Application of Information and Communication Technologies

BS DS / BS IT Fall 2023

Assignment # 1

Submission Deadline: **Thursday, 5th October, 2023 11:59 PM**

Virtual Box:

VirtualBox is open-source software for virtualizing the x86 computing architecture. It acts as a hypervisor, creating a VM (virtual machine) where the user can run another OS (operating system). The operating system where VirtualBox runs is called the "host" OS. The operating system running in the VM is called the "guest" OS. VirtualBox supports Windows, Linux, or macOS as its host OS. When configuring a virtual machine, the user can specify how many CPU cores, and how much RAM and disk space should be devoted to the VM. When the VM is running, it can be "paused." System execution is frozen at that moment in time, and the user can resume using it later.

Linux:

Linux is a family of open-source Unix-like operating systems based on the Linux kernel an operating system kernel first released on September 17, 1991, by Linus Torvalds. Linux was originally developed for personal computers based, but has since been ported to more platforms than any other operating system. Because of the dominance of the Linux-based Android on smartphones, Linux also has the largest installed base of all general-purpose operating systems. Linux is one of the most prominent examples of free and open-source software collaboration. The source code may be used, modified and distributed commercially or non-commercially by anyone under the terms of its respective licenses, such as the GNU General Public License.

Terminal:

The Linux command line terminal is a text interface to your computer. Often referred to as terminal, console, or prompt. The terminal is just a mechanism to transfer information. For the operating system to understand the information, a shell is needed. A shell in Linux is a program that interprets the commands you enter in a terminal window, so the operating system can understand what you want to do.

Basic Commands:

Now, let us look at the most important commands in Linux. Linux commands are case sensitive hence you need to be careful about what you are keying in.

1. *ls:* List directory contents.
2. *cd:* Change the current directory.
3. *pwd:* Print Working Directory.
4. *mv:* Move a file.
5. *cp:* Copy a file.
6. *rm:* Remove files in a directory or the directory itself.
7. *mkdir:* To make a directory.
8. *cat:* The cat command (short for "concatenate") is one of the most frequently used commands in Linux. cat command allows you to create single or multiple files.
9. *echo:* This command is used to display a text or a string to the standard output or a file.
    $ echo "This is an article on basic Linux commands".
10. *clear:* This command lets you clear the terminal screen.

Task 01: Installation of Oracle ® VirtualBox Virtual Machine.   [10 marks]
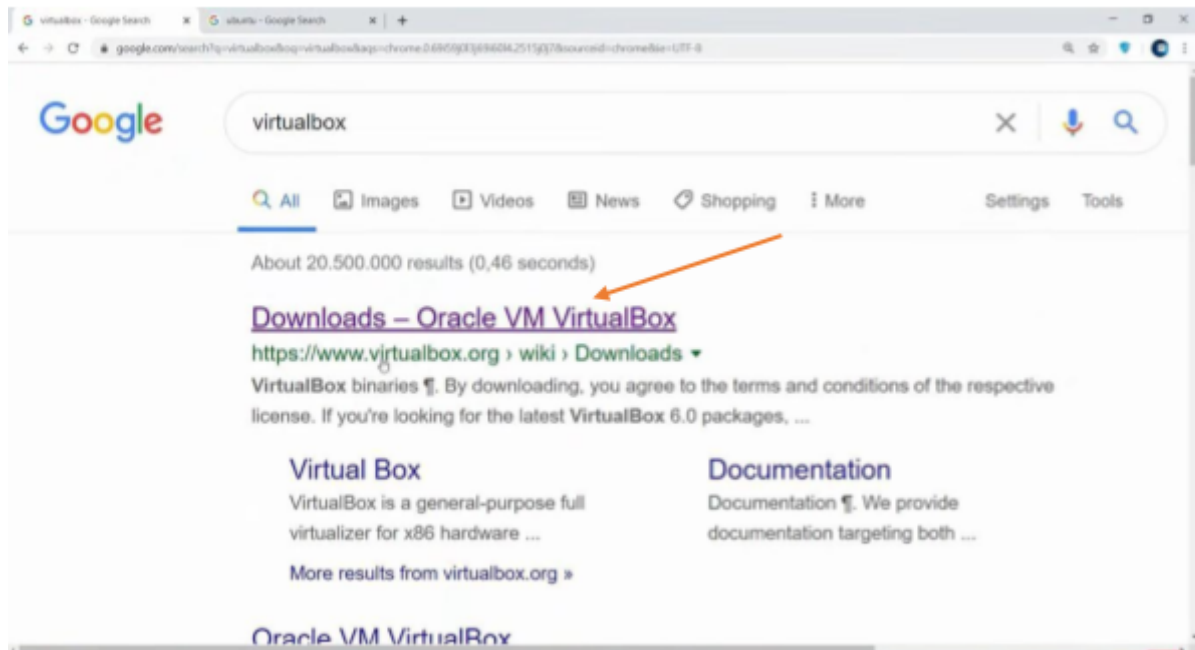
Open your Browser. Search "Virtualbox"

Fig. 1   (Search Virtual Box)

You will see this screen.
On side bar, Click on "**Downloads**".

Fig. 2 (Click Downloads)

Select VirtualBox packages, if you're using Microsoft ® Windows, then Click on **"Windows hosts"**.
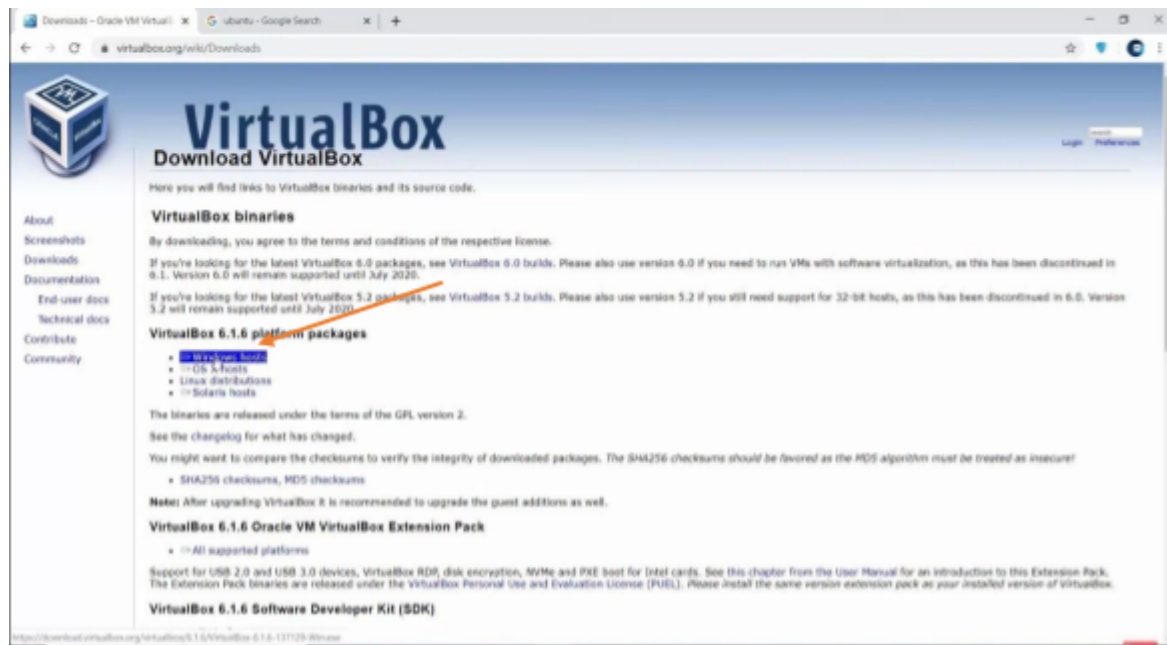

Fig. 3 (Virtual Box Packages)

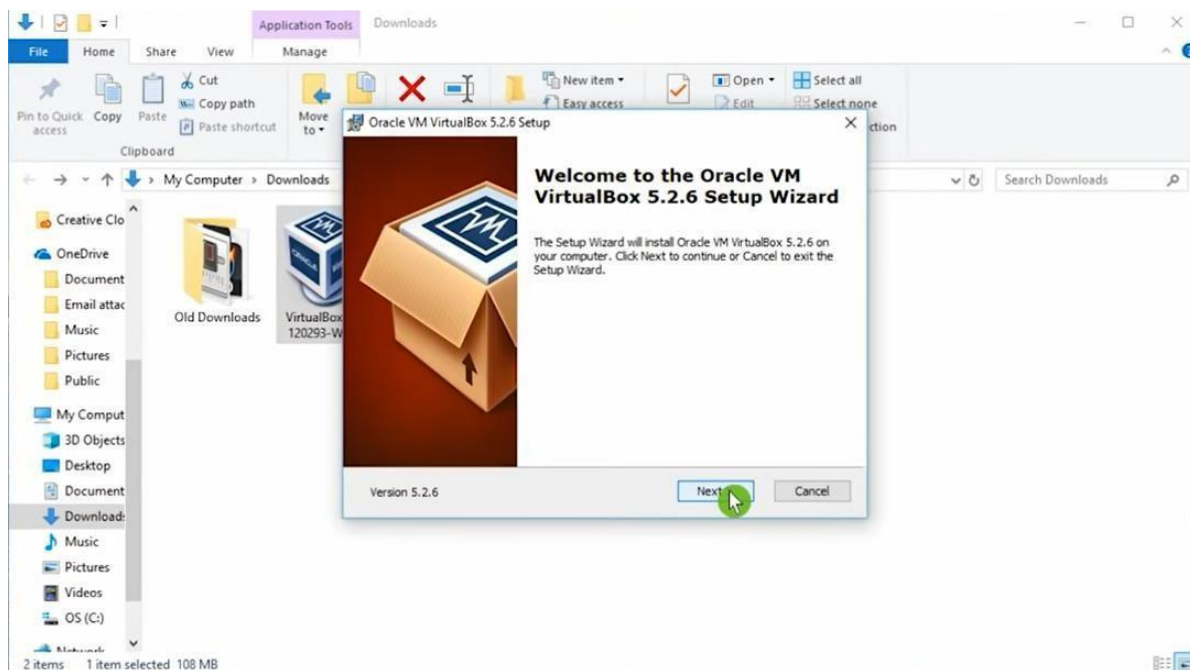After downloading, Double Click on file.

You will see a popup window.

