S.B. JAIN INSTITUTE OF TECHNOLOGY MANAGEMENT & RESEARCH, NAGPUR

Practical 1
Prelab

Aim: Installation of Linux Operating System.

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❖ **Aim:** Installation of Linux Operating System.

❖ **Objectives:**

1. Understand the system requirements and compatibility for Linux OS installation.
2. Learn the step-by-step process to install and configure a Linux distribution.
3. Verify the installation and explore basic Linux commands for system setup.

❖ **Requirements:**

1. A bootable USB drive or DVD with the desired Linux distribution (e.g., Ubuntu, Fedora, Debian).
2. A computer system with minimum hardware requirements: 2 GB RAM, 20 GB free disk space, and a compatible processor.
3. Internet connection (optional, for updates during installation).
4. Software for creating a bootable USB, like Rufus or Etcher (if needed).
5. Basic knowledge of BIOS/UEFI settings for boot sequence configuration.

*****IN THIS PRACTICAL WE'LL BE INSTALLING UBUNTU*****

Prerequisite:

Linux is an open-source operating system widely used for personal, professional, and server environments. Its flexibility, security, and community-driven development make it a popular choice for users. The installation of a Linux OS involves creating a bootable medium, setting up the system to boot from the medium, and following the installation wizard to partition the disk and configure system settings. Common distributions like Ubuntu, Fedora, and Debian offer user-friendly interfaces for easy installation. The process may include creating swap space, selecting a file system like ext4, and setting up user accounts. Post-installation tasks involve updating the system, installing necessary drivers, and customizing the environment. Understanding the installation process ensures better control over system performance and resource allocation, making Linux a powerful tool for both beginners and advanced users.

Steps to Make a Pendrive Bootable Using Rufus:

1. **Download and Open Rufus**: Download Rufus from its official website, install it, and launch the application.
2. **Insert Pendrive and Select ISO**: Connect the USB pendrive to your system. In Rufus, select your pendrive under "Device" and click "SELECT" to choose the Linux ISO file.
3. **Set Partition Scheme and File System**: Choose "GPT" for UEFI or "MBR" for BIOS under "Partition scheme," and ensure the file system is set to "FAT32."

4. **Start the Process**: Click "START," confirm the warning about data deletion, and wait for Rufus to create the bootable USB. Once done, eject the pendrive safely.

❖ Theory :

An Operating System (OS) is an important system software that manages computer hardware and software resources. It acts as a bridge between the user and the computer hardware. The OS controls all basic operations of the computer and provides a reliable platform for running application programs. Without an operating system, a computer cannot work efficiently or securely.

Functions of an Operating System

1. Process Management
The operating system controls the execution of processes in the system. It creates, schedules, and terminates processes and decides which process gets CPU time. This helps in smooth multitasking and better system performance.

2. Memory Management
The OS manages the main memory by allocating memory to programs when needed and freeing it after use. It keeps track of used and unused memory and prevents programs from accessing each other's memory. Virtual memory is also supported to improve memory usage.

3. File System Management
The operating system organizes and manages data stored on storage devices. It allows users to create, open, read, write, and delete files. It also maintains file security, permissions, and proper data organization using directories.

4. Device Management
The OS manages all hardware devices connected to the system through device drivers. It controls input and output operations of devices such as keyboard, mouse, printer, and hard disk, ensuring smooth communication between hardware and software.

5. Security and Protection
Security is an important responsibility of the operating system. It protects system data and resources using passwords, user authentication, access rights, and encryption techniques to prevent unauthorized access.

6. User Interface Management
The operating system provides a way for users to interact with the computer. This can be through a Command Line Interface (CLI) or a Graphical User Interface (GUI), making the system easy to use.

Types of Operating Systems

1. Batch Operating System
Processes jobs in groups without direct user interaction. It is commonly used in systems that handle large amounts of data.

2. Time-Sharing Operating System
Allows many users to use the computer at the same time by sharing CPU time. Each user gets a quick response from the system.

3. Distributed Operating System

Runs on multiple connected computers and treats them as one system. It improves performance, reliability, and resource sharing.

4.Real-Time Operating System (RTOS)

Used in systems where quick and accurate responses are required within a fixed time limit, such as in medical equipment and industrial machines.

5.Mobile Operating System

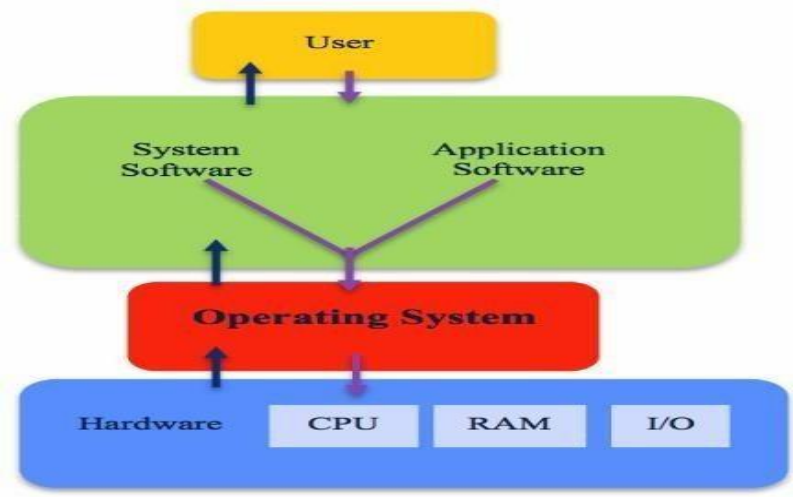
Designed for smartphones and tablets. It supports touch screens, battery optimization, and wireless communication. Examples include Android and iOS.

