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Operating System Assignment: I

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# Aim of assignment

To install and study Ubuntu OS.

# To Perform

Install VMware or Virtual Box and Ubuntu over Windows OS.

# To Submit

## Introduction (in brief about Linux and Ubuntu, its versions + some history)

Linux is an open-source operating system kernel created by Linus Torvalds in 1991 while he was a student at the University of Helsinki. What started as a personal project has grown into one of the most widely used operating system foundations in the world. Unlike Windows or macOS, Linux is free to use and modify, which has led to countless distributions (or distros) being developed for different purposes.

Ubuntu is one of the most popular Linux distributions, developed by Canonical Ltd. The name "Ubuntu" comes from an African philosophy that roughly translates to "humanity towards others" or "I am what I am because of who we all are." This philosophy is reflected in Ubuntu's focus on usability and accessibility for all users, regardless of technical background.

### A Brief History of Linux and Ubuntu

Linux was created when Torvalds wanted an operating system that could take full advantage of the new Intel 386 processor, but did not want to pay for UNIX. He announced his project on a newsgroup on August 25, 1991, saying: "I'm doing a (free) operating system (just a hobby, won't be big and professional like GNU) for 386(486) AT clones." This hobby of his now powers everything from smartphones (Android is built on Linux) to supercomputers, servers, and even the International Space Station.

A key parameter to Linux's success was Torvalds' decision to release it under the GNU General Public License (GPL), which allowed anyone to modify and distribute the code, if they also released their modifications under the same license. This created a collaborative development model that is still going strong today.

Before Ubuntu, it was said that Linux was complicated and only for tech experts. Ubuntu changed that perception by focusing on user-friendliness. Released in October 2004, Ubuntu aimed to make Linux accessible to everyday users.

The first time I booted Ubuntu; I was genuinely surprised by its sleek interface and how it recognized most of my laptop’s hardware automatically. This focus on user experience is what has made Ubuntu one of the most popular Linux distributions for beginners.

### New concept of desktop environments

In Windows, the user interface is fixed, but in Linux, you can choose different desktop environments that completely change how you interact with your computer. Ubuntu's default desktop environment is GNOME, which offers a clean, modern interface. However, there are official Ubuntu variants with different desktop environments:

* Kubuntu (KDE Plasma)
* Xubuntu (Xfce)
* Lubuntu (LXQt)
* Ubuntu MATE
* Ubuntu Budgie

### Ubuntu Versions and Release Cycle

Ubuntu follows a predictable release schedule with version numbers based on the year and month of release:

* Regular releases come out every 6 months (in April and October)
* Version numbers follow the format YY.MM (e.g., Ubuntu 24.04 was released in April 2024)
* Every two years, a Long-Term Support (LTS) version is released, which receives updates for 5 years

Some significant Ubuntu versions include:

* Ubuntu 4.10 (Warty Warthog) - The first release in 2004
* Ubuntu 10.04 LTS (Lucid Lynx) - A major milestone that significantly improved the user interface
* Ubuntu 16.04 LTS (Xenial Xerus) - Introduced the controversial Unity desktop environment
* Ubuntu 18.04 LTS (Bionic Beaver) - Switched back to GNOME as the default desktop environment
* Ubuntu 20.04 LTS (Focal Fossa) - Refined the GNOME experience with performance improvements
* Ubuntu 22.04 LTS (Jammy Jellyfish) - The most recent LTS release with updated software and security features
* Ubuntu 24.04 LTS (Noble Numbat) - The newest LTS release (as of early 2025)

Each version of Ubuntu also has an alliterative animal codename, which adds a bit of fun to the otherwise technical world of operating systems.

## Features of Ubuntu

Coming from Windows, I found several aspects of Ubuntu that stood out as particularly impressive and practical for use.

### User-Friendly Interface

Ubuntu's GNOME desktop environment provides a clean, intuitive interface that was surprisingly easy to navigate. The Activities overview gives a quick way to see all open applications and search for programs or files. The dock on the left side provides quick access to favorite applications, like the Windows taskbar but with a more modern feel.

### Software Center

Unlike Windows where one had to search the internet for software installers (plus often worrying about downloading malware), Ubuntu's Software Center provides a centralized, secure place to find and install thousands of free applications. The software is organized by categories, and user ratings help identify the best options.

### Terminal

While initially intimidating, the Terminal quickly became one of my favorite features. I also learned that many advanced system tasks are much easier through Terminal than trying to navigate through configuration menus.

### Package Management

Ubuntu's APT (Advanced Package Tool) system handles software installation, updates, and dependencies automatically. This means a person no longer must worry about manually updating each application or hunting down required components. The update manager regularly notifies the user about available updates, and a single click keeps the entire system current and secure.

### Workspaces

The virtual workspaces feature allowed me to organize open applications across multiple screens that I can quickly switch between. This has dramatically improved my productivity when working on multiple projects simultaneously, keeping related applications grouped together and reducing clutter.

### Snap Packages

Ubuntu includes support for Snap packages, which are self-contained software packages that include all necessary dependencies. This means applications install cleanly and run consistently regardless of my system configuration. Snap applications are particularly useful for getting the latest versions of software that might not be in the standard repositories.