Fig. 4 (Welcome Screen)

Then you will see this Window, Click **"Next"**.
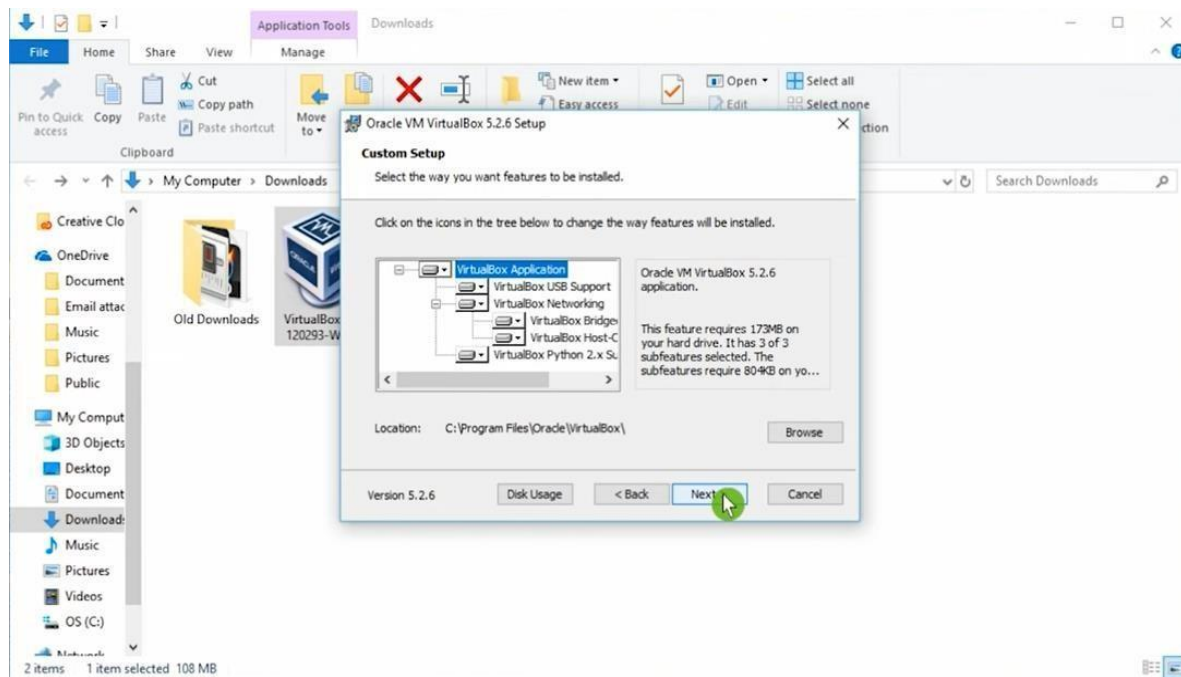
Fig. 5 (Custom Setup)

In this Window, select all check boxes and then Click **"Next"**.
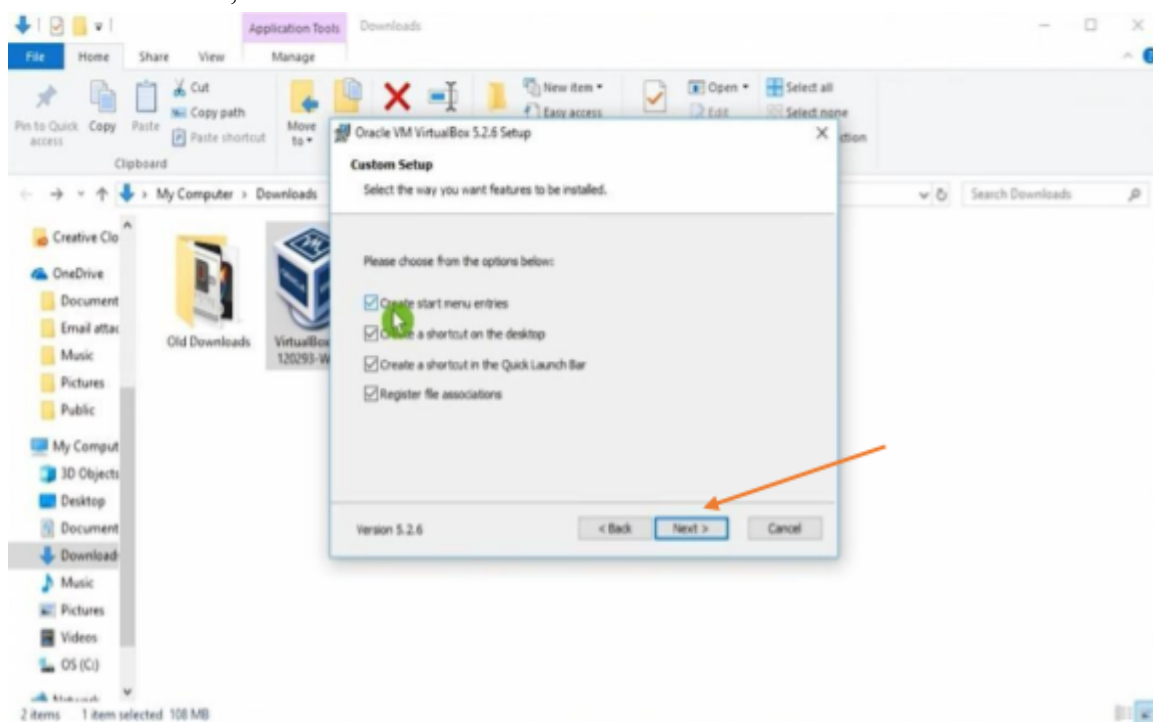
Fig. 6 (Select Features)

Warning: Network Interfaces

Click **"Yes"**.
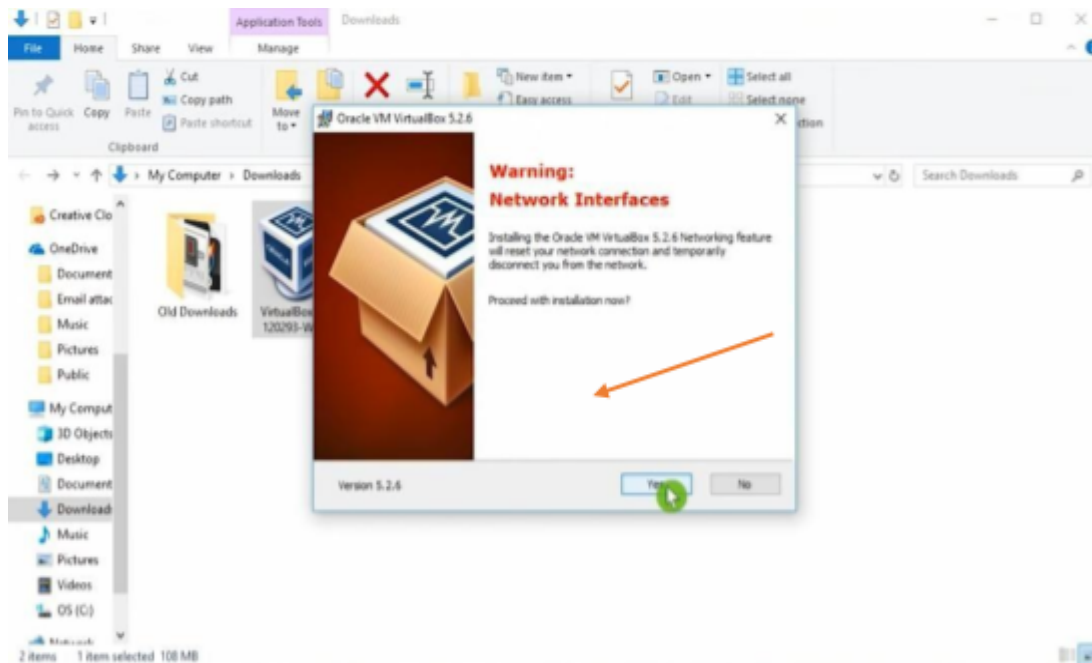
Fig. 7 (Network Interfaces)

Click **"Install"** button to start Installation.
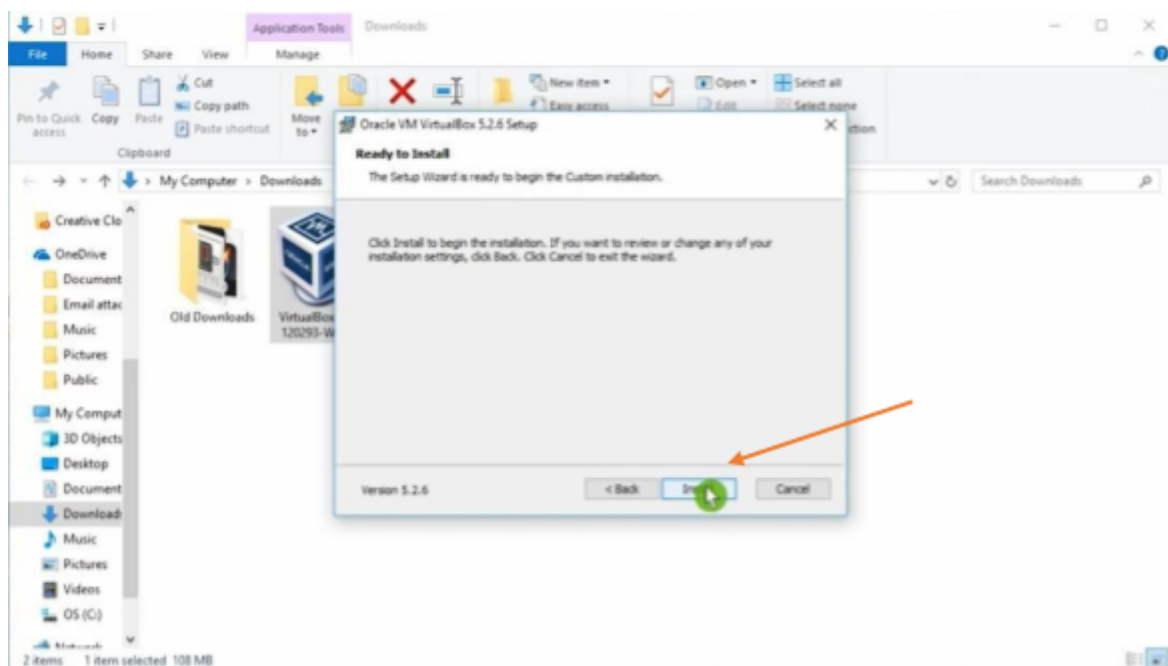
Fig. 8 (Ready to Install)

