

# National University of Computer and Emerging Sciences



## Operating System Lab

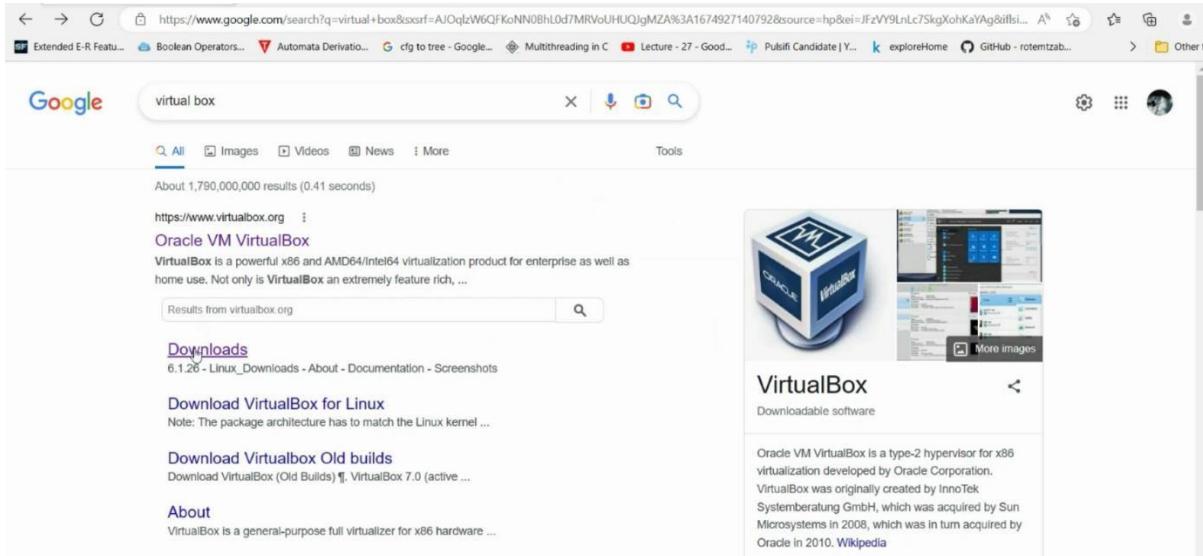
Course Instructor	Rana Asif Rehman
Lab Instructor (s)	Mr. Syed Mujtaba Hassan Rizvi Mr. Sohaib Ahmad
Section	Cs4A
Semester	Spring 2023

Department of Computer Science FAST-NU,

Lahore, Pakistan

## Activity 1: Ubuntu Installation

You can either use virtualbox or VMWare workstation in order to install Ubuntu on your windows operating system. Virtualbox or VMware are open source tools which enable us to run different operating systems virtually on your windows system. [Process of installing ubuntu on virtual box:](#)



The screenshot shows a Google search results page for the query "virtual box". The top result is a link to the Oracle VM VirtualBox website. The page displays the VirtualBox logo, a screenshot of the software interface, and a brief description of it as a type-2 hypervisor for x86 virtualization.

<https://www.virtualbox.org> Oracle VM VirtualBox  
VirtualBox is a powerful x86 and AMD64/Intel64 virtualization product for enterprise as well as home use. Not only is VirtualBox an extremely feature rich, ...

[Downloads](#)  
6.1.26 - Linux\_Downloads - About - Documentation - Screenshots  
[Download VirtualBox for Linux](#)  
Note: The package architecture has to match the Linux kernel ...  
[Download VirtualBox Old builds](#)  
Download VirtualBox (Old Builds) ¶ VirtualBox 7.0 (active ...)  
[About](#)  
VirtualBox is a general-purpose full virtualizer for x86 hardware ...



The screenshot shows the official VirtualBox download page at <https://www.virtualbox.org/wiki/Downloads>. It features the VirtualBox logo and the heading "VirtualBox Download VirtualBox". Below this, there's a sidebar with links like "About", "Screenshots", "Downloads", "Documentation", "End-user docs", "Technical docs", "Contribute", and "Community". The main content area contains sections for "VirtualBox binaries", "VirtualBox 7.0.6 platform packages", and "VirtualBox 7.0.6 Oracle VM VirtualBox Extension Pack". It also includes a note about GPL version 3 and a changelog.

https://www.virtualbox.org/wiki/Downloads

VirtualBox Download VirtualBox

VirtualBox binaries

VirtualBox 7.0.6 platform packages

The binaries are released under the terms of the GPL version 3.

VirtualBox 7.0.6 Oracle VM VirtualBox Extension Pack

Support VirtualBox RDP, disk encryption, NVMe and PXE

Downloads

VirtualBox-7.0.6-155176-Win (1).exe

https://www.google.com/search?q=ubuntu&ssrf=AJOqlzXj4tp0icV-BfOrjUCqq4\_F\_KgLw%3A16749272455378source=hp&ei=VzVY9u6HsTUlwxXt0LzwCg&ilisig=AK50M...

ubuntu

About 514,000,000 results (0.40 seconds)

This search may be relevant to recent activity

ubuntu vm

https://ubuntu.com

Ubuntu: Enterprise Open Source and Linux

Ubuntu is the modern, open source operating system on Linux for the enterprise server, desktop, cloud, and IoT.

Results from ubuntu.com

Download Ubuntu Desktop

Ubuntu is an open source software operating system that runs from ...

Download

Download Ubuntu desktop, Ubuntu Server, Ubuntu for ...

Get Ubuntu Server

Option 1: Manual server installation - Download Ubuntu ...

Ubuntu Software

Ubuntu is a Linux distribution based on Debian and composed mostly of free and open-source software. Ubuntu is officially released in three editions: Desktop, Server, and Core for Internet of things devices and robots. All of the editions can run on the computer alone, or in a virtual machine. Wikipedia

https://ubuntu.com

CANONICAL

ubuntu

Enterprise ▾ Developer ▾ Community ▾ Download

We are hiring Products

Search Q Sign in

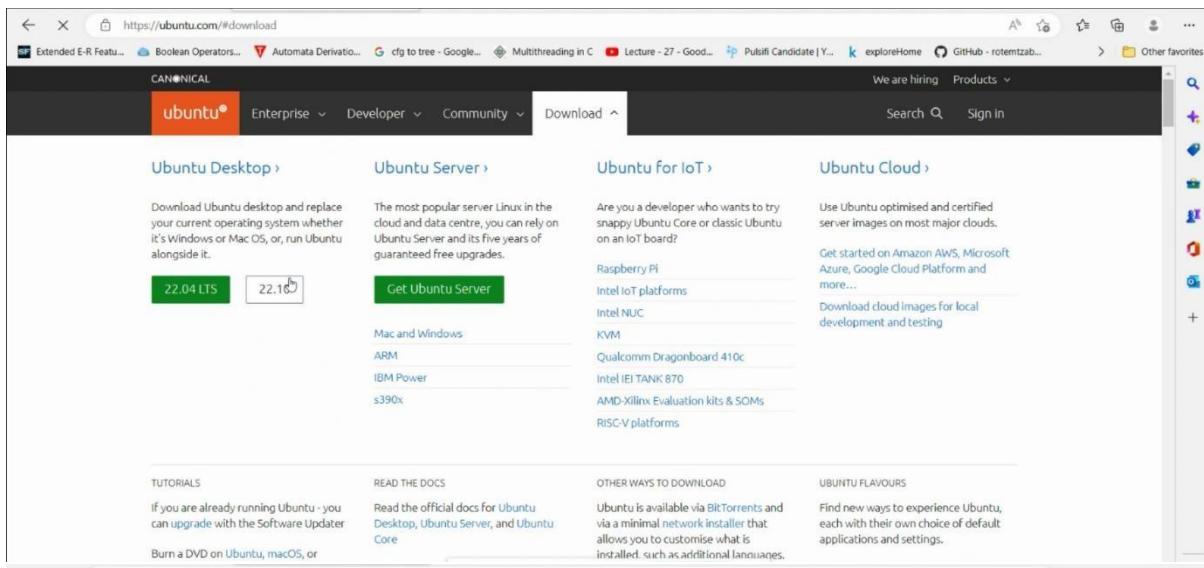
Open source security: best practices for early detection and risk mitigation

Join us on February 9, 2023 at 11 AM EST / 4 PM GMT

Don't miss this webinar!

Lech Sandecki

Senior Product Manager



The screenshot shows the Ubuntu download page on a web browser. The top navigation bar includes links for Extended E-R Features, Boolean Operators, Automata Derivations, cfg to tree - Google, Multithreading in C, Lecture - 27 - Good..., Pulsifi Candidate | Y..., exploreHome, GitHub - rotentmztab..., and Other favorites. The Canonical logo is at the top left, followed by Enterprise, Developer, Community, Download, and a search bar. A sidebar on the right has sections for We are hiring, Products, Search, Sign in, and a list of icons.

**Ubuntu Desktop**

Download Ubuntu desktop and replace your current operating system whether it's Windows or Mac OS, or run Ubuntu alongside it.

**Ubuntu Server**

The most popular server Linux in the cloud and data centre; you can rely on Ubuntu Server and its five years of guaranteed free upgrades.

**Ubuntu for IoT**

Are you a developer who wants to try snappy Ubuntu Core or classic Ubuntu on an IoT board?

**Ubuntu Cloud**

Use Ubuntu optimised and certified server images on most major clouds.

**Platform Options**

- Raspberry Pi
- Intel IoT platforms
- Intel NUC
- KVM
- Qualcomm Dragonboard 410c
- Intel iBT TANIC 870
- AMD-Xilinx Evaluation kits & SOMs
- RISC-V platforms

**TUTORIALS**

If you are already running Ubuntu - you can upgrade with the Software Updater

Burn a DVD on Ubuntu, macOS, or

**READ THE DOCS**

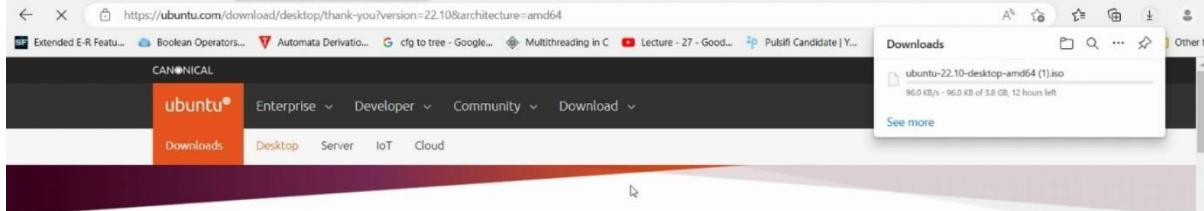
Read the official docs for Ubuntu Desktop, Ubuntu Server, and Ubuntu Core

**OTHER WAYS TO DOWNLOAD**

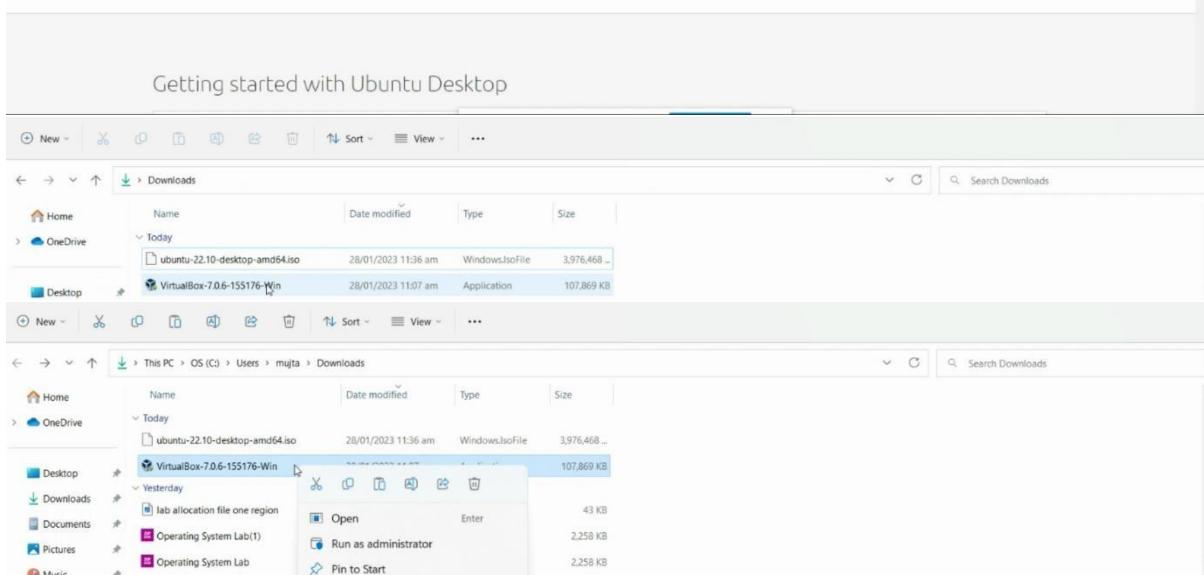
Ubuntu is available via BitTorrents and via a minimal network installer that allows you to customise what is installed, such as additional languages.

**UBUNTU FLAVOURS**

Find new ways to experience Ubuntu, each with their own choice of default applications and settings.



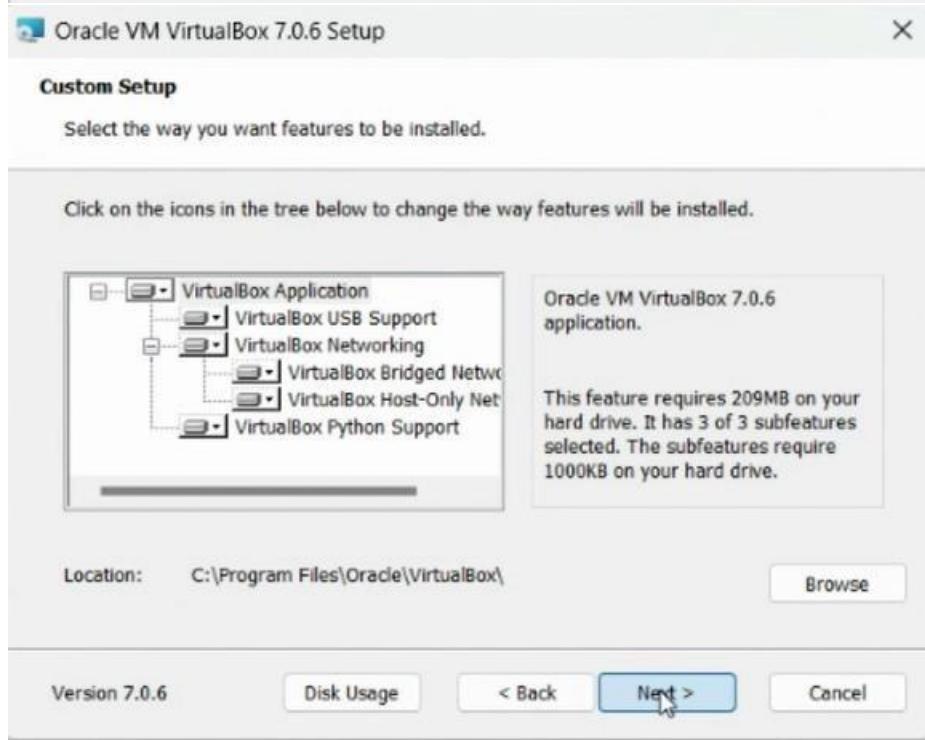
The screenshot shows the Ubuntu download confirmation page. The top navigation bar is identical to the previous page. The main content area displays a message: "Thank you for downloading Ubuntu Desktop". Below this, there are two links: "Your download should start automatically. If it doesn't, download now." and "You can verify your download, or get help on installing."

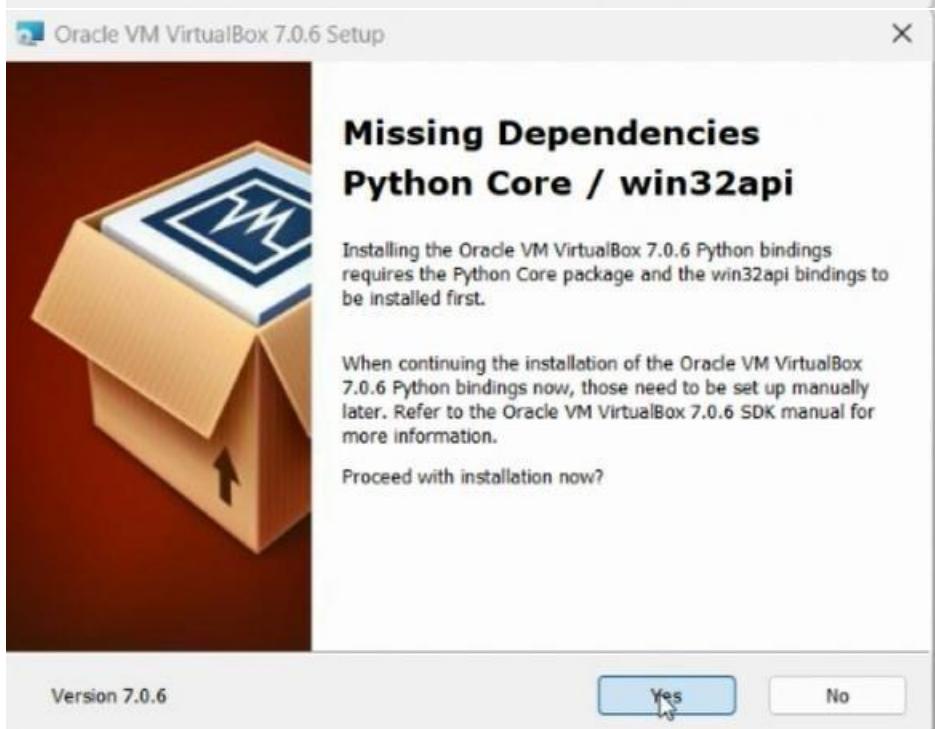


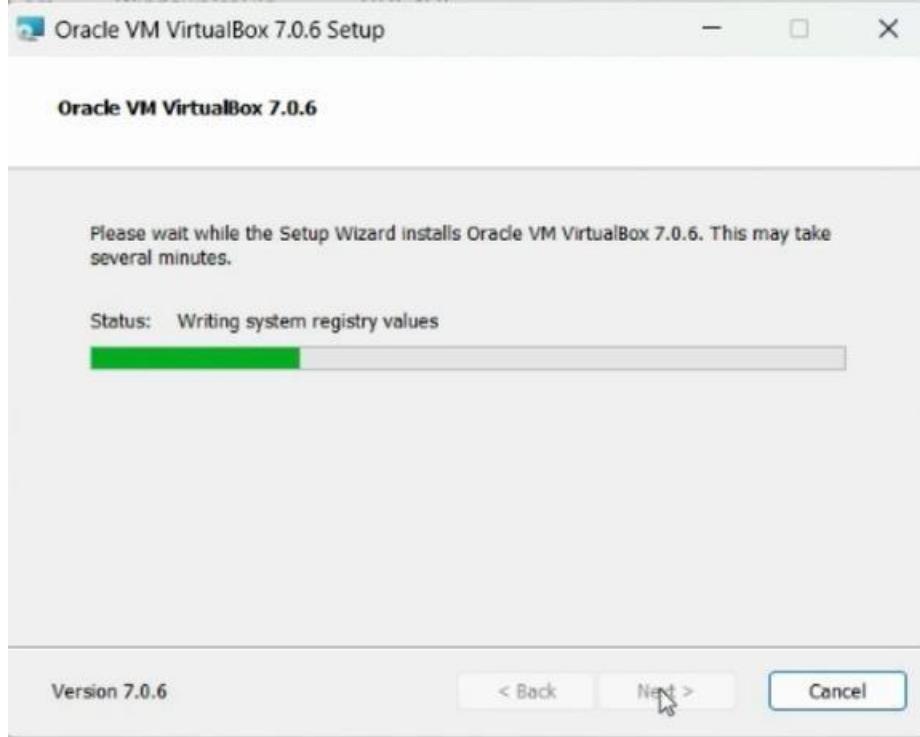
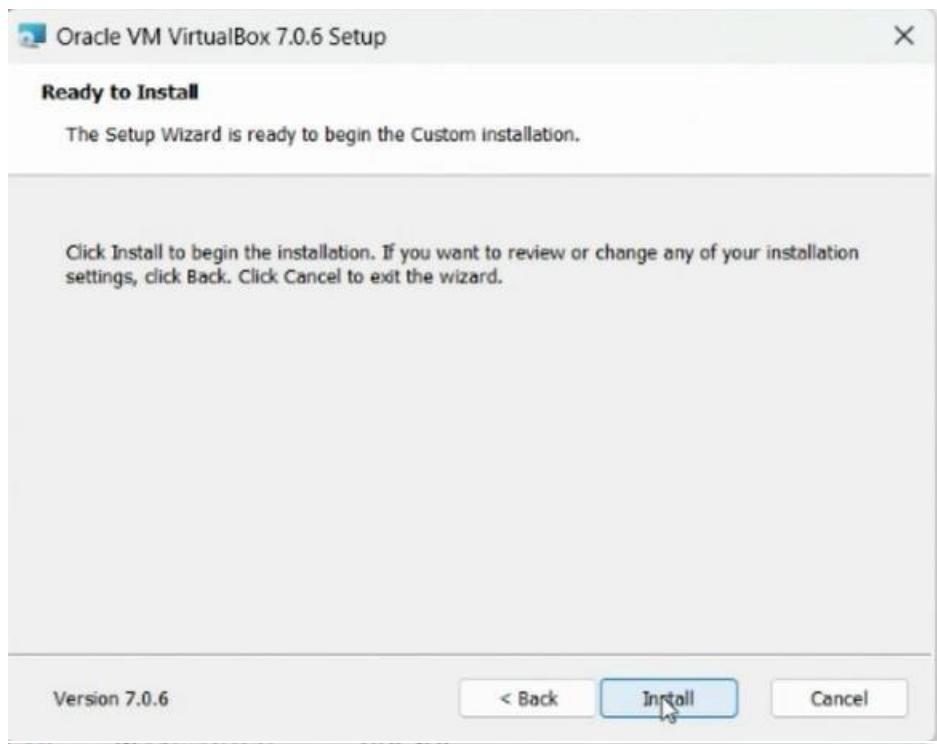
The screenshot shows a Windows File Explorer window with two panes. The left pane shows a file structure: Home, OneDrive, Desktop, Downloads, and a folder named "Operating System Lab". The right pane shows a list of files in the Downloads folder:

