St. Francis Institute of Technology, Mumbai-400 103
Department of Information Technology
A.Y. 2023-2024
Class: SE-ITA/B, Semester: IV

Subject: **UNIX LAB**

Experiment – 1A: Study of UNIX Operating System.

1. **Aim:** To study UNIX Operating System.
2. **Objectives:** After study of this experiment, the student will be able to
     - Understand what UNIX operating system is.
     - Identify the variants of UNIX operating system.
3. **Outcomes:** After study of this experiment, the student will be able to
     - Understand UNIX operating system. (L402.4)
4. **Prerequisite:** None.
5. **Requirements:** Personal Computer, Microsoft Word, Internet Connection.
6. **Pre-Experiment Exercise:**
    Brief Theory:

An operating system(OS) acts as an interface between the computer user and computer hardware. It manages the computer hardware and provides a basis for application programs. It is the first program that gets loaded on a computer when you switch on the system.
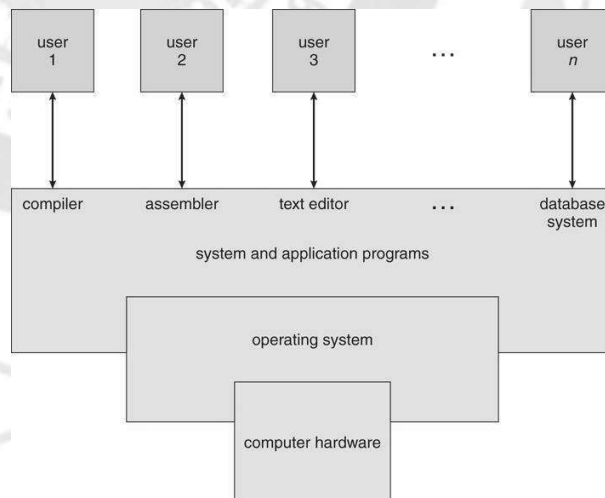
Figure 1: Position of OS in computer system.

Some operating systems are designed to be convenient, others to be efficient, and others some combination of the two. There are many operating systems currently in use, mainly for desktop PCs, server computers, embedded systems and mobile phones. The popular ones are Windows, Linux, UNIX, Macintosh, WinCE, Chrome and Android operating systems.

7. **Laboratory Exercise**
   A. **Procedure**

   Prepare a document on the following points.
   - i. What is UNIX Operating system (OS)?
   - ii. History of UNIX OS.
   - iii. Flavours of UNIX OS.
   - iv. Architecture of UNIX OS.
   - v. Advantages of UNIX OS.
   - vi. Disadvantages of UNIX OS.

   B. **Result/Observation**
8. **Post-Experiments Exercise**
   A. **Extended Theory:**
   Nil.
   B. **Questions:**
   1. Compare and contrast Windows, UNIX and Macintosh OS.
   2. Differentiate between UNIX and Linux operating system.
   C. **Conclusion:**
   1. Write what was performed in the experiment.
   2. Mention few applications of what was studied.
   3. Write the significance of the topic studied in the experiment.
   D. **References:**
   1. https://www.geeksforgeeks.org/introduction-to-unix-system/.
   2. Sumitabha Das, UNIX Concepts and Applications, 3rd Ed., Tata McGraw Hill.

UNIX Operating System

UNIX operating system also referred to as UNICS or UNiplexed Information Computing System is known for its features of multitasking, flexibility, stability, etc. The hierarchical file structure in the UNIX operating system helps in indexed storage and easy retrieval.

The UNIX operating system that was developed in AT&T laboratories was first distributed in government and academic institutions due to its multitasking and multiuser abilities. This helped in ensuring its widespread use and applications. The operating system's power lies in its Kernel.