Click **"Finish"** to end with Installation.
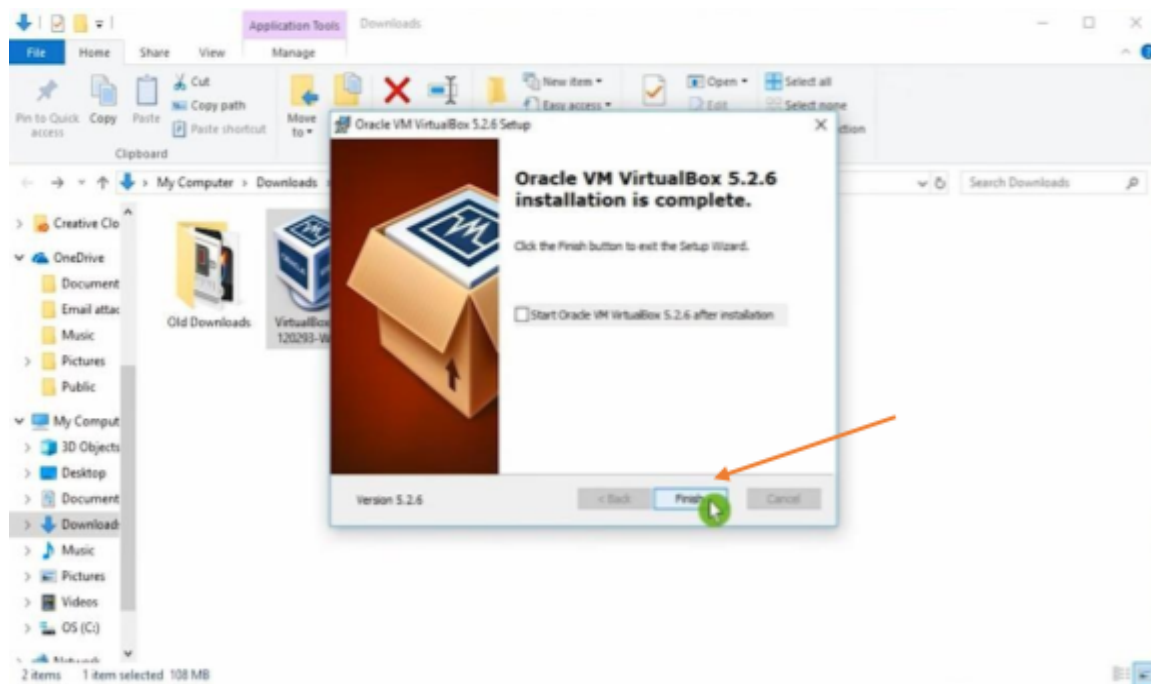
Fig. 9 (Finish Install)

Task 02: Installation of Ubuntu variant of Linux Operating System   [30

marks]

 Search **"Ubuntu"** on Google.
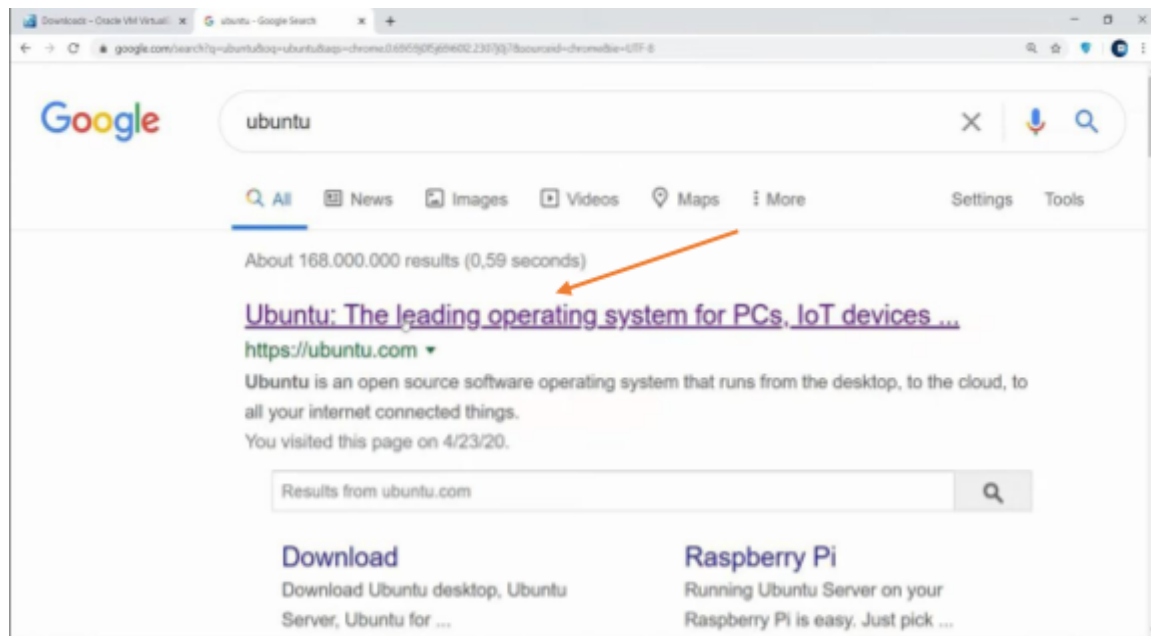
Fig. 10 (Search Ubuntu)

Open first website **https://ubuntu.com**.

You will see this interface.
Click on **"Download"** from top navigation bar.
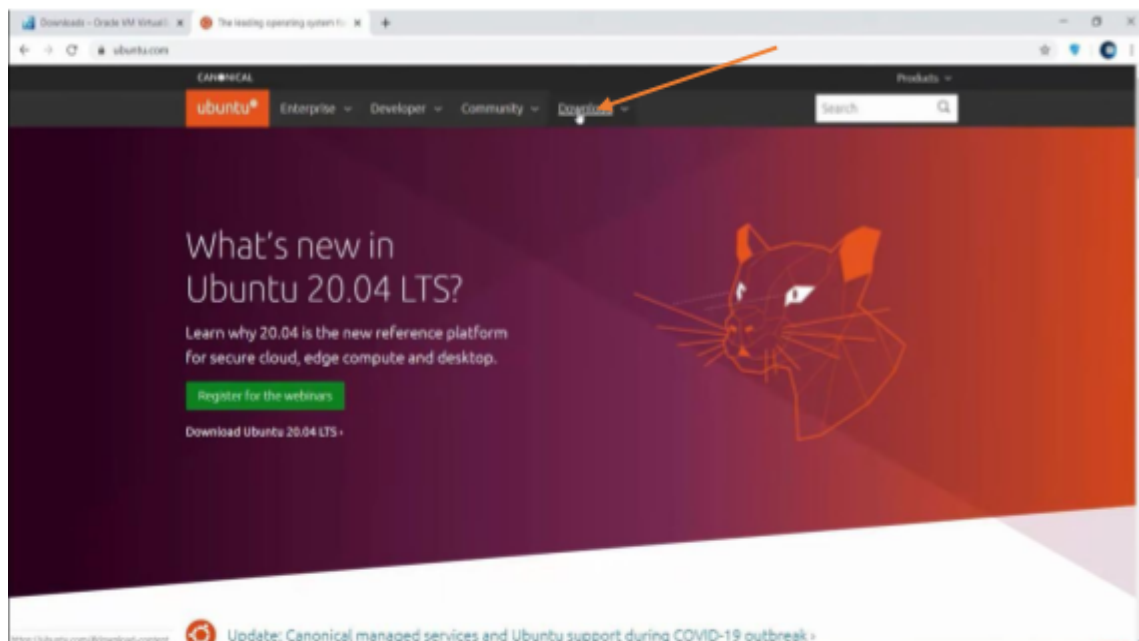
Fig. 11 (Go TO Downloads)

Click on **"20.14 LTS".**
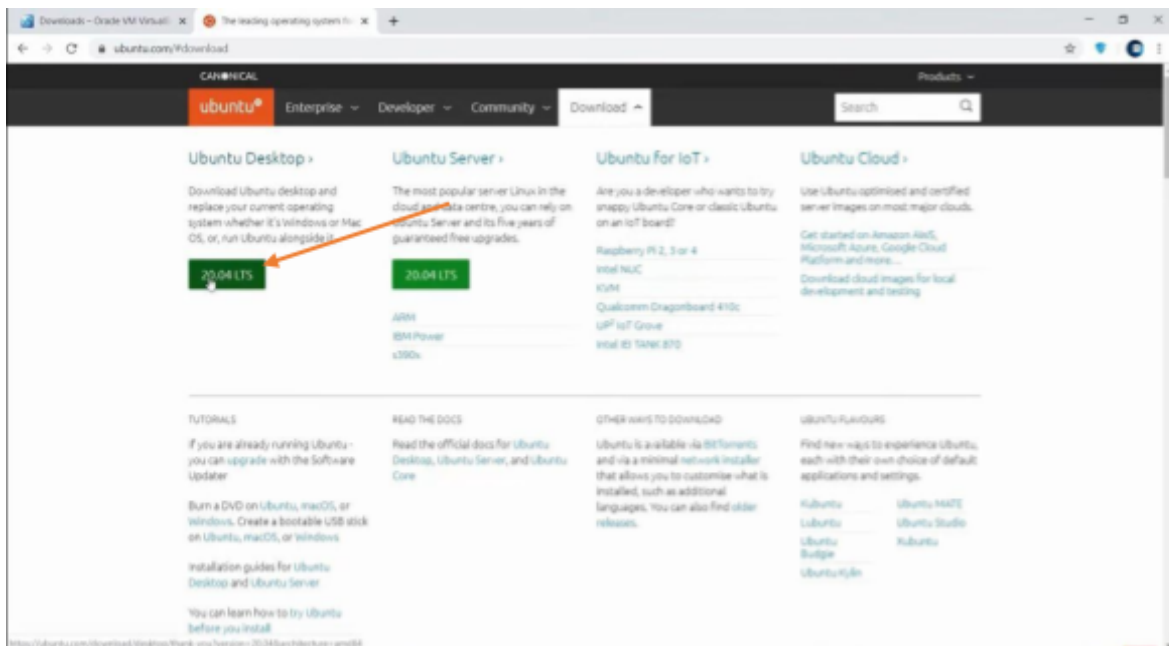
Fig. 12 (Start Downloadng)

Then it will start downloading.

Setup Virtual Box:

Create a new Virtual Machine in Virtual Box.

