity_file] [-J [user@]host[:port]] [-L address]
           [-l login_name] [-m mac_spec] [-O ctl_cmd] [-o option] [-p port]
           [-Q query_option] [-R address] [-S ctl_path] [-W host:port]
           [-w local_tun[:remote_tun]] destination [command]
```

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
$scp /etc/yum.config /etc/hosts ServerX:/home/student $scp
ServerX:/etc/hostname /home/student
```

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

```
gopika@gopika-VirtualBox:~$ ssh-keygen -t rsa
Generating public/private rsa key pair.
Enter file in which to save the key (/home/gopika/.ssh/id_rsa): key1
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in key1
Your public key has been saved in key1.pub
The key fingerprint is:
SHA256:eYLrSdDZazA4JE80T8cjw84+ymeCu9sLJR0/f03qeMA gopika@gopika-VirtualBox
The key's randomart image is:
+---[RSA 3072]---+
|   o.... |
|   . ++.o |
| o oo.o . |
| B oo+ . |
| o Bo* S . |
| + +E+ +. |
| .o...ooo+ |
| .o++o++ . |
| ++o==+. |
+---[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
```

Lab Assignment Managing Files, Creating Users and Groups Using Command-line tools 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 filmX.mp3 (In each set, replace X with the numbers 1 through6)

```
gopika@gopika-VirtualBox:~$ touch song1.mp3
gopika@gopika-VirtualBox:~$ touch song2.mp3
gopika@gopika-VirtualBox:~$ touch song3.mp3
gopika@gopika-VirtualBox:~$ touch song4.mp3
gopika@gopika-VirtualBox:~$ touch song5.mp3
gopika@gopika-VirtualBox:~$ touch song6.mp3
gopika@gopika-VirtualBox:~$ ls
allfiles.txt  Documents  key1.pub  number.txt  sample.txt  song5.mp3  Videos
archive1.tar  Downloads  Music    Pictures    song1.mp3   song6.mp3  work
da1.txt       file23.txt myfile   Public     song2.mp3   Templates
da.txt        file3      myfile1  sample    song3.mp3   text1
Desktop      key1      myfile2  sample1.txt  song4.mp3   text2.txt
```

```

gopika@gopika-VirtualBox:~$ touch snap1.mp3
gopika@gopika-VirtualBox:~$ touch snap2.mp3
gopika@gopika-VirtualBox:~$ touch snap3.mp3
gopika@gopika-VirtualBox:~$ touch snap4.mp3
gopika@gopika-VirtualBox:~$ touch snap5.mp3
gopika@gopika-VirtualBox:~$ touch snap6.mp3
gopika@gopika-VirtualBox:~$ ls
archive1.tar  file23.txt  myfile1    sample1.txt  snap5.mp3  song5.mp3
da1.txt       file3        myfile2    sample.txt   snap6.mp3  song6.mp3
da.txt        key1        number.txt  snap1.mp3   song1.mp3  Templates
Desktop      key1.pub    Pictures   snap2.mp3   song2.mp3  text1
Documents    Music       Public    snap3.mp3   song3.mp3  text2.txt
Downloads   myfile      sample    snap4.mp3   song4.mp3  Videos

gopika@gopika-VirtualBox:~$ touch film1.mp3
gopika@gopika-VirtualBox:~$ touch film2.mp3
gopika@gopika-VirtualBox:~$ touch film3.mp3
gopika@gopika-VirtualBox:~$ touch film4.mp3
gopika@gopika-VirtualBox:~$ touch film5.mp3
gopika@gopika-VirtualBox:~$ touch film6.mp3
gopika@gopika-VirtualBox:~$ ls
allfiles.txt  file23.txt  film6.mp3  number.txt  song2.mp3  text2.txt
archive1.tar  file3      key1     Pictures   song3.mp3  Videos
da1.txt       film1.mp3  key1.pub  Public    song4.mp3  work
da.txt        film2.mp3  Music    sample    song5.mp3
Desktop      film3.mp3  myfile   sample1.txt song6.mp3
Documents    film4.mp3  myfile1  sample.txt Templates
Downloads   film5.mp3  myfile2  song1.mp3  text1

```

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

```
gopika@gopika-VirtualBox:~$ mv song1.mp3 ./Music/
gopika@gopika-VirtualBox:~$ mv song2.mp3 ./Music/
gopika@gopika-VirtualBox:~$ mv song3.mp3 ./Music/
gopika@gopika-VirtualBox:~$ mv song4.mp3 ./Music/
gopika@gopika-VirtualBox:~$ mv song5.mp3 ./Music/
gopika@gopika-VirtualBox:~$ mv song6.mp3 ./Music/
gopika@gopika-VirtualBox:~$ ls -R Music
Music:
song1.mp3  song2.mp3  song3.mp3  song4.mp3  song5.mp3  song6.mp3
```

```
gopika@gopika-VirtualBox:~$ mv snap1.mp3 ./Pictures/
gopika@gopika-VirtualBox:~$ mv snap2.mp3 ./Pictures/
gopika@gopika-VirtualBox:~$ mv snap3.mp3 ./Pictures/
gopika@gopika-VirtualBox:~$ mv snap4.mp3 ./Pictures/
gopika@gopika-VirtualBox:~$ mv snap5.mp3 ./Pictures/
gopika@gopika-VirtualBox:~$ mv snap6.mp3 ./Pictures/
gopika@gopika-VirtualBox:~$ ls -R Pictures
Pictures:
'Screenshot from 2021-06-14 13-30-07.png'
'Screenshot from 2021-06-14 13-35-24.png'
'Screenshot from 2021-06-14 13-35-31.png'
'Screenshot from 2021-06-14 13-35-34.png'
'Screenshot from 2021-06-14 14-04-09.png'
'Screenshot from 2021-06-14 14-06-55.png'
'Screenshot from 2021-06-14 23-15-37.png'
'Screenshot from 2021-06-14 23-17-14.png'
'Screenshot from 2021-06-14 23-20-42.png'
'Screenshot from 2021-06-14 23-24-23.png'
'Screenshot from 2021-06-14 23-27-54.png'
'Screenshot from 2021-06-14 23-32-45.png'
'Screenshot from 2021-06-14 23-33-35.png'
'Screenshot from 2021-06-14 23-35-08.png'
'Screenshot from 2021-06-14 23-39-59.png'
'Screenshot from 2021-06-14 23-59-36.png'
snap1.mp3
snap2.mp3
snap3.mp3
snap4.mp3
snap5.mp3
snap6.mp3
gopika@gopika-VirtualBox:~$ mv film1.mp3 ./Videos/
gopika@gopika-VirtualBox:~$ mv film2.mp3 ./Videos/
gopika@gopika-VirtualBox:~$ mv film3.mp3 ./Videos/
gopika@gopika-VirtualBox:~$ mv film4.mp3 ./Videos/
gopika@gopika-VirtualBox:~$ mv film5.mp3 ./Videos/
gopika@gopika-VirtualBox:~$ mv film6.mp3 ./Videos/
gopika@gopika-VirtualBox:~$ ls -R Videos
Videos:
film1.mp3  film2.mp3  film3.mp3  film4.mp3  film5.mp3  film6.mp3
gopika@gopika-VirtualBox:~$
```

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.

```
gopika@gopika-VirtualBox:~$ mkdir {friends,family,work}
gopika@gopika-VirtualBox:~$ ls
archive1.tar  Downloads  key1      myfile2    sample1.txt  Videos
da1.txt       family     key1.pub   number.txt  sample.txt   work
da.txt        file23.txt Music     Pictures    Templates
Desktop      file3      myfile    Public     text1
Rhythmbox    friends   myfile1   sample    text2.txt
gopika@gopika-VirtualBox:~$
```

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

```
gopika@gopika-VirtualBox:~$ cp Music/song1.mp3 friends
gopika@gopika-VirtualBox:~$ cp Music/song2.mp3 friends
gopika@gopika-VirtualBox:~$ cp Music/song3.mp3 friends
gopika@gopika-VirtualBox:~$ cp Music/song4.mp3 friends
gopika@gopika-VirtualBox:~$ cp Music/song5.mp3 friends
gopika@gopika-VirtualBox:~$ cp Music/song6.mp3 friends
gopika@gopika-VirtualBox:~$ ls -R friends
friends:
song1.mp3  song2.mp3  song3.mp3  song4.mp3  song5.mp3  song6.mp3
```

```
gopika@gopika-VirtualBox:~$ cp Pictures/snap1.mp3 family
gopika@gopika-VirtualBox:~$ cp Pictures/snap2.mp3 family
gopika@gopika-VirtualBox:~$ cp Pictures/snap3.mp3 family
gopika@gopika-VirtualBox:~$ cp Pictures/snap4.mp3 family
gopika@gopika-VirtualBox:~$ cp Pictures/snap5.mp3 family
gopika@gopika-VirtualBox:~$ cp Pictures/snap6.mp3 family
gopika@gopika-VirtualBox:~$ ls -R family
family:
snap1.mp3  snap2.mp3  snap3.mp3  snap4.mp3  snap5.mp3  snap6.mp3
```

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

```
gopika@gopika-VirtualBox:~$ rmdir {family,friends}
rmdir: failed to remove 'family': Directory not empty
rmdir: failed to remove 'friends': Directory not empty
```

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

```
gopika@gopika-VirtualBox:~$ rm -r family friends
gopika@gopika-VirtualBox:~$ ls
archive1.tar  Documents  key1      myfile1    Public      Templates  work
da1.txt       Downloads  key1.pub   myfile2    sample     text1
da.txt        file23.txt Music     Pictures   sample.txt  text2.txt
Desktop      file3      myfile    Pictures   sample.txt  Videos
```

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

```
gopika@gopika-VirtualBox:~$ ls -al>allfiles.txt
gopika@gopika-VirtualBox:~$ ls
allfiles.txt  Documents  key1.pub  number.txt  sample.txt  work
archive1.tar  Downloads  Music    Pictures    Templates
da1.txt       file23.txt myfile   Public     text1
da.txt        file3      myfile1  sample    text2.txt
Desktop      key1      myfile2  sample1.txt Videos
gopika@gopika-VirtualBox:~$ ls -al
total 128
drwxr-xr-x  17 gopika gopika  4096 Aug 17 11:02 .
drwxr-xr-x  3 root   root    4096 Jun 14 11:49 ..
-rw-rw-r--  1 gopika gopika  2129 Aug 17 11:02 allfiles.txt
-rw-rw-r--  1 gopika gopika 10240 Aug 13 06:03 archive1.tar
-rw-----  1 gopika gopika 2802 Aug 13 01:26 .bash_history
-rw-r--r--  1 gopika gopika 220  Jun 14 11:49 .bash_logout
-rw-r--r--  1 gopika gopika 3771 Jun 14 11:49 .bashrc
drwx----- 11 gopika gopika 4096 Jun 14 14:11 .cache
drwx----- 14 gopika gopika 4096 Aug 12 12:35 .config
-rw-rw-r--  1 gopika gopika     0 Jun 20 12:42 da1.txt
-rw-rw-r--  1 gopika gopika     0 Jun 20 12:42 da.txt
drwxr-xr-x  2 gopika gopika 4096 Jun 20 12:47 Desktop
drwxr-xr-x  2 gopika gopika 4096 Jun 20 12:53 Documents
```

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

```
gopika@gopika-VirtualBox:~$ date
Tue 17 Aug 2021 11:03:57 AM EDT
```

9. Add the user Juliet

```
gopika@gopika-VirtualBox:~$ sudo useradd juliet
[sudo] password for gopika:
gopika@gopika-VirtualBox:~$
```

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

```
gopika@gopika-VirtualBox:~$ cat /etc/passwd
root:x:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/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
```

```
gnome-initial-setup:x:124:65534::/run/gnome-initial-setup/:/bin/false
gdm:x:125:130:Gnome Display Manager:/var/lib/gdm3:/bin/false
gopika:x:1000:1000:Gopika Das,,,,:/home/gopika:/bin/bash
systemd-coredump:x:999:999:systemd Core Dumper:/:/usr/sbin/nologin
gopu:x:1001:1001::/home/gopu:/bin/sh
superman:x:1002:1002::/home/superman:/bin/sh
ironman:x:1003:1004::/home/ironman:/bin/sh
juliet:x:1004:1005::/home/juliet:/bin/sh
```

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

```
gopika@gopika-VirtualBox:~$ sudo passwd juliet
New password:
Retype new password:
passwd: password updated successfully
gopika@gopika-VirtualBox:~$
```

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

```
gopika@gopika-VirtualBox:~$ sudo groupadd -g 30000 shakespeare
gopika@gopika-VirtualBox:~$
```

13. Create a supplementary group called artists.

```
gopika@gopika-VirtualBox:~$ sudo groupadd -g 50000 artists
gopika@gopika-VirtualBox:~$ cat /etc/group
root:x:0:
daemon:x:1:
bin:x:2:
sys:x:3:
adm:x:4:syslog,gopika
tty:x:5:syslog
disk:x:6:
lp:x:7:
mail:x:8:
news:x:9:
uucp:x:10:
```

```
[gopika@gopika-VirtualBox:~]$ cat /etc/group
gopu:x:1001:
superman:x:1002:superman
ironman:x:1004:
superheros:x:1003:ironman,superman
juliet:x:1005:
shakespeare:x:30000:
artists:x:50000:
```