History of UNIX Operating System

UNIX development was started in 1969 at Bell Laboratories in New Jersey. Bell Laboratories was (1964–1968) involved in the development of a multi-user, time-sharing operating system called Multics (Multiplexed Information and Computing System). Multics was a failure. In early 1969, Bell Labs withdrew from the Multics project. Bell Labs researchers who had worked on Multics (Ken Thompson, Dennis Ritchie, Douglas McIlroy, Joseph Ossanna, and others) still wanted to develop an operating system for their own and Bell Labs' programming, job control, and resource usage needs. When Multics was withdrawn Ken Thompson and Dennis Ritchie needed to rewrite an operating system in order to play space travel on another smaller machine (a DEC PDP-7 [Programmed Data Processor 4K memory for user programs). The result was a system called UNICS (UNiplexed Information and Computing Service) which was an 'emasculated Multics'. The first version of Unix was written in the low-level PDP-7 assembler language. Later, a language called TMG was developed for the PDP-7 by R. M. McClure. Using TMG to develop a FORTRAN compiler, Ken Thompson instead ended up developing a compiler for a new high-level language he called B, based on the earlier BCPL language developed by Martin Richard. When the PDP-11 computer arrived at Bell Labs, Dennis Ritchie built on B to create a new language called C. Unix components were later rewritten in C, and finally with the kernel itself in 1973.

Flavors of UNIX Operating System:

The widely used term flavors of UNIX refers to the many Unix-like operating systems that have been developed based on the original UNIX that was written in 1969 by Ken Thompson at Bell Labs.

Many of the proprietary flavors have been designed to run only (or mainly) on proprietary hardware sold by the same company that has developed them. Examples include:

- **AIX** - developed by IBM for use on its mainframe computers
- **BSD/OS** - a commercial version of BSD developed by Wind River for Intel processors
- **HP-UX** - developed by Hewlett-Packard for its HP 9000 series of business servers
- **IRIX** - developed by SGI for applications that use 3-D visualization and virtual reality
- **QNX** - a real time operating system developed by QNX Software Systems primarily for use in embedded systems
- **Solaris** - developed by Sun Microsystems for the SPARC platform and the most widely used proprietary flavor for web servers
- **Tru64** - developed by Compaq for the Alpha processor

Others are developed by groups of volunteers who make them available for free. Among them are:

- **Linux** - the most popular and fastest growing of all the Unix-like operating systems
- **FreeBSD** - the most popular of the BSD systems (all of which are direct descendants of BSD UNIX, which was developed at the University of California at Berkeley)
- **NetBSD** - features the ability to run on more than 50 platforms, ranging from acorn26 to x68k
- **OpenBSD** - may have already attained its goal of becoming the most secure of all computer operating systems
- **Darwin** - the new version of BSD that serves as the core for the Mac OS X

Architecture of UNIX Operating System:

There are several layers in the Unix architecture.Those layers interact between the user and the computer hardware when using UNIX OS.These Layers are as shown in diagram 1
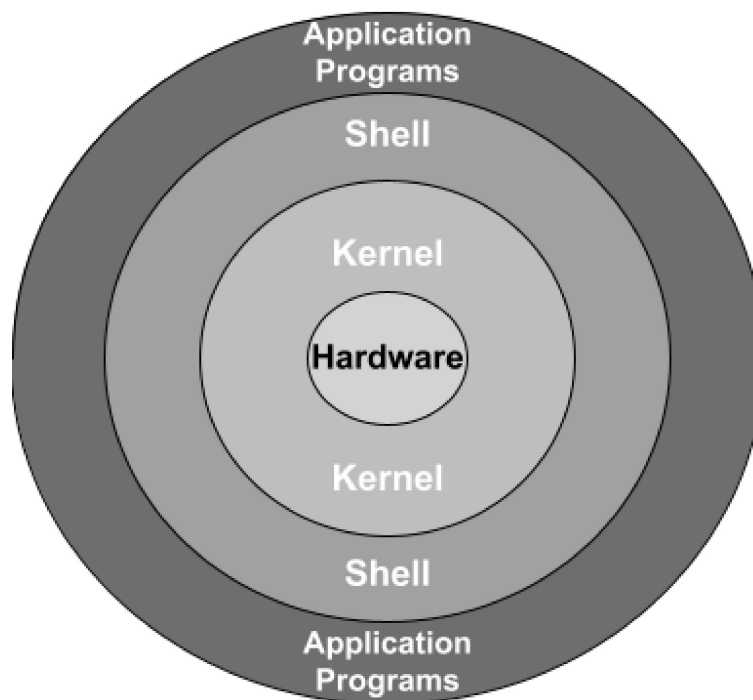
Diagram 1. Architecture of Unix [Source]

Advantages of UNIX Operating System:

1. **Stability**: UNIX is known for its stability and reliability. It can run for long periods of time without requiring a reboot, which makes it ideal for critical systems that need to run continuously.

