



CSE321: Operating Systems

Introduction

Course Outcome

- **To explore** various aspects of process management in operating system
- **To know** how different CPU scheduling algorithm works and their respective importance
- **To develop practical knowledge** on the concepts and behaviors of threads
- **To inspect** process synchronization mechanisms and deadlocks
- **To be able to analyze** the management of main and virtual memory
- **To understand** the concepts and implementations of file systems
- **To identify** the security issues and protection mechanisms in operating systems

Marks Distribution

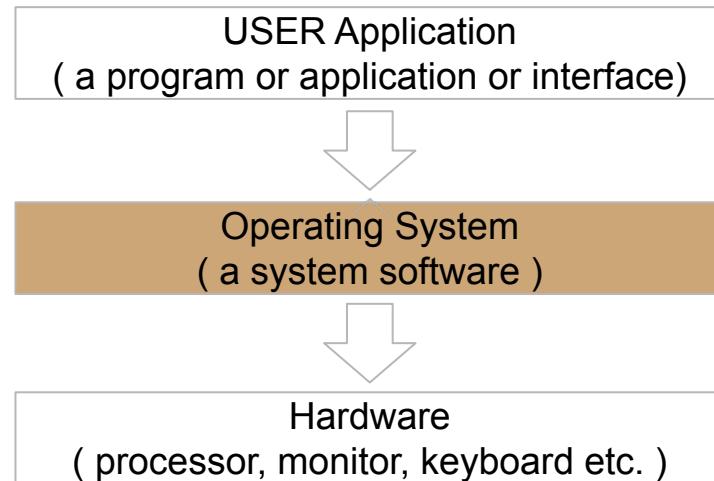
- Theory – 75%
 - Assignment – 5%
 - Quiz – 10% (n-1)
 - Mid – 25%
 - Final – 35%
- Lab – 25%

Attendance Rule: Every student must maintain the following attendance percentages in order to attend the final exam of the course.

- Theory classes: 70%
- Lab classes: 90%

What is an Operating System?

A program that acts as an intermediary between a user of a computer and the computer hardware.



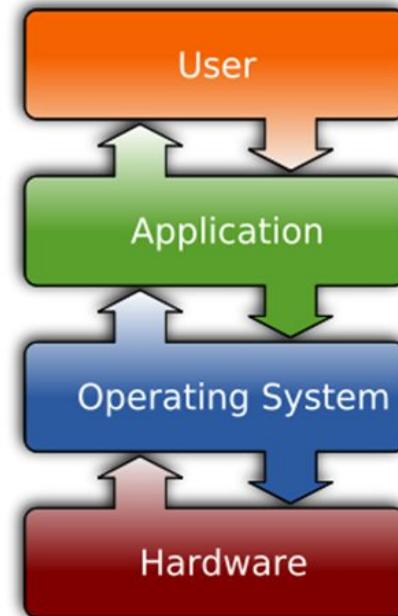
System Software Vs Application Software

System Software:

- System Software refers to the operating system and all utility programs that manage computer resources at a low level.
- Systems software includes compilers, loaders, linkers, and debuggers.

Application Software:

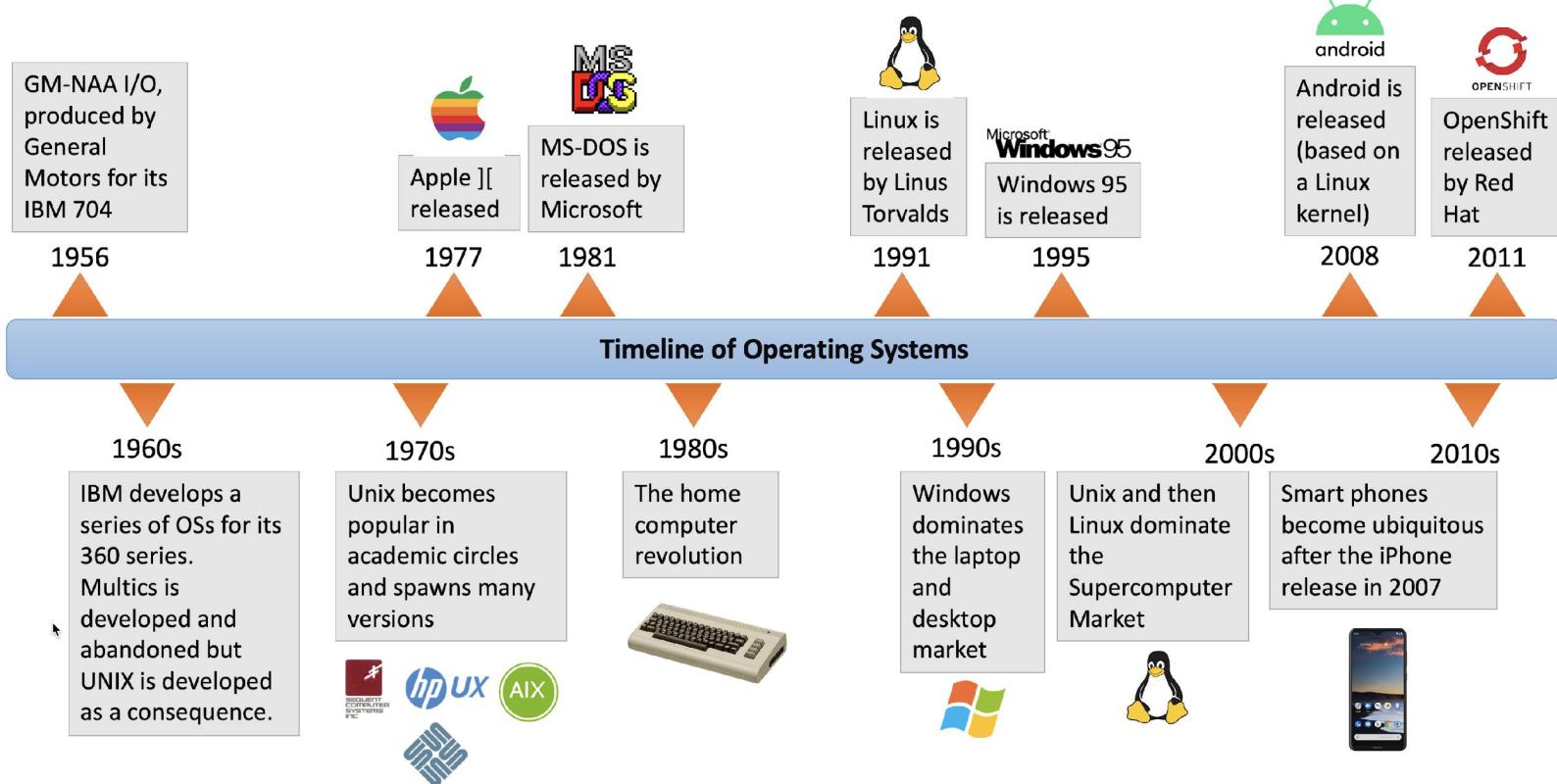
- Applications software comprises programs designed for an end user, such as word processors, database systems, and spreadsheet programs.



Major Goals of OS

- Execute user programs.
- Make the computer system convenient to use.
- Use the computer hardware in an efficient manner
- Manages and allocate all resources
- Controls the execution of user programs and operations of I/O devices

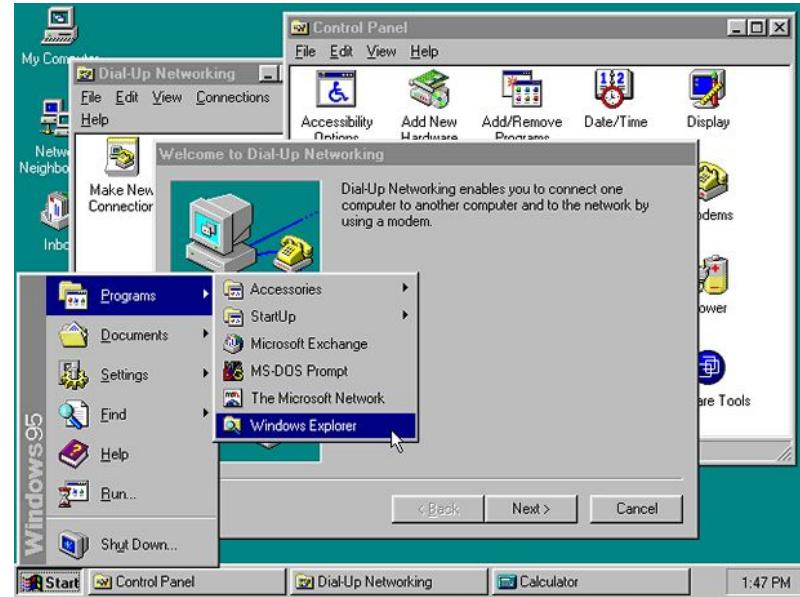
Timeline of OS



Timeline of OS



Timeline of OS



Timeline of OS

- Another revolution of OS came in the mobile computing domain, when Steve Jobs introduced iPhone with iOS in 2007
- The iPhone introduction video is now regarded as a classic advertise video



AN UPDATE IS AVAILABLE FOR YOUR COMPUTER

COOL, MORE
FREE STUFF!