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

```
[gopika@gopika-VirtualBox:~]$ sudo groupadd -g 50000 artists
[gopika@gopika-VirtualBox:~]$ cat /etc/group
```

```
[gopika@gopika-VirtualBox:~]$ cat /etc/group
gopu:x:1001:
superman:x:1002:superman
ironman:x:1004:
superheros:x:1003:ironman,superman
juliet:x:1005:
shakespeare:x:30000:
artists:x:50000:
```

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

```
[gopika@gopika-VirtualBox:~]$ sudo usermod -a -G shakespeare juliet
[gopika@gopika-VirtualBox:~]$ groups juliet
juliet : juliet shakespeare
[gopika@gopika-VirtualBox:~]$
```

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

```
[gopika@gopika-VirtualBox:~]$ id juliet
uid=1004(juliet) gid=1005(juliet) groups=1005(juliet),30000(shakespeare)
[gopika@gopika-VirtualBox:~]$
```

17. Add Romeo and Hamlet to the Shakespeare group

```
[gopika@gopika-VirtualBox:~]$ sudo useradd Romeo
[gopika@gopika-VirtualBox:~]$ sudo useradd Hamlet
[gopika@gopika-VirtualBox:~]$ sudo usermod -a -G shakespeare Romeo
[gopika@gopika-VirtualBox:~]$ sudo usermod -a -G shakespeare Hamlet
[gopika@gopika-VirtualBox:~]$ groups Romeo
Romeo : Romeo shakespeare
[gopika@gopika-VirtualBox:~]$ groups Hamlet
Hamlet : Hamlet shakespeare
[gopika@gopika-VirtualBox:~]$
```

18. Add Reba, Iolly and Elvis to the artists group.

```
gopika@gopika-VirtualBox:~$ sudo useradd Reba
gopika@gopika-VirtualBox:~$ sudo useradd Dolly
gopika@gopika-VirtualBox:~$ sudo usermod -a -G artists Reba
gopika@gopika-VirtualBox:~$ sudo usermod -a -G artists Dolly
gopika@gopika-VirtualBox:~$ groups Reba
Reba : Reba artists
gopika@gopika-VirtualBox:~$ groups Dolly
Dolly : Dolly artists
```

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

```
geoclue:x:127:
pulse:x:128:
pulse-access:x:129:
libreOfficeWriter:
gdm:x:130:
lxd:x:131:gopika
gopika:x:1000:
sambashare:x:132:gopika
systemd-coredump:x:999:
gopu:x:1001:
superman:x:1002:superman
ironman:x:1004:
superheros:x:1003:ironman,superman
juliet:x:1005:
shakespeare:x:30000:juliet,Romeo,Hamlet
artists:x:50000:Reba,Dolly
Romeo:x:50001:
Hamlet:x:1006:
Reba:x:1007:
Dolly:x:1008:
```

20. Attempt to remove user Iolly.

□

```
gopika@gopika-VirtualBox:~$ sudo userdel Dolly
gopika@gopika-VirtualBox:~$ cat /etc/group
root:x:0:
daemon:x:1:
bin:x:2:
sys:x:3:
adm:x:4:syslog,gopika
tty:x:5:syslog
disk:x:6:
lp:x:7:
```

```
juliet:x:1005:
Shakespeare:x:30000:juliet,Romeo,Hamlet
artists:x:50000:Reba
Romeo:x:50001:
Hamlet:x:1006:
Reba:x:1007:
```

LINUX

1.ping

```
gopika@gopika-VirtualBox:~$ ping www.facebook.com
PING star-mini.c10r.facebook.com (157.240.192.35) 56(84) bytes of data.
64 bytes from edge-star-mini-shv-02-maa2.facebook.com (157.240.192.35): icmp_seq=1 ttl=57 time=28.8 ms

gopika@gopika-VirtualBox:~$ ping -V
ping from iputils s20190709
gopika@gopika-VirtualBox:~$ ping -b google.com
PING google.com (142.250.67.46) 56(84) bytes of data.
64 bytes from maa05s12-in-f14.1e100.net (142.250.67.46): icmp_seq=1 ttl=118 time=28.1 ms
64 bytes from maa05s12-in-f14.1e100.net (142.250.67.46): icmp_seq=2 ttl=118 time=26.4 ms
64 bytes from maa05s12-in-f14.1e100.net (142.250.67.46): icmp_seq=3 ttl=118 time=27.5 ms
^C
--- google.com ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2004ms
rtt min/avg/max/mdev = 26.377/27.340/28.144/0.730 ms

gopika@gopika-VirtualBox:~$ ping -a google.com
PING google.com (142.250.67.46) 56(84) bytes of data.
64 bytes from maa05s12-in-f14.1e100.net (142.250.67.46): icmp_seq=1 ttl=118 time=27.0 ms
64 bytes from maa05s12-in-f14.1e100.net (142.250.67.46): icmp_seq=2 ttl=118 time=27.1 ms
64 bytes from maa05s12-in-f14.1e100.net (142.250.67.46): icmp_seq=3 ttl=118 time=25.3 ms
64 bytes from maa05s12-in-f14.1e100.net (142.250.67.46): icmp_seq=4 ttl=118 time=27.5 ms
64 bytes from maa05s12-in-f14.1e100.net (142.250.67.46): icmp_seq=5 ttl=118 time=26.8 ms
64 bytes from maa05s12-in-f14.1e100.net (142.250.67.46): icmp_seq=6 ttl=118 time=25.5 ms
64 bytes from maa05s12-in-f14.1e100.net (142.250.67.46): icmp_seq=7 ttl=118 time=27.0 ms
64 bytes from maa05s12-in-f14.1e100.net (142.250.67.46): icmp_seq=8 ttl=118 time=27.6 ms
64 bytes from maa05s12-in-f14.1e100.net (142.250.67.46): icmp_seq=9 ttl=118 time=26.4 ms
```

2.traceroute

```
gopika@gopika-VirtualBox:~$ traceroute www.facebook.com
traceroute to www.facebook.com (157.240.192.35), 30 hops max, 60 byte packets
 1 _gateway (10.0.2.2)  1.520 ms  1.480 ms  1.546 ms
 2 * * *

gopika@gopika-VirtualBox:~$ traceroute -4 google.com
traceroute to google.com (142.250.67.46), 30 hops max, 60 byte packets
 1 _gateway (10.0.2.2)  0.146 ms  0.104 ms  0.091 ms
 2 * * *
 3 * * *
 4 * * *
 5 * * *
 6 * * *
 7 *^C
```

3.nslookup

```
gopika@gopika-VirtualBox:~$ nslookup google.com
Server:      127.0.0.53
Address:     127.0.0.53#53

Non-authoritative answer:
Name:   google.com
Address: 142.250.67.46
Name:   google.com
Address: 2404:6800:4007:804::200e
```

```
gopika@gopika-VirtualBox:~$ nslookup -type=soa google.com
Server:      127.0.0.53
Address:     127.0.0.53#53

Non-authoritative answer:
google.com
    origin = ns1.google.com
    mail addr = dns-admin.google.com
    serial = 396194125
    refresh = 900
    retry = 900
    expire = 1800
    minimum = 60
```

Authoritative answers can be found from:

```
gopika@gopika-VirtualBox:~$ nslookup -type=a google.com
Server:      127.0.0.53
Address:     127.0.0.53#53

Non-authoritative answer:
Name:   google.com
Address: 142.250.67.46
```

4.NetStat -l

```
gopika@gopika-VirtualBox:~$ netstat -l
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address          Foreign Address        State
tcp      0      0 localhost:domain        0.0.0.0:*
tcp      0      0 localhost:ipp          0.0.0.0:*
tcp6     0      0 ip6-localhost:ipp       [::]:*
udp      0      0 0.0.0.0:42717        0.0.0.0:*
udp      0      0 0.0.0.0:mdns         0.0.0.0:*
udp      0      0 localhost:domain        0.0.0.0:*
udp      0      0 0.0.0.0:631          0.0.0.0:*
udp6     0      0 [::]:59610            [::]:*
udp6     0      0 [::]:mdns             [::]:*
raw6     0      0 [::]:ipv6-icmp        [::]:*                7

Active UNIX domain sockets (only servers)
Proto RefCnt Flags       Type      State      I-Node      Path
unix      2  [ ACC ]           STREAM    LISTENING   27890      @/tmp/.ICE-unix/1025
```

```

gopika@gopika-VirtualBox:~$ netstat -n
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address          Foreign Address        State
udp      0      0 10.0.2.15:68              10.0.2.2:67          ESTABLISHED

Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags     Type      State         I-Node  Path
unix    2      [ ]      DGRAM                    26205   /run/user/1000/systemd
md/notify
unix    2      [ ]      DGRAM                    15160   /run/systemd/journal
/syslog
unix   15     [ ]      DGRAM                    15170   /run/systemd/journal
/dev-log
unix    8      [ ]      DGRAM                    15174   /run/systemd/journal
/socket
unix    3      [ ]      DGRAM                    15146   /run/systemd/notify
unix    3      [ ]      STREAM     CONNECTED    30847   /run/dbus/system_bus
_socket
unix    3      [ ]      STREAM     CONNECTED    30599
unix    3      [ ]      STREAM     CONNECTED    24180
unix    3      [ ]      STREAM     CONNECTED    28130   /run/user/1000/bus
unix    3      [ ]      STREAM     CONNECTED    27000

```

```

gopika@gopika-VirtualBox:~$ netstat -a
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address          Foreign Address        State
tcp      0      0 localhost:domain        0.0.0.0:*            LISTEN
tcp      0      0 localhost:ipp          0.0.0.0:*            LISTEN
tcp6     0      0 ip6-localhost:ipp       [::]:*              LISTEN
udp      0      0 0.0.0.0:39032          0.0.0.0:*
udp      0      0 0.0.0.0:mdns           0.0.0.0:*
udp      0      0 localhost:domain        0.0.0.0:*
udp      0      0 gopika-VirtualBo:bootpc _gateway:bootps      ESTABLISHED
udp      0      0 0.0.0.0:631            0.0.0.0:*
udp6     0      0 [::]:mdns             [::]:*
udp6     0      0 [::]:44025            [::]:*
raw6     0      0 [::]:ipv6-icmp        [::]:*                7

Active UNIX domain sockets (servers and established)
Proto RefCnt Flags     Type      State         I-Node  Path

```

```

gopika@gopika-VirtualBox:~$ netstat -n 5
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address          Foreign Address        State
udp      0      0 10.0.2.15:68              10.0.2.2:67          ESTABLISHED

Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags     Type      State         I-Node  Path
unix    2      [ ]      DGRAM                    26205   /run/user/1000/systemd
md/notify
unix    2      [ ]      DGRAM                    15160   /run/systemd/journal
/syslog
unix   15     [ ]      DGRAM                    15170   /run/systemd/journal
/dev-log
unix    8      [ ]      DGRAM                    15174   /run/systemd/journal
/socket
unix    3      [ ]      DGRAM                    15146   /run/systemd/notify
unix    3      [ ]      STREAM     CONNECTED    30847   /run/dbus/system_bus
_socket
unix    3      [ ]      STREAM     CONNECTED    30599

```

5.route

```
gopika@gopika-VirtualBox:~$ sudo route
Kernel IP routing table
Destination     Gateway         Genmask        Flags Metric Ref    Use Iface
default         _gateway       0.0.0.0        UG    100    0        0 enp0s3
10.0.2.0        0.0.0.0        255.255.255.0   U     100    0        0 enp0s3
link-local      0.0.0.0        255.255.0.0    U     1000   0        0 enp0s3

gopika@gopika-VirtualBox:~$ 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 enp0s3
10.0.2.0        0.0.0.0        255.255.255.0   U     100    0        0 enp0s3
169.254.0.0     0.0.0.0        255.255.0.0    U     1000   0        0 enp0s3
gopika@gopika-VirtualBox:~$ route -Cn
Kernel IP routing cache
Source          Destination     Gateway         Flags Metric Ref    Use Iface
gopika@gopika-VirtualBox:~$ ip route
default via 10.0.2.2 dev enp0s3 proto dhcp metric 100
10.0.2.0/24 dev enp0s3 proto kernel scope link src 10.0.2.15 metric 100
169.254.0.0/16 dev enp0s3 scope link metric 1000
gopika@gopika-VirtualBox:~$ traceroute -4 google.com
traceroute to google.com (142.250.67.46), 30 hops max, 60 byte packets
 1  _gateway (10.0.2.2)  0.146 ms  0.104 ms  0.091 ms
 2  * * *
 3  * * *
 4  * * *
 5  * * *
 6  * * *
 7  *^C
```