 2. **Security**: UNIX has a robust security model that includes file permissions, user accounts, and network security features. This makes it a popular choice for systems that require high levels of security.

3. **Scalability**: UNIX can be scaled up to handle large workloads and can be used on a variety of hardware platforms.

4. **Flexibility**: UNIX is highly customizable and can be configured to suit a wide range of needs. It can be used for everything from simple desktop systems to complex server environments. 5. Command-line interface: UNIX's command-line interface allows for powerful and efficient interaction with the system.

Disadvantages of UNIX Operating System:

1. **Complexity**: UNIX can be complex and difficult to learn for users who are used to graphical user interfaces (GUIs).

2. **Cost**: Some UNIX systems can be expensive, especially when compared to open-source alternatives like Linux.

3. **Lack of standardization**: There are many different versions of UNIX, which can make it difficult to ensure compatibility between different systems.

4. **Limited software availability**: Some specialized software may not be available for UNIX systems.

5. **Steep learning curve**: UNIX requires a certain level of technical knowledge and expertise, which can make it challenging for novice users.

References:
[1]https://www.scaler.com/topics/unix-operating-system/

[2]https://www.omnisecu.com/gnu-linux/redhat-certified-engineer-rhce/unix-history.php

[3]https://www.linfo.org/flavors.html

[4]https://www.geeksforgeeks.org/introduction-to-unix-system/

St. Francis Institute of Technology, Mumbai-400 103
Department of Information Technology

A.Y. 2023-2024
Class: SE-ITA/B, Semester: IV

Subject: <u>**UNIX LAB**</u>

Experiment – 1B: Installation of UNIX Operating System (Ubuntu OS).

1. **Aim:** To install Ubuntu Operating System.
2. **Objectives:** After study of this experiment, the student will be able to
   - Understand installation process of Ubuntu OS.
   - Install Ubuntu operating system.
3. **Outcomes:** After study of this experiment, the student will be able to
   - Install Ubuntu OS in a single boot or dual boot mode alongside Windows OS. (L402.4)
4. **Prerequisite:** Introduction to Ubuntu operating system.
1. **Requirements:** Personal Computer, Ubuntu Operating System set-up, Internet Connection.

2. **Pre-Experiment Exercise:**
   Brief Theory:
   UNIX Operating System
   UNIX is an operating system developed at AT&T Bell Laboratories and released in 1973. It is a portable, multitasking, multiuser and time-sharing operating system. UNIX operating systems are widely used in PCs, servers and mobile devices. The UNIX environment was also an essential element in the development of the Internet and networking.
   Ubuntu OS
   The environment in which the agent acts is called as its task environment. The agent's properties can be grouped under PEAS (Performance, Environment, Actuators, Sensors) representation model. PEAS is a type of model on which an AI agent works upon.

3. **Laboratory Exercise**
   A. Procedure
   i.   List down the steps to install Ubuntu OS.
   B. Result/Observation/Installation Screenshots

4. **Post-Experiments Exercise**
   A. Extended Theory: Nil.
   B. Questions:
   1. How to create partitions in Ubuntu while installing?
   C. Conclusion:
   1. Write what was performed in the experiment.
   2. Mention few applications of what was studied.
   3. Write the significance of the topic studied in the experiment.
   D. References:
   1. https://www.geeksforgeeks.org/introduction-to-unix-system/.
   2. https://tutorials.ubuntu.com/tutorial/tutorial-install-ubuntu-desktop#0