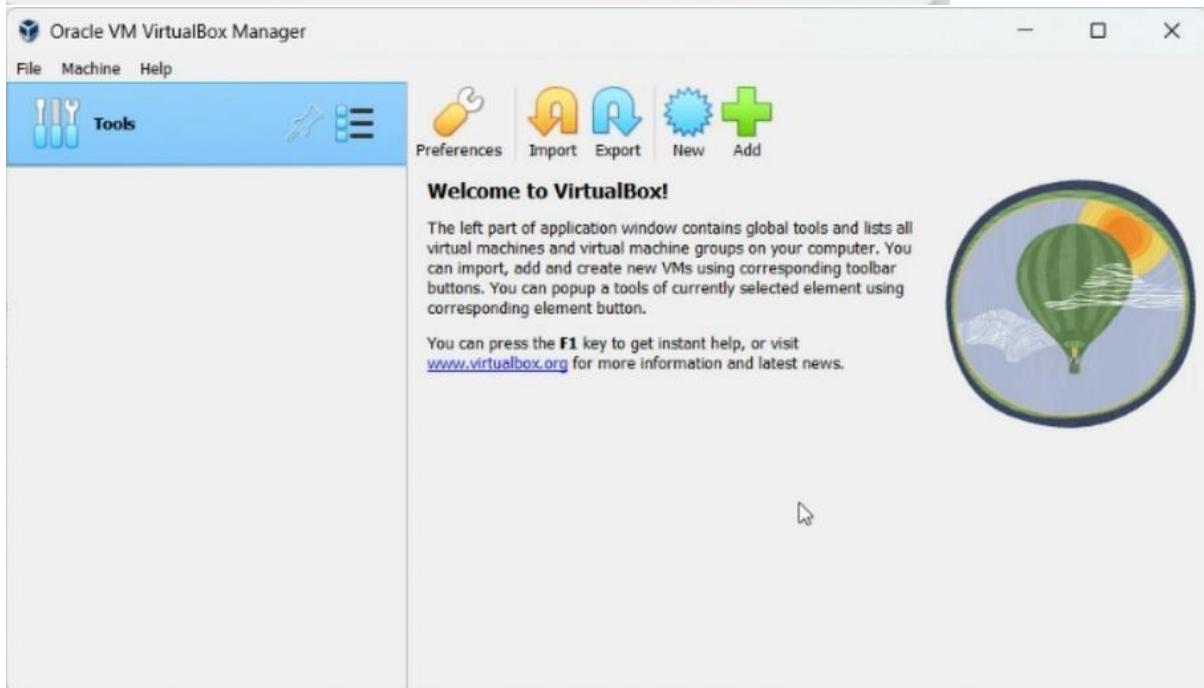
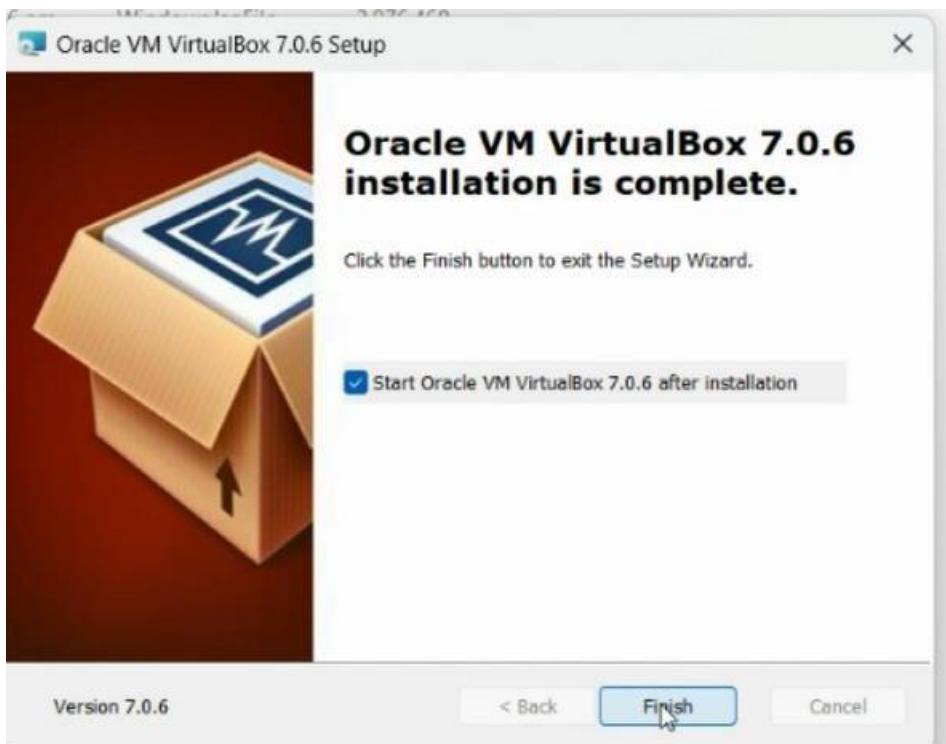
Name	Date modified	Type	Size
ubuntu-22.10-desktop-amd64.iso	28/01/2023 11:36 am	WindowsIsoFile	3,976,468 –
VirtualBox-7.0.6-155176-Win	28/01/2023 11:07 am	Application	107,869 KB

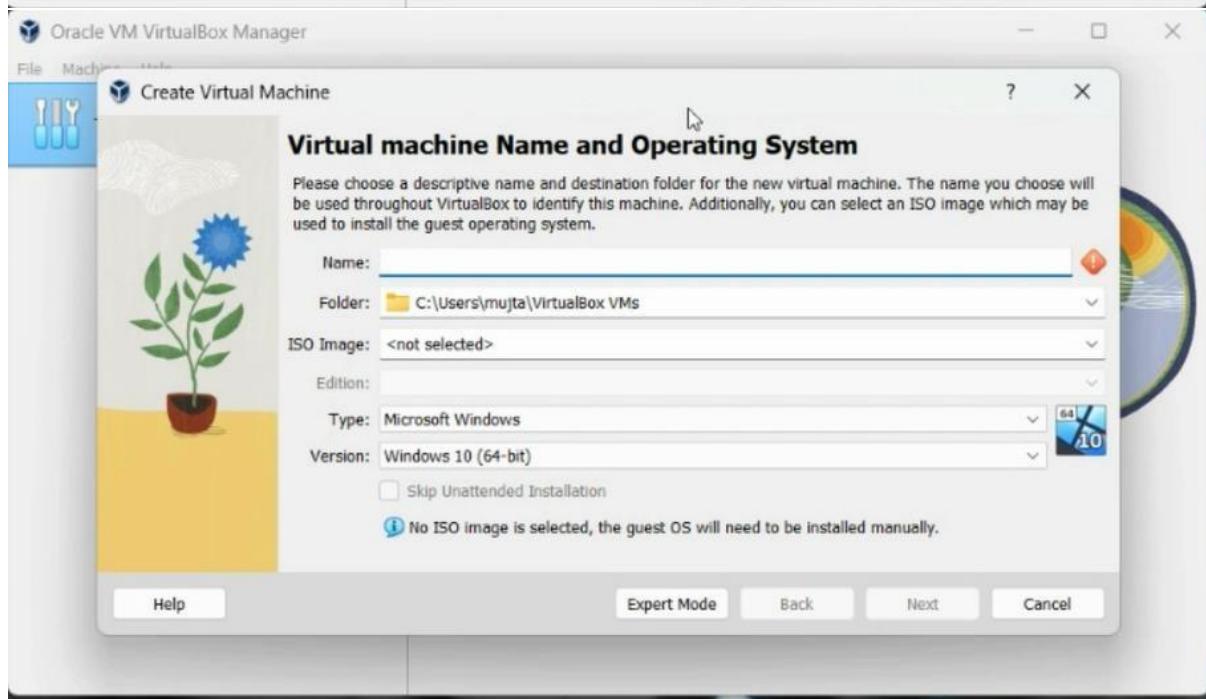
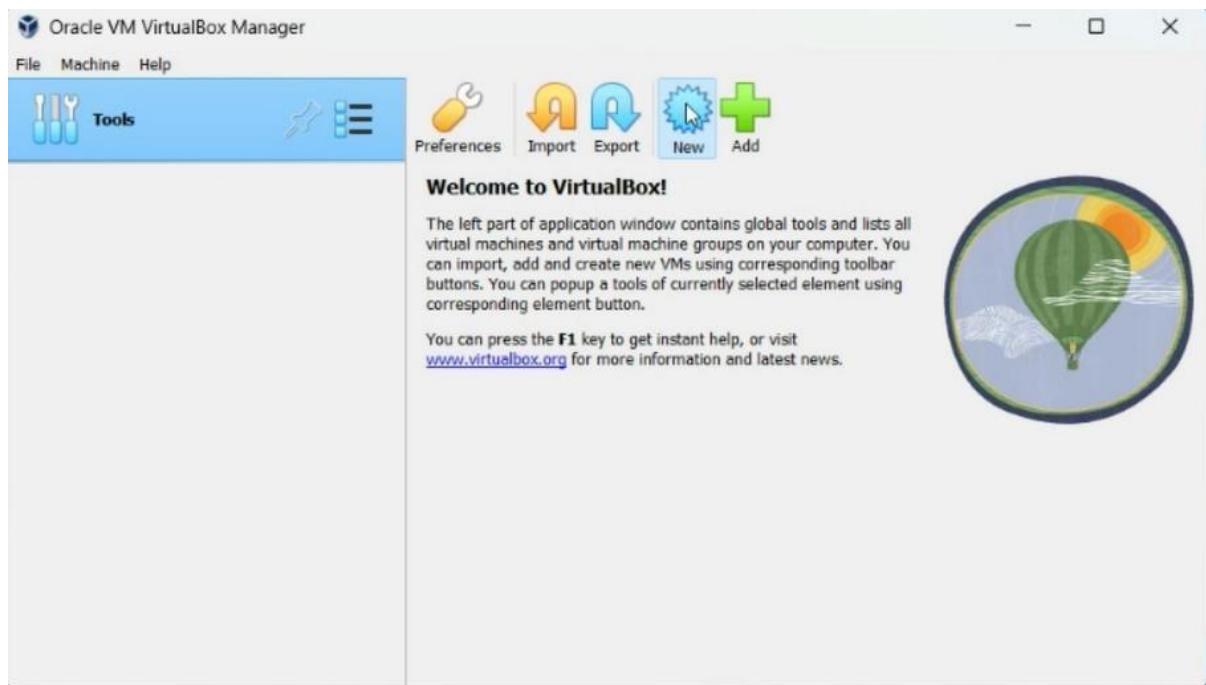
Below this, another File Explorer window is shown, also displaying the same list of files in the Downloads folder.



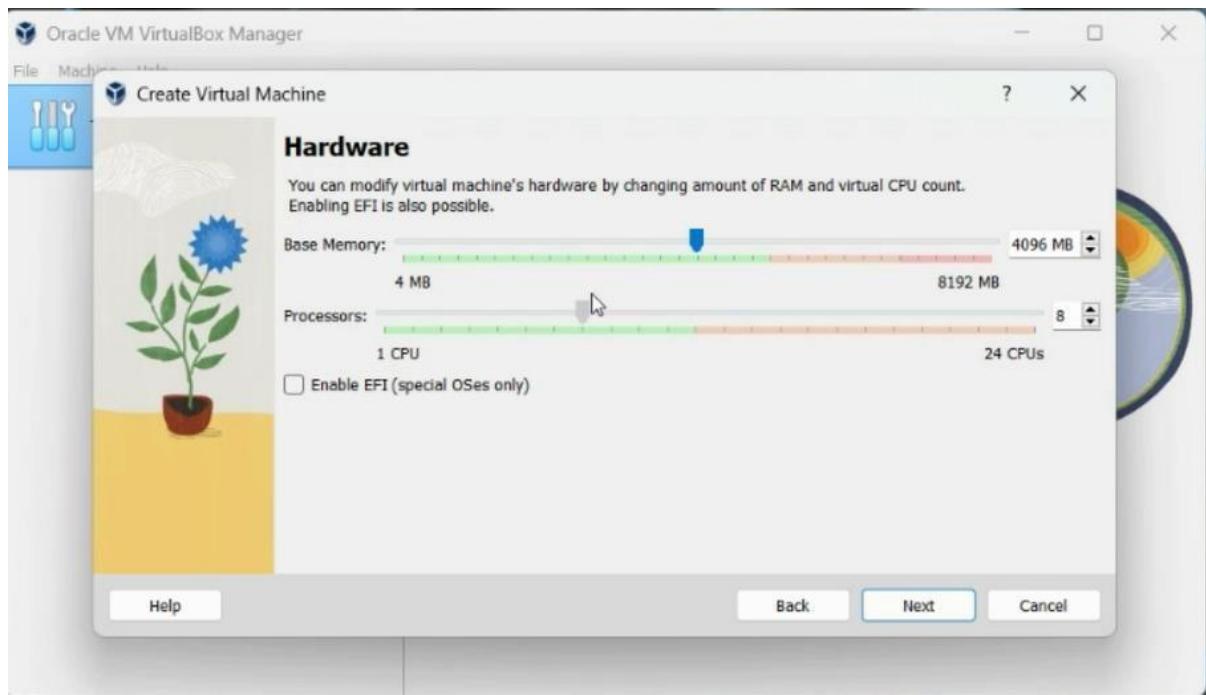


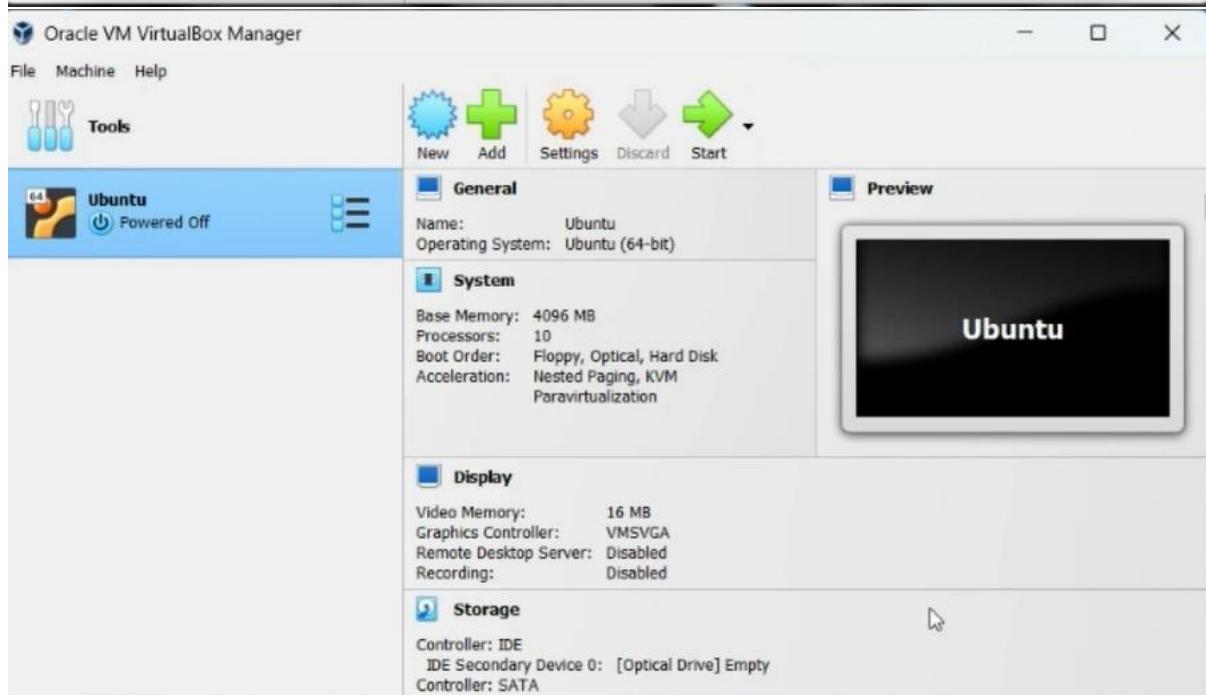


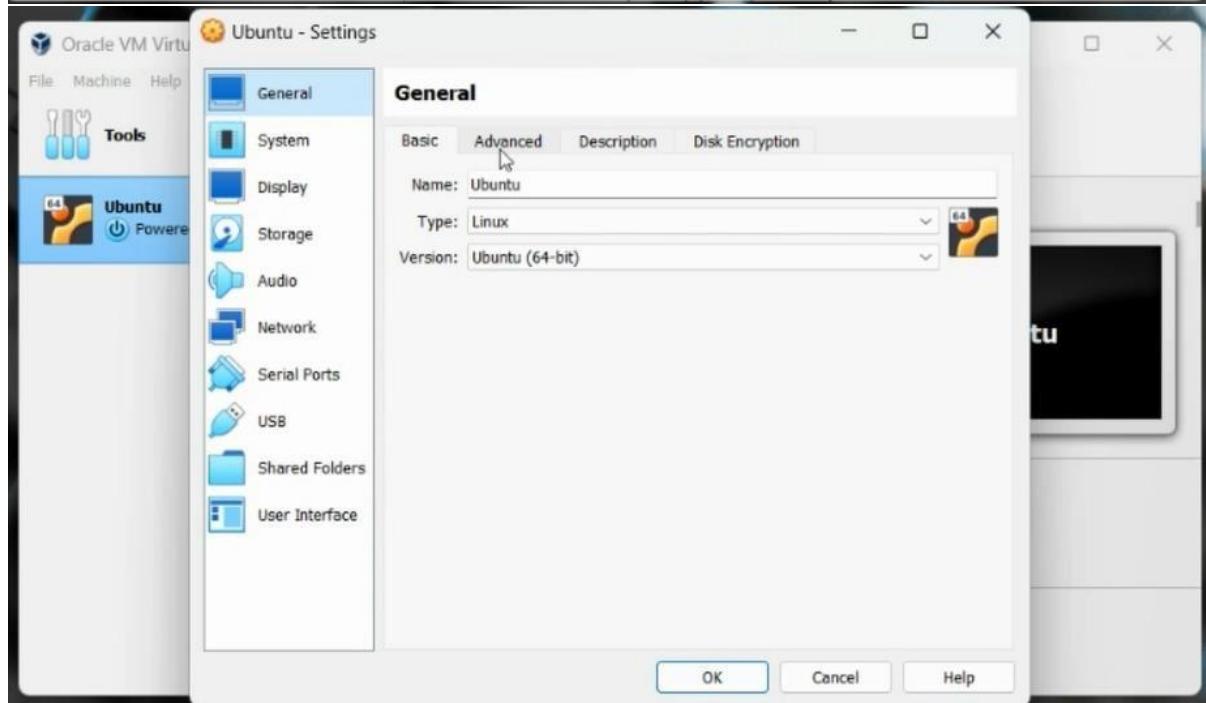
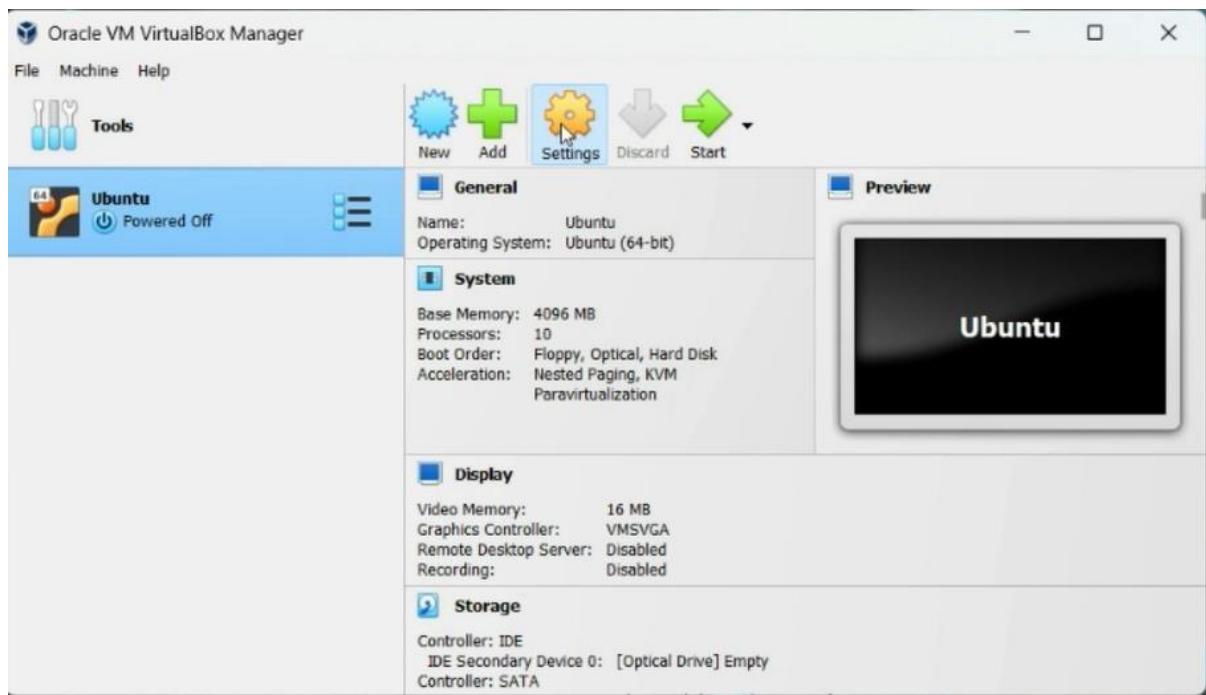


