**LAB ASSIGNMENT 1**

**INTRODUCTION TO UBUNTU AND LINUX**

Linux is an open-source, Unix-like operating system kernel that serves as the foundation for various distributions (distros). It was created by Linus Torvalds in 1991 and is widely used in servers, embedded systems, and personal computers due to its stability, security, and flexibility. Unlike proprietary operating systems, Linux allows users to modify and distribute the source code freely, making it a favorite among developers and enterprises.

Ubuntu, developed by Canonical Ltd., is one of the most popular Linux distributions. Launched in 2004, it is based on Debian and is designed to be user-friendly, making it ideal for beginners and professionals alike. Ubuntu is widely used in cloud computing, software development, and ethical hacking. It comes in different versions, including Ubuntu Desktop for personal use, Ubuntu Server for enterprise applications, and Ubuntu Core for IoT devices.

**HISTORY OF LINUX AND UBUNTU**

**Linux History**

Linux was created in 1991 by Linus Torvalds, a Finnish computer science student, as an alternative to the proprietary Unix operating system. Initially, it was just a kernel (the core part of an OS), but with contributions from developers worldwide, it grew into a complete operating system. Today, Linux powers servers, supercomputers, smartphones (Android), IoT devices, and even gaming consoles.

**Ubuntu History**

Ubuntu was first released in 2004 by Canonical Ltd., founded by Mark Shuttleworth. It was built on Debian, one of the oldest Linux distributions, with a focus on user-friendliness and accessibility. The name "Ubuntu" comes from a South African philosophy meaning "humanity to others", reflecting its open-source and community-driven nature. Over the years, Ubuntu has become one of the most widely used Linux distributions, particularly in desktop computing, cloud computing, and AI development.

**VERSIONS OF LINUX AND UBUNTU**

**Linux Versions (Distributions)**

Linux is available in many different distributions (distros), each catering to specific needs:

* Debian – A stable and community-driven distro, forming the base of Ubuntu.
* Ubuntu – User-friendly, widely used in desktops and servers.
* Fedora – Cutting-edge features, supported by Red Hat.
* CentOS / Rocky Linux – Enterprise-level, focused on stability.
* Arch Linux – Lightweight and customizable for advanced users.
* Kali Linux – Designed for cybersecurity and penetration testing.

**Ubuntu Versions**

Ubuntu follows a biannual release cycle, with new versions released every April and October.

1. LTS (Long-Term Support) Releases – Supported for 5 years, used in enterprises (e.g., Ubuntu 20.04 LTS, Ubuntu 22.04 LTS).
2. Regular Releases – Supported for 9 months, mainly for users who want the latest features (e.g., Ubuntu 23.10).

**FEATURES OF UBUNTU**

Ubuntu is a free, open-source, and user-friendly Linux distribution known for its security, stability, and versatility. It is widely used for personal computing, servers, cloud environments, and AI development. Here are some key features that make Ubuntu a popular choice:

1. Free and Open Source

* Ubuntu is completely free to use, modify, and distribute.
* Developed and maintained by Canonical Ltd. with strong community support.

2. User-Friendly Interface

* Uses GNOME Desktop Environment (default), providing a modern and intuitive UI.
* Available in other flavors like Kubuntu (KDE), Xubuntu (XFCE), and Ubuntu MATE for different user preferences.

3. High Security

* Built-in firewall and security updates for protection.
* No need for antivirus due to Linux’s strong security model.
* AppArmor & SELinux provide additional security layers.

4. Stability and Performance

* Ubuntu is highly stable, making it suitable for long-term use.
* Regular Long-Term Support (LTS) versions ensure reliability.
* Uses lightweight resource management, making it faster than Windows on old hardware.

5. Vast Software Repository

* Comes with essential apps like Firefox, LibreOffice, Thunderbird, and VLC pre-installed.
* Supports Snap, APT, and Flatpak package management systems.
* Software can be installed easily via the Ubuntu Software Center or terminal.

**DIFFERENCE BETWEEN WINDOWS OS AND UBUNTU**

Difference Between Ubuntu and Windows OS

Ubuntu and Windows are two popular operating systems, but they differ significantly in terms of architecture, usability, security, and cost. Here's a detailed comparison:

| Feature | Ubuntu (Linux-based) | Windows OS |
| --- | --- | --- |
| Developer | Canonical Ltd. (open-source) | Microsoft (proprietary) |
| License | Free & Open Source (GPL) | Paid & Proprietary |
| User Interface | Uses GNOME (default), customizable (KDE, XFCE, etc.) | Uses Windows UI, with less customization |
| Security | Highly secure, requires admin privileges for changes, no need for antivirus | More vulnerable to malware & viruses, requires antivirus |
| Performance | Faster & lightweight, low resource usage, runs smoothly on old hardware | Heavier, requires more RAM & storage, slower on old PCs |
| Software Support | Uses APT, Snap, Flatpak for software installation, supports most open-source apps | Supports .exe & .msi files, compatible with most commercial software |
| Gaming | Limited game support, relies on Steam Proton & Wine for Windows games | Best for gaming, supports DirectX, NVIDIA/AMD drivers |
| Hardware Compatibility | May require manual driver installation, not all printers/scanners work by default | Works out-of-the-box with most hardware |
| Customization | Highly customizable (UI, themes, desktop environments) | Limited UI customization |
| Command-Line | Powerful Terminal with Bash, scripting-friendly | Command Prompt (CMD) & PowerShell, but less powerful |
| Updates & Stability | Regular updates, LTS (Long-Term Support) versions are stable | Frequent updates, Windows Updates can be forced & cause issues |
| Usage | Best for developers, programmers, servers, cloud computing | Best for general users, gaming, office work |