Name: Vishal Rajesh Mahajan   Exp: 1 B

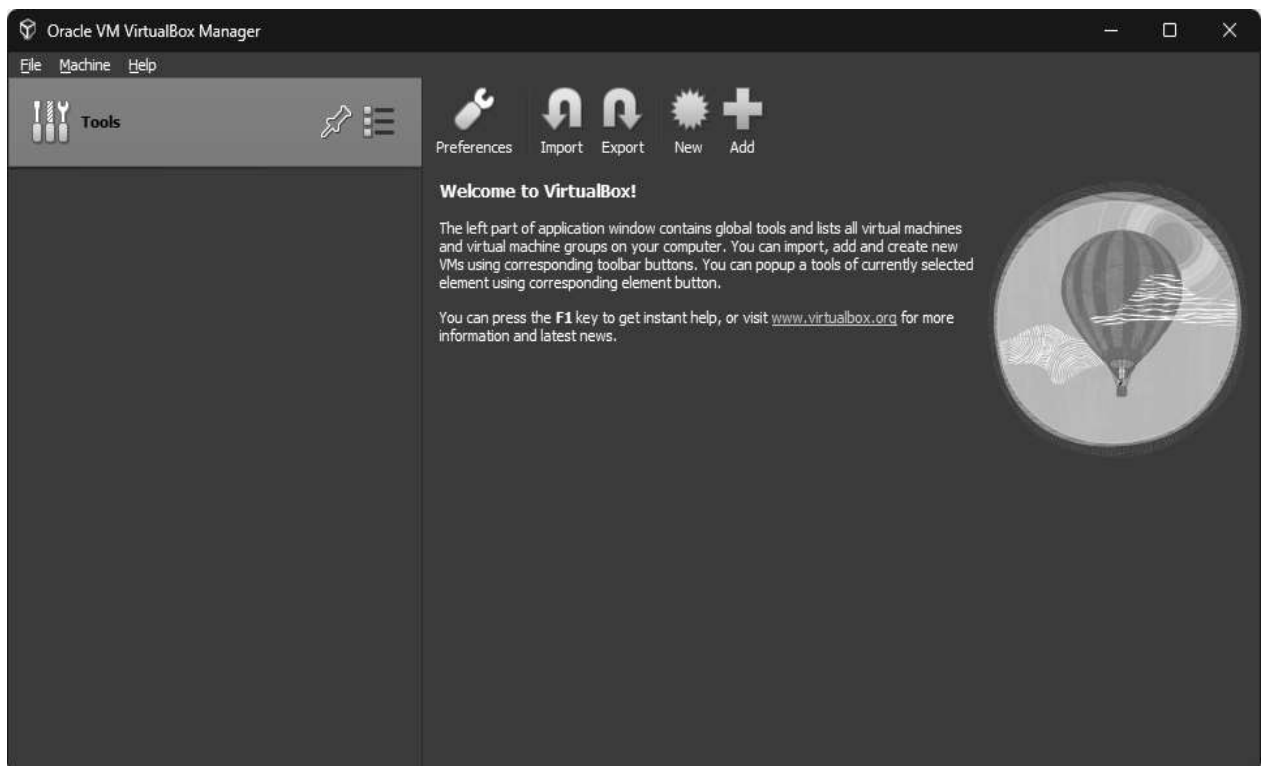Class: SE IT A   Roll No: 63

Experiment -1B:Installation of UNIX Operating System(Ubuntu OS)

Step 1.Downloaded Virtual Box and Ubuntu from their Respective Website.
(https://www.virtualbox.org/wiki/Downloads)
(https://ubuntu.com/download/desktop)

Step 2. Installed and Opened Virtual Box

Step 3: Pressed New and Added Details (Name : Desired Name, Folder: Path where Virtual Machine is installed,ISO Image: Downloaded Ubutnu ISO File)
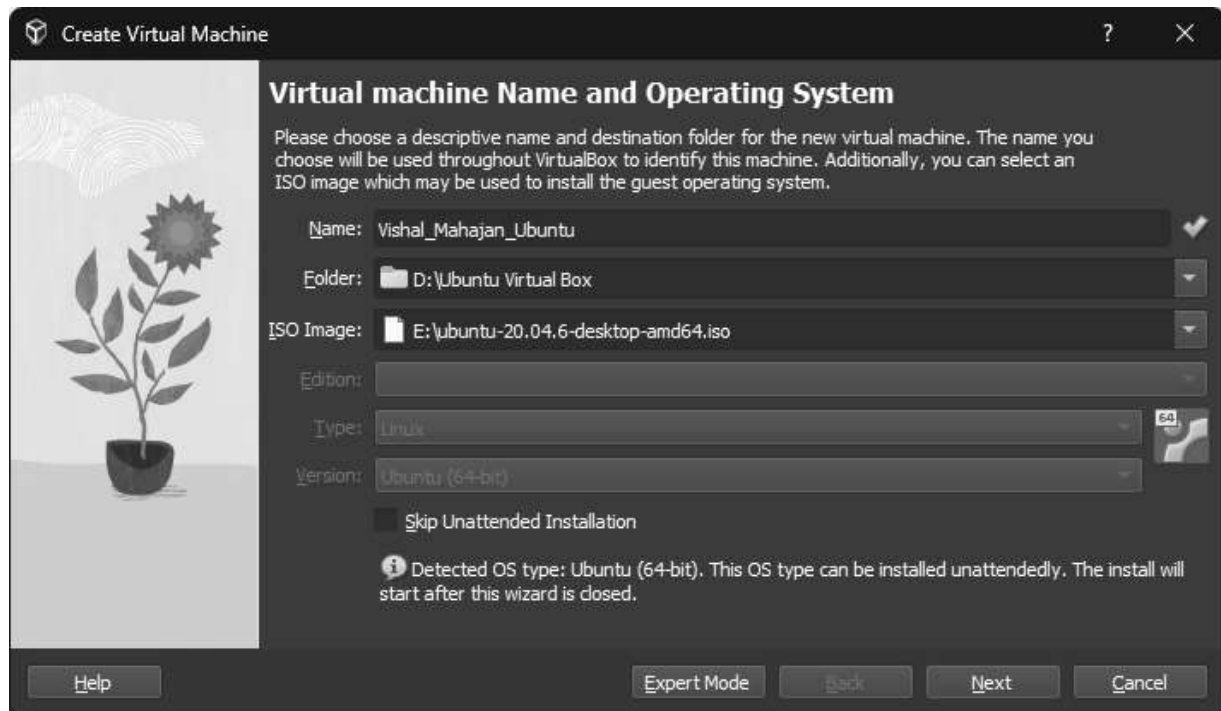
Step 4: Filled username and Password. Also Updated Hostname.