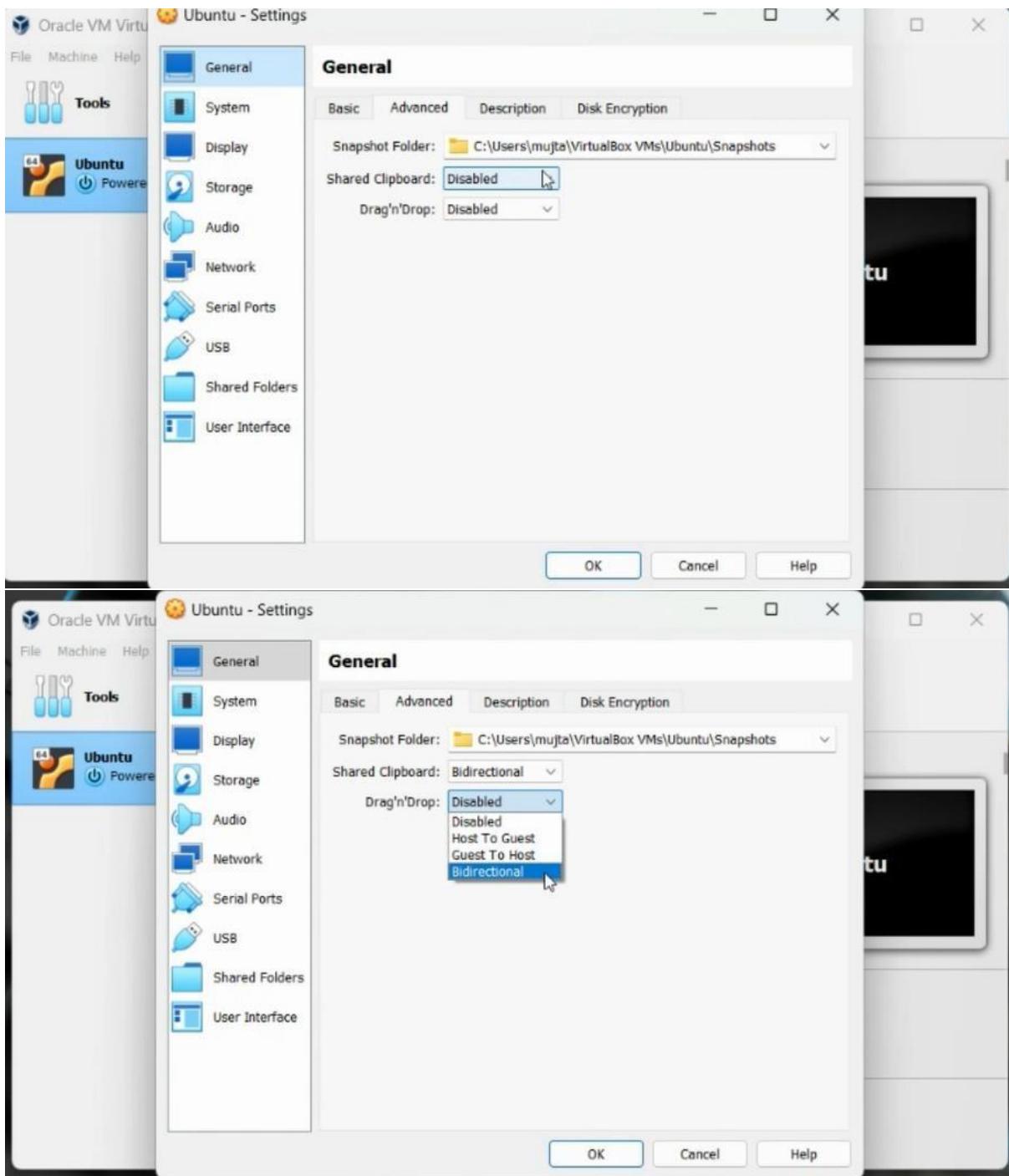


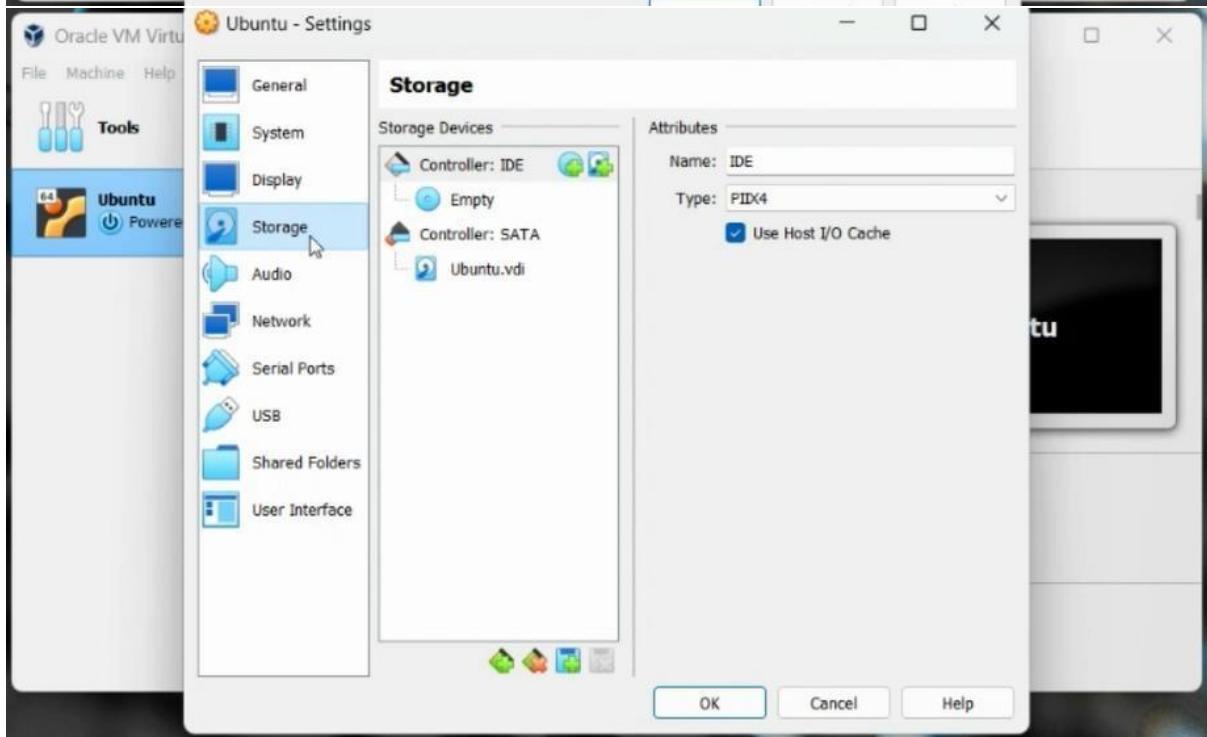
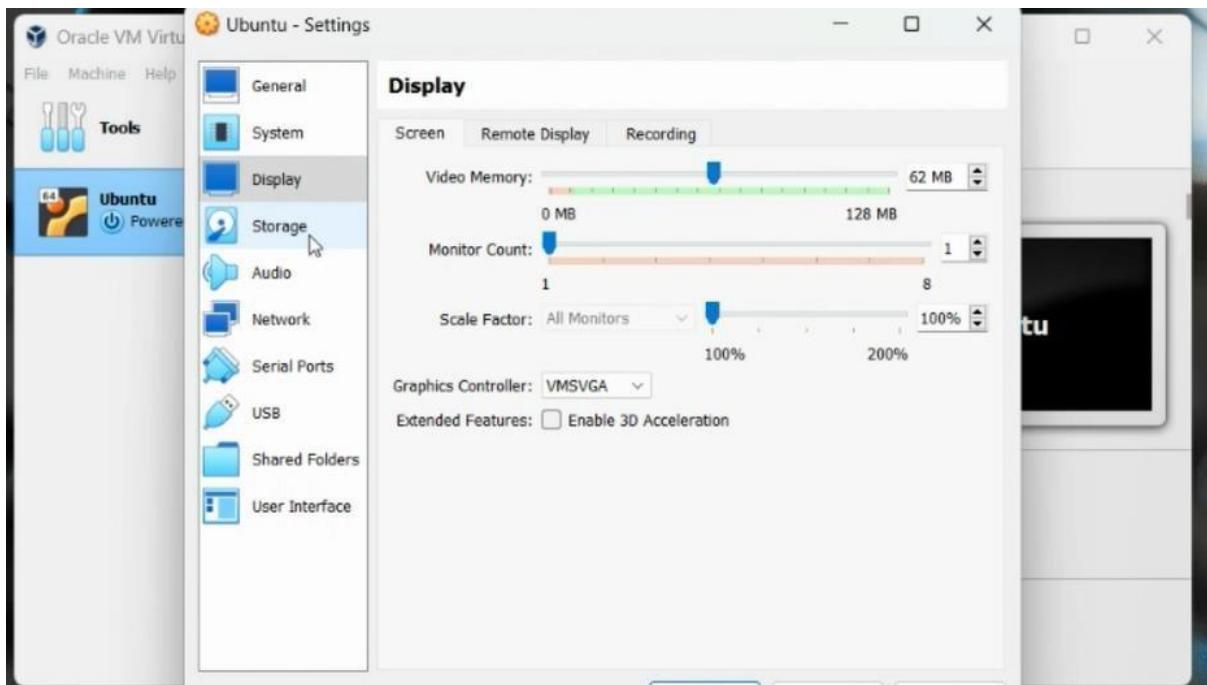


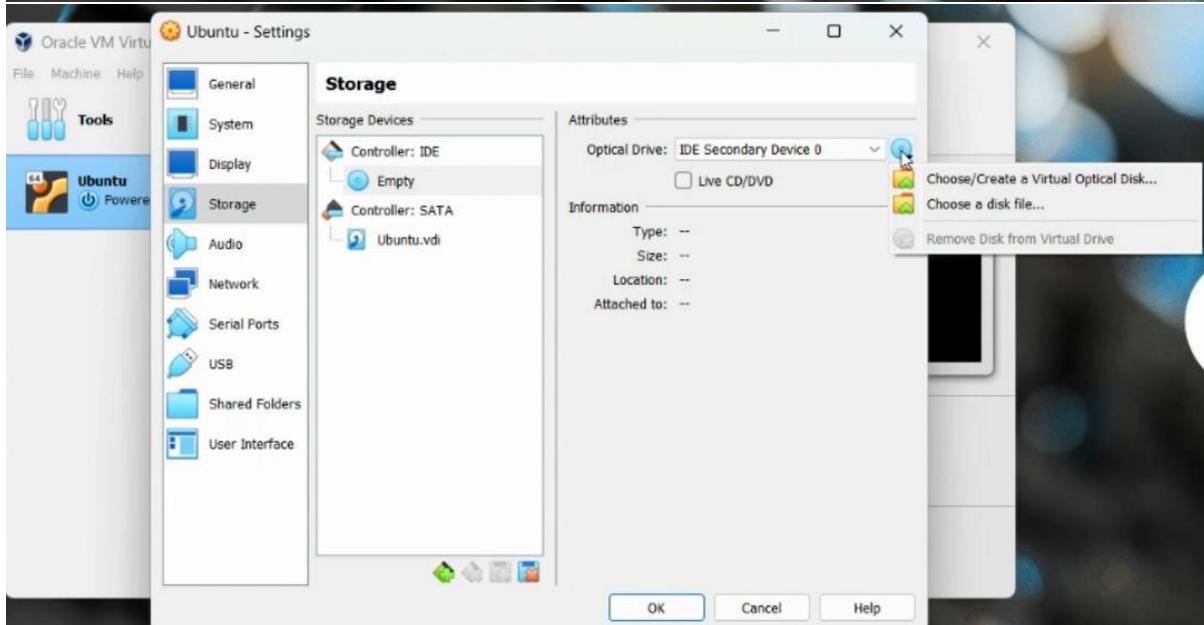
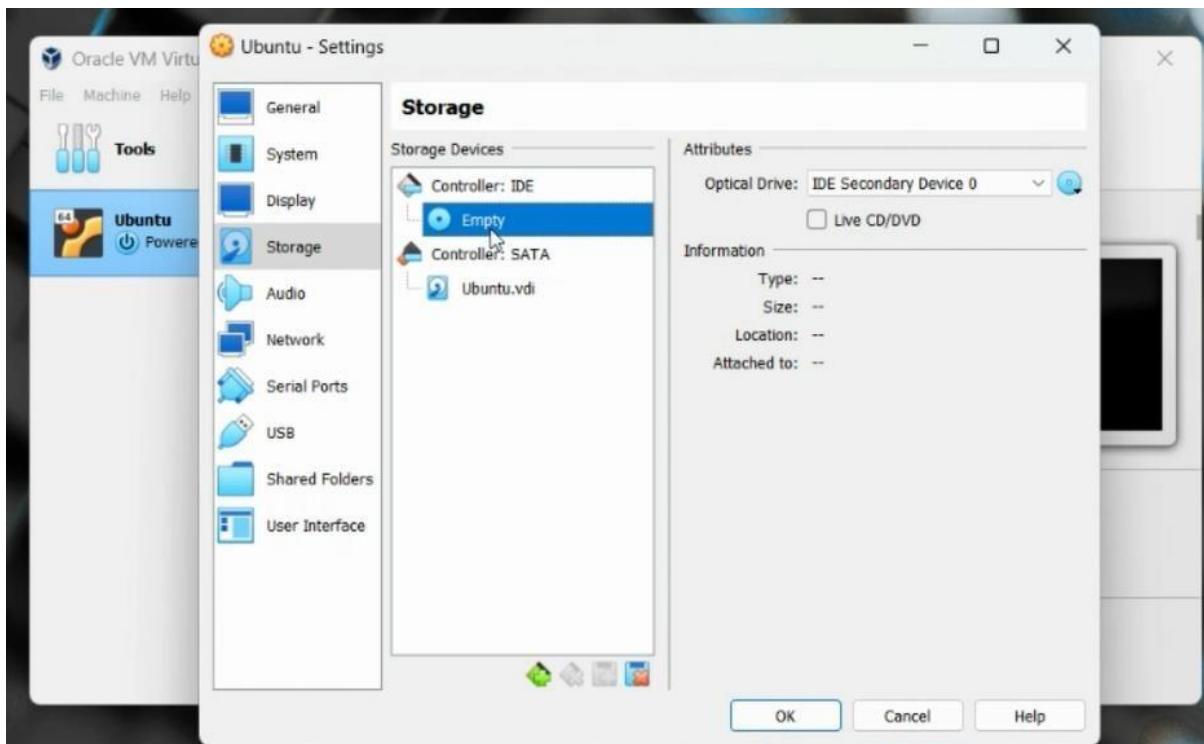




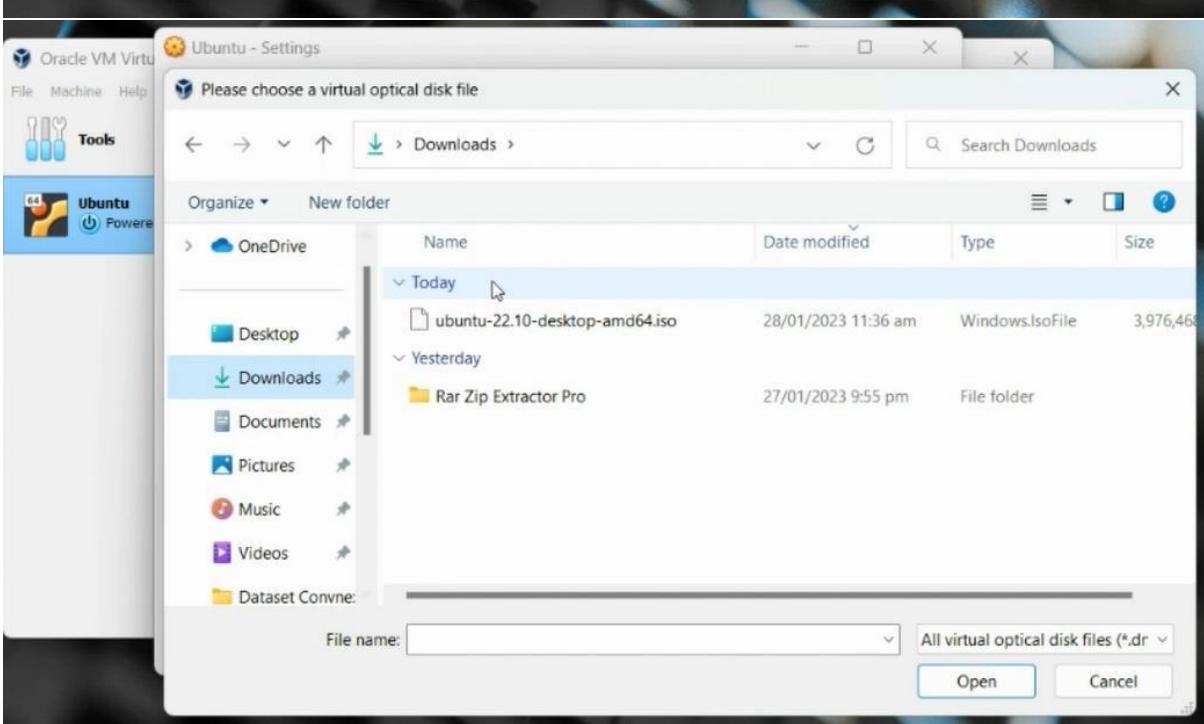
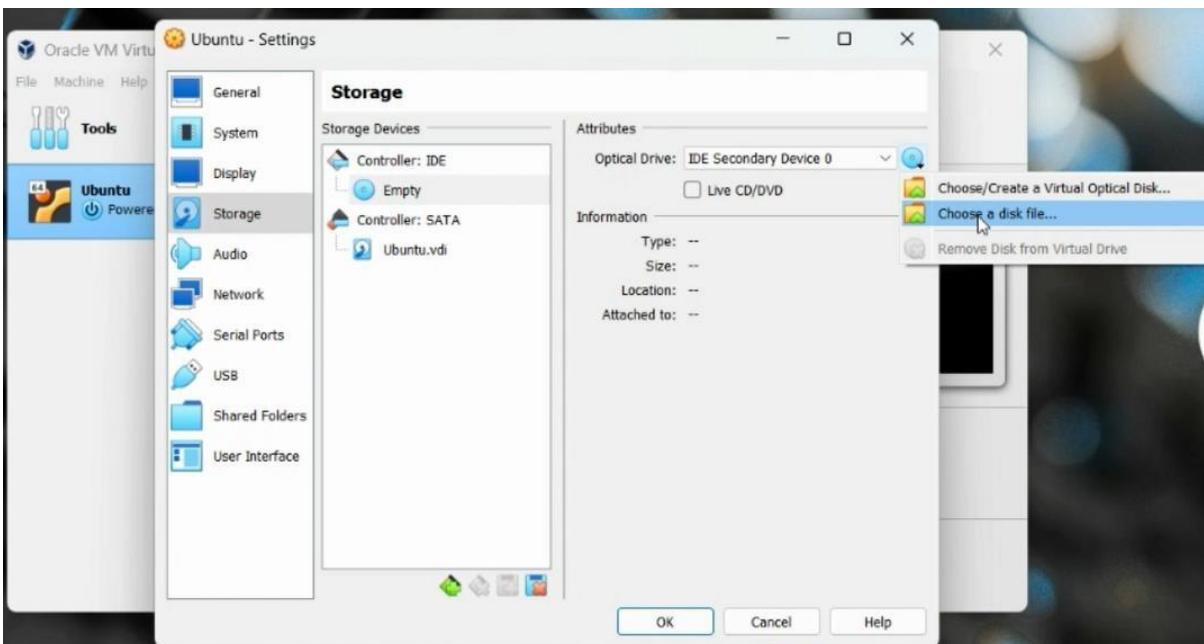