Click on **"New".**
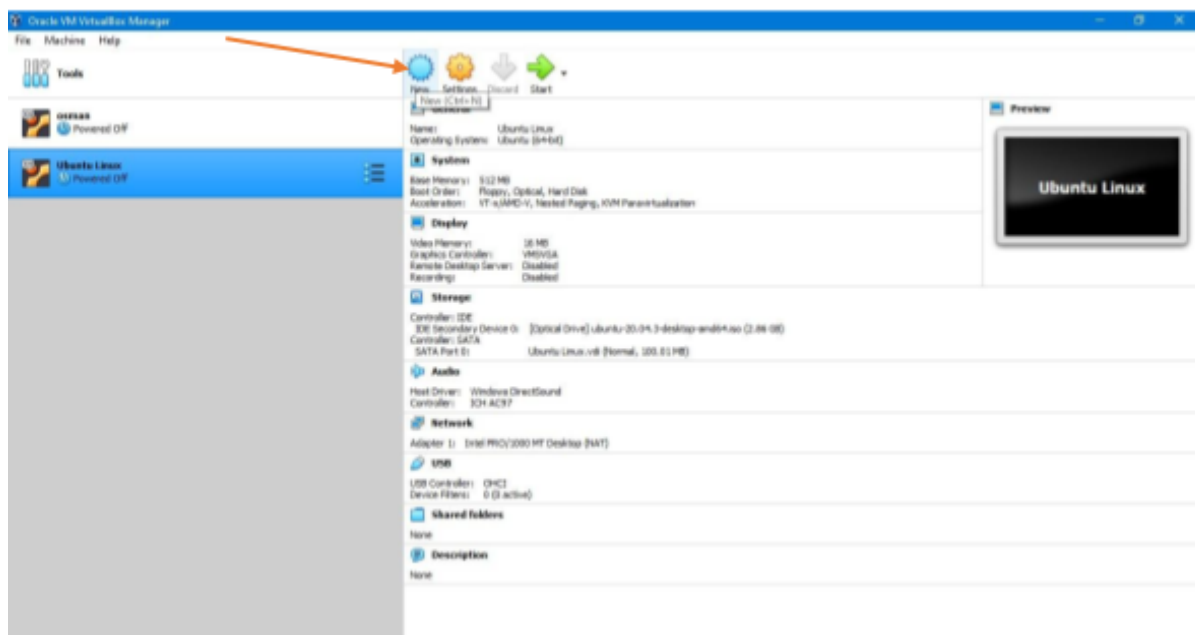
Fig. 13 (New Virtual Machine)

You see a Window with Title Create Virtual Machine.
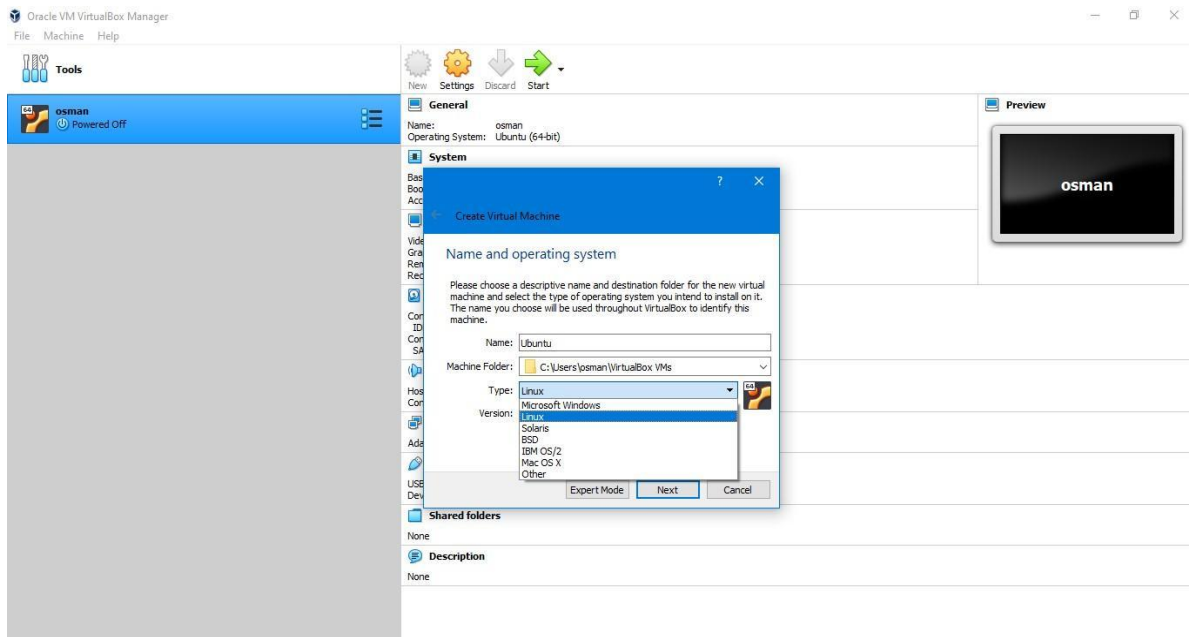
Fig. 14 (Create Virtual Machine)

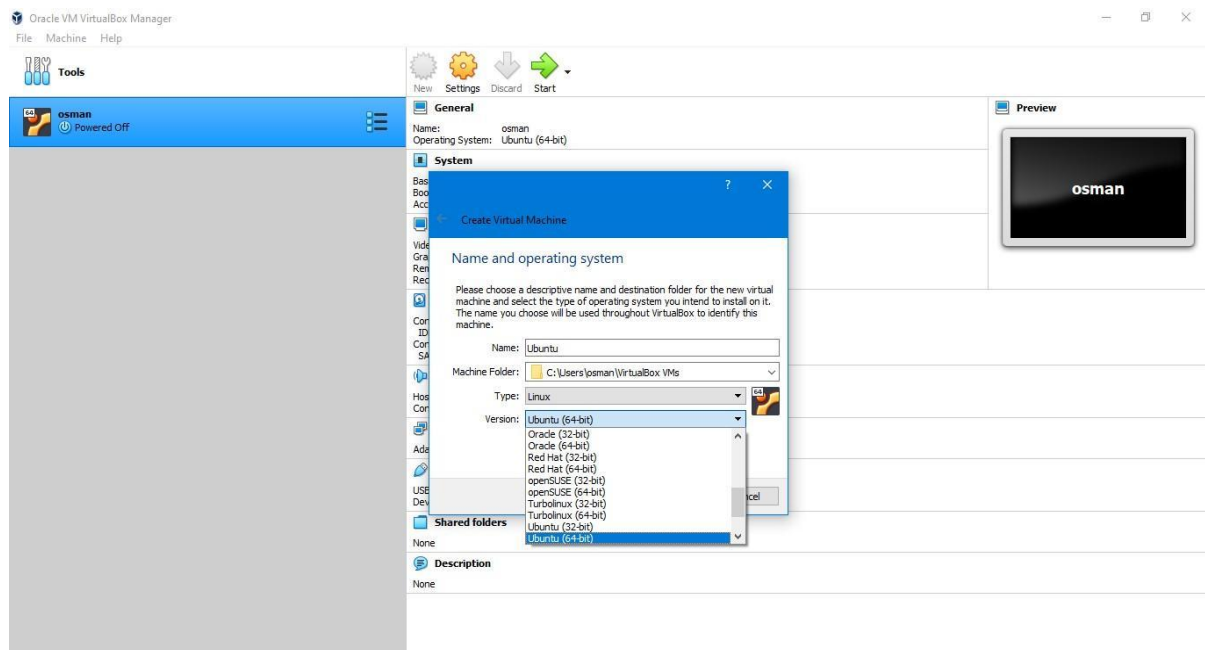Here, Linux Operating System is selected.

Fig. 15 (Create Virtual Machine)

Select Version.

You will select Ubuntu (64-bit).
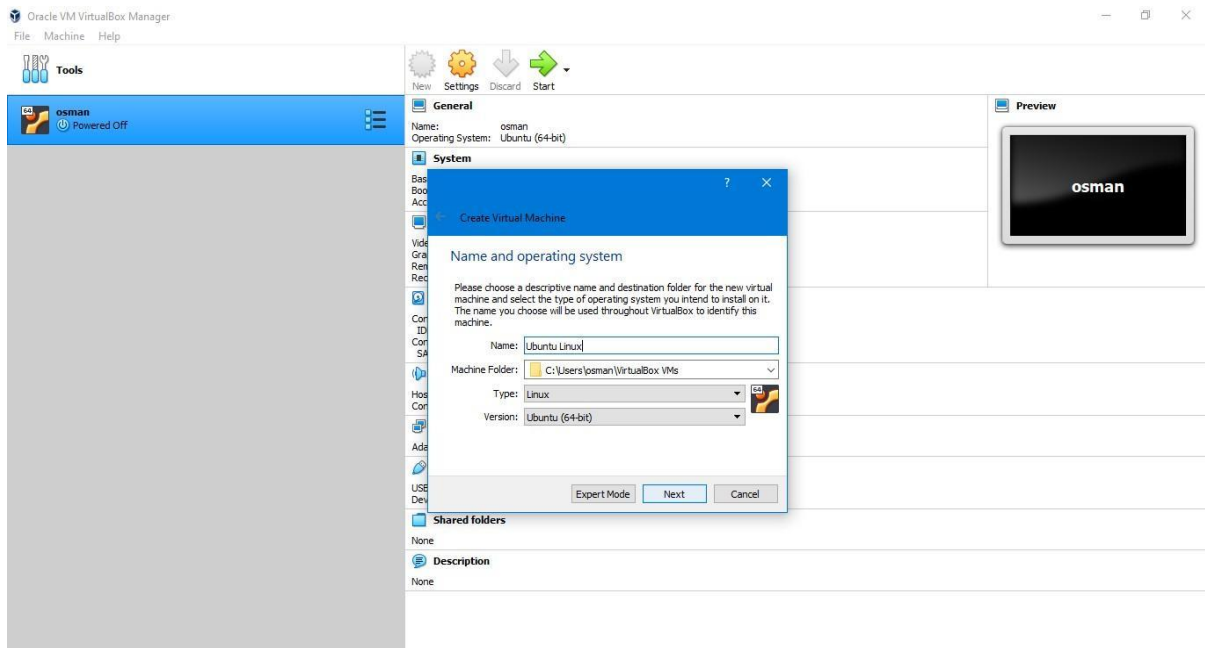
Name your Virtual Machine.