2

Step 5 : Allocated RAM and CPU as per laptop and requirement
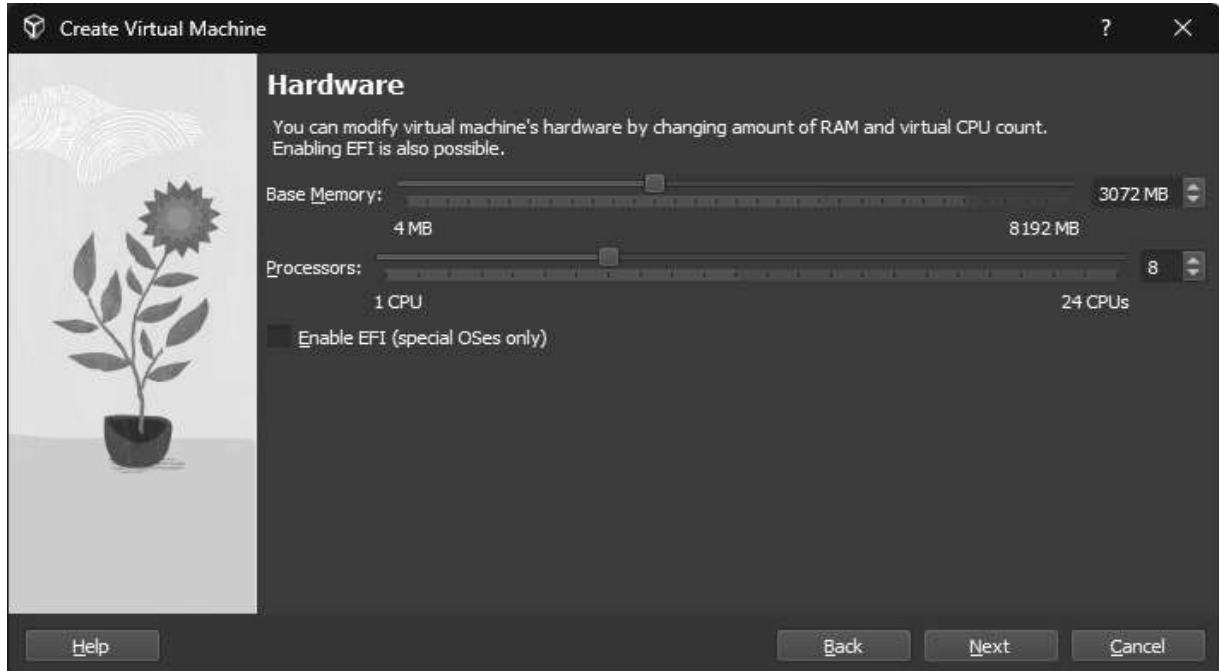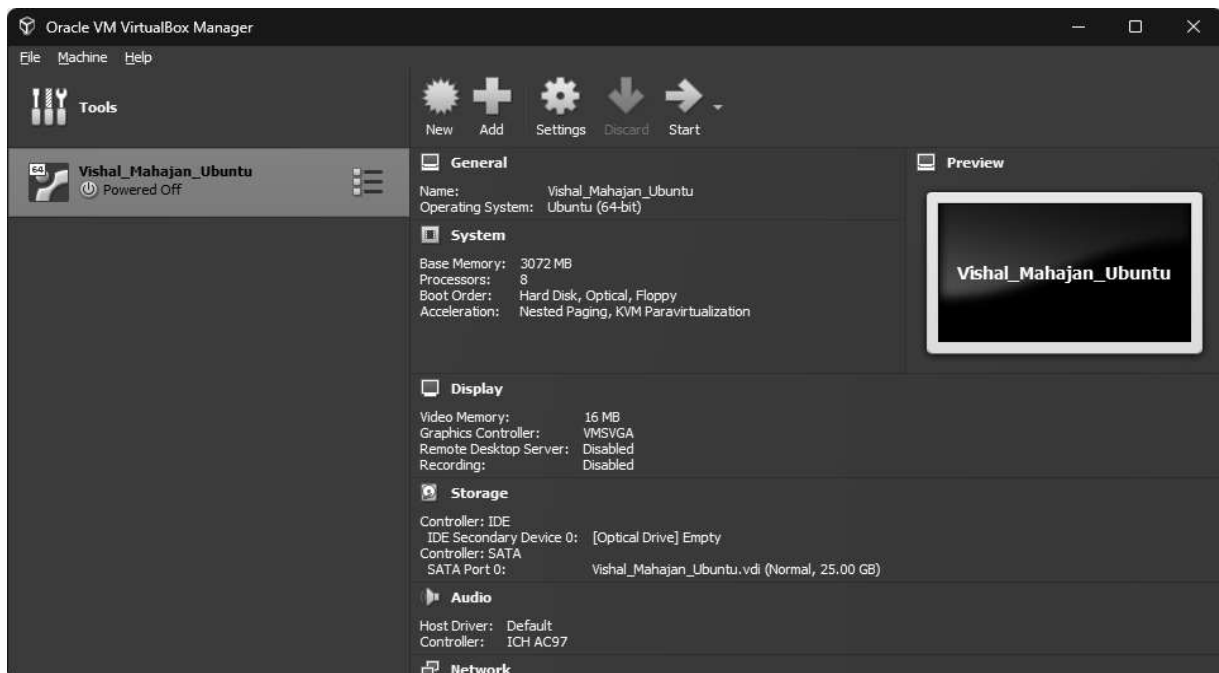

