SCHOOL LOGO

A COMPREHENSIVE STUDY OF OPERATING SYSTEMS

Windows, macOS, Linux, and Unix

Prepared for Academic Submission

Acknowledgement

I would like to express my sincere gratitude to my teacher for providing guidance and encouragement throughout the preparation of this assignment. I am also thankful to my school for offering the necessary learning environment and resources. This project has helped me gain a deeper understanding of operating systems and their importance in modern computing.

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1. Introduction

An operating system (OS) is system software that manages computer hardware, software resources, and provides common services for computer programs. It acts as an intermediary between users and the hardware, ensuring efficient execution of tasks. Operating systems have evolved over decades, adapting to changes in hardware, user needs, and technological advancement. This document provides an in-depth study of four major operating systems: Windows, macOS, Linux, and Unix.

2. Microsoft Windows Operating System

History and Development: Microsoft Windows was developed by Microsoft Corporation, founded by Bill Gates and Paul Allen. Windows 1.0 was released in 1985 as a graphical interface over MS-DOS. Major versions include Windows 95, XP, 7, 10, and 11, each improving multitasking, security, and usability.

File System and File Distribution: Windows mainly uses NTFS, supporting file permissions, encryption, and large storage capacities. Files are organized using drive letters and hierarchical folders.

Hardware Requirements: Windows requires x86/x64 processors, 2GB–8GB RAM depending on version, and sufficient disk space.

General and Specific Uses: Generally used in homes, schools, and offices. Specifically used for gaming, enterprise systems, engineering applications, and general productivity.

3. Apple macOS Operating System

History and Development: macOS was developed by Apple Inc. and is based on NeXTSTEP created by Steve Jobs. First released as Mac OS X in 2001 and evolved into modern versions like Big Sur and Sonoma.

File System and File Distribution: Uses Apple File System (APFS), optimized for SSDs. Follows Unix-based directory structure.

Hardware Requirements: Runs exclusively on Apple hardware with Apple Silicon or Intel processors.

General and Specific Uses: Generally used for personal and professional tasks. Specifically popular in creative industries and software development.

4. Linux Operating System

History and Development: Linux was created in 1991 by Linus Torvalds as an open-source kernel. Combined with GNU tools to form full operating systems called distributions.

File System and File Distribution: Supports EXT4, Btrfs, XFS. Uses a single-root directory hierarchy.

Hardware Requirements: Runs on low-end to high-end hardware, supports x86 and ARM architectures.

General and Specific Uses: Generally used for desktop and education. Specifically dominant in servers, cybersecurity, cloud, and supercomputing.

5. Unix Operating System

History and Development: Unix was developed at AT&T; Bell Labs by Ken Thompson and Dennis Ritchie. It introduced multi-user and multitasking concepts.

File System and File Distribution: Uses hierarchical file system where everything is treated as a file.

Hardware Requirements: Traditionally runs on enterprise-grade servers.

General and Specific Uses: Used in enterprise, research, banking, and telecommunications.

6. Conclusion

Windows, macOS, Linux, and Unix each represent different design philosophies and use cases. Understanding their history, structure, and applications provides a strong foundation in computer science.