Here, Virtual Machine is named as **"Ubuntu Linux"**

Fig. 16 (Name Virtual Machine)

Set size of Virtual Machine.
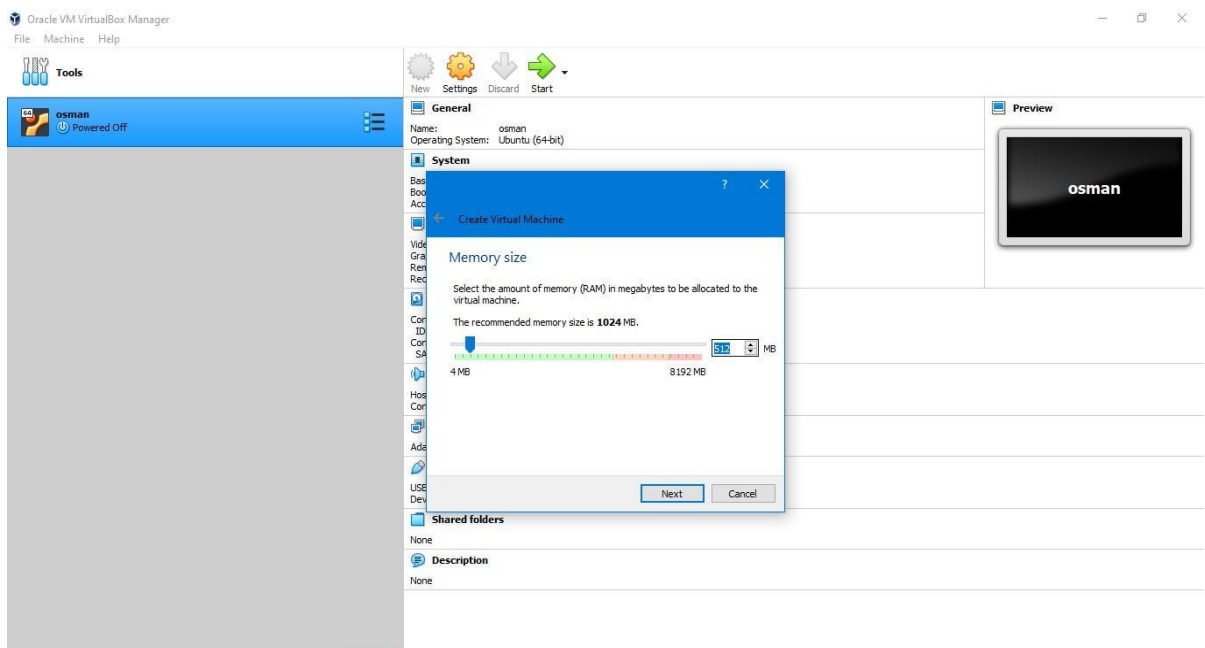
Here, size for Virtual Machine is 512MB.

Fig. 16 (Memory Size)

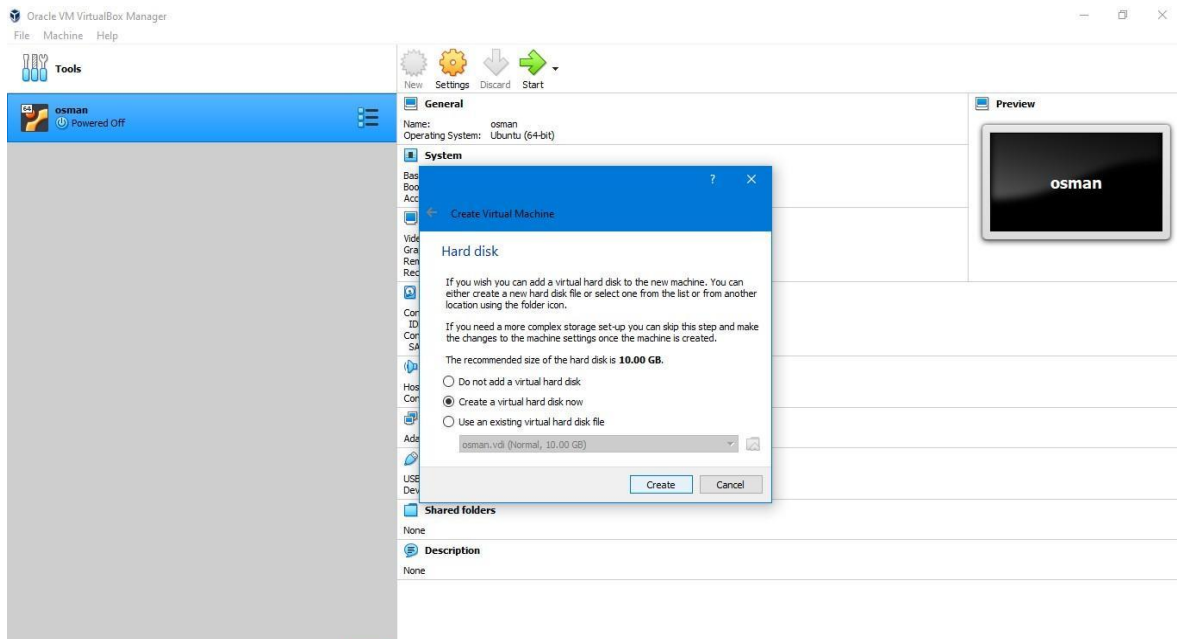Select **"Create a virtual hard disk now"**.

Click on **"Create"**.

Fig. 17 (Hard Disk)

Hard Disk File Type:
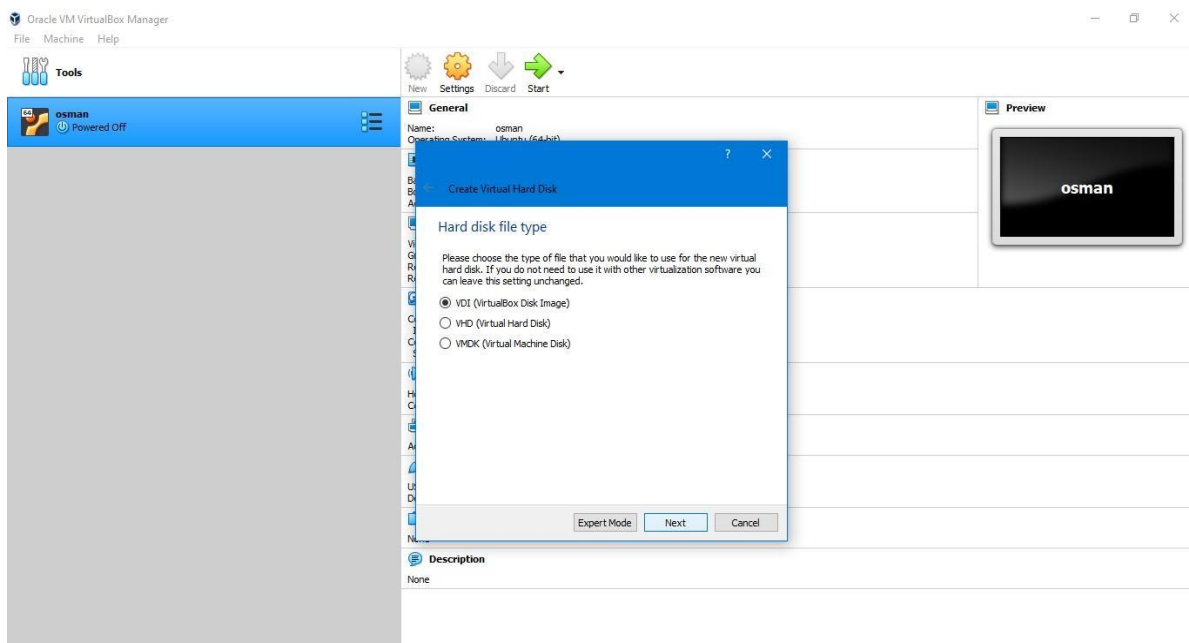
You will select "VDI (VirtualBox Disk Image).

Fig. 18 (Hard Disk File Type)

Storage on Physical Hard Disk:

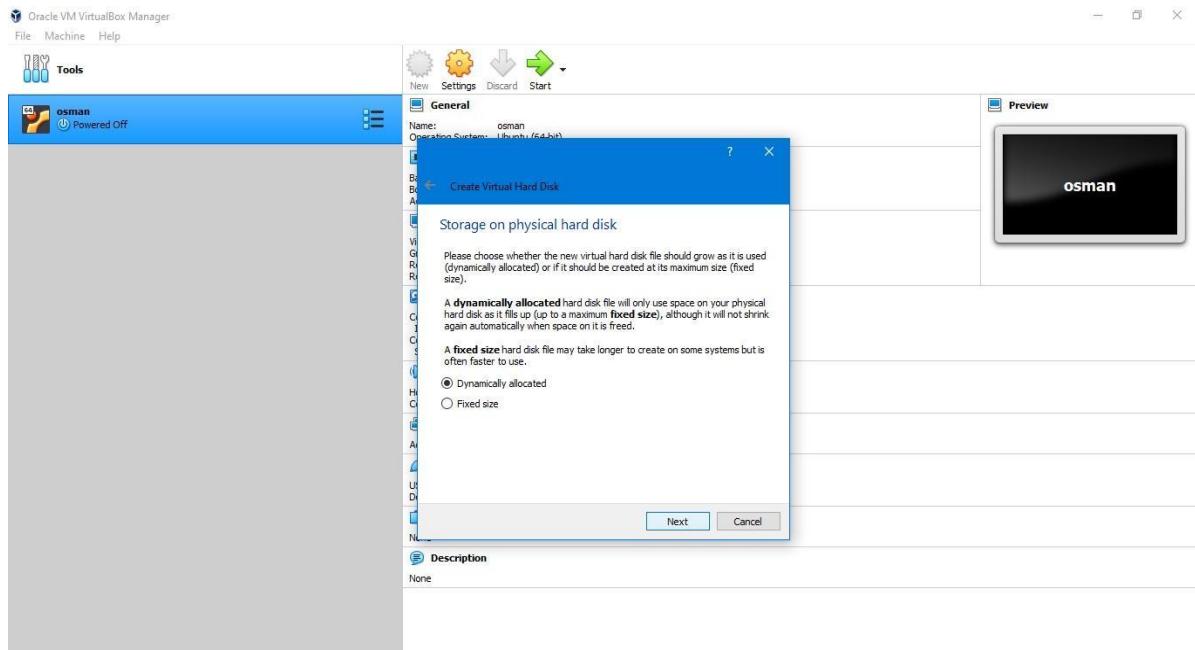You will select **"Dynamically allocated"**.

Then Click on **"Next"**.

Fig. 19 (Dynamic Storage)

Then you will see final screen.