Step 6: Added a virtual hard disk by creating a new one

3

Step 7 : Finished the Process of Creating Virtual Machine
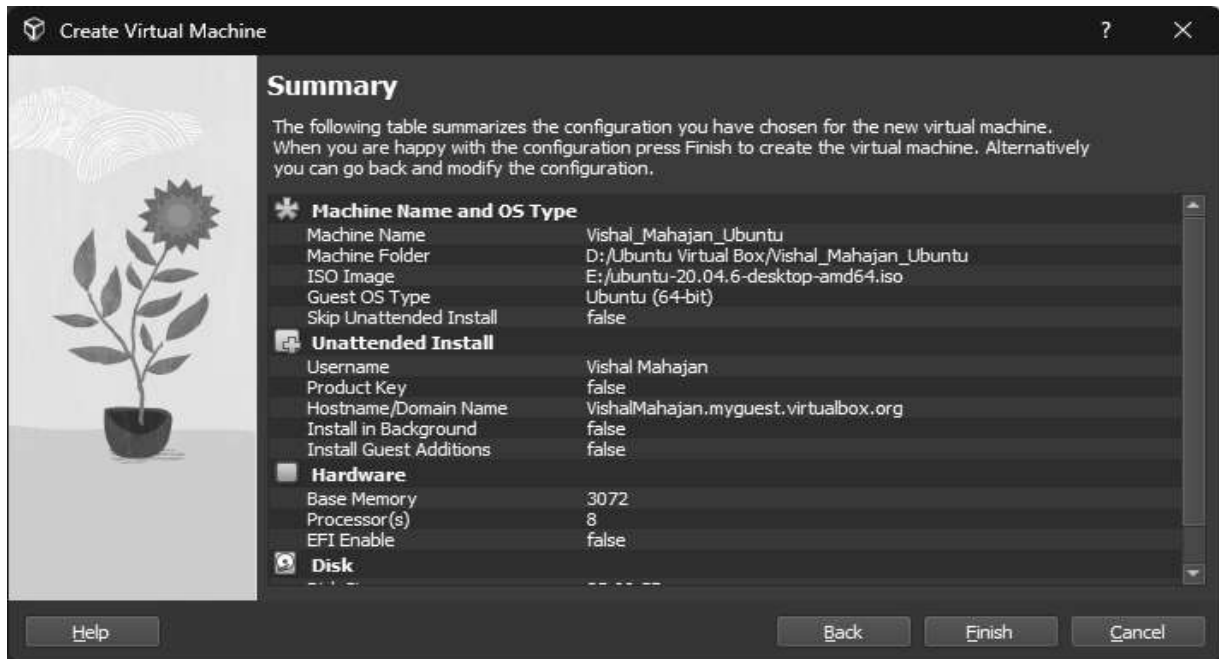
Step 8: Started the Virtual Machine.