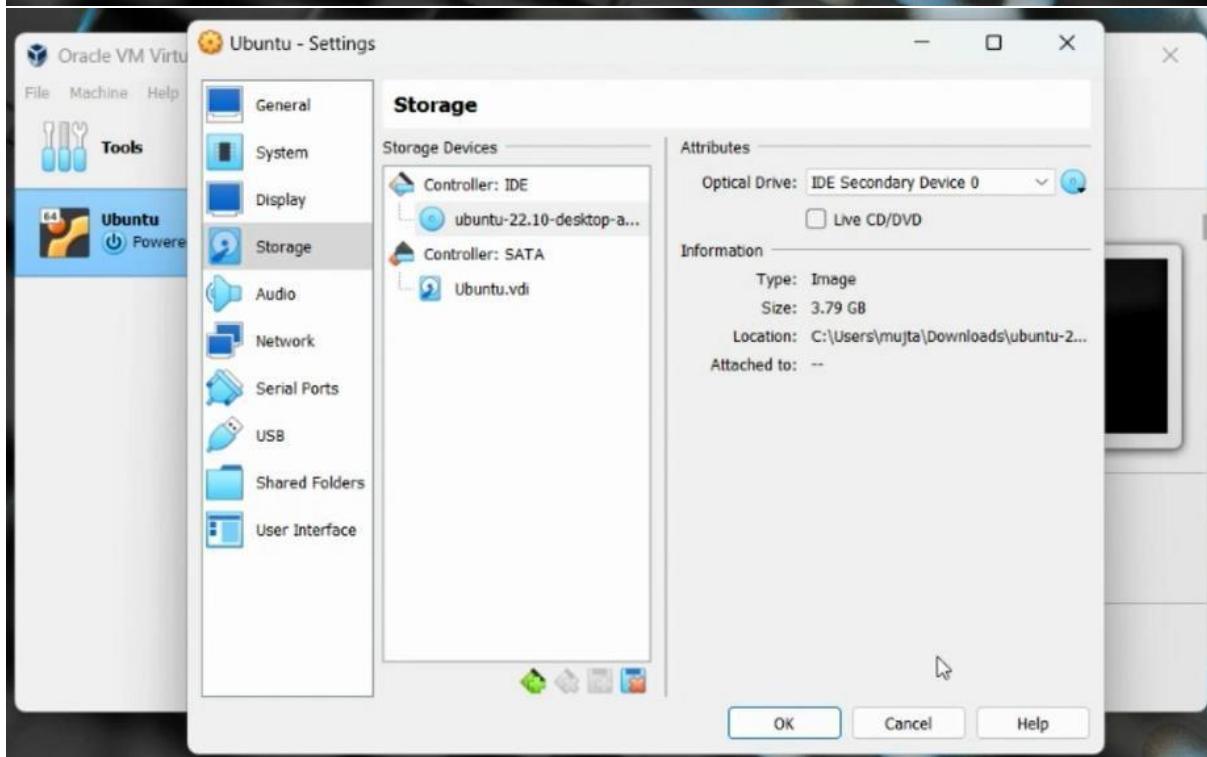
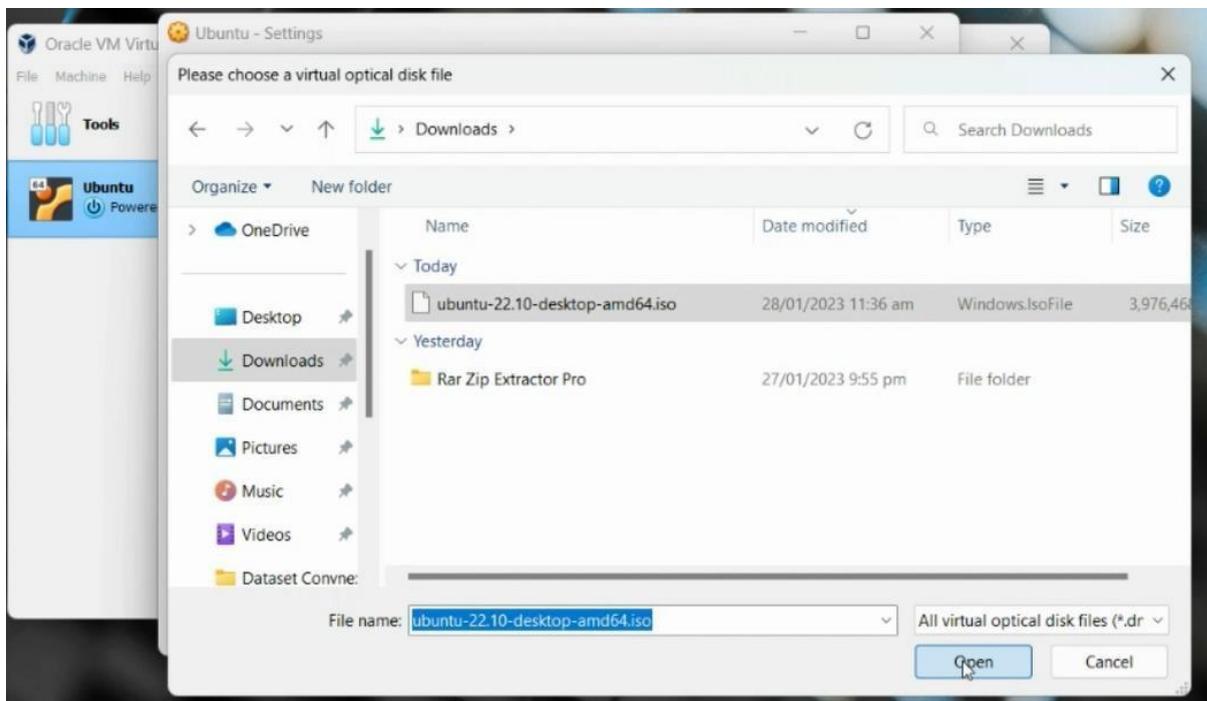


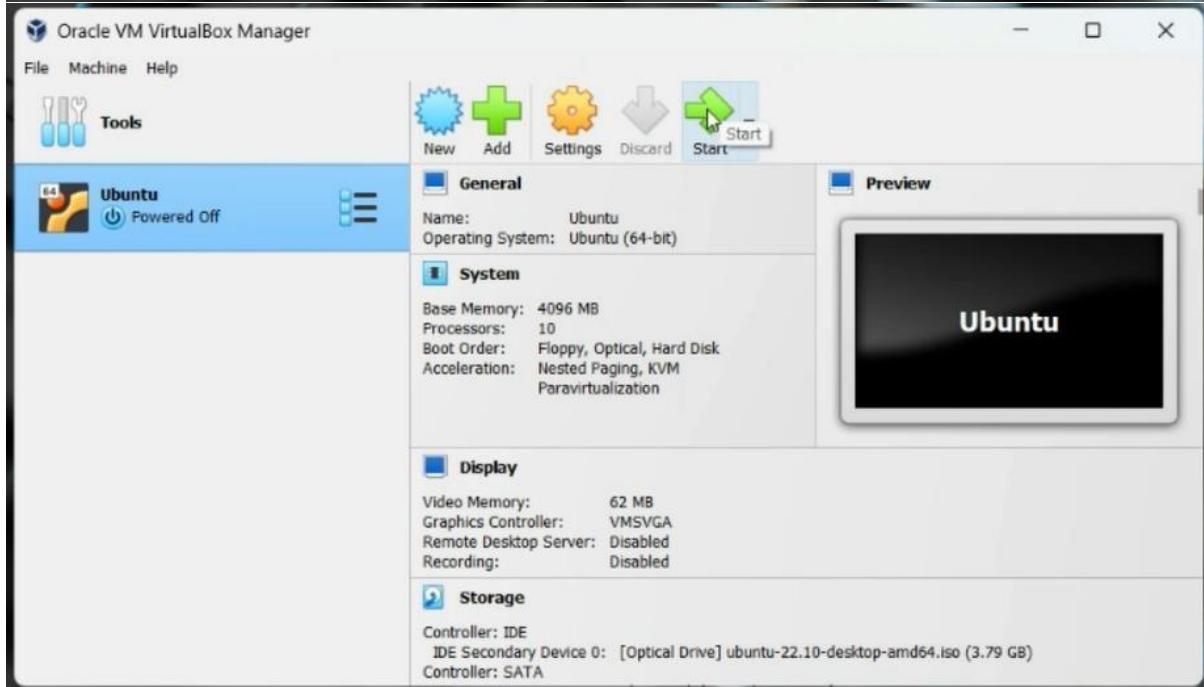
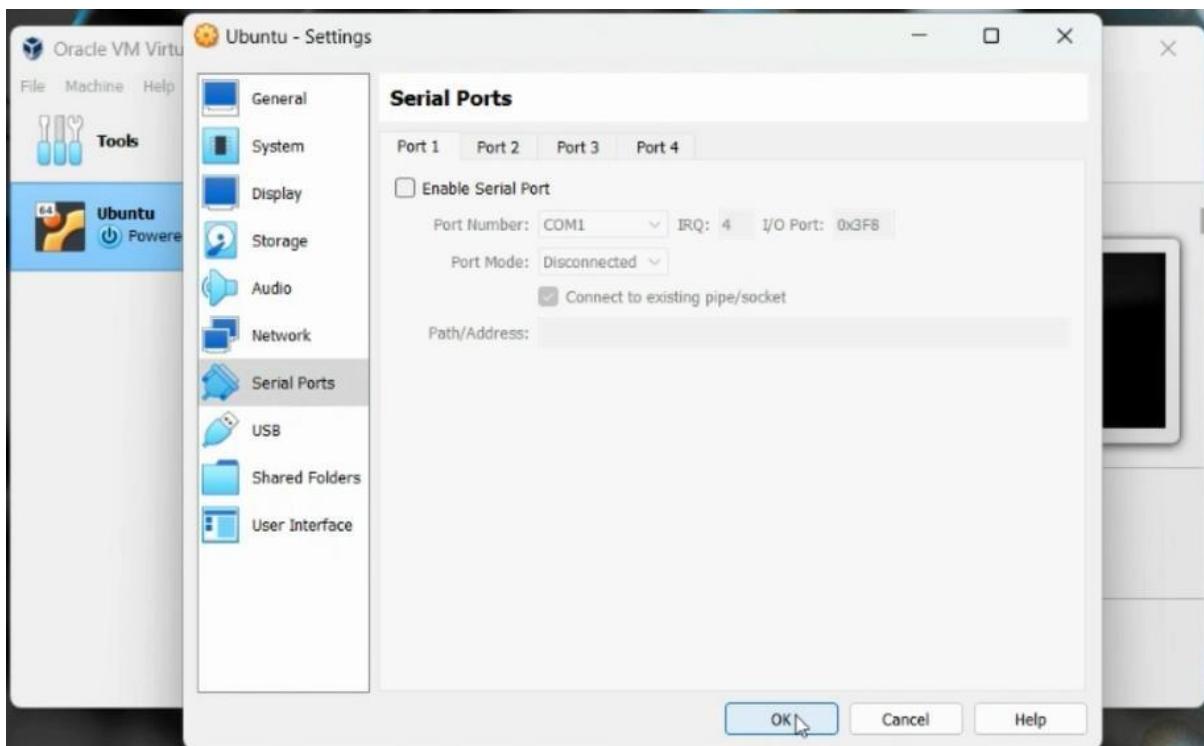


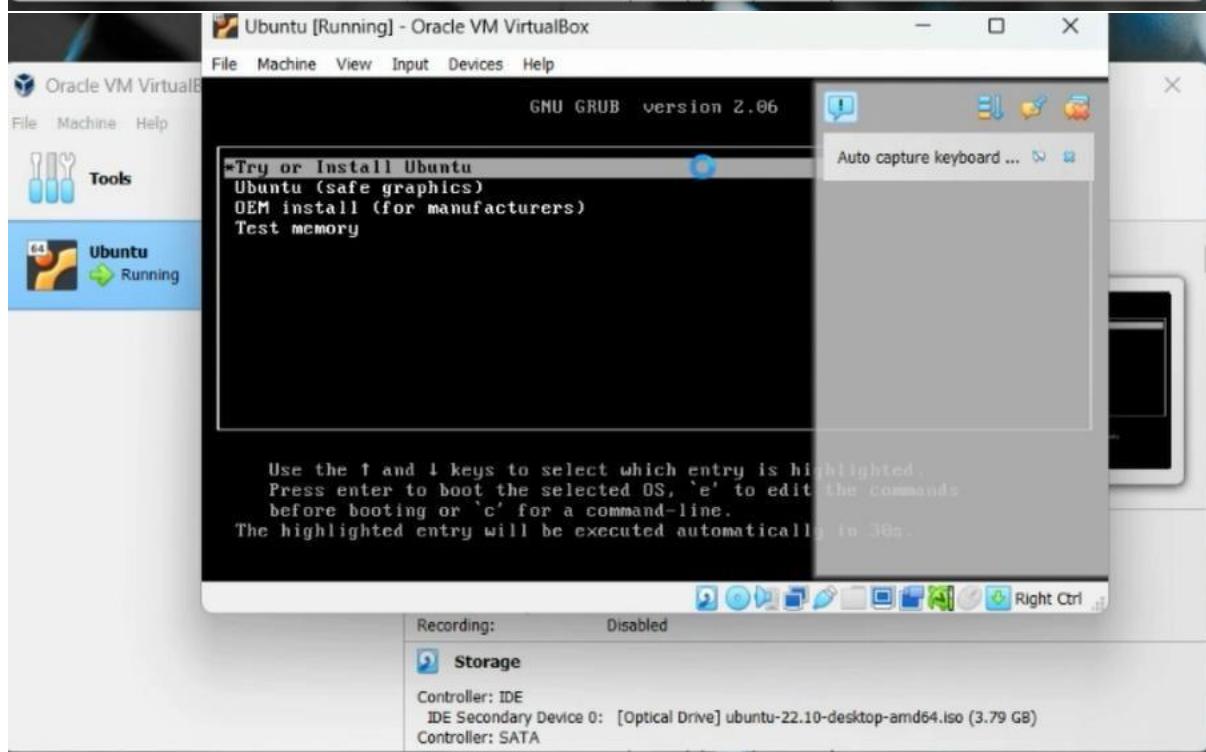


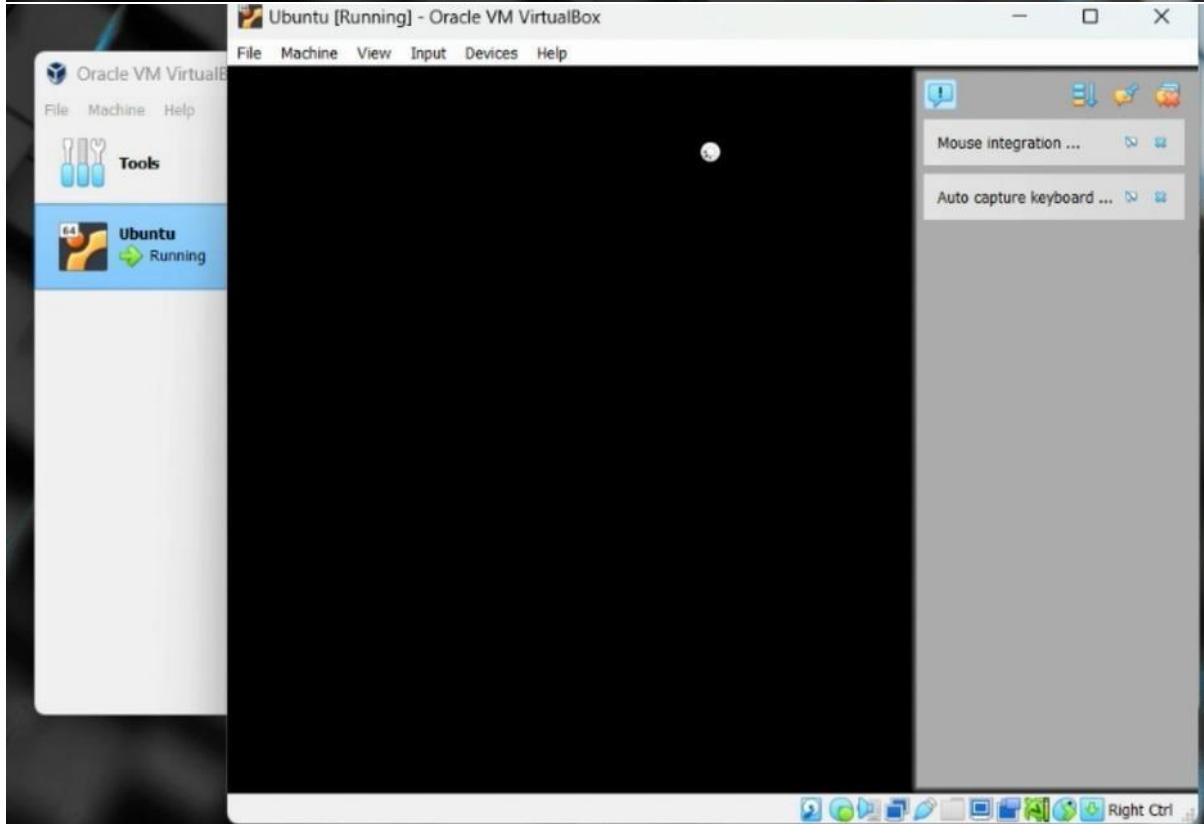
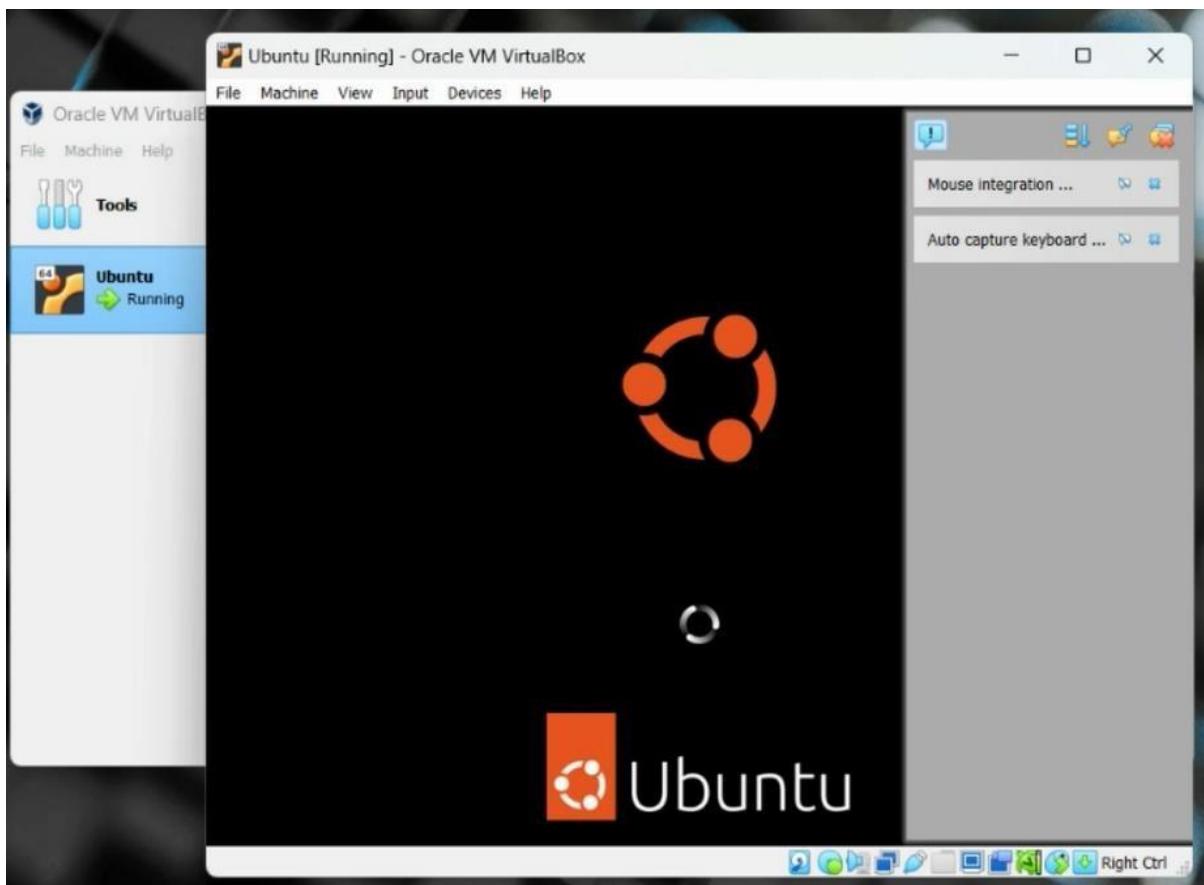
Now click browse and give path to your ubuntu iso file. After that click ok.

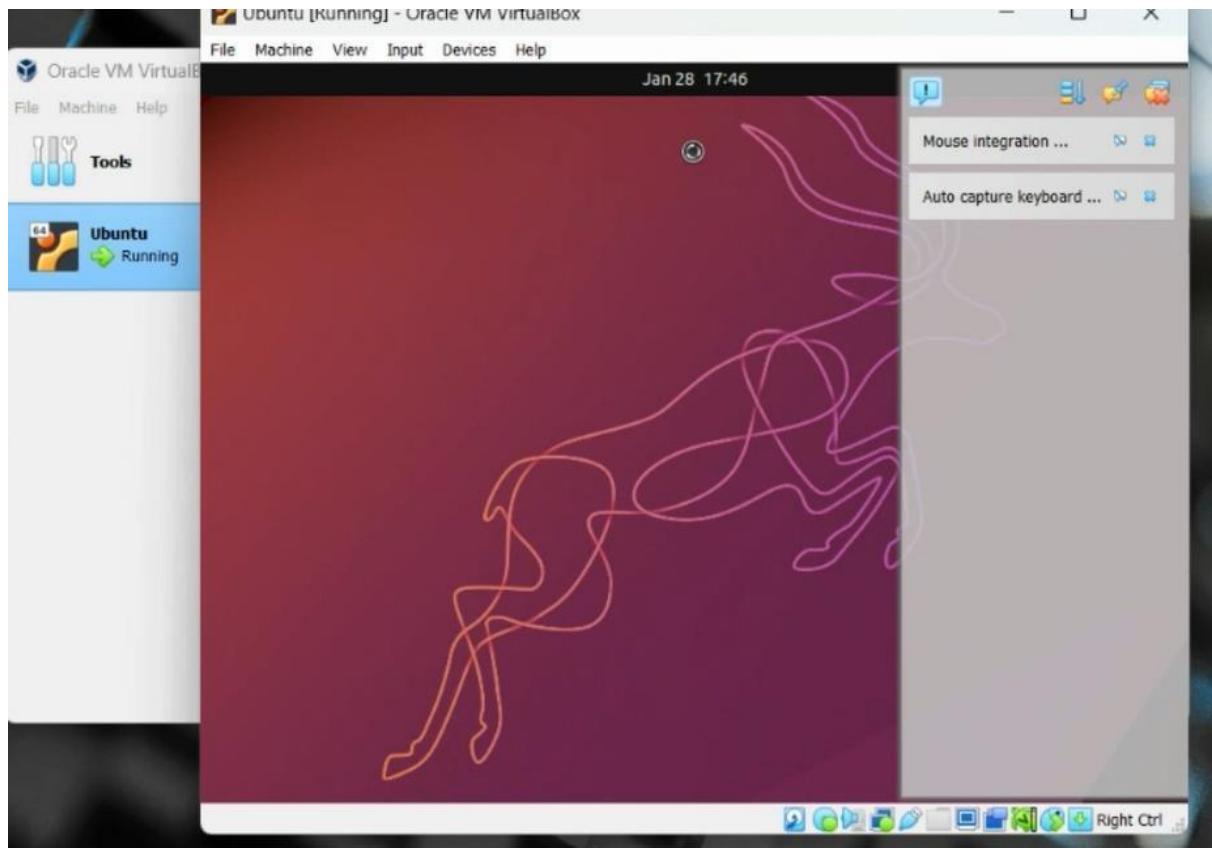












Jan 28 17:47

Install

X



Jan 28 17:47

Install

x

## Welcome

English

Español

Esperanto

Euskara

Français

Gaeilge

Galego

Hrvatski

Íslenska

Italiano

Kurdî

Latviski

Lietuviškai

Magyar

Nederlands

No localization (UTF-8)

Norsk bokmål

Norsk nynorsk



Try Ubuntu



Install Ubuntu

You can try Ubuntu without making any changes to your computer, directly from this CD.