6.ipconfig

```
gopika@gopika-VirtualBox:~$ sudo ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
        inet 10.0.2.15 netmask 255.255.255.0 broadcast 10.0.2.255
        inet6 fe80::ca66:43d4:40b3:c8e2 prefixlen 64 scopeid 0x20<link>
          ether 08:00:27:8a:94:1a txqueuelen 1000 (Ethernet)
            RX packets 10631 bytes 15466337 (15.4 MB)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 1442 bytes 126029 (126.0 KB)
            TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
        inet 127.0.0.1 netmask 255.0.0.0
        inet6 ::1 prefixlen 128 scopeid 0x10<host>
          loop txqueuelen 1000 (Local Loopback)
            RX packets 217 bytes 18557 (18.5 KB)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 217 bytes 18557 (18.5 KB)
            TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

```
gopika@gopika-VirtualBox:~$ ifconfig -a
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
        inet 10.0.2.15 netmask 255.255.255.0 broadcast 10.0.2.255
        inet6 fe80::ca66:43d4:40b3:c8e2 prefixlen 64 scopeid 0x20<link>
          ether 08:00:27:8a:94:1a txqueuelen 1000 (Ethernet)
            RX packets 196 bytes 61784 (61.7 KB)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 280 bytes 31534 (31.5 KB)
            TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
        inet 127.0.0.1 netmask 255.0.0.0
        inet6 ::1 prefixlen 128 scopeid 0x10<host>
          loop txqueuelen 1000 (Local Loopback)
            RX packets 186 bytes 15427 (15.4 KB)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 186 bytes 15427 (15.4 KB)
            TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

gopika@gopika-VirtualBox:~$ ifconfig -s
Iface      MTU     RX-OK RX-ERR RX-DRP RX-OVR      TX-OK TX-ERR TX-DRP TX-OVR Flg
enp0s3    1500      196     0     0 0        280      0     0 0      0 BMRU
lo       65536      186     0     0 0        186      0     0 0      0 LRU
gopika@gopika-VirtualBox:~$ ifconfig -v
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
        inet 10.0.2.15 netmask 255.255.255.0 broadcast 10.0.2.255
        inet6 fe80::ca66:43d4:40b3:c8e2 prefixlen 64 scopeid 0x20<link>
          ether 08:00:27:8a:94:1a txqueuelen 1000 (Ethernet)
            RX packets 196 bytes 61784 (61.7 KB)
```

WINDOWS

1.ping

```
C:\Users\user>ping

Usage: ping [-t] [-a] [-n count] [-l size] [-f] [-i TTL] [-v TOS]
           [-r count] [-s count] [[-j host-list] | [-k host-list]]
           [-w timeout] [-R] [-S srcaddr] [-c compartment] [-p]
           [-4] [-6] target_name

Options:
  -t          Ping the specified host until stopped.
              To see statistics and continue - type Control-Break;
              To stop - type Control-C.
  -a          Resolve addresses to hostnames.
  -n count    Number of echo requests to send.
  -l size     Send buffer size.
  -f          Set Don't Fragment flag in packet (IPv4-only).
              Time-to-live.
```

2.route

```
C:\Users\user>route

Manipulates network routing tables.

ROUTE [-f] [-p] [-4|-6] command [destination]
       [MASK netmask] [gateway] [METRIC metric] [IF interface]

  -f          Clears the routing tables of all gateway entries. If this is
              used in conjunction with one of the commands, the tables are
              cleared prior to running the command.

  -p          When used with the ADD command, makes a route persistent across
              boots of the system. By default, routes are not preserved
              when the system is restarted. Ignored for all other commands,
              which always affect the appropriate persistent routes.

  -4          Force using IPv4.

  -6          Force using IPv6.
```

3.tracert

```
Microsoft Windows [Version 10.0.19041.1165]
(c) Microsoft Corporation. All rights reserved.
```

```
C:\Users\user>tracert

Usage: tracert [-d] [-h maximum_hops] [-j host-list] [-w timeout]
                [-R] [-S srcaddr] [-4] [-6] target_name

Options:
  -d          Do not resolve addresses to hostnames.
  -h maximum_hops Maximum number of hops to search for target.
  -j host-list  Loose source route along host-list (IPv4-only).
  -w timeout   Wait timeout milliseconds for each reply.
  -R          Trace round-trip path (IPv6-only).
  -S srcaddr   Source address to use (IPv6-only).
  -4          Force using IPv4.
  -6          Force using IPv6.
```

4.NetStat

```
Microsoft Windows [Version 10.0.19041.1165]
(c) Microsoft Corporation. All rights reserved.

C:\Users\user>netstat -a

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    0.0.0.0:135           LAPTOP-00HOF868:0      LISTENING
  TCP    0.0.0.0:445           LAPTOP-00HOF868:0      LISTENING
  TCP    0.0.0.0:5040          LAPTOP-00HOF868:0      LISTENING
  TCP    0.0.0.0:5357          LAPTOP-00HOF868:0      LISTENING
  TCP    0.0.0.0:6646          LAPTOP-00HOF868:0      LISTENING
  TCP    0.0.0.0:49664         LAPTOP-00HOF868:0      LISTENING
  TCP    0.0.0.0:49665         LAPTOP-00HOF868:0      LISTENING
  TCP    0.0.0.0:49666         LAPTOP-00HOF868:0      LISTENING
  TCP    0.0.0.0:49667         LAPTOP-00HOF868:0      LISTENING
  TCP    0.0.0.0:49668         LAPTOP-00HOF868:0      LISTENING
  TCP    0.0.0.0:49671         LAPTOP-00HOF868:0      LISTENING
  TCP    192.168.0.106:139     LAPTOP-00HOF868:0      LISTENING
  TCP    192.168.0.106:57184   20.197.71.89:https    ESTABLISHED
```

5.ipconfig

```
C:\Users\user>ipConfig

Windows IP Configuration

Ethernet adapter VirtualBox Host-Only Network:

  Connection-specific DNS Suffix . :
  Link-local IPv6 Address . . . . . : fe80::e4f0:526c:febd:5267%18
  IPv4 Address . . . . . : 192.168.56.1
  Subnet Mask . . . . . : 255.255.255.0
  Default Gateway . . . . . :

Wireless LAN adapter Local Area Connection* 9:

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

Wireless LAN adapter Local Area Connection* 10:
```

6.nslookup

```
C:\Users\user>nslookup google.com
Server: UnKnown
Address: 192.168.0.1

Name: google.com
Addresses: 2404:6800:4007:804::200e
           142.250.67.46
```

INSTALLATION OF PHPMYADMIN

Install Apache

- Update your system

- sudo apt update

```
gopika@gopika-VirtualBox:~$ sudo apt update
[sudo] password for gopika:
Sorry, try again.
[sudo] password for gopika:
Get:1 http://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Hit:2 http://us.archive.ubuntu.com/ubuntu focal InRelease
Get:3 http://us.archive.ubuntu.com/ubuntu focal-updates InRelease [114 kB]
Get:4 http://us.archive.ubuntu.com/ubuntu focal-backports InRelease [101 kB]
Get:5 http://security.ubuntu.com/ubuntu focal-security/main amd64 Packages [900
kB]
Get:6 http://us.archive.ubuntu.com/ubuntu focal-updates/main i386 Packages [544
kB]
Get:7 http://us.archive.ubuntu.com/ubuntu focal-updates/main amd64 Packages [1,
255 kB]
Get:8 http://security.ubuntu.com/ubuntu focal-security/main i386 Packages [289
kB]
Get:9 http://security.ubuntu.com/ubuntu focal-security/main Translation-en [172
kB]
Get:10 http://security.ubuntu.com/ubuntu focal-security/main amd64 DEP-11 Metad
ata [29.0 kB]
Get:11 http://security.ubuntu.com/ubuntu focal-security/main DEP-11 48x48 Icons
[11.5 kB]
```

- **Install Apache using apt:**

- sudo apt install apache2

```
gopika@gopika-VirtualBox:~$ sudo apt install apache2
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  apache2-bin apache2-data apache2-utils libaprpri libaprutil1
    libaprutil1-dbd-sqlite3 libaprutil1-ldap liblua5.2-0
Suggested packages:
  apache2-doc apache2-suexec-pristine | apache2-suexec-custom

The following NEW packages will be installed:
  apache2 apache2-bin apache2-data apache2-utils libaprpri libaprutil1
    libaprutil1-dbd-sqlite3 libaprutil1-ldap liblua5.2-0
0 upgraded, 9 newly installed, 0 to remove and 332 not upgraded.
Need to get 1,820 kB of archives.
After this operation, 7,942 kB of additional disk space will be used.
Get:1 http://us.archive.ubuntu.com/ubuntu focal/main amd64 libaprpri amd64 1.6.5
1ubuntu1 [91.4 kB]
Get:2 http://us.archive.ubuntu.com/ubuntu focal/main amd64 libaprutil1 amd64 1
6.1-4ubuntu2 [84.7 kB]
```

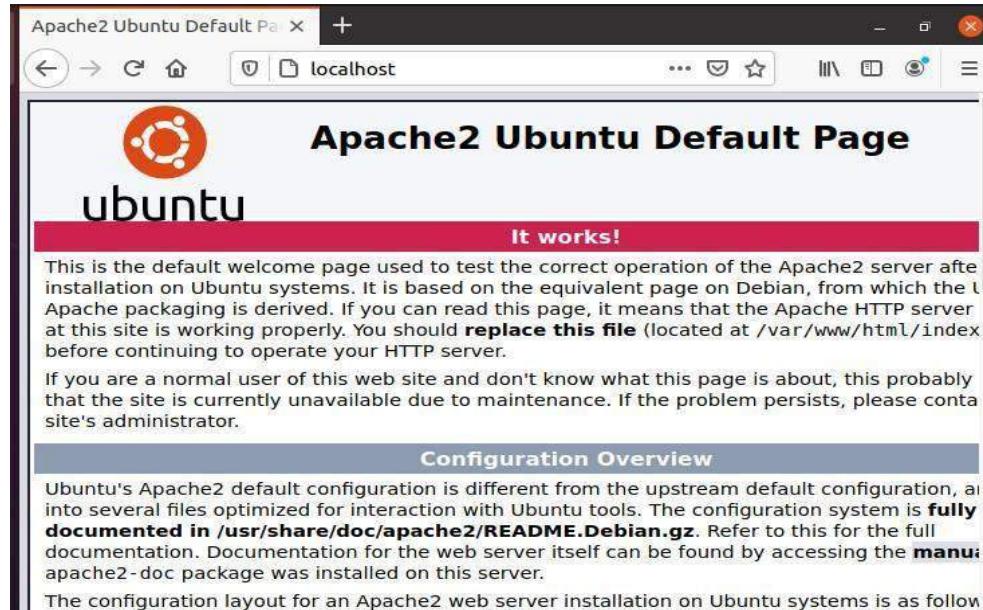
- **Confirm that Apache is now running with the following**

- command:** ○ sudo systemctl status apache2

```
gopika@gopika-VirtualBox:~$ sudo systemctl status apache2
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor pres>
   Active: active (running) since Tue 2021-09-28 11:38:28 EDT; 3min 29s ago
     Docs: https://httpd.apache.org/docs/2.4/
   Main PID: 3424 (apache2)
      Tasks: 55 (limit: 1107)
    Memory: 5.0M
   CGroup: /system.slice/apache2.service
           ├─3424 /usr/sbin/apache2 -k start
           ├─3426 /usr/sbin/apache2 -k start
           └─3427 /usr/sbin/apache2 -k start

Sep 28 11:38:27 gopika-VirtualBox systemd[1]: Starting The Apache HTTP Server.>
Sep 28 11:38:28 gopika-VirtualBox apachectl[3423]: AH00558: apache2: Could not>
Sep 28 11:38:28 gopika-VirtualBox systemd[1]: Started The Apache HTTP Server.
lines 1-15/15 (END)
```

- 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)



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
```

```

gopika@gopika-VirtualBox:~$ sudo apt install mariadb-server mariadb-client
[sudo] password for gopika:
Sorry, try again.
[sudo] password for gopika:
Sorry, try again.
[sudo] password for gopika:
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  galera-3 gawk libaio1 libcgi-fast-perl libcgi-pm-perl
  libconfig-inifiles-perl libdbd-mysql-perl libdbi-perl libfcgi-perl
  libhtml-template-perl libreadline5 libsigsegv2 libsnapy1v5
  libterm-readkey-perl mariadb-client-10.3 mariadb-client-core-10.3
  mariadb-common mariadb-server-10.3 mariadb-server-core-10.3 socat
Suggested packages:
  gawk-doc libclone-perl libmlbm-perl libnet-daemon-perl
  libsql-statement-perl libipc-sharedcache-perl mailx mariadb-test tinyca
The following NEW packages will be installed:
  galera-3 gawk libaio1 libcgi-fast-perl libcgi-pm-perl
  libconfig-inifiles-perl libdbd-mysql-perl libdbi-perl libfcgi-perl
  libhtml-template-perl libreadline5 libsigsegv2 libsnapy1v5
  libterm-readkey-perl mariadb-client mariadb-client-10.3
  mariadb-client-core-10.3 mariadb-common mariadb-server mariadb-server-10.3
  mariadb-server-core-10.3 socat
0 upgraded, 22 newly installed, 0 to remove and 332 not upgraded.
Need to get 20.2 MB of archives.