Step 9:Created Username and Password for the Ubuntu operating system.
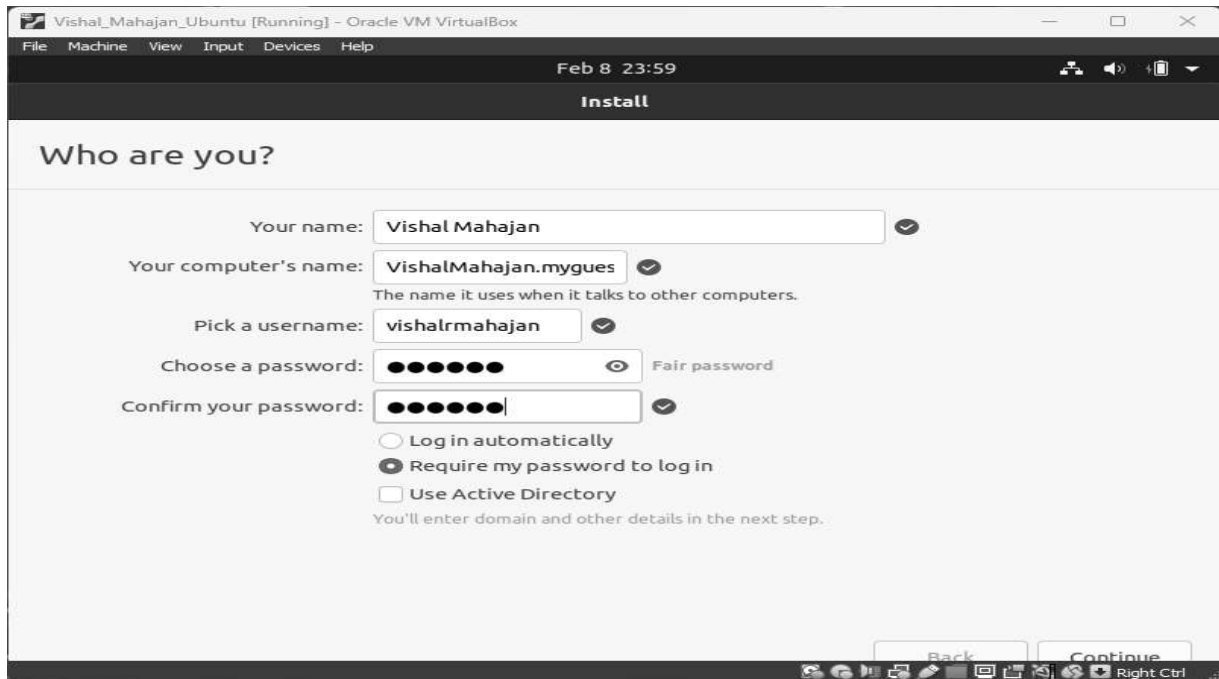
Step 10 : Started the installation process of Ubuntu on the virtual machine.

Step 11: Entered the password to log in to the Ubuntu operating system after completing the installation process on the virtual machine.

Step 12: Completed the installation process of Ubuntu on the virtual machine.