There will be new Virtual Machine named **"Ubuntu Linux"**.
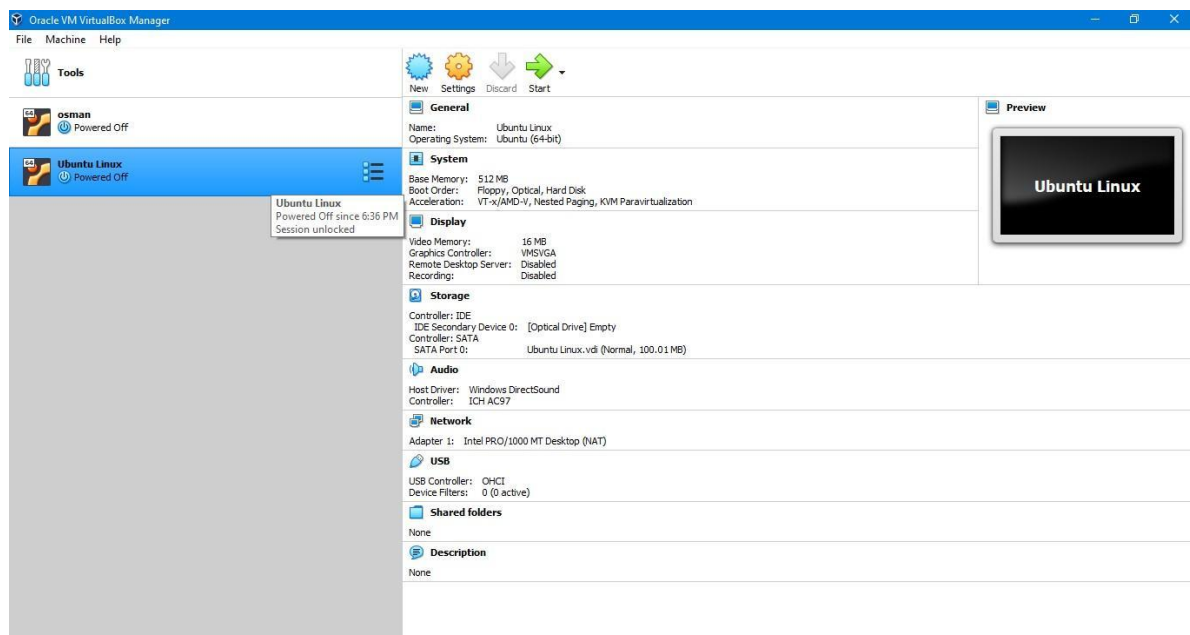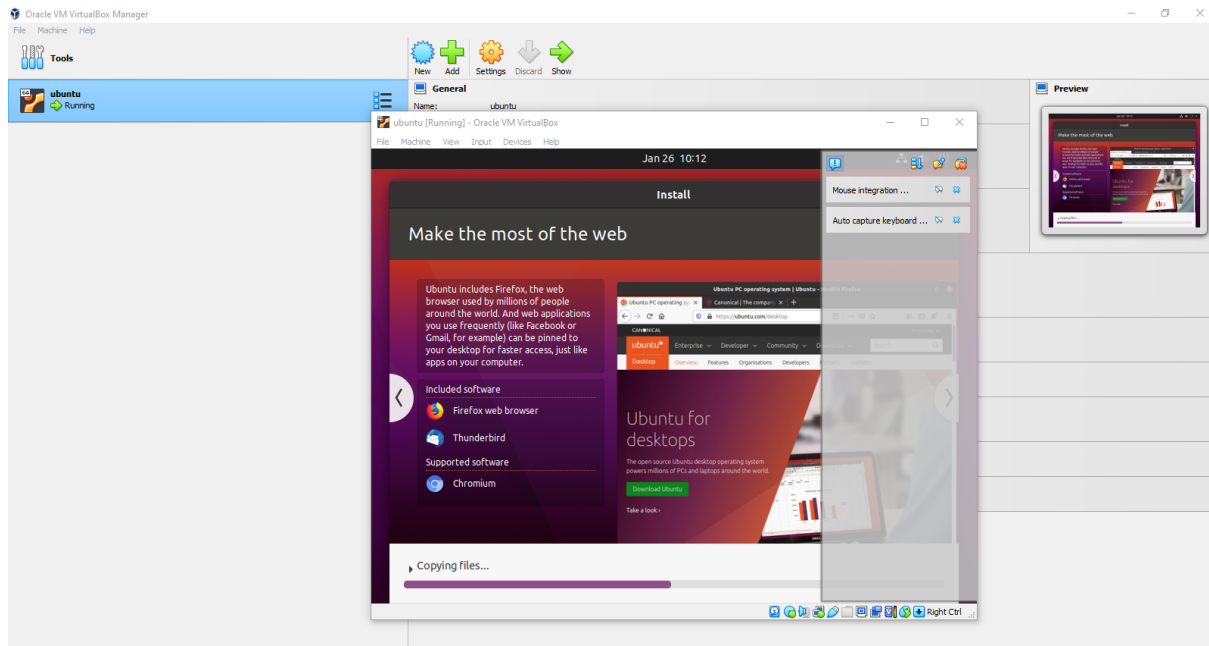

Fig. 20 (New Virtual Machine)

Fig. 21 (Ubuntu Installation on VM)

Demonstration on Linux Terminal:

Open Terminal:
Go to search bar in Linux and Search **"Terminal"**. You will see built-in terminal by Linux. You can also use short key **"Ctrl + Alt +**
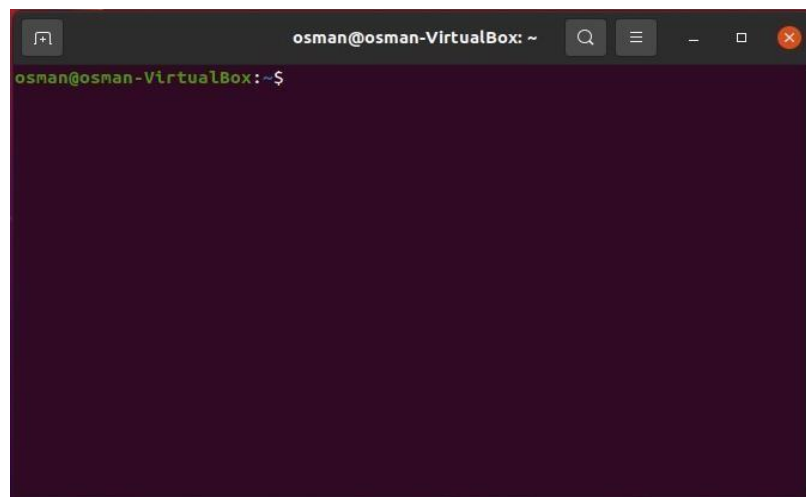**t"**. You will this screen on your computers.

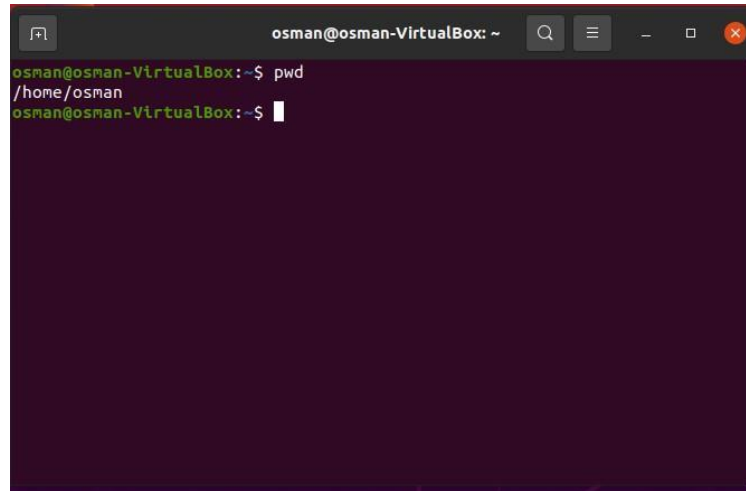Fig. 22 (Open Terminal)

Start Learning Commands:

When you will open your terminal, you'll be in home directory. It will your current working directory.

The current working directory is **the directory in which the user is currently working in**. Each time you interact with your command prompt, you are working within a directory. By

default, when you log into your Linux system, your current working directory is set to your home directory.

You can get current working directory by using command **"pwd"** on terminal.

~**$** pwd
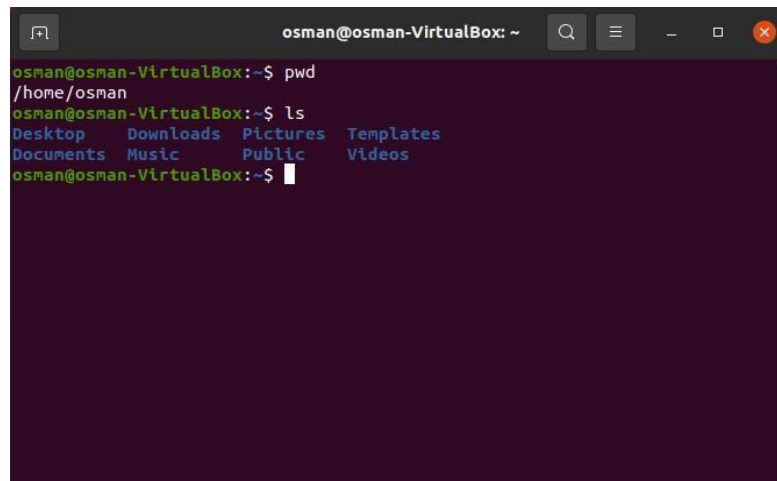
Fig. 23 (Current Working Directory)

To find out what is in your home directory, use the **"ls"** command. (ls is short for "list"). There may be no files visible in your home directory, in which case, nothing will print but the command prompt again.

List contents of your current working directory:

~**$** ls

Fig. 18 (List Command)

List detailed content of your current working directory:

To see detailed content of your current working directory, use **"ls -l"** command.

~$ ls -l

Fig. 24 (List Detailed Information)

Here you can see detailed list of directories. In the list items in blue color are directories and file are in white color.

Show hidden files:

By using **"ls -la"** command, you can get list all files including hidden files.

~$ ls -la

Fig. 25 (List with Hidden Files)

It is showing hidden files. All the files starting with **"."** Are hidden files.

Change to a different directory:

The command cd directory means change the current working directory to **"directory"**. The current working directory may be thought of as the directory you are in, i.e., your current position in the filesystem. To change to the directory you have just made, type.

To change current working directory, use command **"cd <next-directory>"**.