```

- Check mariadb

Installation **sudo
systemctl status
mysql**

(if it is not working **sudo systemctl start mysql**)

```

gopika@gopika-VirtualBox:~$ sudo systemctl status mysql
● mariadb.service - MariaDB 10.3.31 database server
   Loaded: loaded (/lib/systemd/system/mariadb.service; enabled; vendor pres
   Active: active (running) since Tue 2021-09-28 12:46:21 EDT; 1min 13s ago
     Docs: man:mysqld(8)
           https://mariadb.com/kb/en/library/systemd/
   Main PID: 3028 (mysqld)
     Status: "Taking your SQL requests now..."
      Tasks: 32 (limit: 1107)
    Memory: 68.0M
   CGroup: /system.slice/mariadb.service
           └─3028 /usr/sbin/mysqld

Sep 28 12:46:23 gopika-VirtualBox /etc/mysql/debian-start[3066]: Processing da>
Sep 28 12:46:23 gopika-VirtualBox /etc/mysql/debian-start[3066]: information_s>
Sep 28 12:46:23 gopika-VirtualBox /etc/mysql/debian-start[3066]: mysql
Sep 28 12:46:23 gopika-VirtualBox /etc/mysql/debian-start[3066]: performance_s>
Sep 28 12:46:23 gopika-VirtualBox /etc/mysql/debian-start[3066]: Phase 6/7: Ch>
Sep 28 12:46:23 gopika-VirtualBox /etc/mysql/debian-start[3066]: Processing da>
Sep 28 12:46:23 gopika-VirtualBox /etc/mysql/debian-start[3066]: information_s>
Sep 28 12:46:23 gopika-VirtualBox /etc/mysql/debian-start[3066]: performance_s>
Sep 28 12:46:23 gopika-VirtualBox /etc/mysql/debian-start[3066]: Phase 7/7: Ru>
Sep 28 12:46:23 gopika-VirtualBox /etc/mysql/debian-start[3066]: OK

```

- 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)

```
gopika@gopika-VirtualBox:~$ sudo mysql_secure_installation

NOTE: RUNNING ALL PARTS OF THIS SCRIPT IS RECOMMENDED FOR ALL MariaDB
      SERVERS IN PRODUCTION USE! PLEASE READ EACH STEP CAREFULLY!

In order to log into MariaDB to secure it, we'll need the current
password for the root user. If you've just installed MariaDB, and
you haven't set the root password yet, the password will be blank,
so you should just press enter here.

Enter current password for root (enter for none):
OK, successfully used password, moving on...

Setting the root password ensures that nobody can log into the MariaDB
root user without the proper authorisation.

You already have a root password set, so you can safely answer 'n'.

Change the root password? [Y/n] n
... skipping.

By default, a MariaDB installation has an anonymous user, allowing anyone
to log into MariaDB without having to have a user account created for
them. This is intended only for testing, and to make the installation
reload privilege tables now? [Y/n] y
... Success!

Cleaning up...

All done! If you've completed all of the above steps, your MariaDB
installation should now be secure.

Thanks for using MariaDB!
```

Install PHP and commonly used modules

- sudo apt install php libapache2-mod-php php-ocache php-cli php-gd php-curl

```
gopika@gopika-VirtualBox:~$ sudo apt install php libapache2-mod-php php-ocache
  php-cli php-gd php-curl php-mysql
Reading package lists... Done
Building dependency tree
Reading state information... Done
Note, selecting 'php7.4-ocache' instead of 'php-ocache'
The following additional packages will be installed:
  libapache2-mod-php7.4 php-common php7.4 php7.4-cli php7.4-common
    php7.4-curl php7.4-gd php7.4-json php7.4-mysql php7.4-readline
Suggested packages:
  php-pear
The following NEW packages will be installed:
  libapache2-mod-php libapache2-mod-php7.4 php php-common php-curl
    php-gd php-mysql php7.4 php7.4-cli php7.4-common php7.4-curl php7.4-gd
    php7.4-json php7.4-mysql php7.4-ocache php7.4-readline
0 upgraded, 17 newly installed, 0 to remove and 332 not upgraded.
Need to get 4,209 kB of archives.
After this operation, 18.8 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
```

- **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

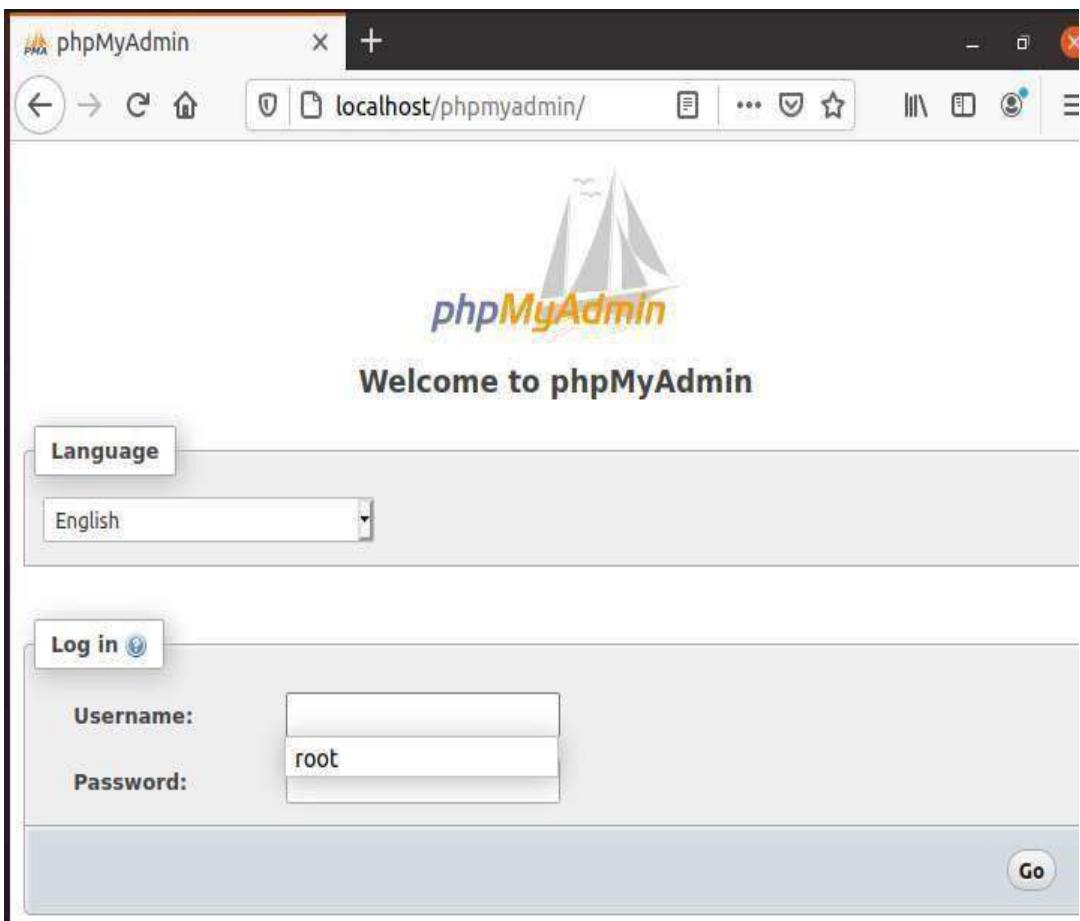
- <http://127.0.0.1/phpinfo.php>

System	Linux gopika-VirtualBox 5.8.0-55-generic #62~20.04.1-Ubuntu x86_64
Build Date	Aug 13 2021 05:39:12
Server API	Apache 2.0 Handler
Virtual Directory Support	disabled
Configuration File (php.ini) Path	/etc/php/7.4/apache2
Loaded Configuration File	/etc/php/7.4/apache2/php.ini
Scan this dir for additional .ini files	/etc/php/7.4/apache2/conf.d
Additional .ini files parsed	/etc/php/7.4/apache2/conf.d/10-mysqlind.ini, /etc/php/7.4/apache2/conf.d/10-pdo.ini, /etc/php/7.4/apache2/conf.d/20-c ctype.ini, /etc/php/7.4/apache2/conf.d/20-curl.ini, /etc/php/7.4/apache2/conf.d/20-ffi.ini, /etc/php/7.4/apache2/conf.d/20-ftp.ini, /etc/php/7.4/apache2/conf.d/20-gd gettext.ini, /etc/php/7.4/apache2/conf.d/20-iconv.ini, /etc/php/7.4/apache2/conf.d/20-mysqli.ini, /etc/php/7.4/apache2/conf.d/20-phar.ini, /etc/php/7.4/apache2/conf.d/20-readline.ini, /etc/php/7.4/apache2/conf.d/20-shmop.ini, /etc/php/7.4/apache2/conf.d/20-sysvmsg.ini, /etc/php/7.4/apache2/conf.d/20-sysvshm.ini, /etc/php/7.4/apache2/conf.d/20-zip.ini

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

```
gopika@gopika-VirtualBox:~$ sudo apt install phpmyadmin php-mbstring php-zip  
php-gd php-json php-curl  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
php-curl is already the newest version (2:7.4+75).  
php-gd is already the newest version (2:7.4+75).  
The following additional packages will be installed:  
  dbconfig-common dbconfig-mysql icc-profiles-free javascript-common  
  libjs-jquery libjs-openlayers libjs-sphinxdoc libjs-underscore libonig5  
  libzip5 php-bz2 php-google-recaptcha php-phpmyadmin-motranslator  
  php-phpmyadmin-shapefile php-phpmyadmin-sql-parser php-phpseclib  
  php-psr-cache php-psr-container php-psr-log php-symfony-cache  
  php-symfony-cache-contracts php-symfony-expression-language  
  php-symfony-service-contracts php-symfony-var-exporter php-tcpdf php-twig  
  php-twig-extensions php-xml php7.4-bz2 php7.4-mbstring php7.4-xml  
  php7.4-zip  
Suggested packages:  
  php-dbase php-libodium php-mcrypt php-gmp  
  php-symfony-service-implementation php-imagick php-twig-doc  
  php-symfony-translation php-recode php-gd2 php-pragmarx-google2fa  
  php-bacon-qr-code php-samyoul-u2f-php-server  
Recommended packages:  
  php-mcrypt  
The following NEW packages will be installed:  
  dbconfig-common dbconfig-mysql icc-profiles-free javascript-common
```

- (It ask for webserver select apache2, select db configuration and set password)
 -) 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/phpmyadmin>
 - **Open a browser**
 - <http://localhost/phpmyadmin>
 - username : root
 - password : yourpassword



If any problem for login run the following command

- sudo mysql
- ALTER USER root@localhost IDENTIFIED BY "yourpassword";

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**

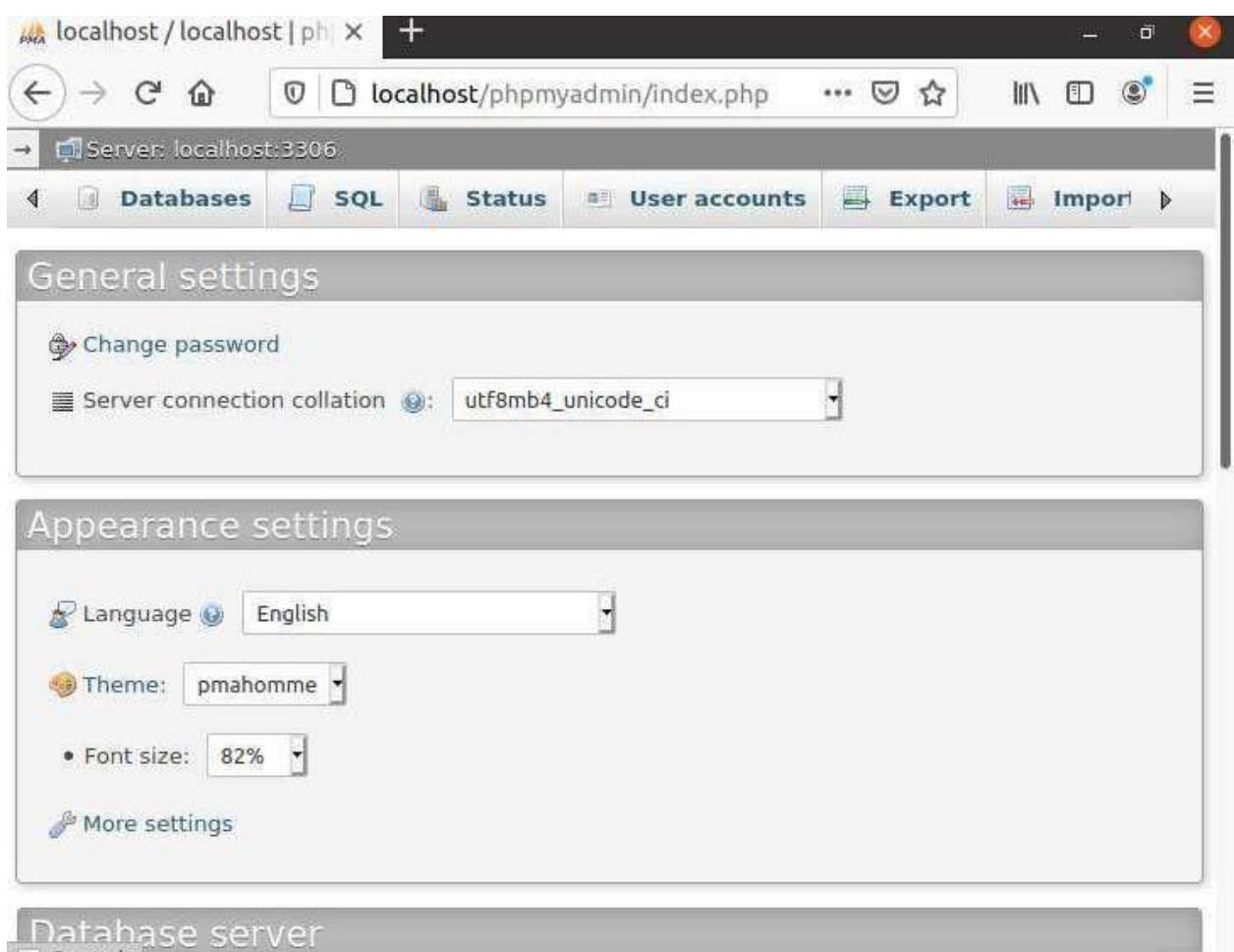
/etc/phpmyadmin/apache.conf Then restart

apache:

- **sudo systemctl restart**

apache2 Then install phpmyadmin again

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

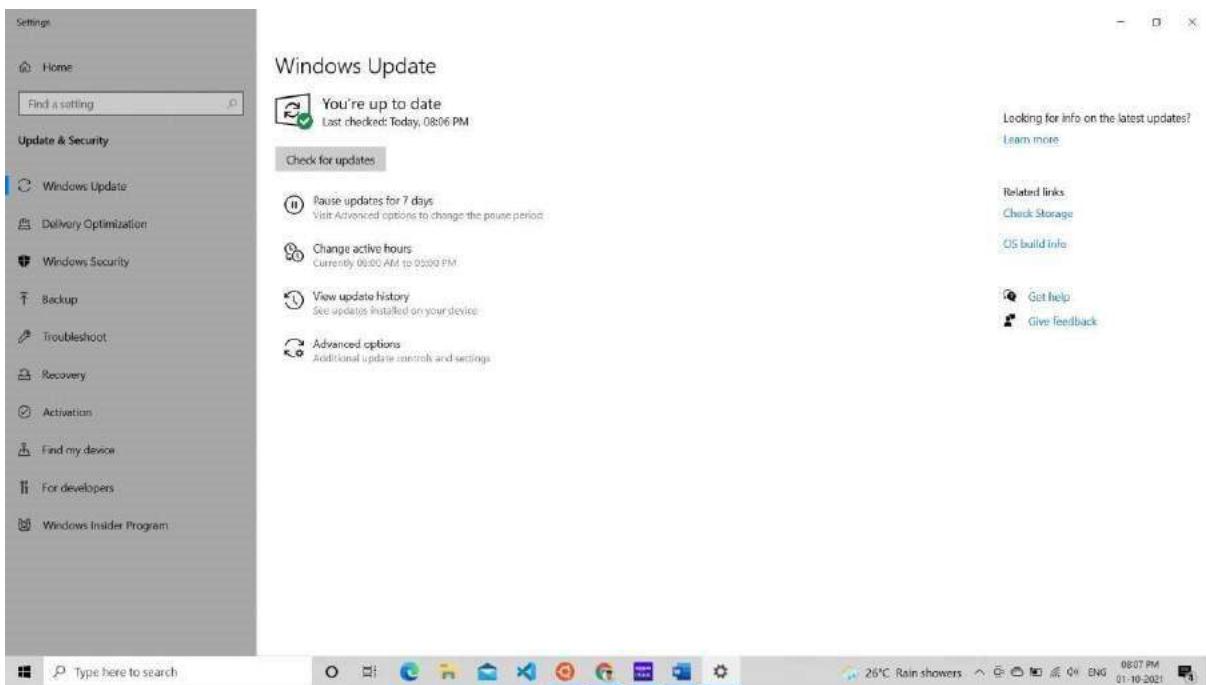


Installing Docker on Windows 10

First make sure Windows is up to date.

In the Windows search type "Windows Update" and select Windows Update setting

You should see a green check and “You’re up to date”. If not click “Check for updates”. You will need to repeat this process until you no longer have any updates to install.



Next install [WSL2](#)

- From the Windows Search Type "powershell" then right-click on Windows PowerShell and then Run as administrator.
- Click 'Yes' to allow PowerShell to make changes to your device.
- In the Administrator: Windows PowerShell window run (copy and past) "wsl –install" to install Windows Services for Linux (wsl).

```
PS C:\Windows\system32> wsl --install
Installing: Virtual Machine Platform
Virtual Machine Platform has been installed.
Installing: Windows Subsystem for Linux
Windows Subsystem for Linux has been installed.
Downloading: WSL Kernel
Installing: WSL Kernel
WSL Kernel has been installed.
Downloading: Ubuntu
The requested operation is successful. Changes will not be effective until the system is rebooted.
PS C:\Windows\system32>
```

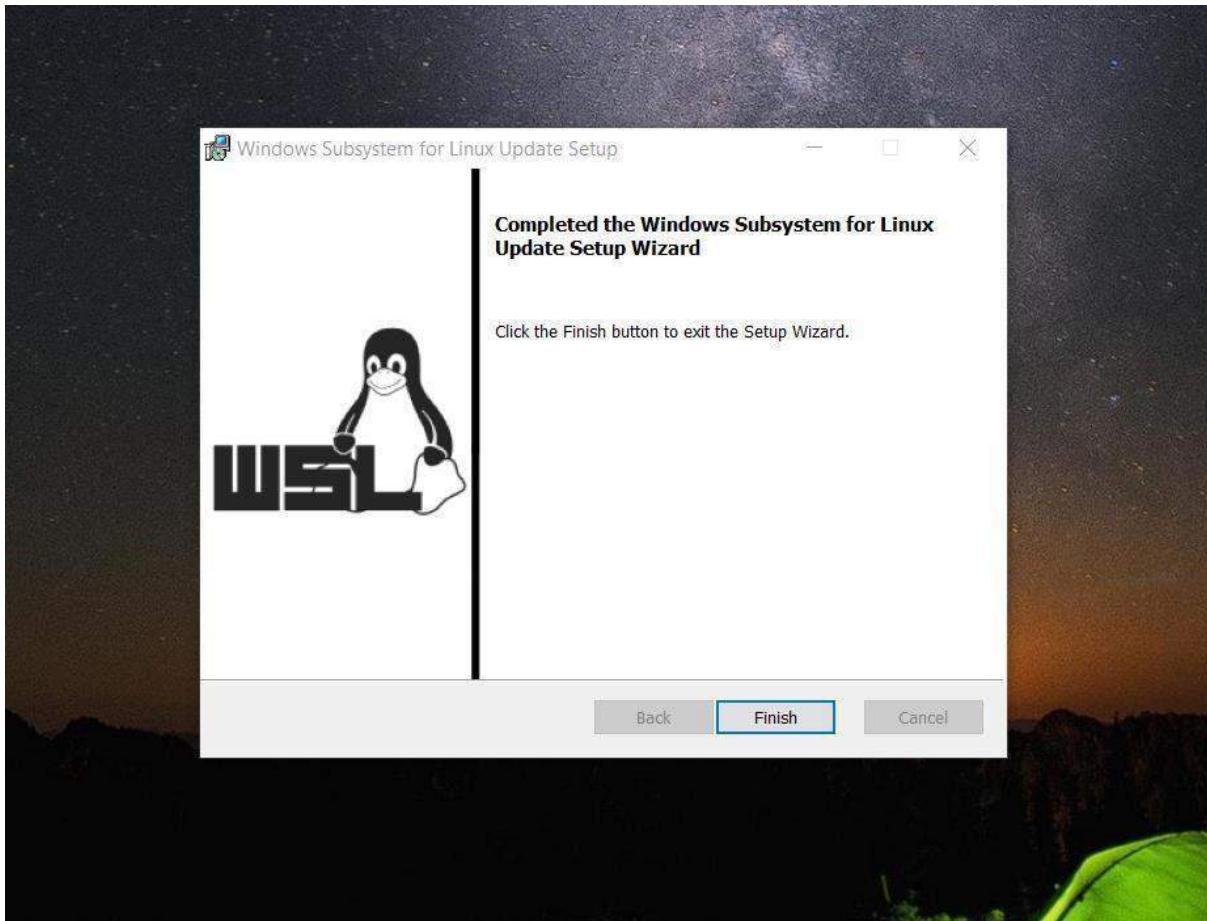
Next enable the Virtual Machine Platform. In the Administrator: Windows PowerShell run (copy and past) "dism.exe /online /enablefeature /featurename:VirtualMachinePlatform /all /norestart".

```
PS C:\Windows\system32> dism.exe /online /enable-feature /featurename:VirtualMachinePlatform /all /norestart
Deployment Image Servicing and Management tool
Version: 10.0.19041.844

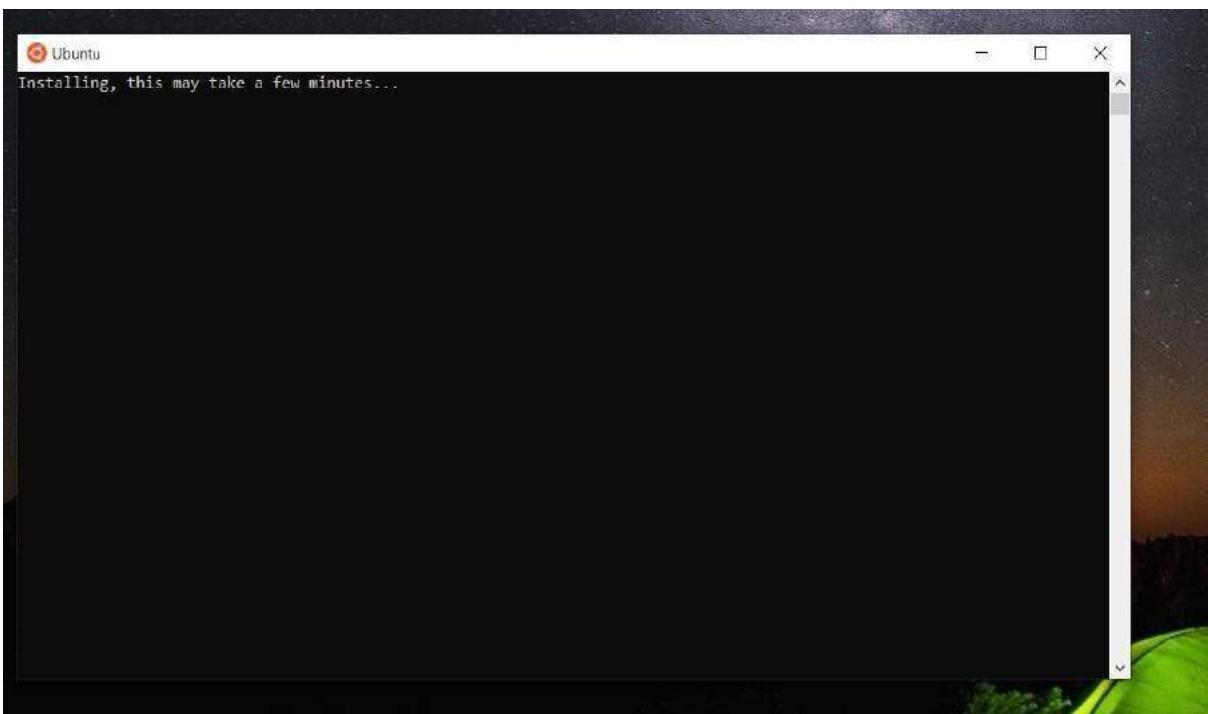
Image Version: 10.0.19043.1266

Enabling feature(s)
[=====100.0%=====]
The operation completed successfully.
PS C:\Windows\system32>
```

- Download and install the [WSL2 Linux kernel update package for x64 machines](#)



set up a Linux user



```
Ubuntu
Installing, this may take a few minutes...

Retype new password:
passwd: password updated successfully
Installation successful!
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

Welcome to Ubuntu 20.04 LTS (GNU/Linux 5.10.16.3-microsoft-standard-WSL2 x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage

System information as of Fri Oct  1 11:50:30 IST 2021

System load:  0.16          Processes:           8
Usage of /:   0.4% of 250.98GB  Users logged in:    0
Memory usage: 2%            IPv4 address for eth0: 172.24.46.235
Swap usage:   0%

0 updates can be installed immediately.
0 of these updates are security updates.

The list of available updates is more than a week old.
To check for new updates run: sudo apt update

This message is shown once once a day. To disable it please create the
/home/sam/.hushlogin file.
sam@LAPTOP-2S6KTBFB:~$
```

- Reboot Windows.