### System Performance

One of the most noticeable features when I first installed Ubuntu was how responsive it felt compared to Windows on the same hardware. The system boots quickly, applications launch faster, and the overall experience feels more fluid. The resource efficiency means my computer's fan rarely kicks into high speed, and battery life has improved on my laptop.

### Security Features

Ubuntu's security model is impressive. The system requires administrator privileges for any significant changes, preventing accidental or malicious system modifications. The built-in firewall (UFW) provides additional protection, and the system rarely requires reboots after updates, unlike my experience with Windows.

### Customization Options

While the default Ubuntu configuration works well, I discovered I could customize almost every aspect of the system. From changing themes and icon sets to modifying keyboard shortcuts and gestures, Ubuntu lets me create a personalized computing environment that works the way I think.

### File System Structure

The Linux file system at first confused me with its hierarchy of directories like /home, /etc, and /usr, but I've come to appreciate its logical organization. My personal files stay in the /home directory, system configuration is in /etc, and installed software goes in standardized locations. This separation makes backup and system maintenance more straightforward than I was used to.

### Compatibility and Interoperability

Ubuntu works well with files from other operating systems. I can access my Windows NTFS drives, read and write Microsoft Office documents using LibreOffice, and even run some Windows applications through Wine or PlayOnLinux. The system also connects easily to network shares, printers, and other devices.

The learning curve was gentler than I expected, and the benefits in terms of performance, security, and control have made the transition to Ubuntu worthwhile.

## Difference Between Ubuntu and Windows OS

The key points of difference between Ubuntu and Windows OS are:

### Licensing and Cost

Ubuntu is completely free, while Windows requires purchasing a license. This was a significant advantage for me as a student on budget. Not only is the operating system itself free, but most software for Ubuntu is also free and open source, saving me money on software licenses.

### User Interface

Coming from Windows, Ubuntu's interface initially felt different but not difficult to learn:

* Windows has the Start menu in the bottom left, while Ubuntu has the Activities overview in the top left
* Ubuntu uses a dock on the left side instead of a taskbar at the bottom
* Windows uses File Explorer, while Ubuntu uses Files
* Ubuntu's interface feels more customizable right from the start

### Software Installation

This was one of the biggest changes for me:

* In Windows, I used to download .exe files from various websites and run installation wizards
* In Ubuntu, I mostly use the Software Center or Terminal commands
* Ubuntu's centralized repository system means I do not need to hunt for software on different websites
* Software updates happen system-wide rather than each application updating itself separately

### System Requirements

* Ubuntu runs smoothly on hardware that Windows 10/11 considers below minimum requirements
* My system boots faster and applications launch more quickly on Ubuntu
* Ubuntu uses less RAM and CPU resources for basic operations
* Battery life improved noticeably after switching

### File System Structure

The file system organization took me some time to understand:

* Windows uses drive letters (C:, D:, etc.) while Ubuntu uses a unified file hierarchy
* In Ubuntu, everything stems from the root directory (/) with standardized subdirectories
* Windows stores user data in C:\Users\[username], while Ubuntu uses /home/[username]
* File permissions are more explicit and stricter in Ubuntu

### Security Model

Security works differently between the two systems:

* Windows relies heavily on antivirus software, while Ubuntu rarely needs it
* Ubuntu's permission model prevents accidental system changes
* Windows updates often require reboots, while Ubuntu rarely needs to restart
* Ubuntu separates user applications from system files more strictly
* Windows is a much larger target for malware due to market share

### Customization

The level of customization possible was eye-opening:

* Windows allows changing wallpapers, colors, and some interface elements
* Ubuntu lets me change almost everything: desktop environments, themes, icons, behaviors
* I can modify system components that would be locked in Windows
* Ubuntu does not push back against customization like Windows sometimes does

### Software Compatibility

This is where I faced some challenges:

* Windows has better support for commercial software like Adobe Creative Suite
* Many games are designed primarily for Windows
* Ubuntu has alternatives for most software, but they sometimes work differently
* Some specialized hardware lacks proper Ubuntu drivers
* Ubuntu runs many Windows applications through compatibility layers like Wine, but performance varies

### Terminal vs. GUI

The command line is far more powerful and central in Ubuntu:

* Windows focuses on graphical interfaces for most tasks
* Ubuntu's Terminal provides efficient ways to perform system operations
* Many advanced features in Ubuntu are easier to access via Terminal commands
* I found learning basic Terminal commands made me more productive

### Privacy

I noticed significant differences in privacy approaches:

* Windows collects telemetry data by default
* Ubuntu has minimal data collection (and it is optional)
* Windows integrates advertising in the Start menu and built-in apps
* Ubuntu does not push online services or accounts as aggressively

### Support and Troubleshooting

When problems arise, the support experience differs dramatically:

* Windows has official Microsoft support channels
* Ubuntu relies on community forums, documentation, and volunteer help
* Troubleshooting Ubuntu often involves learning more about how the system works
* Windows troubleshooting frequently leads to generic solutions like restarting