It is showing how to change current working directory which is home directory to next directory which is **"Desktop"**.
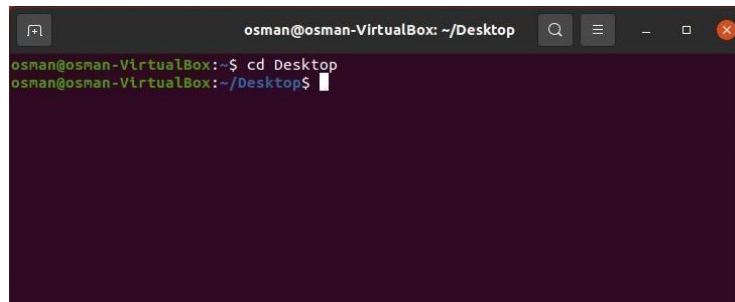
~$ cd Desktop

Fig. 26 (Change Directory)

To go up one level in the directory tree, use two dots.

~$ cd ..

At this point you should be back in your home directory.
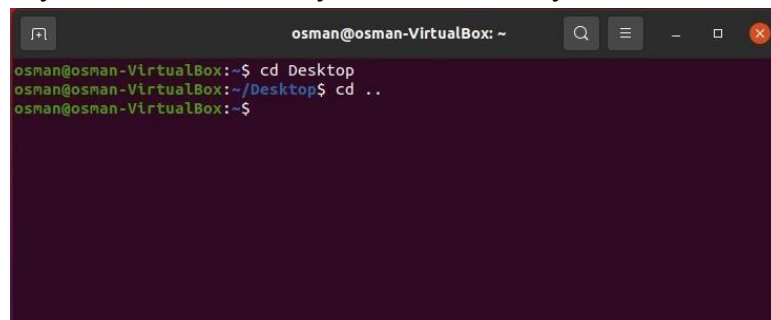
Fig. 27 (Current Working Directory)

To jump back to your home directory (regardless of how deep in the file tree you happen to be), use either of the two following commands.

~$ cd

or

~$ cd ~

In Linux systems, the tilde (~) character represents your home directory.
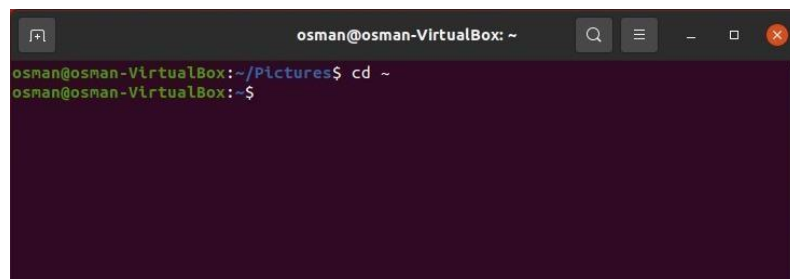
Fig. 28 (Change Directory to home directory)

Create a file:

To create a new file simply run the touch command followed by the name of file you want to

create.   **~$** touch textfile.txt
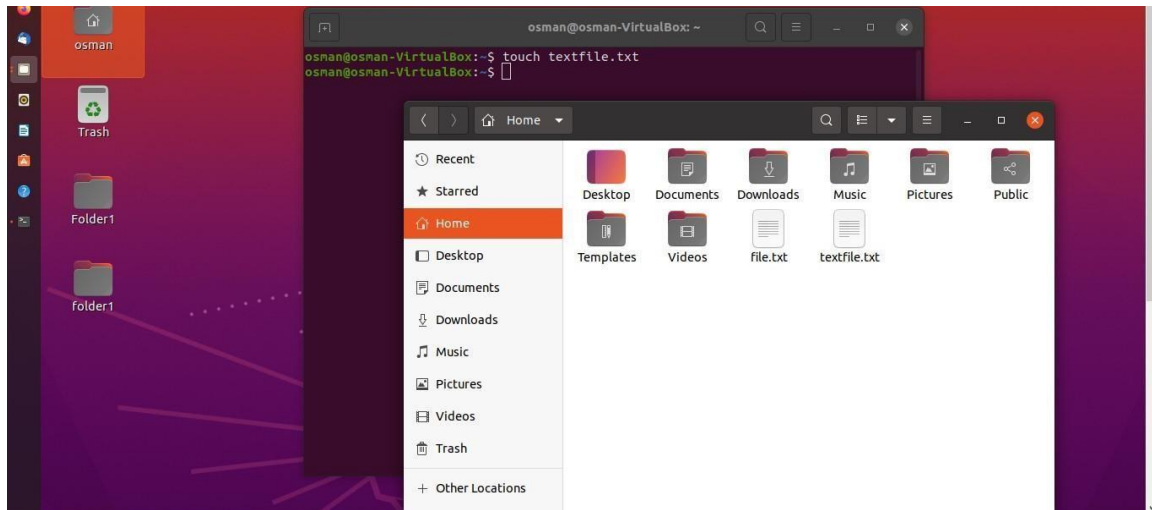
Fig.29 (Create a file)

After running command, a text file of name **"textfile.txt"** has been created.

Creating a File with "cat" Command:

The **"cat"** command is mainly used to read and concatenate files, but it can also be used for creating new files.

To create a new file run the cat command followed by the redirection operator **">"** and the name of the file you want to create. Press Enter type the text and once you are done press the CRTL+D to save the files.

~**$** cat > file1.txt
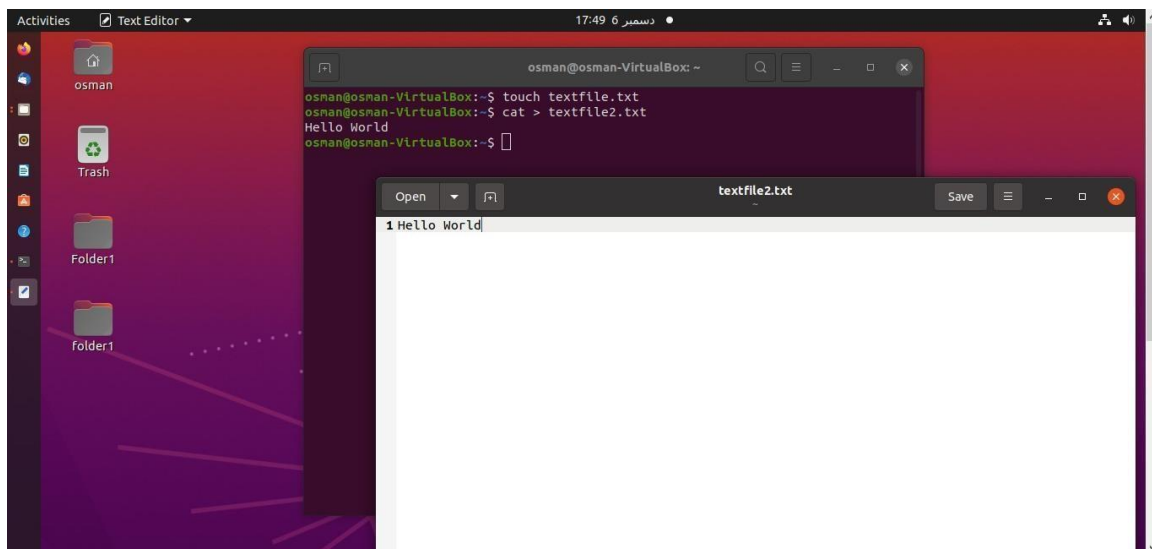
Fig. 30 (Create a file with cat)

cat (concatenate) command is very frequently used in Linux. It reads data from the file and gives their content as output.

To view a single file:

~**$** cat filename
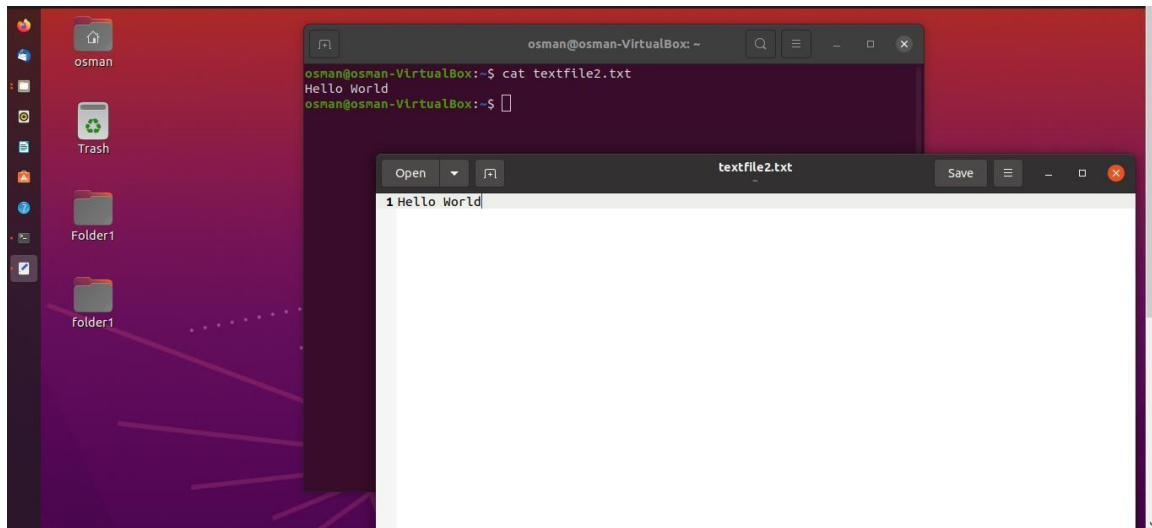
Fig. 31 (Create a file)

Create Directory:

Now let's learn how to create your own directory with the help of command prompt in Linux.

To directory Linux has command **"mkdir"** stands for 'make directory'. With the help of **"mkdir"** command, you can create a new directory wherever you want in your system. Just type **"mkdir <dir name>"**, in place of <dir name> type the name of new directory, you want to create and then press enter.