Again, from the Windows Search Type "powershell" then right-click on Windows PowerShell and then Run as administrator.

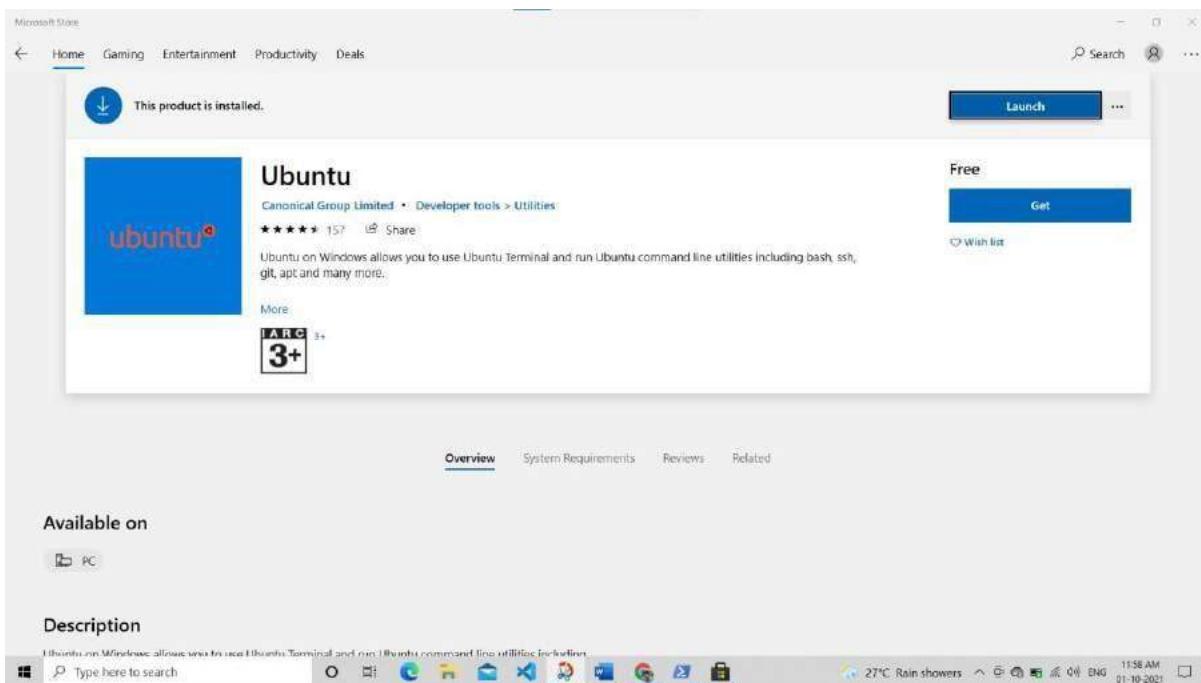
- In the PowerShell window run "**wsl --set-default-version 2**".

```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Windows\system32> wsl --set-default-version 2
For information on key differences with WSL 2 please visit https://aka.ms/wsl2
The operation completed successfully.
PS C:\Windows\system32>
```

- Next install a Linux distribution from the [Microsoft Store](#)



- You will now be able to run Linux commands in the Ubuntu terminal window.

```
 sam@LAPTOP-2S6KTBFB:~ 
  run a command as administrator (user "root"), use "sudo <command>". See "man sudo_root" for details.

sam@LAPTOP-2S6KTBFB:~$ ls
sam@LAPTOP-2S6KTBFB:~$ exit
```

Now you can install Docker Desktop for Windows

- Download the Docker Desktop for Windows installer from <https://www.docker.com/products/docker-desktop> Run the installer.



Configuration

- Install required Windows components for WSL 2
- Add shortcut to desktop

Ok



Docker Desktop 4.1.0

Unpacking files...

```
Unpacking file: resources/docker-desktop.iso
Unpacking file: resources/ddvp.ico
Unpacking file: resources/config-options.json
Unpacking file: resources/componentsVersion.json
Unpacking file: resources/bin/docker-compose
Unpacking file: resources/bin/docker
Unpacking file: resources/.gitignore
Unpacking file: InstallerCli.pdb
Unpacking file: InstallerCli.exe.config
Unpacking file: frontend/vk_swiftshader_icd.json
Unpacking file: frontend/v8_context_snapshot.bin
Unpacking file: frontend/snapshot_blob.bin
Unpacking file: frontend/resources/regedit/vbs/util.vbs
Unpacking file: frontend/resources/regedit/vbs/regUtil.vbs
```



Installing Docker Desktop 4.1.0 (69386)



Docker Desktop 4.1.0

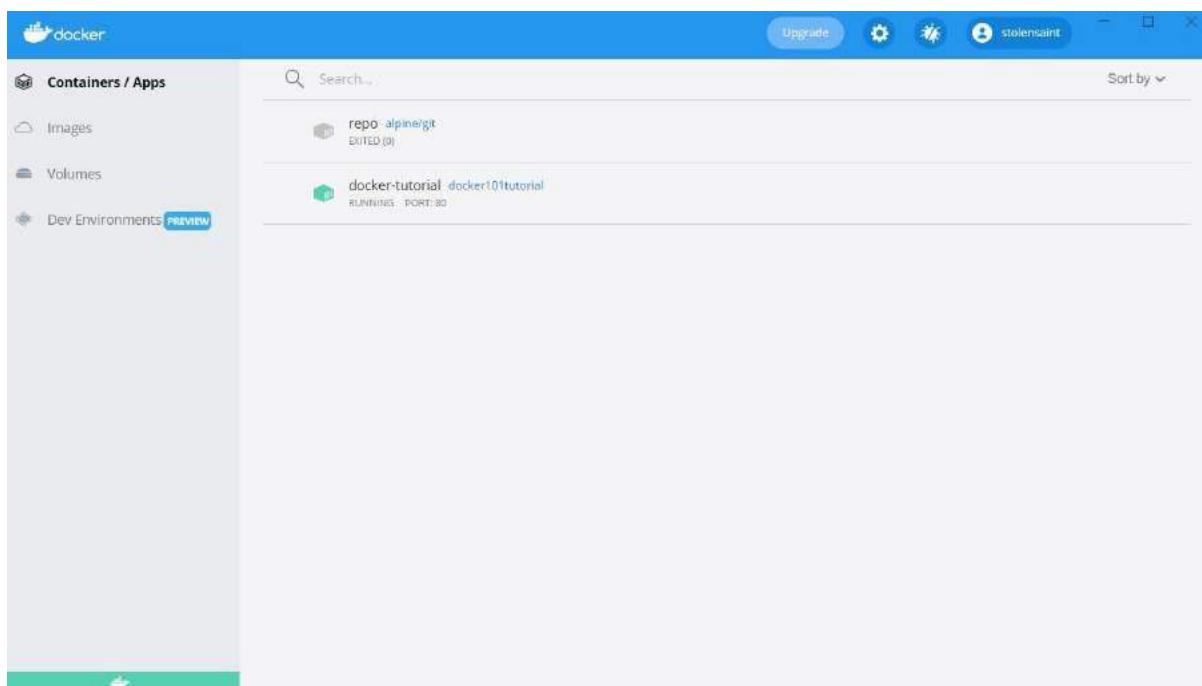
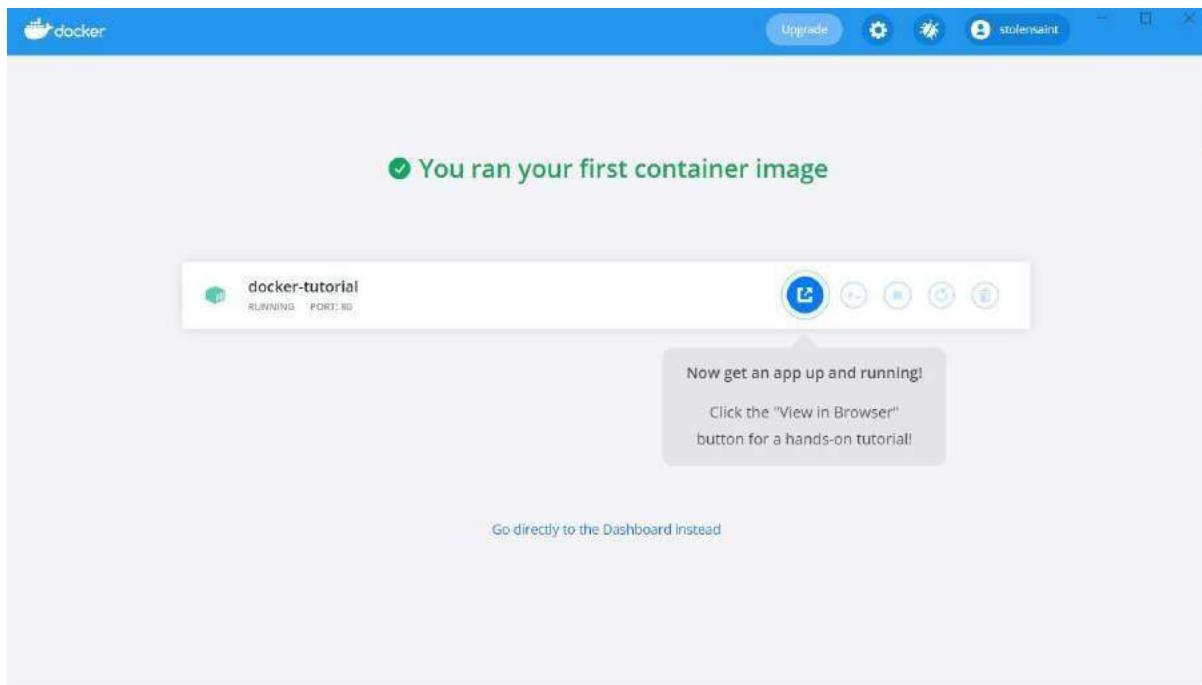
Installation succeeded

*You must log out of Windows to complete installation.

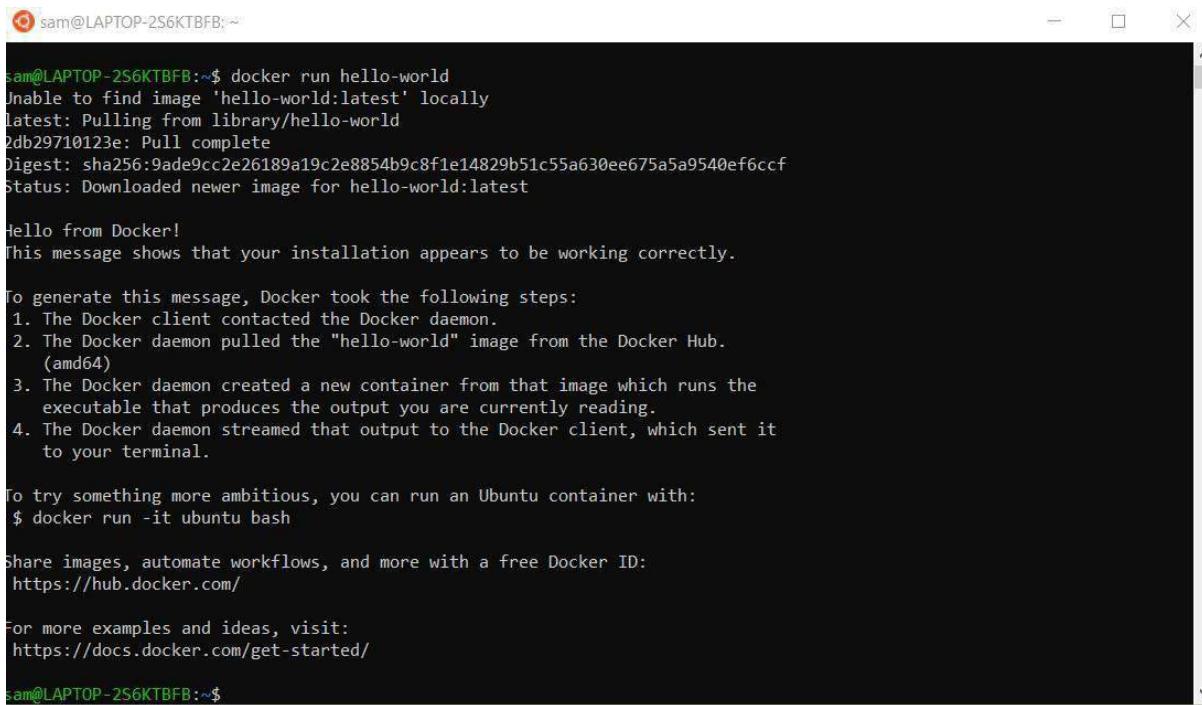
[Close and log out](#)

-
- Reboot Windows.
 - Login to Windows and let Docker finish setting up. This can take a few minutes depending on your machine.