Or if you're ready, you can install Ubuntu alongside (or instead of) your current operating system. This shouldn't take too long.

You may wish to read the [release notes](#).

Jan 28 17:47

Install X

## Keyboard layout

Choose your keyboard layout:

DE (Germany)

- English (Australian)
- English (Cameroon)
- English (Ghana)
- English (Nigeria)
- English (South Africa)
- English (UK)
- English (US)**
- Esperanto
- Estonian
- Faroese
- Filipino
- Finnish
- French

**English (US)**

- English (US) - Cherokee
- English (US) - English (Colemak)
- English (US) - English (Colemak-DH ISO)
- English (US) - English (Colemak-DH)
- English (US) - English (Dvorak)
- English (US) - English (Dvorak, Macintosh)
- English (US) - English (Dvorak, alt. intl.)
- English (US) - English (Dvorak, intl., with dead keys)
- English (US) - English (Dvorak, left-handed)
- English (US) - English (Dvorak, right-handed)
- English (US) - English (Macintosh)
- English (US) - English (Norman)
- English (US) - English (US, Canadian)

Type here to test your keyboard

Detect Keyboard Layout

Quit

Back

Continue

Jan 28 17:47

Install



## Updates and other software

### What apps would you like to install to start with?

Normal installation

Web browser, utilities, office software, games, and media players.

Minimal installation

Web browser and basic utilities.

### Other options

Download updates while installing Ubuntu

This saves time after installation.

Install third-party software for graphics and Wi-Fi hardware and additional media formats

This software is subject to license terms included with its documentation. Some is proprietary.

Quit

Back

Continue



Jan 28 17:47

Install

X

## Installation type

This computer currently has no detected operating systems. What would you like to do?

- Erase disk and install Ubuntu

Warning: This will delete all your programs, documents, photos, music, and any other files in all operating systems.

Advanced features... None selected

- Something else

You can create or resize partitions yourself, or choose multiple partitions for Ubuntu.

Quit

Back

Install Now

Jan 28 17:48

Install

Where are you?



Karachi

Back

Continue

Jan 28 22:49

Install

## Who are you?

Your name:  

Your computer's name:  

The name it uses when it talks to other computers.

Pick a username:  

Choose a password:  

Confirm your password:

Log in automatically

Require my password to log in

Use Active Directory

You'll enter domain and other details in the next step.

[Back](#)

[Continue](#)

Jan 28 22:49

Install

## Who are you?

Your name:  ✓

Your computer's name:  ✓

The name it uses when it talks to other computers.

Pick a username:  ✓

Choose a password:  ⚡ [Fair password](#)

Confirm your password:  ✓

Log in automatically

Require my password to log in

Use Active Directory

You'll enter domain and other details in the next step.

Back

Continue

Jan 28 22:49

Install

> Copying files...

Skip

Jan 28 23:06

Install

## Help and support

The official documentation covers many of the most common areas about Ubuntu. It's available both [online](#) and via the Help icon in the Dock.

At [Ask Ubuntu](#) you can ask questions and search an impressive collection of already answered questions. Support in your own language may be provided by your [Local Community Team](#).

For pointers to other useful resources, please visit [Community support](#) or [Commercial support](#).



› Copying installation logs...

Skip

Jan 28 23:07

Installation Complete X



Installation is complete. You need to restart the computer  
in order to use the new installation.

[Restart Now](#)



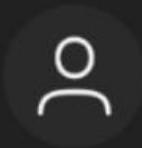
جنوری 28 23:09



Not listed?