Syntax:

~$ mkdir <dirname>
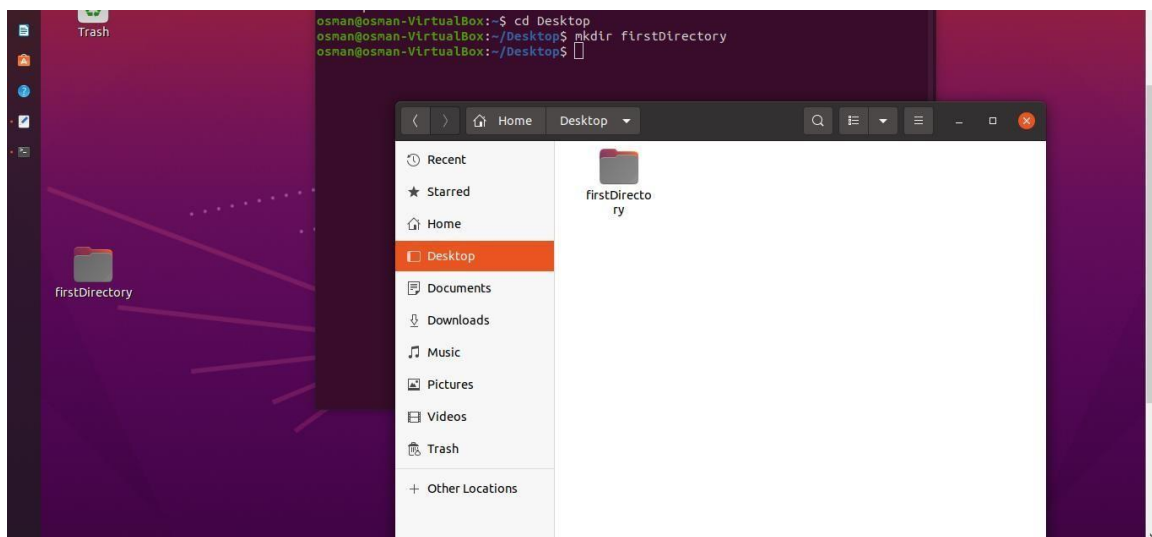
Fig. 32 (Make Directory)

Copy Files and Directories:

The "**cp"** command is the primary method for copying files and directories in Linux. Virtually all Linux distributions can use "**cp"**. The basic format of the command is:

~$ cp source_file target_file

For example:

~**$** cp textfile2.txt file.txt

This Linux command creates a copy of the **"my_file.txt"** file and renames the new file to **"my_file2.txt"**.
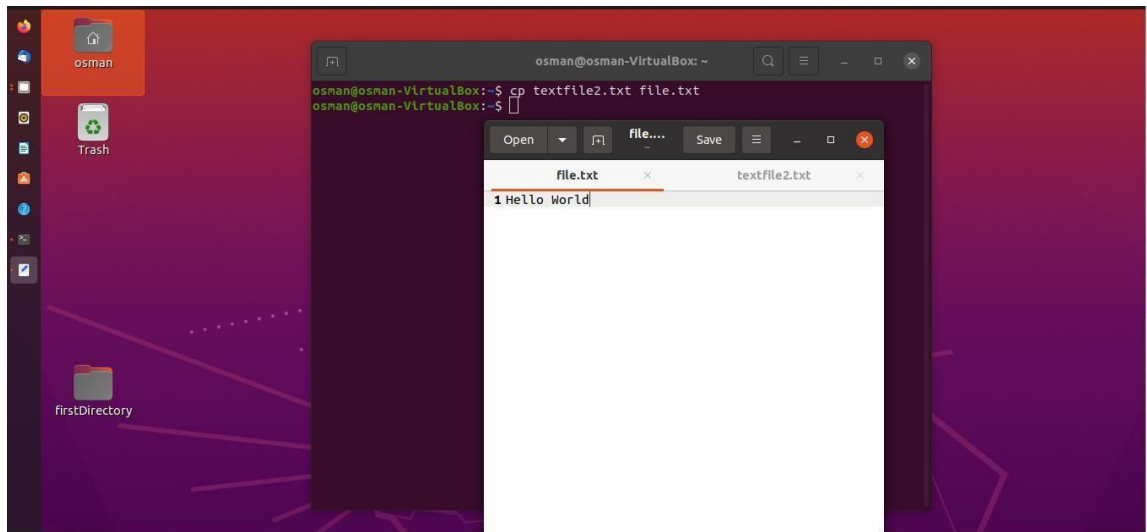
Fig. 33 (Copy File or Directory)
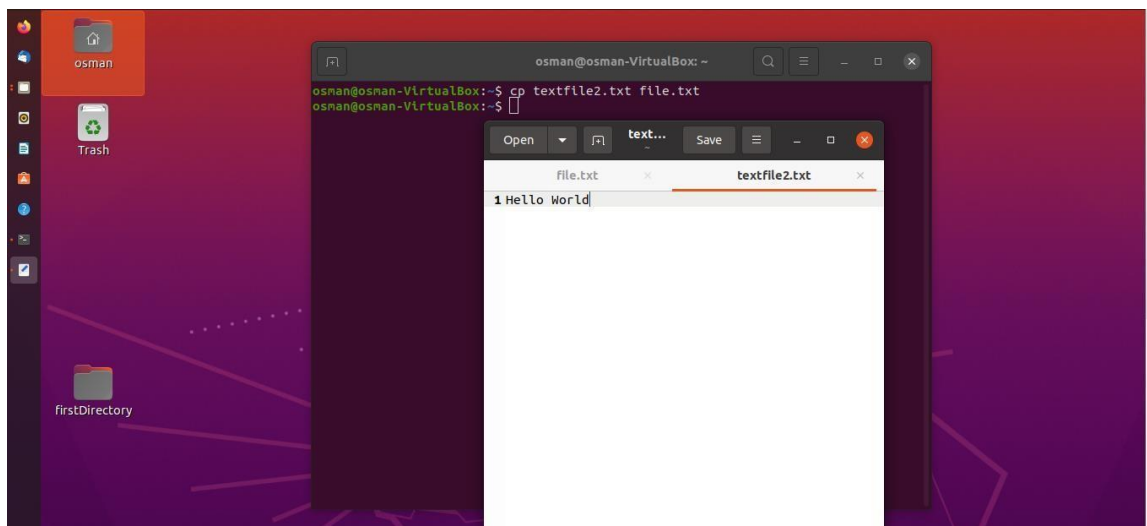
Fig. 34 (Copy File)

Copy File to Another Directory in Linux:

To copy a file from the directory you're working in to a different location, use the command:

~**$** cp file.txt /new_directory

You don't need to rename the file unless there's already one with the same name in the target directory.

To specify a path for the source file:

~**$** cp /etc/my_file.txt /new_directory

This lets you copy without having to change directories. The "**cp"** command will create the **"/new_directory"** if it doesn't exist.

Removing Directories with rmdir:

"rmdir" is a command-line utility for deleting empty directories. It is useful when you want to delete a directory only if it is empty, without needing to check whether the directory is empty or not.

To delete a directory with rmdir, type the command followed by the name of the directory you want to remove. For example, to delete a directory named dir1 you would type:

~$ rmdir directory

Fig. 35 (Remove Directory)

If the directory is not empty, you will get the following

error: rmdir: failed to remove 'directory': No such file or

directory

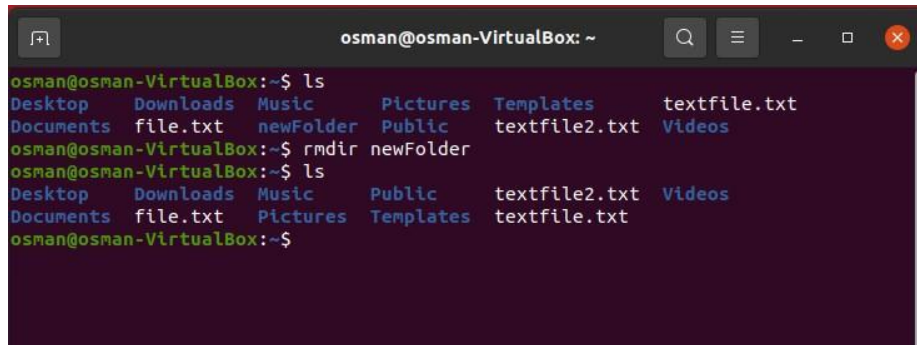In this case, you will need to use the rm command or manually remove the directory contents before you can delete it

For example, to delete a directory named dir1 along with all of its contents you would type:

~$ rm -r dir1Copy

If a directory or a file within the directory is write-protected, you will be prompted to confirm the deletion. To remove a directory without being prompted, use the -f option.

Move file or directory:

To move a file from one folder to another with mv, remember the syntax **"mv <source> <destination>"**. For instance, to move the file example.txt into your Documents directory.

~$ touch example.txt

~$ mv example.txt /Documents

~$ ls /Documents

~$ example.txt

Just like when you move a file by dragging and dropping it onto a folder icon, this command doesn't replace **Documents** with **example.txt**. Instead, **mv** detects that **Documents** is a folder, and places the **example.txt** file into it.

Self-Learning:

Linux is not difficult to learn. The more experience you have using technology, the easier you'll find it to master the basics of Linux. With the right amount of time, you can learn how to use the basic Linux commands in a few days. It will take you a few weeks to become more familiar with these commands.

Ubuntu tutorial Command Line for Beginners.

https://ubuntu.com/tutorials/command-line-for-beginners#1-overview

Task 03: Describe Linux Terminal Commands [30 marks]

Write the syntax and function of the following commands in Word document file. Also attach the screenshot after running these on Linux command line interface on your PC. (Capture full terminal screen).

1. help
2. mkdir
3. cd xyz 4. cd ..
5. cd ~
6. ls
7. rm myfile
8. cp file1 file2
9. cat myfile

Task 04: Linux Terminal Commands [30 marks]

Note: Use Only Linux Terminal Commands and take Screenshot at each step.

Make directories of name F1, F2, F3 and F4.

Make file of named **"file1.txt"** into directory F1.

Make file of named **"file2.txt"** into directory F2.

Make file of named **"file3.txt"** into directory F3.

Make file of named **"file4.txt"** into directory F4.

Move directory F3 into F1 and F4 into F2.

Copy F3 directory to F4 (F3 is destination directory and F4 is Source directory).

Submissions:

- Perform mentioned tasks.
- Make a folder on Desktop by name "YourName_Assignment_01_Your_Class_Section".
- Take screenshot of each step and save in folder "YourName_Assignment_01_Your_Class_Section".
- Take screenshot of each command, (by name screenshot1.png screenshot2.png …) and write the function of each command in text file of named "Linux Command" and put in the same folder "YourName_Assignment_01_Your_Class_Section".

- Then zip whole folder (YourName_Assignment_01_Your_Class_Section.zip), and email.
- The subject of the Email should be "YourName_Assignment_01_Your_Class_Section" for example **Abdullah_Assignment_01_BS_DS_Morning**
- Send the zipped folder to the Email address of the TAs (aict.fall2023@gmail.com) :