**4ITRC2 Operating System Lab**

# Lab Assignment 1 Study of Ubuntu OS

**1. Introduction**

**What is Linux?**

Linux is an open-source, Unix-like operating system kernel developed by Linus Torvalds in 1991. It serves as the foundation for various operating systems, collectively called Linux distributions (distros). Due to its flexibility, security, and robustness, Linux is widely used in servers, embedded systems, and personal computing.

**What is Ubuntu?**

Ubuntu is one of the most popular Linux distributions, developed and maintained by **Canonical Ltd.** It is designed to be user-friendly while maintaining the power and security of Linux. Ubuntu is based on **Debian** and is widely used for personal computing, cloud computing, and server management.

**History and Versions of Ubuntu**

Ubuntu was first released in **October 2004** as a free and open-source OS, with the goal of providing a stable and easy-to-use Linux-based system. It follows a **six-month release cycle**, with **Long-Term Support (LTS) versions** released every two years, receiving updates for five years.

Some notable versions include:

* **Ubuntu 4.10 (Warty Warthog)** – The first release (2004).
* **Ubuntu 10.04 LTS (Lucid Lynx)** – A major long-term release that improved stability.
* **Ubuntu 16.04 LTS (Xenial Xerus)** – Introduced the Snap package system.
* **Ubuntu 20.04 LTS (Focal Fossa)** – Improved UI and system performance.
* **Ubuntu 22.04 LTS (Jammy Jellyfish)** – Latest LTS version with enhanced Wayland support and GNOME improvements.

Ubuntu comes in different flavors, including **Ubuntu Desktop**, **Ubuntu Server**, **Kubuntu** (with KDE), and **Xubuntu** (with XFCE).

**2. Features of Ubuntu**

1. **Open Source and Free**  
   Ubuntu is completely free to use, modify, and distribute, making it an ideal choice for personal and professional use.
2. **Regular Updates & LTS Versions**  
   Ubuntu releases updates frequently, ensuring security, performance, and software enhancements. The **LTS (Long-Term Support)** versions provide stable and reliable updates for extended periods.
3. **User-Friendly Interface**  
   The **GNOME desktop environment** (default in Ubuntu Desktop) provides an intuitive and visually appealing interface, making it easier for Windows users to adapt.
4. **Secure & Stable**  
   Ubuntu is less prone to viruses and malware compared to Windows, as it has better security features, including **AppArmor, firewall, and permission-based access control**.
5. **Lightweight & Performance Efficient**  
   Unlike Windows, Ubuntu does not require high-end hardware and runs efficiently even on older machines.
6. **Customizability**  
   Ubuntu allows users to change themes, icons, and even desktop environments (like KDE, XFCE, etc.), offering a high level of customization.
7. **Pre-installed Essential Software**  
   Ubuntu comes with **LibreOffice, Firefox, Thunderbird, and other essential applications**, reducing the need for additional installations.
8. **Powerful Command Line Interface (CLI)**  
   The **Terminal** in Ubuntu allows advanced users to perform tasks efficiently using command-line tools.
9. **Support for Development & Programming**  
   Ubuntu is widely used for programming as it supports multiple languages (Python, Java, C, C++, etc.) and development tools like **VS Code, Git, and Docker**.
10. **Great Community Support**  
    Being open-source, Ubuntu has a strong community that provides solutions, troubleshooting guides, and software support.

**3. Difference Between Ubuntu and Windows OS**

While both Ubuntu and Windows are operating systems, they have fundamental differences in their design, functionality, and user experience.

**1. User Interface & Customization**

Ubuntu offers a **customizable** user interface through different desktop environments like **GNOME, KDE, XFCE**, while Windows has a **fixed** UI with limited customization.

**2. File System**

Ubuntu uses **EXT4, XFS, or Btrfs** as its file system, whereas Windows uses **NTFS and FAT32**. Ubuntu’s file system is more efficient in handling large amounts of data and provides better recovery options.

**3. Security**

Ubuntu is **more secure** due to its permission-based system and lower susceptibility to malware. Windows, being widely used, is often targeted by viruses and requires antivirus software.

**4. Software Management**

Ubuntu uses **APT (Advanced Package Tool)** and **Snap** to install applications via the Terminal or GUI (Ubuntu Software Center). Windows uses **EXE, MSI**, and the **Microsoft Store**.

**5. Cost**

Ubuntu is **free and open-source**, whereas Windows is a **paid** operating system requiring a license.

**6. Performance & System Requirements**

Ubuntu runs efficiently on older hardware, while Windows requires **higher system resources** to function smoothly.

**7. Gaming & Software Compatibility**

Windows has better support for **gaming and commercial software** (Adobe Photoshop, MS Office, etc.), while Ubuntu is preferred for **development and server-related tasks**.

**8. Updates & Stability**

Ubuntu receives **regular, stable updates** without forced restarts, whereas Windows updates can sometimes disrupt workflows.

**9. Community & Support**

Ubuntu has a **large open-source community** providing free support, whereas Windows relies on Microsoft’s official support and paid services.

**Conclusion**

Ubuntu is a powerful, secure, and free alternative to Windows. It is an excellent choice for developers, system administrators, and users who prefer a **customizable, stable, and lightweight OS**. While Windows is dominant in gaming and enterprise applications, Ubuntu excels in **security, flexibility, and performance**, making it a strong contender in the OS ecosystem.