- Run the docker “**Hello World**” from an Ubuntu Terminal run "**docker run hello-world**".



```

sam@LAPTOP-2S6KTBFB:~$ docker run hello-world
Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
2db29710123e: Pull complete
Digest: sha256:9ade9cc2e26189a19c2e8854b9c8f1e14829b51c55a630ee675a5a9540ef6ccf
Status: Downloaded newer image for hello-world:latest

Hello from Docker!
This message shows that your installation appears to be working correctly.

To generate this message, Docker took the following steps:
1. The Docker client contacted the Docker daemon.
2. The Docker daemon pulled the "hello-world" image from the Docker Hub.
   (amd64)
3. The Docker daemon created a new container from that image which runs the
   executable that produces the output you are currently reading.
4. The Docker daemon streamed that output to the Docker client, which sent it
   to your terminal.

To try something more ambitious, you can run an Ubuntu container with:
$ docker run -it ubuntu bash

Share images, automate workflows, and more with a free Docker ID:
https://hub.docker.com/

For more examples and ideas, visit:
https://docs.docker.com/get-started/

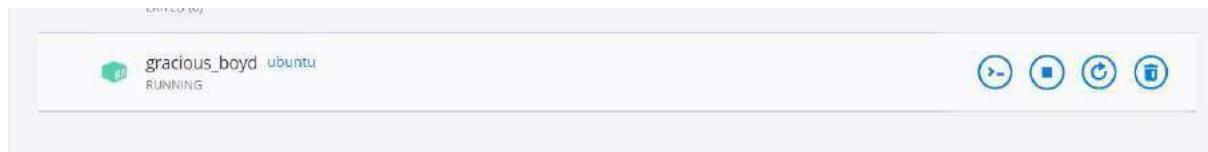
```

Running the Ubuntu Machine

- Run the command “**docker run -t -i ubuntu /bin/bash**” in powershell
- This is a Linux root bash, try some commands

```
root@afab3919c935:/  
Windows PowerShell  
Copyright (C) Microsoft Corporation. All rights reserved.  
  
Try the new cross-platform PowerShell https://aka.ms/pscore6  
  
PS C:\Windows\system32> docker run -t -i ubuntu /bin/bash  
root@afab3919c935:/# ls  
bin boot dev etc home lib lib32 lib64 libx32 mnt opt proc root run sbin tmp var  
root@afab3919c935:/# pwd  
/  
root@afab3919c935:/# cat >> demo.txt  
Hi I'm Sam  
^C  
root@afab3919c935:/# cat demo.txt  
Hi I'm Sam  
root@afab3919c935:/# mkdir demo  
root@afab3919c935:/# mv demo.txt demo  
root@afab3919c935:/# cd demo  
root@afab3919c935:/demo# ls  
demo.txt  
root@afab3919c935:/demo# rm demo.txt  
root@afab3919c935:/demo# ls  
root@afab3919c935:/demo# cd ..  
root@afab3919c935:/# rmdir demo  
root@afab3919c935:/# ls  
bin boot dev etc home lib lib32 lib64 libx32 mnt opt proc root run sbin tmp var  
root@afab3919c935:/#
```

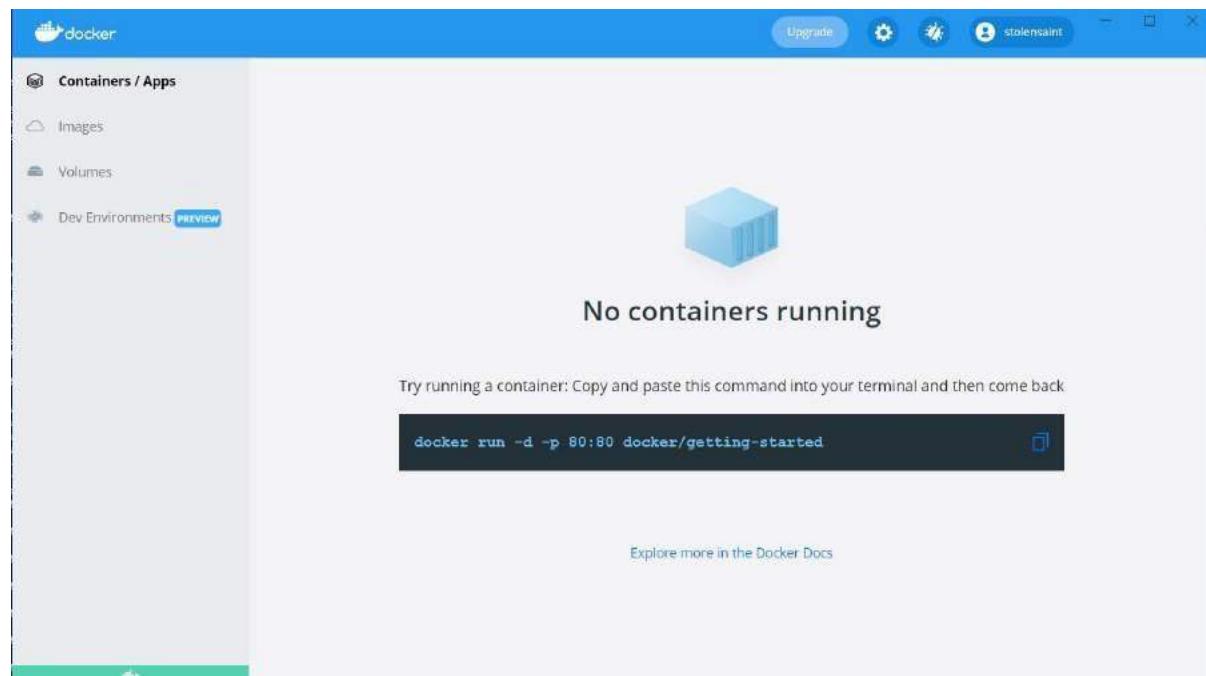
Docker GUI-Containers



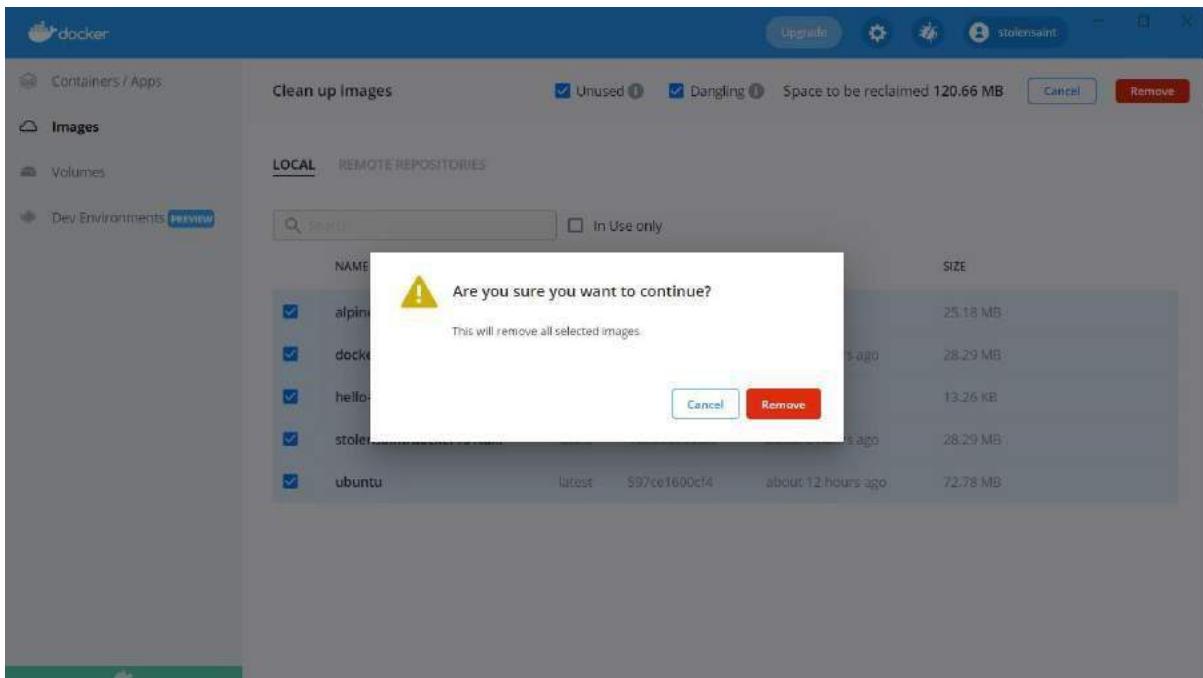
Removing All Containers

```
root@afab3919c935:/# exit
exit
PS C:\Windows\system32> docker ps -a
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
acious_boyd 8d21c1d81c22 ubuntu:latest "bash" 6 hours ago Exited (255) 8 minutes ago
busy_maxwell 1b0186a069a3 ubuntu "bash" 6 hours ago Exited (0) 6 hours ago
serene_dubinsky 48ab9a4423d5 ubuntu "bash" 7 hours ago Exited (0) 7 hours ago
serene_bhaskara fd9061619454 ubuntu "bash" 7 hours ago Exited (0) 7 hours ago
beautiful_tereshkova 398156a697cc hello-world "/hello" 8 hours ago Exited (0) 8 hours ago
jolly_torvalds a7e83e3eeda docker101tutorial "/docker-entrypoint..." 8 hours ago Exited (0) 7 hours ago
repo e750d0f55bb4 alpine/git "git clone https://g..." 8 hours ago Exited (0) 8 hours ago
PS C:\Windows\system32>

PS C:\Windows\system32> docker rm -f busy_maxwell
busy_maxwell
PS C:\Windows\system32> docker ps -a
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
afab3919c935 ubuntu "/bin/bash" 7 minutes ago Exited (0) 2 minutes ago
gracious_boyd 1b0186a069a3 ubuntu "bash" 6 hours ago Exited (0) 6 hours ago
serene_dubinsky 48ab9a4423d5 ubuntu "bash" 8 hours ago Exited (0) 7 hours ago
serene_bhaskara fd9061619454 ubuntu "bash" 8 hours ago Exited (0) 7 hours ago
beautiful_tereshkova 398156a697cc hello-world "/hello" 8 hours ago Exited (0) 8 hours ago
jolly_torvalds a7e83e3eeda docker101tutorial "/docker-entrypoint..." 8 hours ago Exited (0) 8 hours ago
repo e750d0f55bb4 alpine/git "git clone https://g..." 8 hours ago Exited (0) 8 hours ago
PS C:\Windows\system32> docker rm -f gracious_boyd
gracious_boyd
PS C:\Windows\system32> docker rm -f serene_dubinsky
serene_dubinsky
PS C:\Windows\system32> docker rm -f serene_bhaskara
serene_bhaskara
PS C:\Windows\system32> docker rm -f beautiful_tereshkova
beautiful_tereshkova
PS C:\Windows\system32> docker rm -f jolly_torvalds
jolly_torvalds
PS C:\Windows\system32> docker rm -f docker-tutorial
docker-tutorial
PS C:\Windows\system32> docker rm -f repo
repo
PS C:\Windows\system32> docker ps -a
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
PS C:\Windows\system32>
```



Cleaning Up Images



INSTALLATION OF ANSIBLE

WHAT IS ANSIBLE?

- Ansible is an open source IT automation engine that automates provisioning, configuration management, application deployment, orchestration, and many other IT processes.
- Use Ansible automation to install software, automate daily tasks, provision infrastructure, improve security and compliance, patch systems, and share automation across your organization.
- Ansible works by connecting to your nodes and pushing out small programs, called modules to them. Modules are used to accomplish automation tasks in Ansible.
- These programs are written to be resource models of the desired state of the system. Ansible then executes these modules and removes them when finished.

- Without modules, you'd have to rely on ad-hoc commands and scripting to accomplish tasks.
- Ansible is agentless, which means the nodes it manages do not require any software to be installed on them.
- Ansible reads information about which machines you want to manage from your inventory. Ansible has a default inventory file, but you can create your own and define which servers you want Ansible to manage.
- Ansible uses SSH protocol to connect to servers and run tasks. By default, Ansible uses SSH keys with ssh-agent and connects to remote machines using your current username. Root logins are not required. You can log in as any user, and then su or sudo to any user.

Ansible Playbooks:

- **Ansible Playbooks** are the files where Ansible code is written. These files are written in the language, **YAML**, which is a funny acronym for, “YAML Ain’t no Markup Language.”
- Playbooks contain one or more Plays. **Plays** map a group of computers to a few well-defined roles known as Tasks. **Tasks** can be defined as Ansible scripts.

YAML

YAML is a simple language that consists of key-value pairs. While not mandatory,  marks the beginning of a YAML program,

 and  marks the end.

YAML also allows the creation of lists. Lists can be created with the  symbol.

Orchestration with Ansible:

- In general, automation refers to automating a single task. This is different from orchestration, which is how you can automate a process or workflow that involves many steps across multiple disparate systems.
- Cloud orchestration can be used to provision or deploy servers, assign storage capacity, create virtual machines, and manage networking, among other tasks. There are many different orchestration tools that can help you with cloud orchestration. Ansible is one option.
- Server configuration and management and application deployments can also be orchestrated with a tool like Ansible.