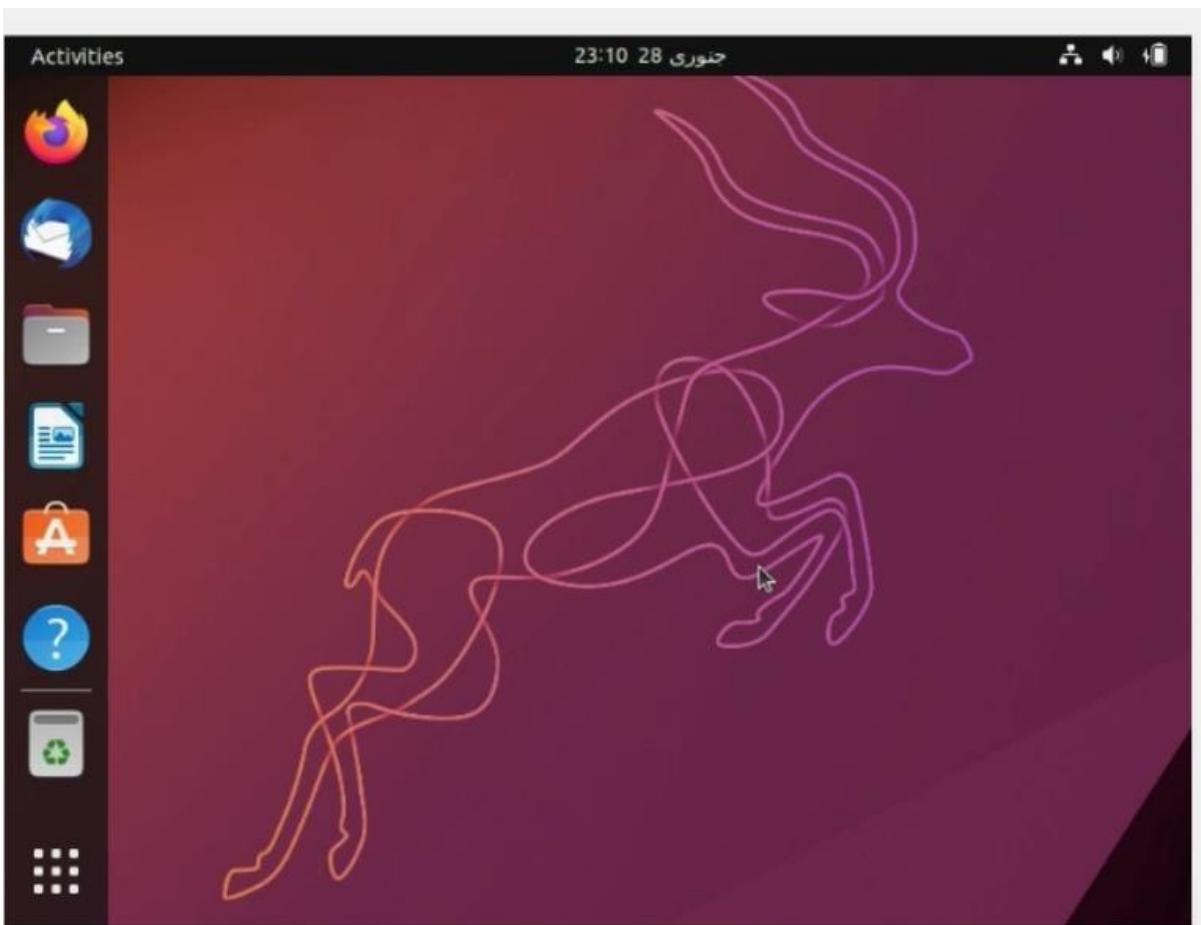


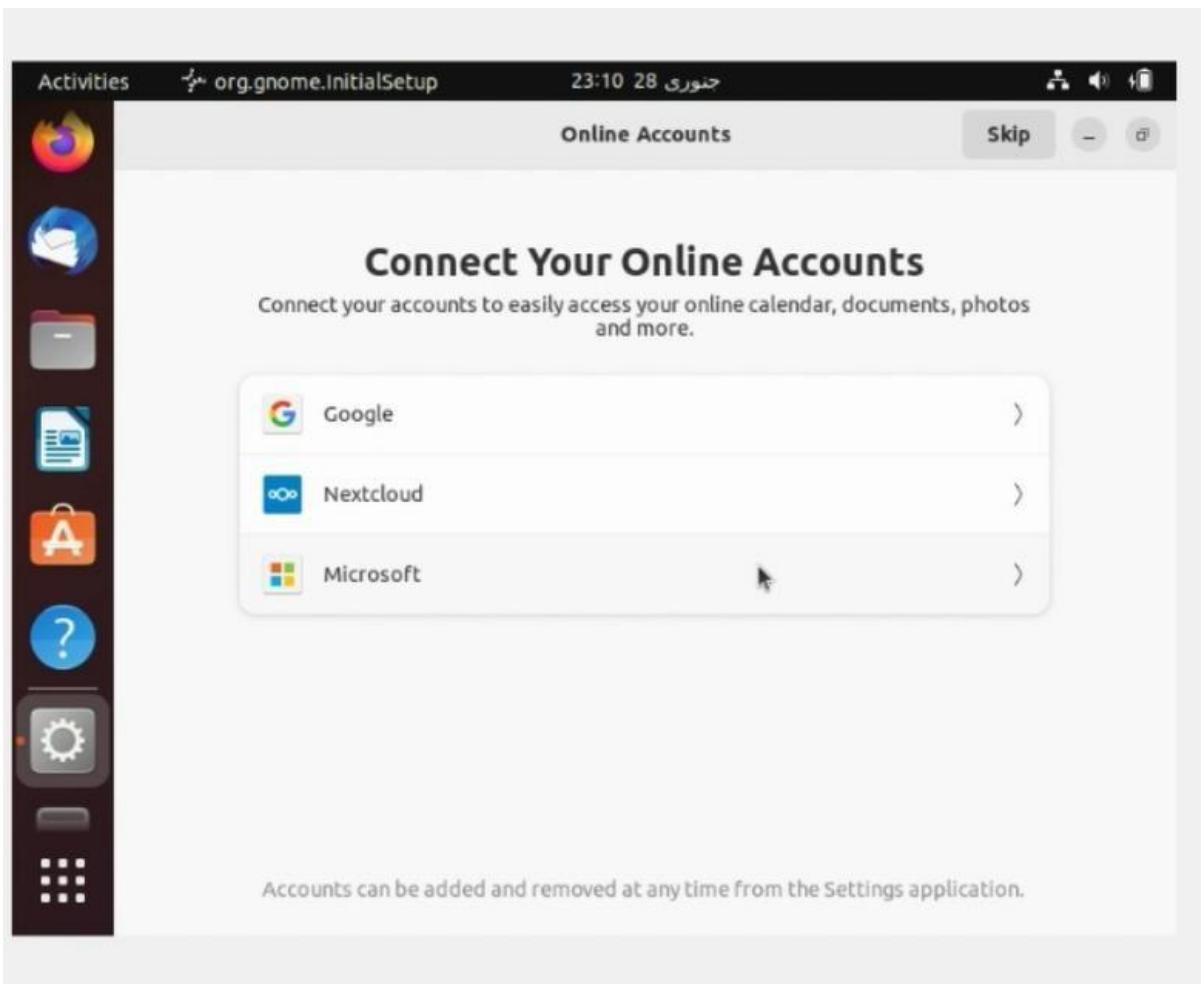
23:10 28 جنوری

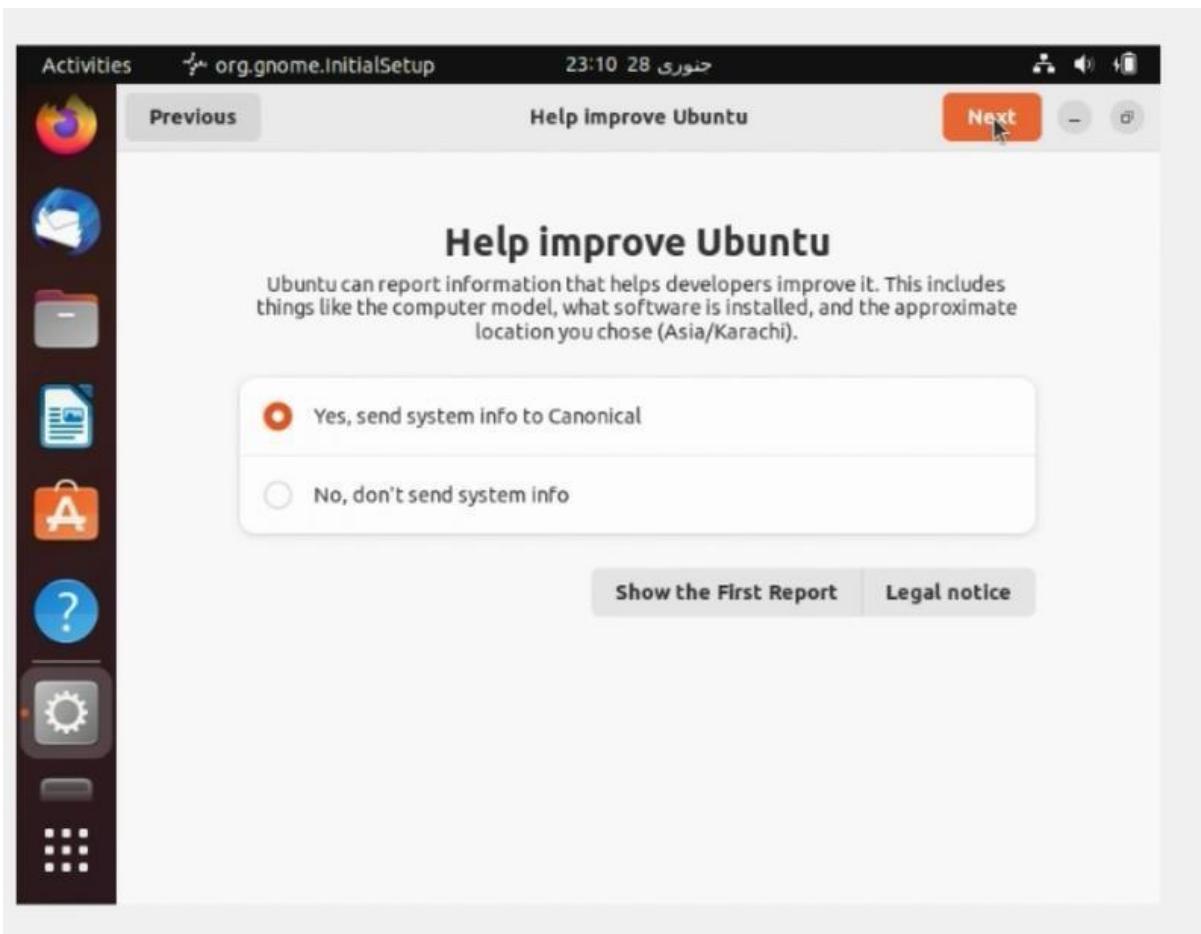


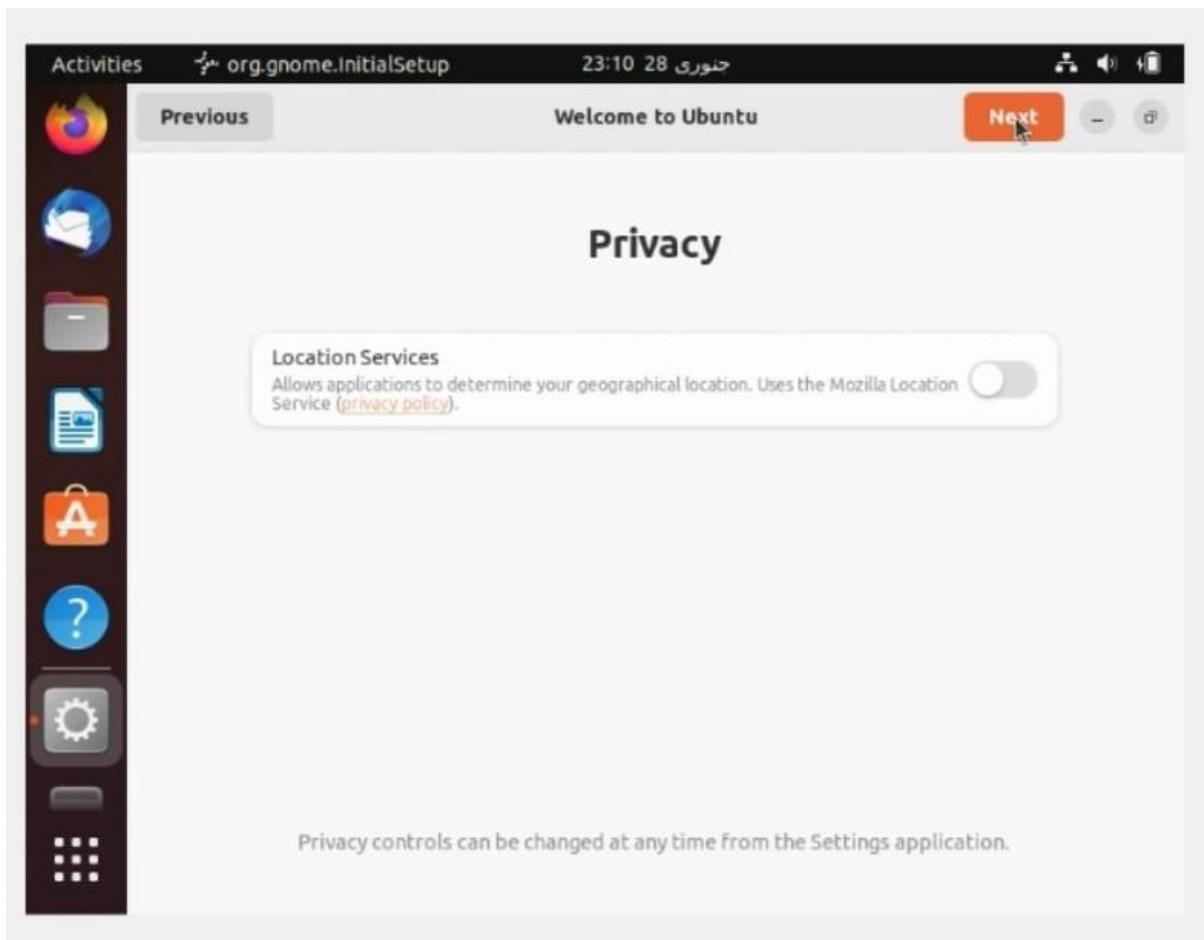
Mujtaba

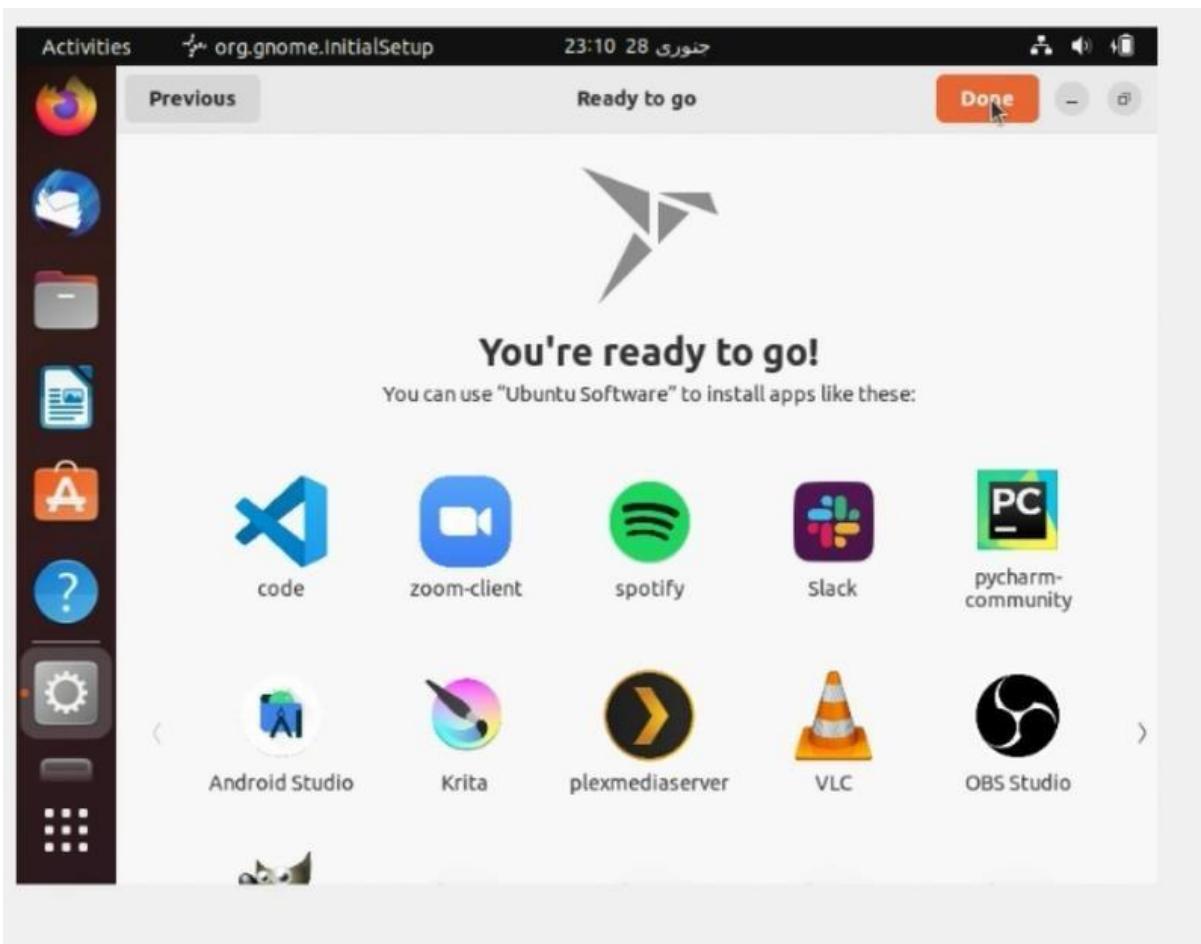


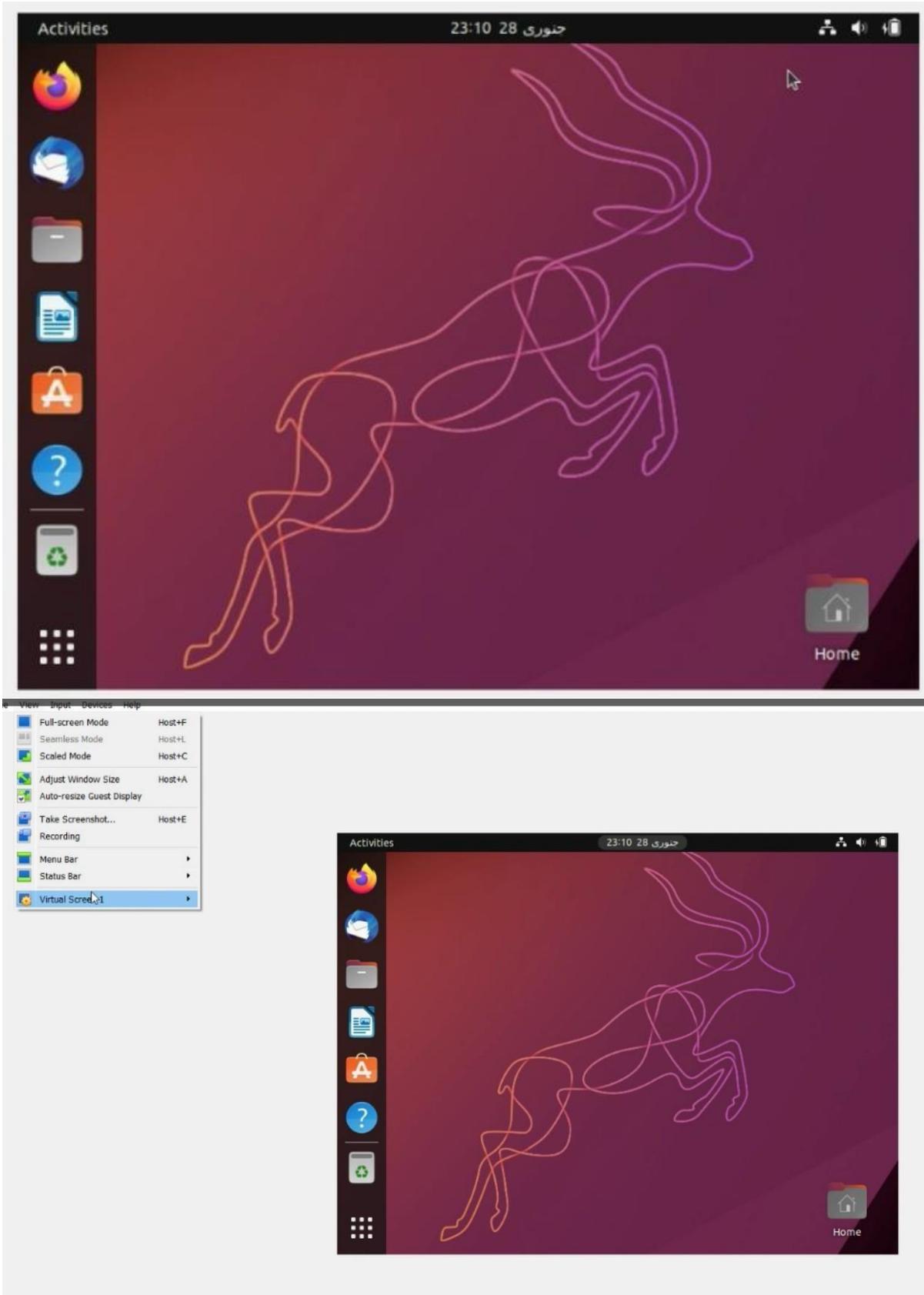


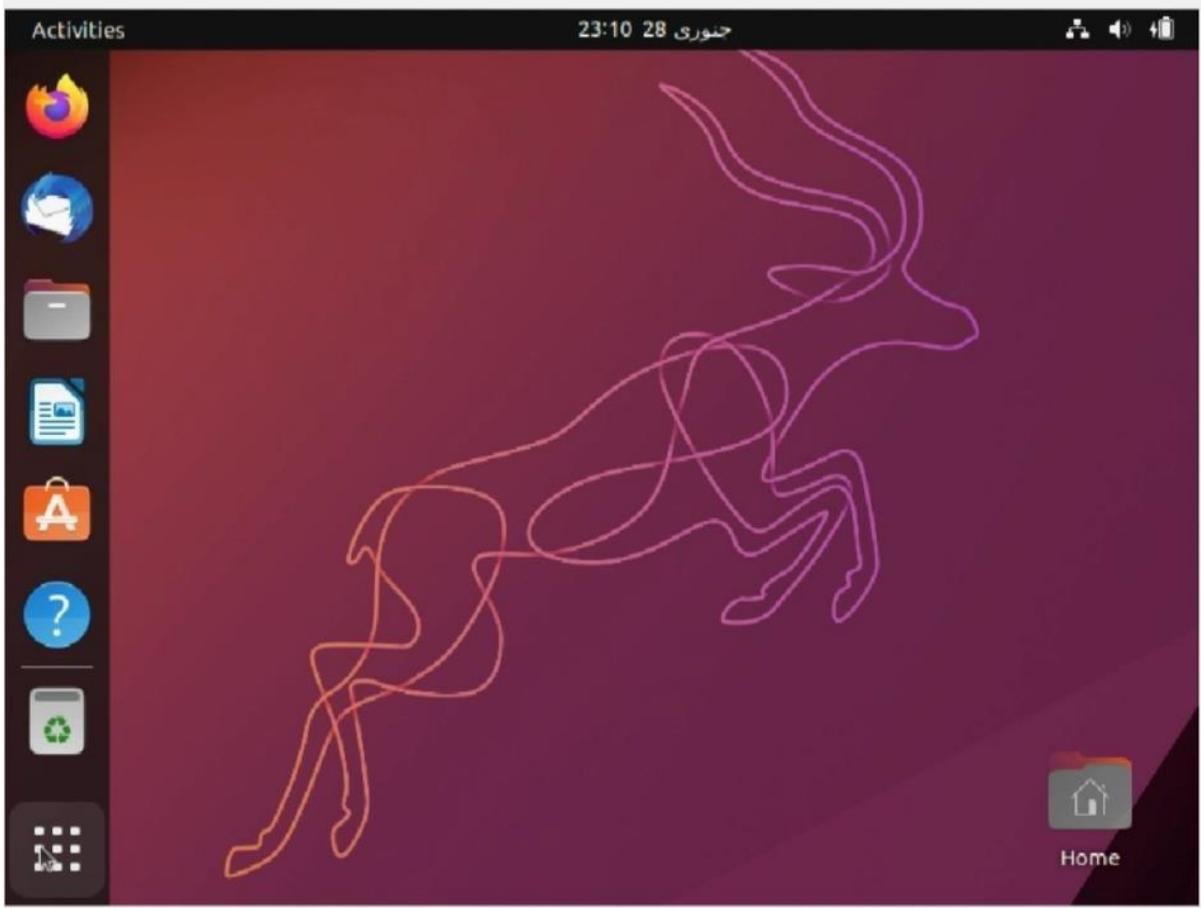
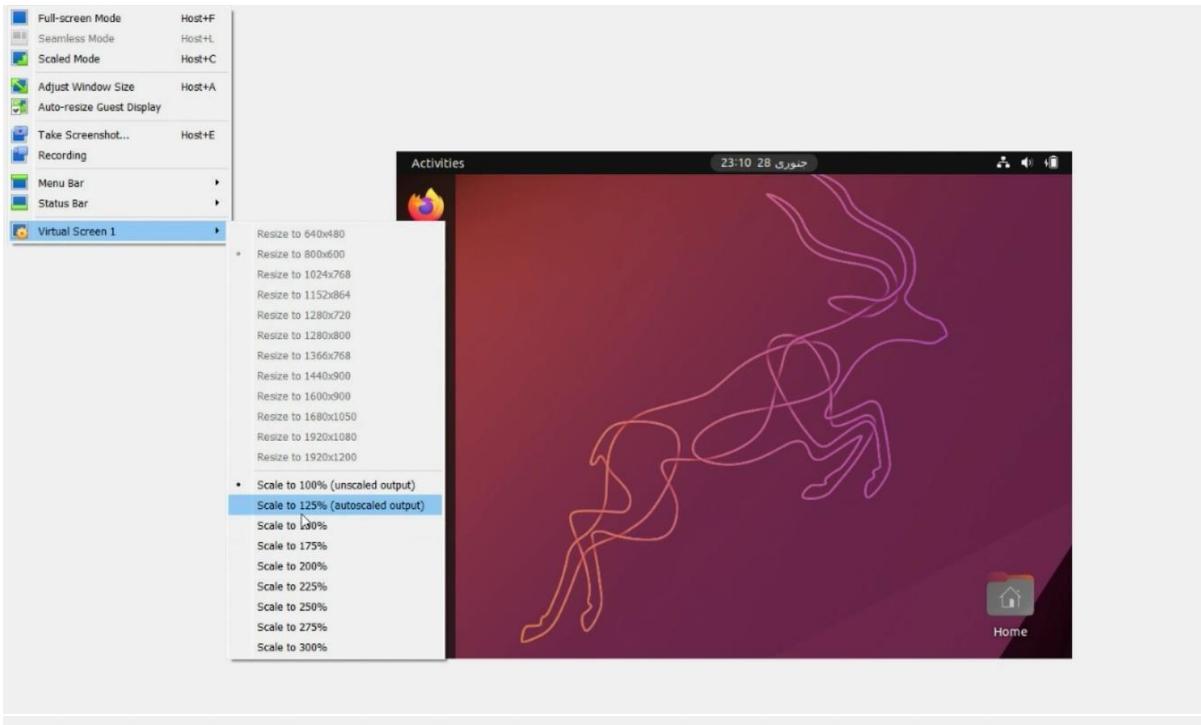


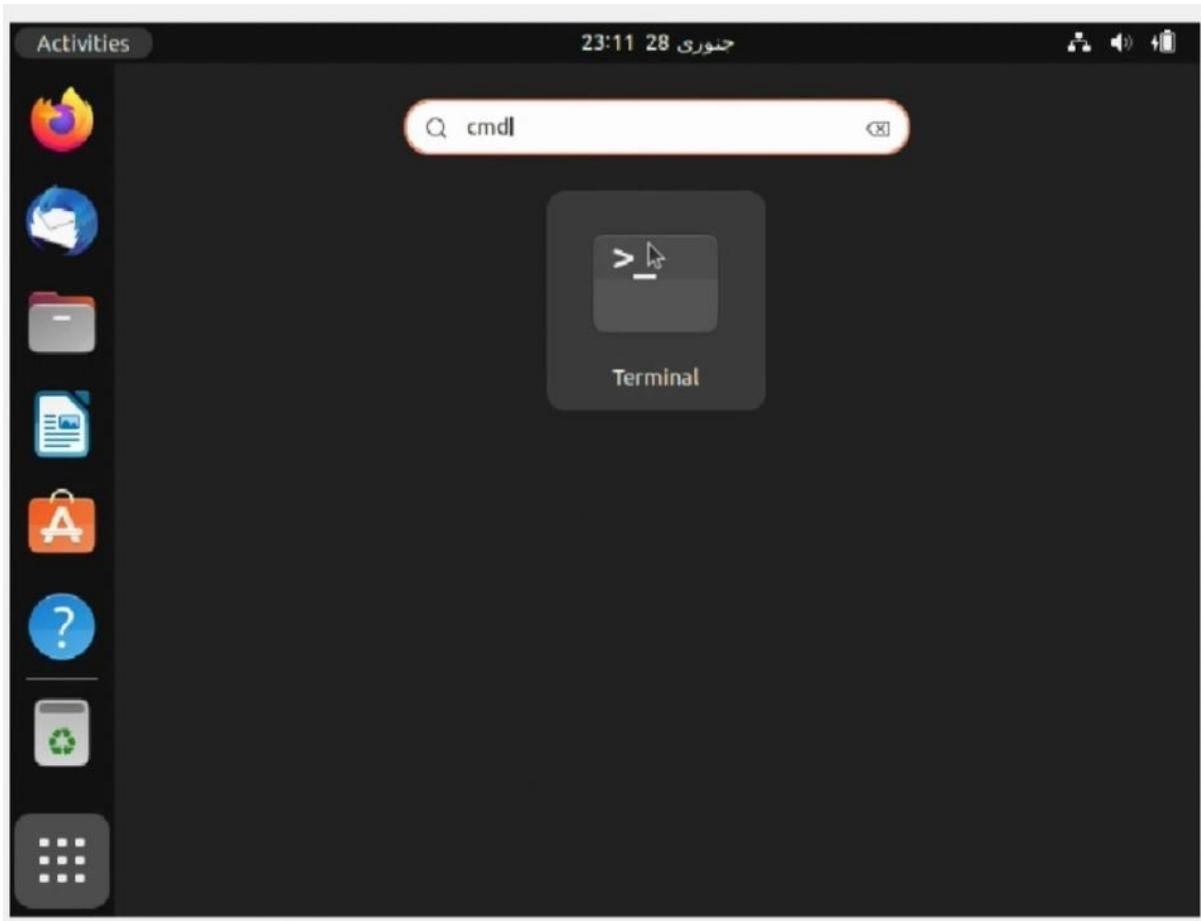


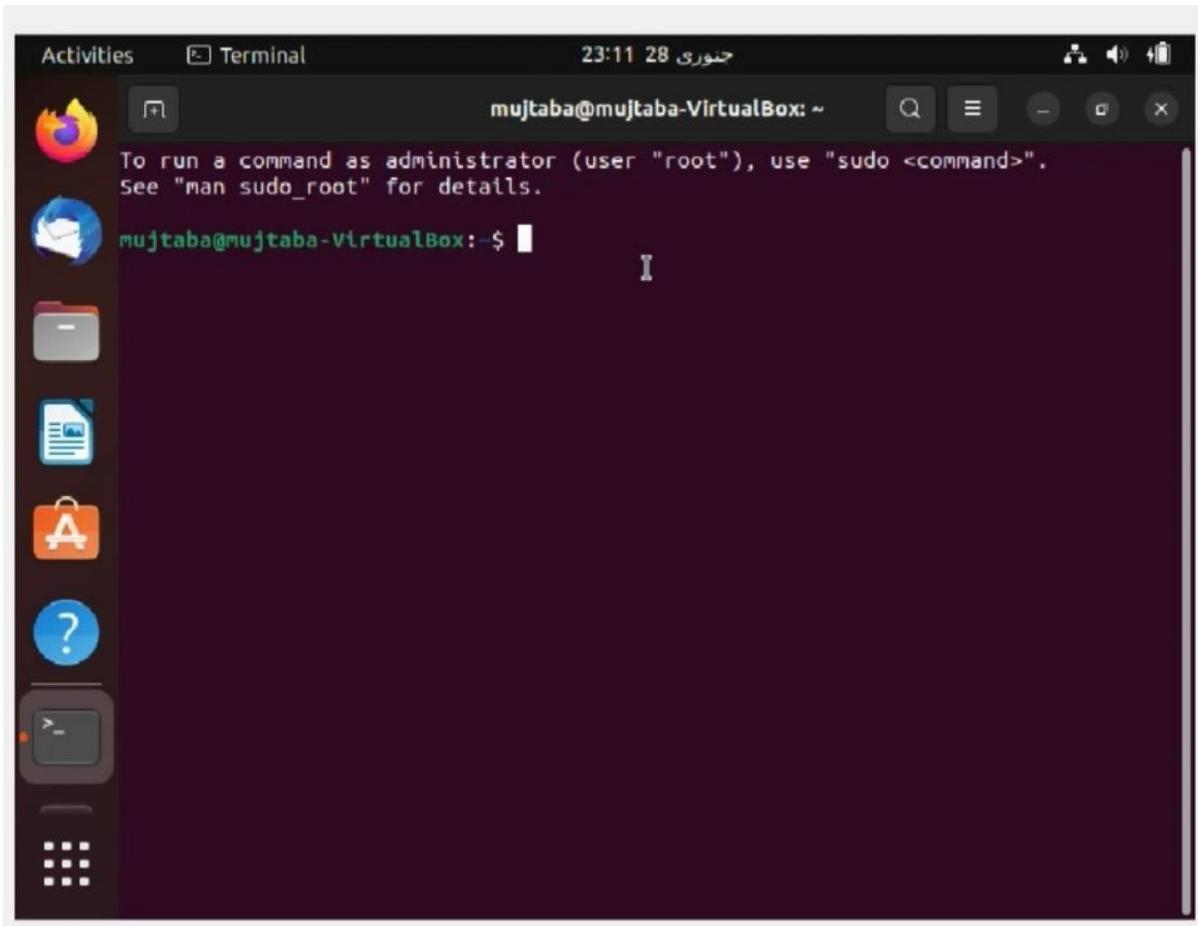












#### VMware workstation:

You can use the below mentioned links to install VMware.

<https://www.youtube.com/watch?v=9QXXyG0hKtI> After

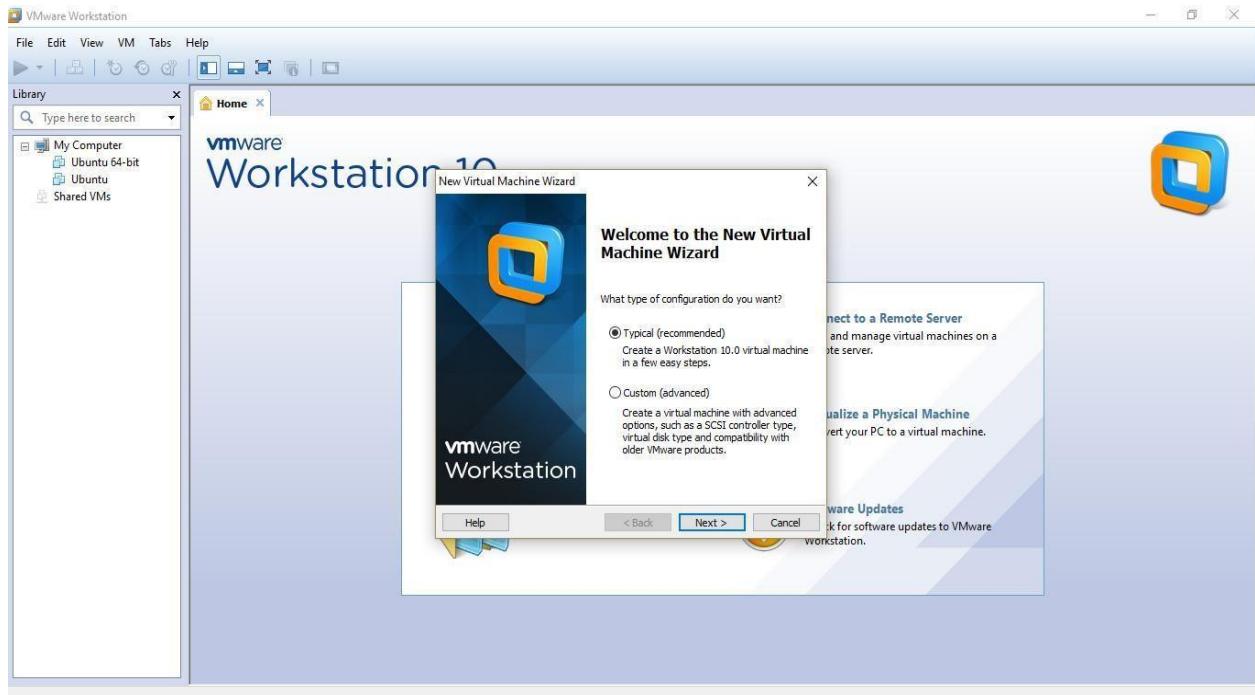
installing VMware install Ubuntu

<https://www.youtube.com/watch?v=9QXXyG0hKtI>

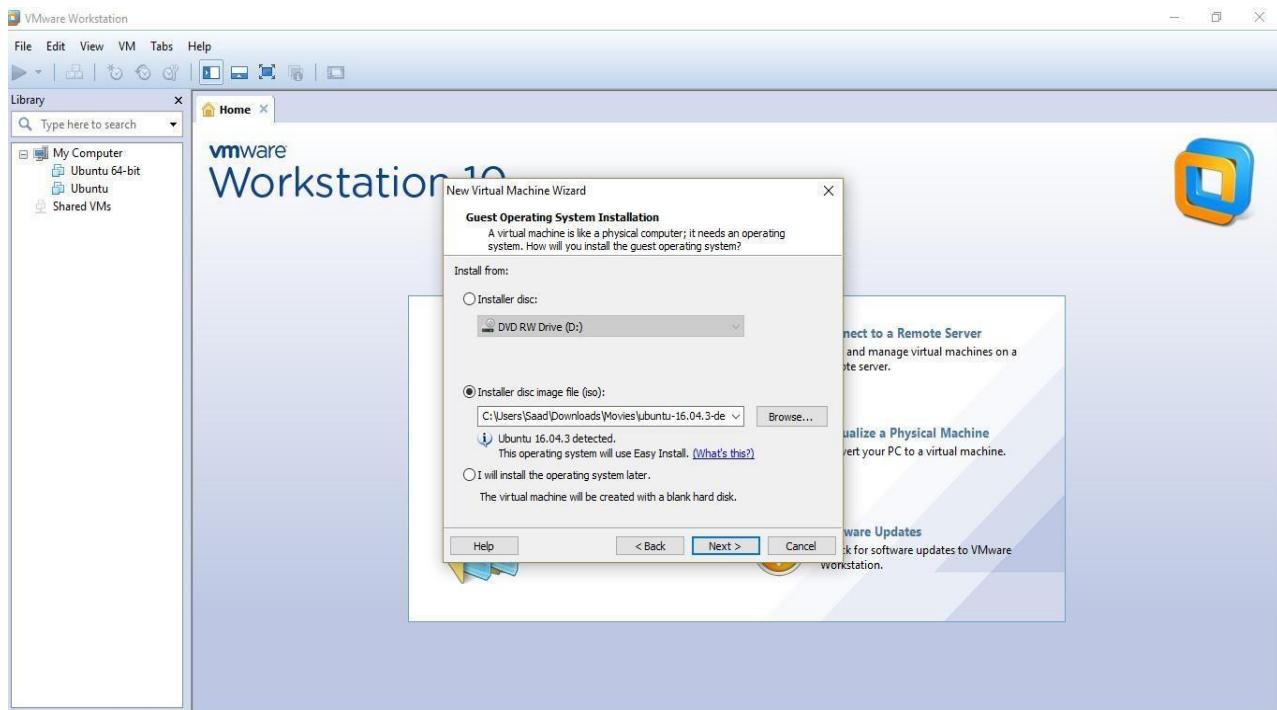
Open Vmware and select “Create a New Virtual Machine”.