Examples of Operating Systems

Commonly used operating systems include Windows, Linux, and macOS.

Windows is one of the most popular operating systems for both home and workplace use because of its user-friendly interface and wide compatibility with software applications.

- **Linux** is an open-source operating system valued for its strong security, adaptability, and frequent use in servers and embedded devices.
- **macOS** is known for its reliability, high performance, and smooth integration with Apple's hardware ecosystem.

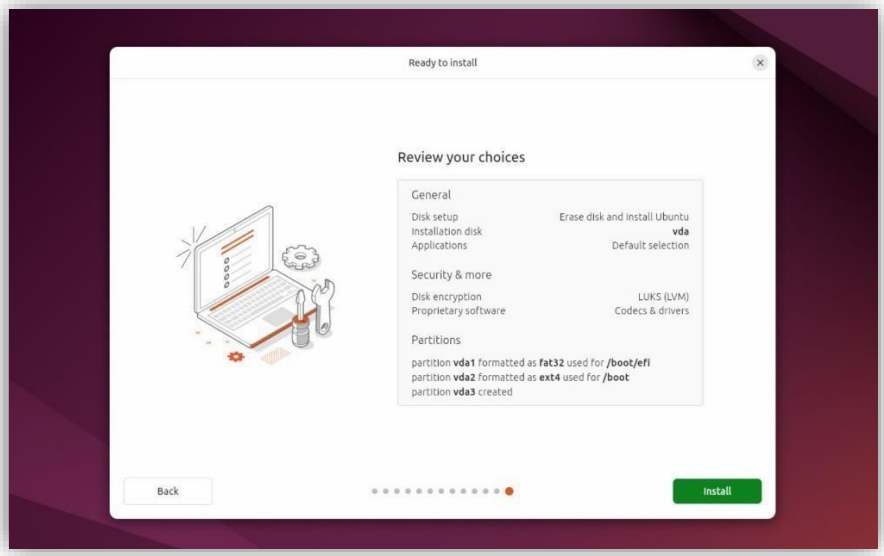


❖ Steps to Install Linux Operating System:

1. **Prepare Bootable Media**: Use a tool like Rufus to create a bootable USB drive or DVD with the Linux distribution ISO.

2. **Configure BIOS/UEFI Settings**: Restart your computer and access the BIOS/UEFI settings (usually by pressing a key like F2, F10, or DEL during boot). Set the boot priority to USB or DVD.

3. **Boot from Media**: Insert the bootable USB or DVD and restart the computer. The system will boot into the Linux installer.
4. **Choose Installation Option**: Select "Install Linux" or a similar option from the menu. Some distributions may allow you to try the OS before installation.
5. **Partition the Disk**:
   - Select the partition scheme (automatic or manual).
   - Create required partitions (e.g., root `/`, swap, and optionally `/home`).
6. **Set Up User Details**: Enter your username, password, and system name.
7. **Select Time Zone**: Choose your location to configure the correct time and date settings.
8. **Begin Installation**: Review the settings and click "Install." The process will take a few minutes to complete.



9. **Remove Bootable Media**: Once installation is finished, remove the USB or DVD when prompted and restart the system.

10. **Post-Installation Configuration**: Log in to your new Linux system, update packages, and install additional software if needed.

Commands to update:

Command	Use
sudo apt update	Fetches the latest information about available packages and versions.
sudo apt upgrade	Installs the latest versions of all currently installed packages.
sudo apt full-upgrade	Upgrades packages, adding or removing dependencies as required.
sudo apt autoremove	Removes unnecessary packages no longer needed as dependencies.
sudo reboot	Restarts the system to apply critical updates if required.

- **Conclusion:** The successful deployment of the Linux operating system confirms that a customized, high-performance environment can be achieved through manual configuration. This installation not only optimizes system performance but also equips the user with the troubleshooting skills necessary for effective systems administration and long-term OS maintenance."

- **References**:

https://ubuntu.com/tutorials/install-ubuntu-desktop#1-overview ***https://youtu.be/wjbbl0TTMeo?si=32l6h8VbcmU-euD https://answers.microsoft.com/ https://rufus.ie/en/***

Discussion Questions:

1. **What is an operating system, and why is it important?**
2. **What is the purpose of creating a bootable USB, and how is it done?**
3. **Can you explain the difference between apt update and apt upgrade in Ubuntu?**
4. **Why is partitioning necessary during OS installation, and what are the common partitions used?**
5. **What steps should you follow after successfully installing a Linux OS?**

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