INSTALLATION:

- a. Sudo apt-get install ansible

```
gopika@gopika-VirtualBox:~$ sudo apt-get install ansible
[sudo] password for gopika:
Sorry, try again.
[sudo] password for gopika:
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  ieee-data python3-argcomplete python3-crypto python3-distutils
  python3-dnspython python3-jinja2 python3-jmespath python3-kerberos
  python3-lib2to3 python3-libcloud python3-netaddr python3-ntlm-auth
  python3-requests-kerberos python3-requests-ntlm python3-selinux
  python3-winrm python3-xmldict
Suggested packages:
  cowsay sshpass python-jinja2-doc ipython3 python-netaddr-docs
The following NEW packages will be installed:
  ansible ieee-data python3-argcomplete python3-crypto python3-distutils
  python3-dnspython python3-jinja2 python3-jmespath python3-kerberos
  python3-libcloud python3-netaddr python3-ntlm-auth
  python3-requests-kerberos python3-requests-ntlm python3-selinux
  python3-winrm python3-xmldict
The following packages will be upgraded:
  python3-lib2to3
1 upgraded, 17 newly installed, 0 to remove and 331 not upgraded.
Need to get 9,942 kB of archives.
After this operation, 92.0 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
```

- b. ansible --version

```
gopika@gopika-VirtualBox:~$ ansible --version
ansible 2.9.6
  config file = /etc/ansible/ansible.cfg
  configured module search path = ['/home/gopika/.ansible/plugins/modules', '/usr/share/ansible/plugins/modules']
  ansible python module location = /usr/lib/python3/dist-packages/ansible
  executable location = /usr/bin/ansible
  python version = 3.8.5 (default, Jul 28 2020, 12:59:40) [GCC 9.3.0]
gopika@gopika-VirtualBox:~$
```

SHELL SCRIPT

Q1. Write a shell script to ask your name, and college name and print it on the screen.

```
1 echo "enter details and view"
2 echo enter your name
3 read name
4 echo enter your college name
5 read c
6 echo details you required
7 echo name:$name
8 echo college:$c
```

```
gopika@gopika-VirtualBox:~$ gedit colleges.sh

gopika@gopika-VirtualBox:~$ 
gopika@gopika-VirtualBox:~$ chmod +x colleges.sh
gopika@gopika-VirtualBox:~$ ./colleges.sh
enter details and view
enter your name
appu
enter your college name
Amaljyothi
details you required
name:appu
college:Amaljyothi
gopika@gopika-VirtualBox:~$
```

Q2. Write a shell script to set a value for a variable and display it on command line interface.

```
1 echo "display value of a variable"
2 a=26
3 echo $a
```

```
gopika@gopika-VirtualBox:~$ gedit variable.sh
gopika@gopika-VirtualBox:~$ chmod +x variable.sh
gopika@gopika-VirtualBox:~$ ./variable.sh
display value of a variable
26
gopika@gopika-VirtualBox:~$
```

Q3. Write a shell script to perform addition, subtraction, multiplication, division with two numbers that is accepted from user.

```
1 echo enter a number
2 read a
3 echo enter another number
4 read b
5 echo enter operation
6 echo "1.addition 2.subtraction 3.multiplication 4.division"
7 read op
8 case "$op" in
9 "1") echo "a+b=$((a+b));;
10 "2") echo "a-b=$((a-b));;
11 "3") echo "a*b=$((a*b));;
12 "4") echo "a/b=$((a/b));;
13
```

```
gopika@gopika-VirtualBox:~$ gedit operation.sh
gopika@gopika-VirtualBox:~$ ./operation.sh
enter a number
7
enter another number
3
enter operation
1.addition 2.subtraction 3.multiplication 4.division
1
a+b=10
```

Q4. Write a shell script to check the value of a given number and display whether the number is found or not.

```
1 echo enter a number
2 read a
3 if [ $a -eq 20];
4 then
5 echo "number found"
6 else
7 echo "not found"
8 fi
```

```
Not Found
gopika@gopika-VirtualBox:~$ gedit number.sh
gopika@gopika-VirtualBox:~$ ./number.sh
enter a number
3
./number.sh: line 3: [3: command not found
not found
```

Q5. Write a shell script to display current date, calendar.

```
1 echo "today is $(date)"
2 echo "calender";
3 cal
```

```
gopika@gopika-VirtualBox:~$ gedit calender.sh
gopika@gopika-VirtualBox:~$ chmod +x calender.sh
gopika@gopika-VirtualBox:~$ ./calender.sh
today is Sun 03 Oct 2021 11:12:48 AM EDT
calender
          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
```

Q6. Write a shell script to check a number is even or odd. #!/bin/bash

```
1 echo enter a number
2 read n
3 x=$(( $n % 2 ))
4 if [ $x -eq 0 ];
5 then
6 echo "number is even"
7 else
8 echo "number is odd"
9 fi
```

```
gopika@gopika-VirtualBox:~$ gedit oddeven.sh
gopika@gopika-VirtualBox:~$ chmod +x oddeven.sh
gopika@gopika-VirtualBox:~$ ./oddeven.sh
enter a number
5
number is odd
gopika@gopika-VirtualBox:~$
```

Q7. Write a shell script to check a number is greater than, less than or equal to another number.

```
1 echo enter first number
2 read a
3 echo second number
4 read b
5 if [ $a -gt $b ];
6 then
7 echo "$a is larger"
8 elif [ $b -gt $a ];
9 then
10 echo "$b is larger"
11 else
12 echo "both are equal"
13 fi
```

```
gopika@gopika-VirtualBox:~$ gedit greater.sh
gopika@gopika-VirtualBox:~$ chmod +x greater.sh
gopika@gopika-VirtualBox:~$ ./greater.sh
enter first number
6
second number
4
6 is larger
```

Q8. Write a shell script to find the sum of first 10 numbers.

```
1 s=0
2 for ((i=0;i<=10;i++))
3 do
4 s=`expr $s + $i`
5 done
6 echo "sum of first 10 numbers=$s"
0 ls target
gopika@gopika-VirtualBox:~$ gedit sum.sh
gopika@gopika-VirtualBox:~$ chmod +x sum.sh
gopika@gopika-VirtualBox:~$ ./sum.sh
sum of first 10 numbers=55
gopika@gopika-VirtualBox:~$
```

Q9. Write a shell script to find the sum, the average and the product of the four integers entered.

```
1 echo enter first number
2 read a
3 echo enter second number
4 read b
5 echo enter third number
6 read c
7 echo enter fourth number
8 read d
9 sum=$((a + b + c + d))
10 product=$((a * b * c * d))
11 avg=$(echo $sum/4 | bc -l)
12 echo "the sum:$sum
13 echo "the average:$avg
14 echo "the product is:$product
0 ls target
gopika@gopika-VirtualBox:~$ gedit average.sh
gopika@gopika-VirtualBox:~$ chmod +x average.sh
gopika@gopika-VirtualBox:~$ ./average.sh
enter first number
6
enter second number
4
enter third number
5
enter fourth number
1
the sum:16
the average:4.000000000000000000000000
the product is:
```

Q10. Write a shell script to find the smallest of three numbers.

```
1 echo enter first no
2 read a
3 echo enter second no
4 read b
5 echo enter third no
6 read c
7 if [ $a -lt $b ];
8 then
9 if [ $a -lt $c ];
10 then
11 echo "$a is smallest"
12 fi
13 elif [ $b -lt $c ];
14 then
15 echo "$b is smallest"
16 else
17 echo "$c is smallest"
18 fi
```

```
gopika@gopika-VirtualBox:~/Documents$ ./small.sh
enter first no
7
enter second no
4
enter third no
2
2 is smallest
```

Q11. Write a shell program to find factorial of given number.

```
1 echo enter number
2 read n
3 f=1
4 for ((i=2;i<=n;i++))
5 do
6 f=$((f*i))
7 done
8 echo "factorial is $f"
```

```
gopika@gopika-VirtualBox:~/Documents$ gedit factorial.sh
gopika@gopika-VirtualBox:~/Documents$ chmod +x factorial.sh
gopika@gopika-VirtualBox:~/Documents$ ./factorial.sh
enter number
5
factorial is 120
```

Q12. Write a shell program to check a number is palindrome or not.

```

1 echo enter number
2 read n
3 rev=$(echo $n | rev)
4 if [ $n -eq $rev ];
5 then
6 echo " number is palindrome"
7 else
8 echo " not palindrome"
9 fi

```

```

gopika@gopika-VirtualBox:~$ gedit palin.sh
gopika@gopika-VirtualBox:~$ chmod +x palin.sh
gopika@gopika-VirtualBox:~$ ./palin.sh
enter number
44
number is palindrome

```

Q13. Write a shell script to find the average of the numbers entered in

```

1 echo enter size
2 read n
3 i=1
4 s=0
5 echo "enter number"
6 while [ $i -le $n ]
7 do
8 read num
9 s=$((s+num))
10 i=$((i+1))
11 done
12 avg=$(echo $s/$n | bc -l)
13 echo "average is $avg"

```

```

gopika@gopika-VirtualBox:~$ gedit avg.sh
gopika@gopika-VirtualBox:~$ chmod +x avg.sh
gopika@gopika-VirtualBox:~$ ./avg.sh
enter size
5
enter number
4
5
1
2
3
average is 3.00000000000000000000000000000000

```

command line.

Q14. Write a shell program to find the sum of all the digits in a number.

```
1 echo enter number
2 read n
3 s=0
4 while [ $n -gt 0 ]
5 do
6 mod=$((n%10))
7 s=$((s+mod))
8 n=$((n/10))
9 done
10 echo " sum is $s"

gopika@gopika-VirtualBox:~$ gedit total.sh
gopika@gopika-VirtualBox:~$ chmod +x total.sh
gopika@gopika-VirtualBox:~$ ./total.sh
enter number
4
sum is 4
```

Q15. Write a shell Script to check whether given year is leap year or not.

```
1 echo enter year
2 read y
3 a=$((y%4))
4 b=$((y%100))
5 c=$((y%400))
6 if [ $a -eq 0 -a $b -ne 0 -o $c -eq 0 ];
7 then
8 echo "$y is leap year"
9 else
10 echo "$y is not year"
11 fi

gopika@gopika-VirtualBox:~$ gedit leap.sh
gopika@gopika-VirtualBox:~$ chmod +x leap.sh
gopika@gopika-VirtualBox:~$ ./leap.sh
enter year
2010
2010 is not year
```

WIRESHARK INSTALLATION

Wireshark installation

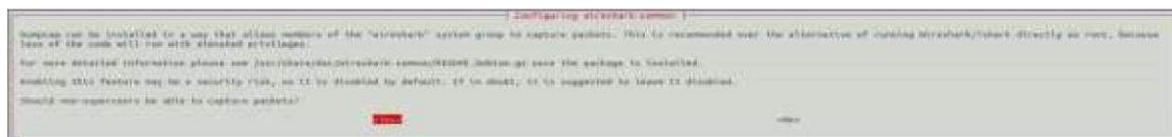
1. Command: sudo apt-get install wireshark

```
vimalthomson@vimal-thomson:~$ sudo apt-get install wireshark
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
chromium-codecs-ffmpeg-extra gstreamer1.0-vaapi libgstreamer-plugins-bad1.0-0 libnvidia-cfg1-460 libnvidia-common-460 libnvidia-gl-460 libnvidia-ifri-460 libva-wayland libxcb-xcb1:1386 libxnvctrl nvidia-compute-utils-460 nvidia-kernel-xserver-xorg-video-nvidia-460
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
libdouble-conversion3 libpcre2-16-0 libqt5core5a libqt5dbus5 libqt5gui5 libqt5multimedia5 libqt5multimedia5-plugins libqt5printsupport5 libqt5svg5 libqt5widget5 libsmi2lqlbl libspandsp2 libwireshark-data libwireshark13 libwireshark18 libwireshark-common wireshark-qt
Suggested packages:
qt5-image-formats-plugins qtwayland5 snmp-mibs-downloader geolipupdate geolp-database geolp-database-extra libjs-leaflet
The following NEW packages will be installed:
libdouble-conversion3 libpcre2-16-0 libqt5core5a libqt5dbus5 libqt5gui5 libqt5multimedia5 libqt5multimedia5-plugins libqt5printsupport5 libqt5svg5 libqt5widget5 libsmi2lqlbl libspandsp2 libwireshark-data libwireshark13 libwireshark18 libwireshark-common wireshark-qt
0 upgraded, 27 newly installed, 0 to remove and 342 not upgraded.
Need to get 32.6 MB of archives.
After this operation, 162 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu focal/universe amd64 libdouble-conversion3 amd64 3.1.5-4ubuntu1 [37.9 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu focal/main amd64 libpcre2-16-0 amd64 10.34-7 [181 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu focal/universe amd64 libqt5core5a amd64 5.12.8+dfsg-8ubuntu1 [2,005 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu focal/universe amd64 libqt5dbus5 amd64 5.12.8+dfsg-8ubuntu1 [7288 kB]
```

2. Command: sudo dpkg-reconfigure wireshark-common

```
vimalthomson@vimal-thomson:~$ sudo dpkg-reconfigure wireshark-common
vimalthomson@vimal-thomson:~$ █
```

3. Command: Select Yes and press enter



4. Open wireshark from the applist