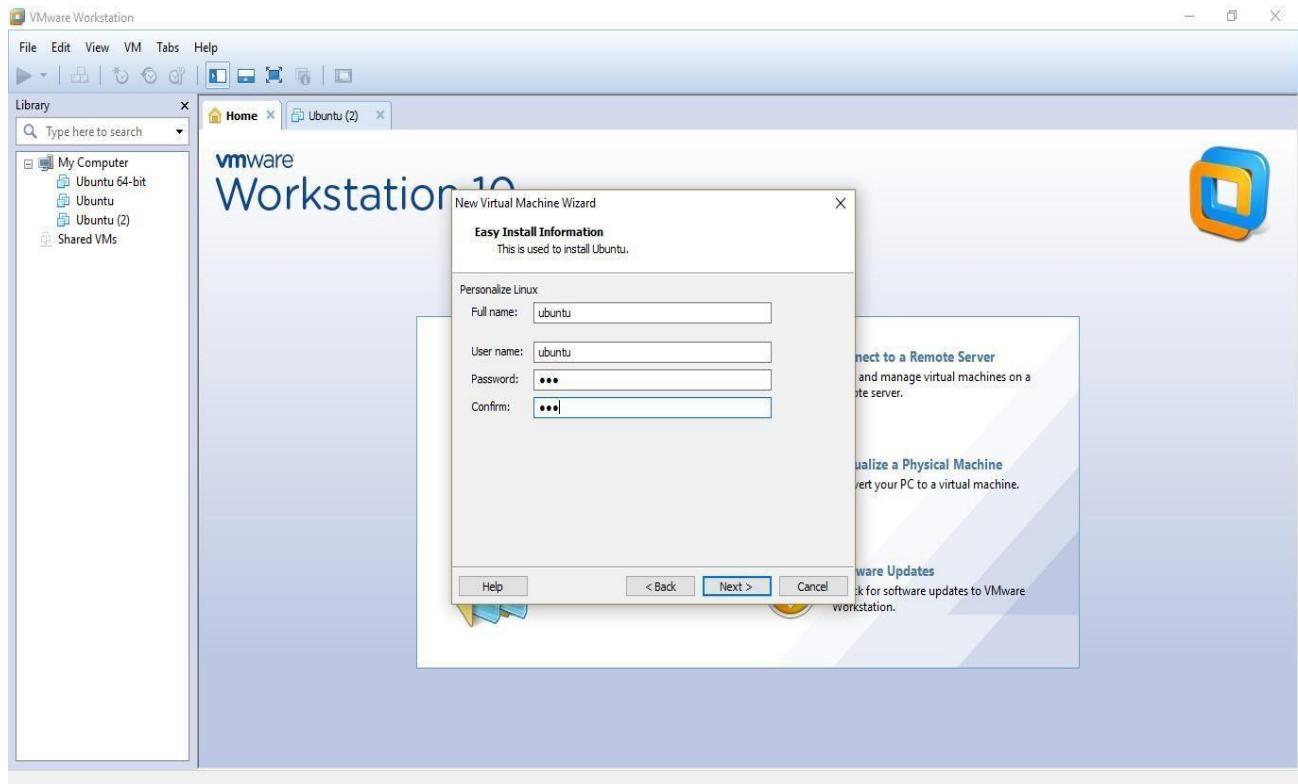
Click Next



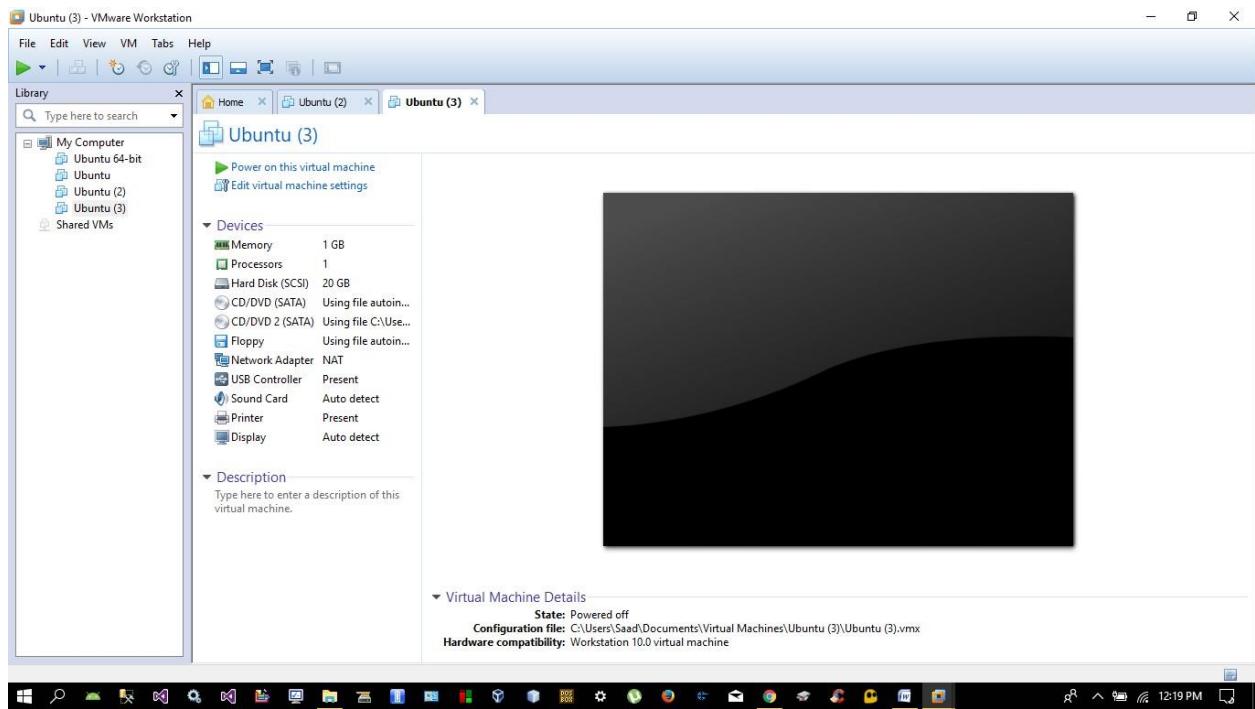
Now click browse and give path to your ubuntu iso file. After that click next.



Now enter a new username and password for ubuntu, and click next.

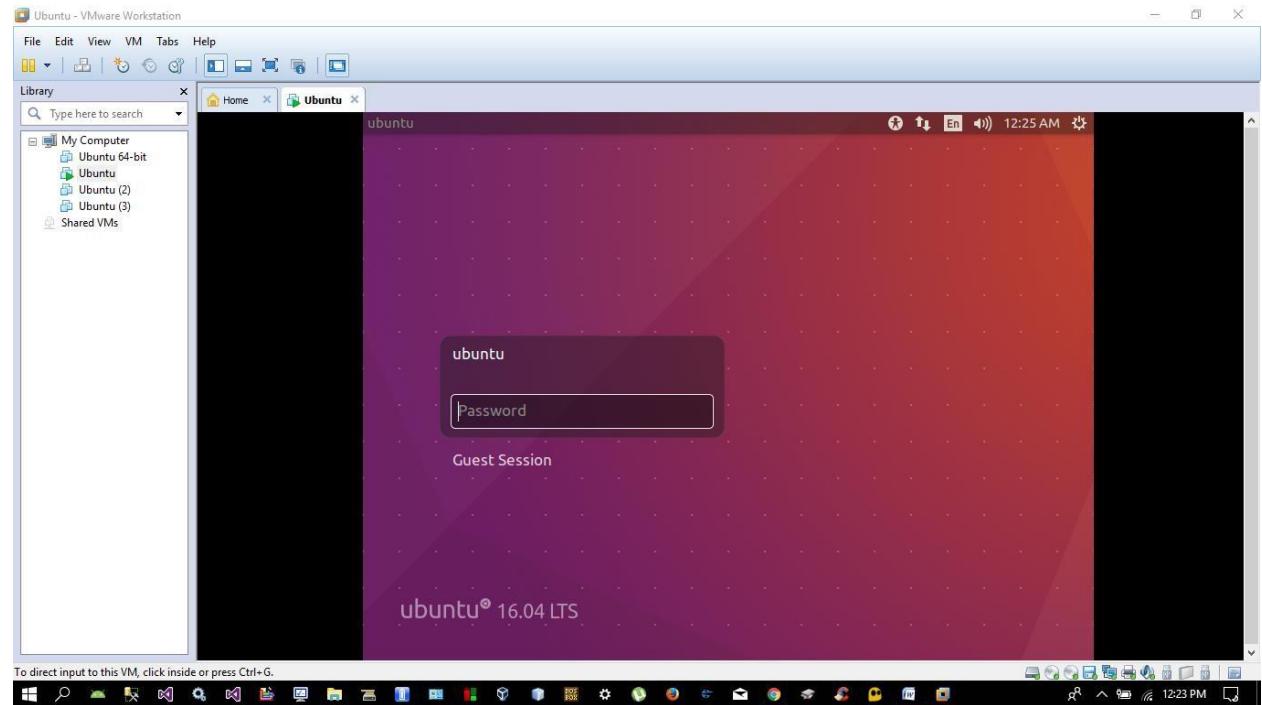


Then keep clicking next. After the wizard has finished, the following screen will appear

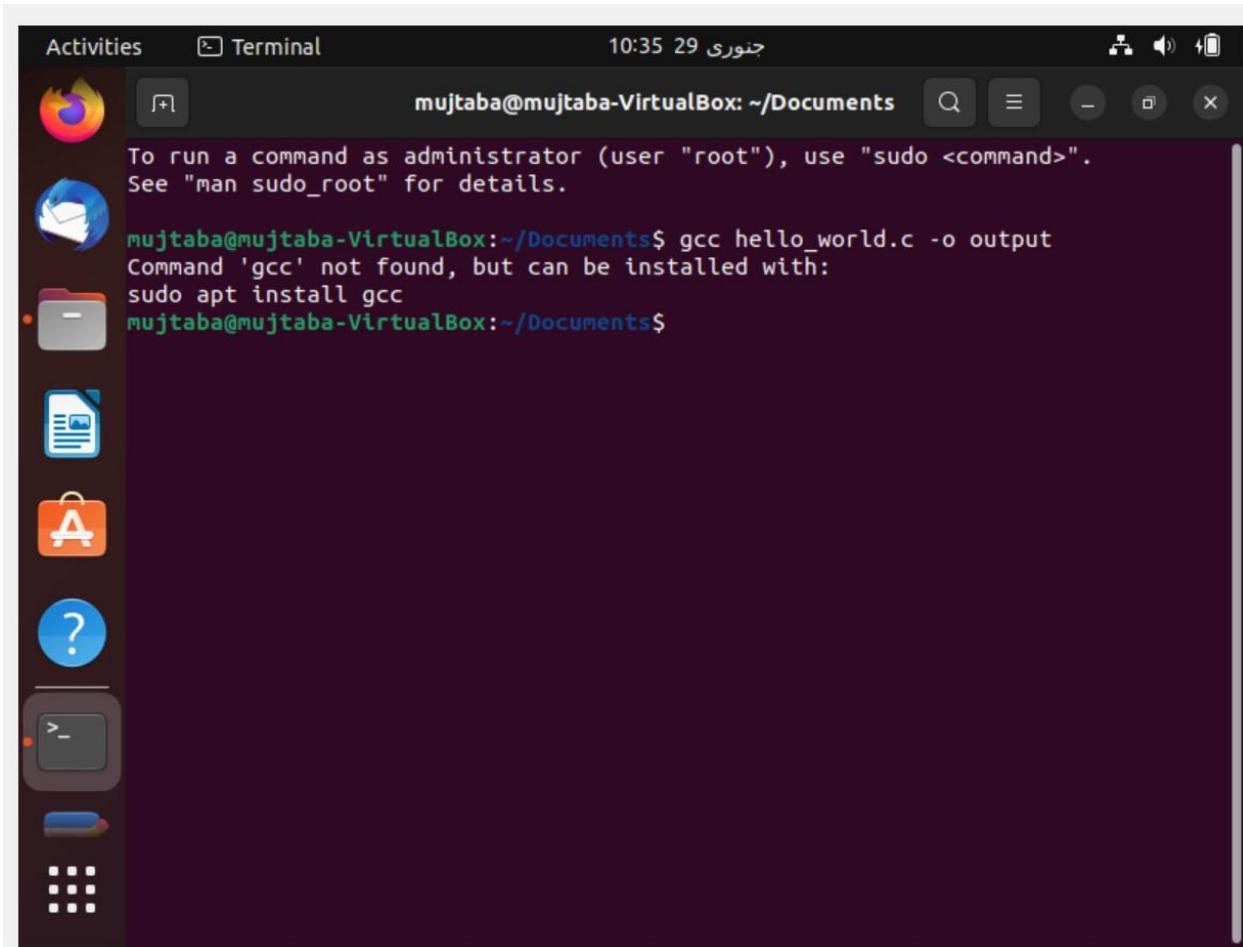


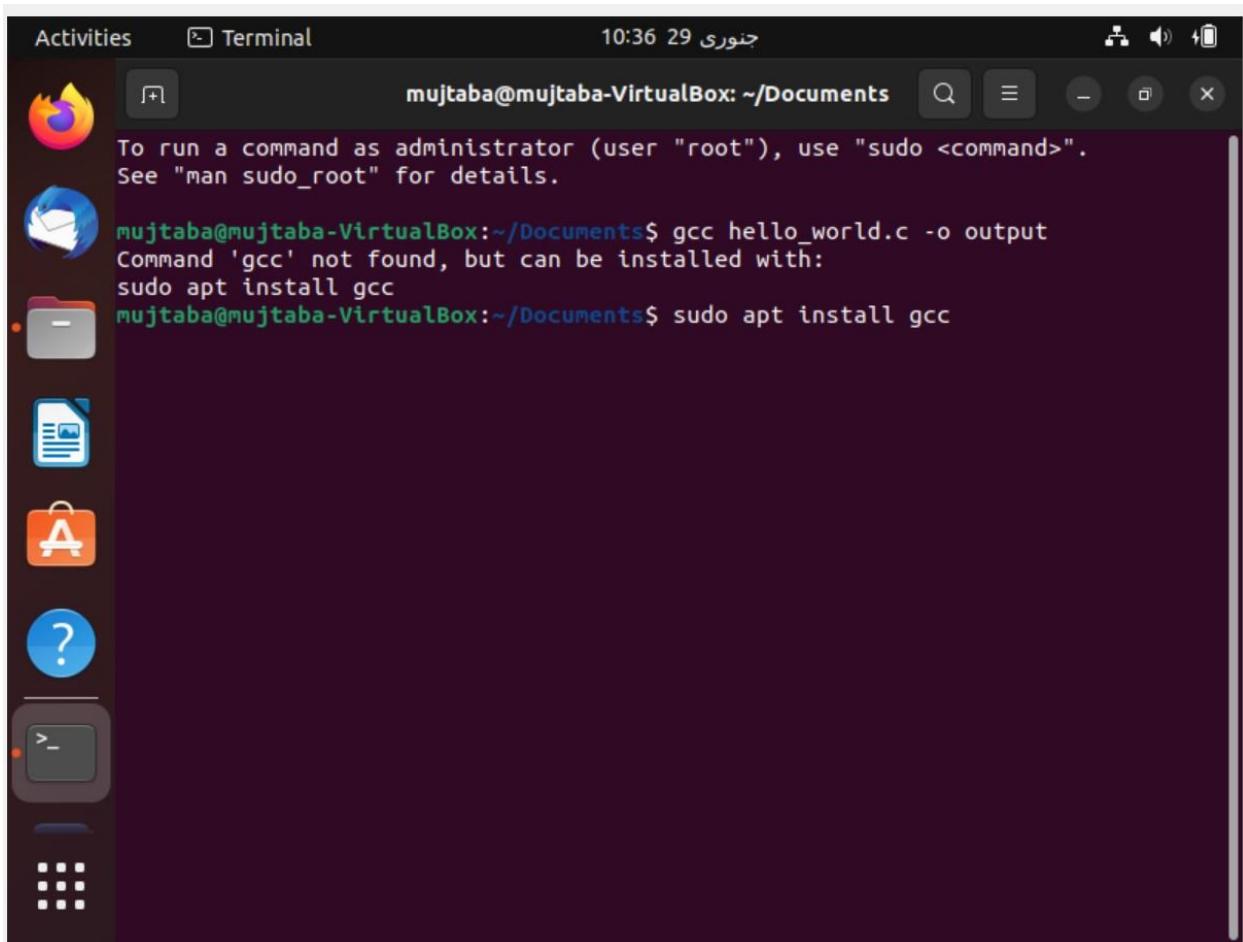
Now “Click Power on This Virtual Machine”. The system will now perform installation of ubuntu. This may take 10-15 minutes.

If ubuntu asks you for username and password, you will have to enter the user name and password that you had chosen earlier during installation wizard.



#### Activity 2 Installation of GCC compiler:





Activities Terminal 10:36 29 جنوری mujtaba@mujtaba-VirtualBox: ~/Documents

```
See "man sudo_root" for details.

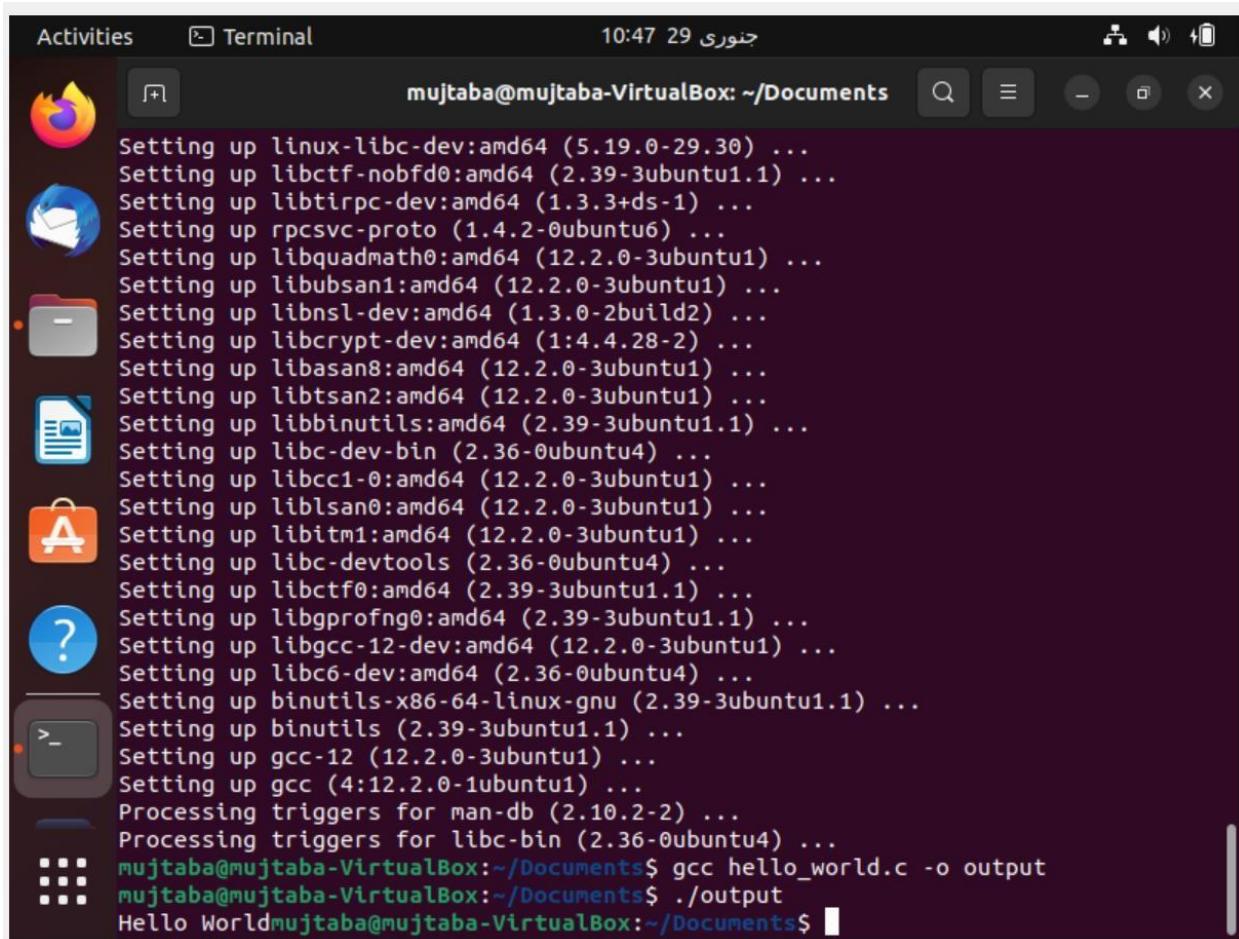
mujtaba@mujtaba-VirtualBox:~/Documents$ gcc hello_world.c -o output
Command 'gcc' not found, but can be installed with:
sudo apt install gcc
[msudo] password for mujtaba:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  binutils binutils-common binutils-x86_64-linux-gnu gcc-12 libasan8
  libbinutils libc-dev-bin libc-devtools libc6-dev libcc1-0 libcrypt-dev
  libctf-nobfd0 libctf0 libgcc-12-dev libgprofng0 libitm1 liblsan0 libnsl-dev
  libquadmath0 libtirpc-dev libtsan2 libubsan1 linux-libc-dev manpages-dev
  rpcsvc-proto
Suggested packages:
  binutils-doc gcc-multilib make autoconf automake libtool flex bison gcc-doc
  gcc-12-multilib gcc-12-doc gcc-12-locales glibc-doc
The following NEW packages will be installed:
  binutils binutils-common binutils-x86_64-linux-gnu gcc gcc-12 libasan8
  libbinutils libc-dev-bin libc-devtools libc6-dev libcc1-0 libcrypt-dev
  libctf-nobfd0 libctf0 libgcc-12-dev libgprofng0 libitm1 liblsan0 libnsl-dev
  libquadmath0 libtirpc-dev libtsan2 libubsan1 linux-libc-dev manpages-dev
  rpcsvc-proto
0 upgraded, 26 newly installed, 0 to remove and 115 not upgraded.
Need to get 41.7 MB of archives.
After this operation, 155 MB of additional disk space will be used.
Do you want to continue? [Y/n] █
```

Activities Terminal 10:37 29 جنوری mujtaba@mujtaba-VirtualBox: ~/Documents

```
mujtaba@mujtaba-VirtualBox:~/Documents$ sudo apt install gcc
[sudo] password for mujtaba:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  binutils binutils-common binutils-x86_64-linux-gnu gcc-12 libasan8
  libbinutils libc-dev-bin libc-devtools libc6-dev libcc1-0 libcrypt-dev
  libctf-nobfd0 libctf0 libgcc-12-dev libgprofng0 libitm1 liblsan0 libnsl-dev
  libquadmath0 libtirpc-dev libtsan2 libubsan1 linux-libc-dev manpages-dev
  rpcsvc-proto
Suggested packages:
  binutils-doc gcc-multilib make autoconf automake libtool flex bison gcc-doc
  gcc-12-multilib gcc-12-doc gcc-12-locales glibc-doc
The following NEW packages will be installed:
  binutils binutils-common binutils-x86_64-linux-gnu gcc gcc-12 libasan8
  libbinutils libc-dev-bin libc-devtools libc6-dev libcc1-0 libcrypt-dev
  libctf-nobfd0 libctf0 libgcc-12-dev libgprofng0 libitm1 liblsan0 libnsl-dev
  libquadmath0 libtirpc-dev libtsan2 libubsan1 linux-libc-dev manpages-dev
  rpcsvc-proto
0 upgraded, 26 newly installed, 0 to remove and 115 not upgraded.
Need to get 41.7 MB of archives.
After this operation, 155 MB of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 http://pk.archive.ubuntu.com/ubuntu kinetic-updates/main amd64 binutils-common amd64 2.39-3ubuntu1.1 [225 kB]
Get:2 http://pk.archive.ubuntu.com/ubuntu kinetic-updates/main amd64 libbinutils amd64 2.39-3ubuntu1.1 [610 kB]
1% [2 libbinutils 131 kB/610 kB 22%] 23.6 kB/s 29min 14s
```

Activities Terminal 10:43 29 جنوری mujtaba@mujtaba-VirtualBox: ~/Documents

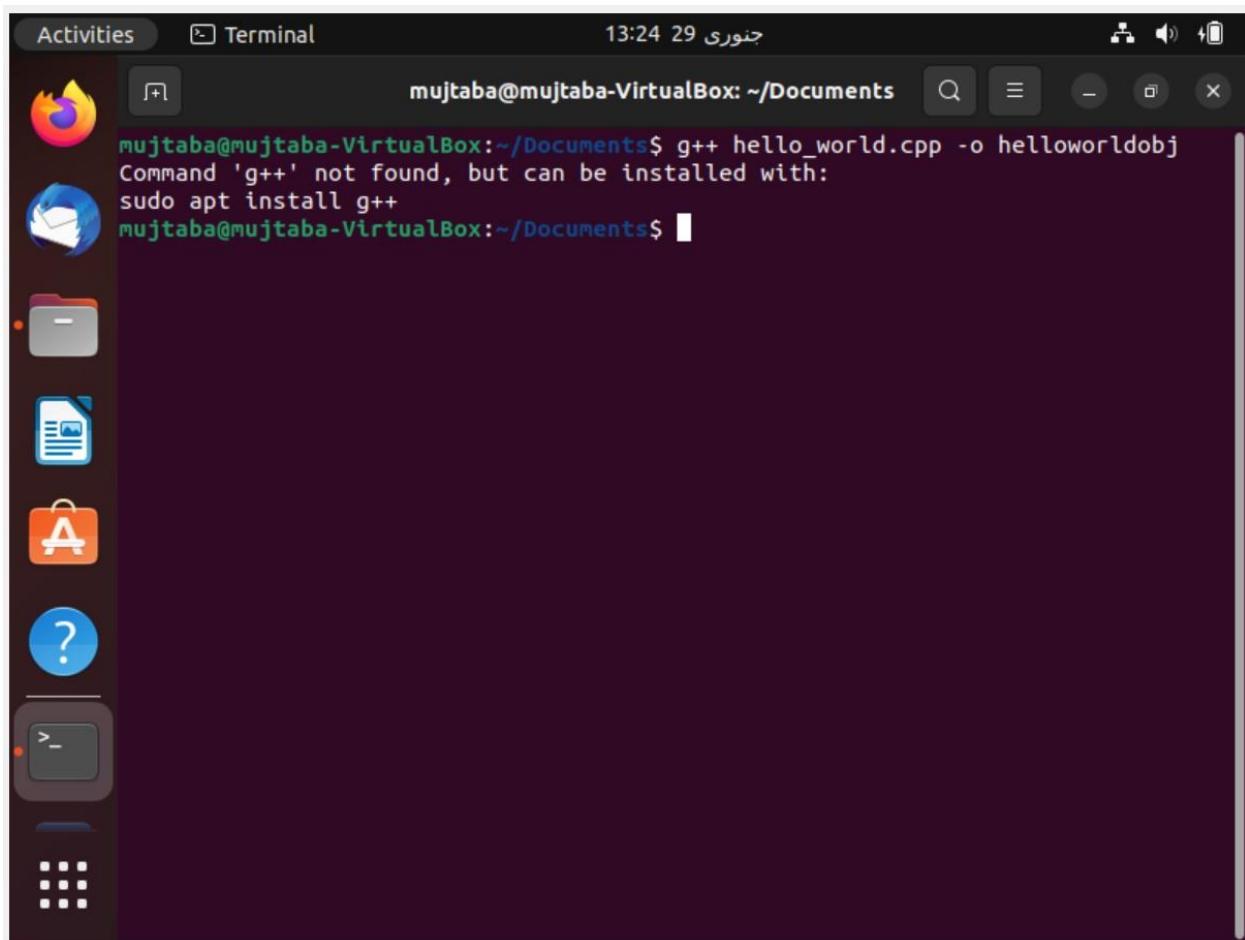
```
Setting up linux-libc-dev:amd64 (5.19.0-29.30) ...
Setting up libctf-nobfd0:amd64 (2.39-3ubuntu1.1) ...
Setting up libtirpc-dev:amd64 (1.3.3+ds-1) ...
Setting up rpcsvc-proto (1.4.2-0ubuntu6) ...
Setting up libquadmath0:amd64 (12.2.0-3ubuntu1) ...
Setting up libubsan1:amd64 (12.2.0-3ubuntu1) ...
Setting up libnsl-dev:amd64 (1.3.0-2build2) ...
Setting up libcrypt-dev:amd64 (1:4.4.28-2) ...
Setting up libasan8:amd64 (12.2.0-3ubuntu1) ...
Setting up libtsan2:amd64 (12.2.0-3ubuntu1) ...
Setting up libbinutils:amd64 (2.39-3ubuntu1.1) ...
Setting up libc-dev-bin (2.36-0ubuntu4) ...
Setting up libcc1-0:amd64 (12.2.0-3ubuntu1) ...
Setting up liblsan0:amd64 (12.2.0-3ubuntu1) ...
Setting up libitm1:amd64 (12.2.0-3ubuntu1) ...
Setting up libc-devtools (2.36-0ubuntu4) ...
Setting up libctf0:amd64 (2.39-3ubuntu1.1) ...
Setting up libgprofng0:amd64 (2.39-3ubuntu1.1) ...
Setting up libgcc-12-dev:amd64 (12.2.0-3ubuntu1) ...
Setting up libc6-dev:amd64 (2.36-0ubuntu4) ...
Setting up binutils-x86-64-linux-gnu (2.39-3ubuntu1.1) ...
Setting up binutils (2.39-3ubuntu1.1) ...
Setting up gcc-12 (12.2.0-3ubuntu1) ...
Setting up gcc (4:12.2.0-1ubuntu1) ...
Processing triggers for man-db (2.10.2-2) ...
Processing triggers for libc-bin (2.36-0ubuntu4) ...
mujtaba@mujtaba-VirtualBox:~/Documents$ gcc hello_world.c -o output
mujtaba@mujtaba-VirtualBox:~/Documents$
```

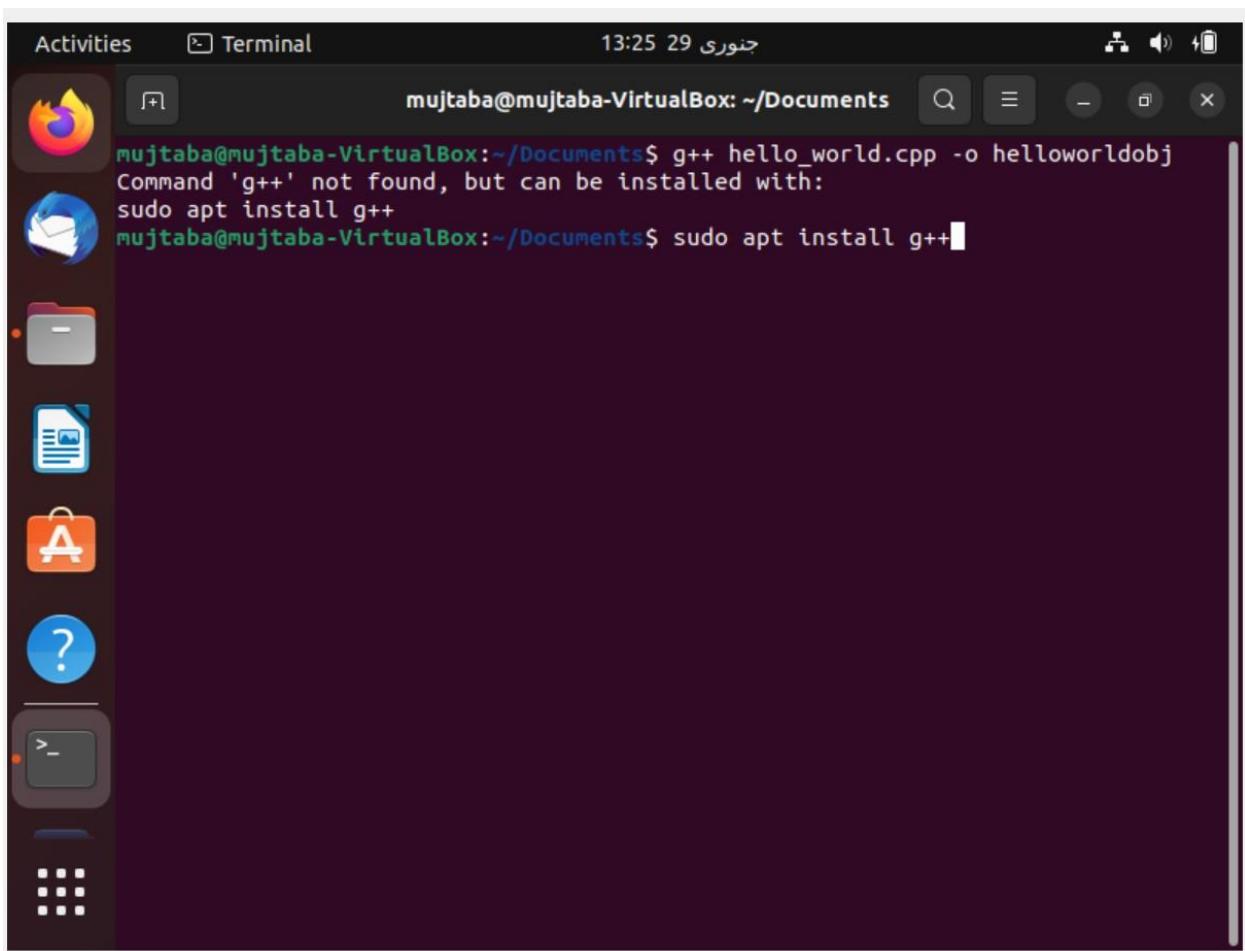


A screenshot of a Ubuntu desktop environment. The terminal window shows the output of a package manager (likely apt) listing many packages being installed or upgraded. The terminal window title is "Terminal" and the prompt is "mujtaba@mujtaba-VirtualBox: ~/Documents". The terminal content includes:

```
Setting up linux-libc-dev:amd64 (5.19.0-29.30) ...
Setting up libctf-nobfd0:amd64 (2.39-3ubuntu1.1) ...
Setting up libtirpc-dev:amd64 (1.3.3+ds-1) ...
Setting up rpcsvc-proto (1.4.2-0ubuntu6) ...
Setting up libquadmath0:amd64 (12.2.0-3ubuntu1) ...
Setting up libubsan1:amd64 (12.2.0-3ubuntu1) ...
Setting up libnsl-dev:amd64 (1.3.0-2build2) ...
Setting up libcrypt-dev:amd64 (1:4.4.28-2) ...
Setting up libasan8:amd64 (12.2.0-3ubuntu1) ...
Setting up libtsan2:amd64 (12.2.0-3ubuntu1) ...
Setting up libbinutils:amd64 (2.39-3ubuntu1.1) ...
Setting up libc-dev-bin (2.36-0ubuntu4) ...
Setting up libcc1-0:amd64 (12.2.0-3ubuntu1) ...
Setting up liblsan0:amd64 (12.2.0-3ubuntu1) ...
Setting up libitm1:amd64 (12.2.0-3ubuntu1) ...
Setting up libc-devtools (2.36-0ubuntu4) ...
Setting up libctf0:amd64 (2.39-3ubuntu1.1) ...
Setting up libgprofng0:amd64 (2.39-3ubuntu1.1) ...
Setting up libgcc-12-dev:amd64 (12.2.0-3ubuntu1) ...
Setting up libc6-dev:amd64 (2.36-0ubuntu4) ...
Setting up binutils-x86-64-linux-gnu (2.39-3ubuntu1.1) ...
Setting up binutils (2.39-3ubuntu1.1) ...
Setting up gcc-12 (12.2.0-3ubuntu1) ...
Setting up gcc (4:12.2.0-1ubuntu1) ...
Processing triggers for man-db (2.10.2-2) ...
Processing triggers for libc-bin (2.36-0ubuntu4) ...
mujtaba@mujtaba-VirtualBox:~/Documents$ gcc hello_world.c -o output
mujtaba@mujtaba-VirtualBox:~/Documents$ ./output
Hello Worldmujtaba@mujtaba-VirtualBox:~/Documents$
```

**Activity 3 Installation of G++ compiler:**





Activities Terminal 13:27 29 جنوری mujtaba@mujtaba-VirtualBox: ~/Documents

```
mujtaba@mujtaba-VirtualBox:~/Documents$ g++ hello_world.cpp -o helloworldobj
Command 'g++' not found, but can be installed with:
sudo apt install g++
mujtaba@mujtaba-VirtualBox:~/Documents$ sudo apt install g++
[sudo] password for mujtaba:
Sorry, try again.
[sudo] password for mujtaba:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  g++-12 libstdc++-12-dev
Suggested packages:
  g++-multilib g++-12-multilib gcc-12-doc libstdc++-12-doc
The following NEW packages will be installed:
  g++ g++-12 libstdc++-12-dev
0 upgraded, 3 newly installed, 0 to remove and 115 not upgraded.
Need to get 14.1 MB of archives.
After this operation, 57.8 MB of additional disk space will be used.
Do you want to continue? [Y/n] █
```

Activities Terminal 13:27 29 جنوری mujtaba@mujtaba-VirtualBox: ~/Documents

```
mujtaba@mujtaba-VirtualBox:~/Documents$ g++ hello_world.cpp -o helloworldobj
Command 'g++' not found, but can be installed with:
sudo apt install g++
mujtaba@mujtaba-VirtualBox:~/Documents$ sudo apt install g++
[sudo] password for mujtaba:
Sorry, try again.
[sudo] password for mujtaba:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  g++-12 libstdc++-12-dev
Suggested packages:
  g++-multilib g++-12-multilib gcc-12-doc libstdc++-12-doc
The following NEW packages will be installed:
  g++ g++-12 libstdc++-12-dev
0 upgraded, 3 newly installed, 0 to remove and 115 not upgraded.
Need to get 14.1 MB of archives.
After this operation, 57.8 MB of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 http://pk.archive.ubuntu.com/ubuntu kinetic/main amd64 libstdc++-12-dev all 12.2.0-3ubuntu1 [2,158 kB]
1% [1 libstdc++-12-dev 135 kB/2,158 kB 6%]
```

Activities Terminal 13:46 29 جنوری mujtaba@mujtaba-VirtualBox: ~/Documents

```
Get:1 http://pk.archive.ubuntu.com/ubuntu kinetic/main amd64 libstdc++-12-dev amd64 12.2.0-3ubuntu1 [2,158 kB]
Get:2 http://pk.archive.ubuntu.com/ubuntu kinetic/main amd64 g++-12 amd64 12.2.0-3ubuntu1 [12.0 MB]
Get:3 http://pk.archive.ubuntu.com/ubuntu kinetic/main amd64 g++ amd64 4:12.2.0-1ubuntu1 [1,406 B]
Fetched 14.1 MB in 4min 31s (52.3 kB/s)
Selecting previously unselected package libstdc++-12-dev:amd64.
(Reading database ... 201078 files and directories currently installed.)
Preparing to unpack .../libstdc++-12-dev_12.2.0-3ubuntu1_amd64.deb ...
Unpacking libstdc++-12-dev:amd64 (12.2.0-3ubuntu1) ...
Selecting previously unselected package g++-12.
Preparing to unpack .../g++-12_12.2.0-3ubuntu1_amd64.deb ...
Unpacking g++-12 (12.2.0-3ubuntu1) ...
Selecting previously unselected package g++.
Preparing to unpack .../g++_4%3a12.2.0-1ubuntu1_amd64.deb ...
Unpacking g++ (4:12.2.0-1ubuntu1) ...
Setting up libstdc++-12-dev:amd64 (12.2.0-3ubuntu1) ...
Setting up g++-12 (12.2.0-3ubuntu1) ...
Setting up g++ (4:12.2.0-1ubuntu1) ...
update-alternatives: using /usr/bin/g++ to provide /usr/bin/c++ (c++) in auto mode
Processing triggers for man-db (2.10.2-2) ...
mujtaba@mujtaba-VirtualBox:~/Documents$ g++ hello_world.cpp -o hello_worldobj
mujtaba@mujtaba-VirtualBox:~/Documents$ ls
hello_world.c    hello_worldobj  Makefile      message.h
hello_world.cpp  main.cpp        message.cpp  output
mujtaba@mujtaba-VirtualBox:~/Documents$ ./hello_worldobj
hello worldmujtaba@mujtaba-VirtualBox:~/Documents$
```