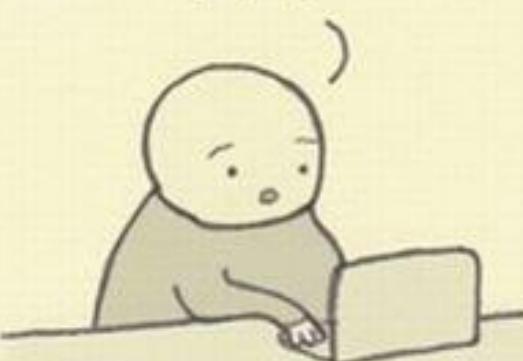
linux

NOT AGAIN!



windows

OOH, ONLY
\$99!



mac

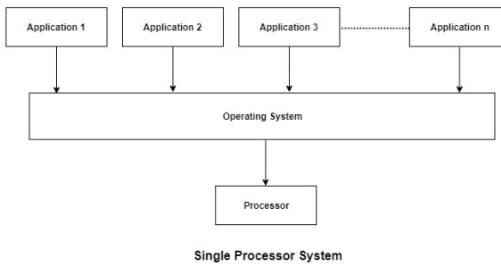
Kernel

The one program running at all times.

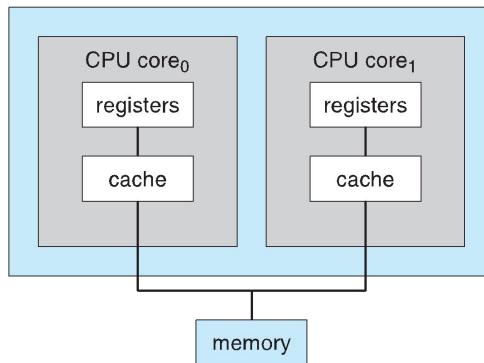
- Kernel is the central module of an operating system
- Part of OS that loads first, and it remains in main memory.
- As small as possible
- Provide all the essential services required by other parts of the operating system and applications.
- Kernel code is usually loaded into a protected area of memory to prevent it from being overwritten.

System Architecture

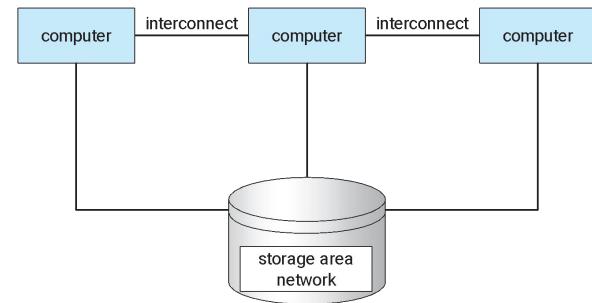
Single-Processor Systems



Multiprocessor Systems



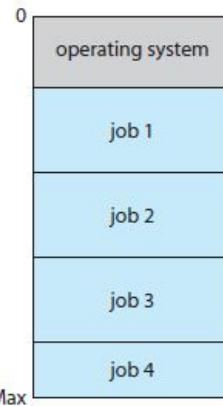
Clustered Systems



Operating System Architecture

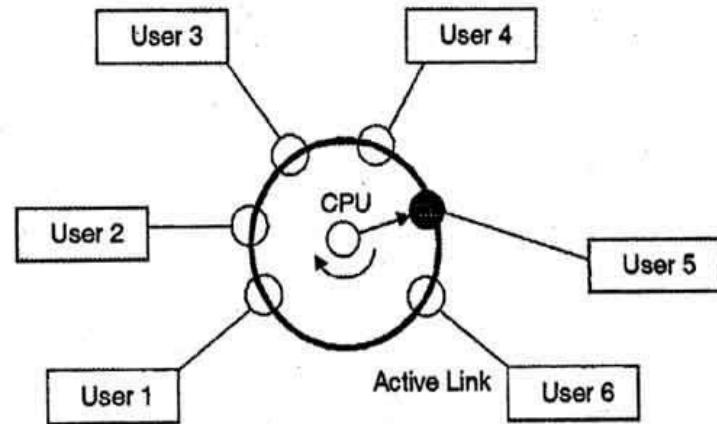
Multiprogramming

- Job Scheduling
- CPU Scheduling



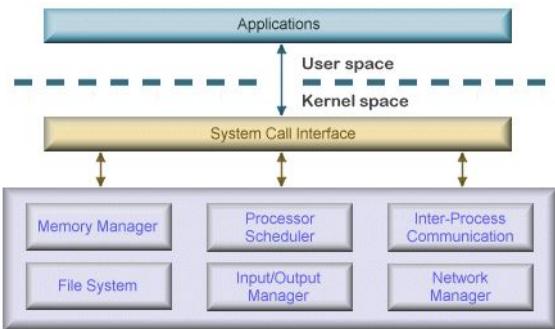
Memory layout for a multiprogramming system.

Time Sharing System

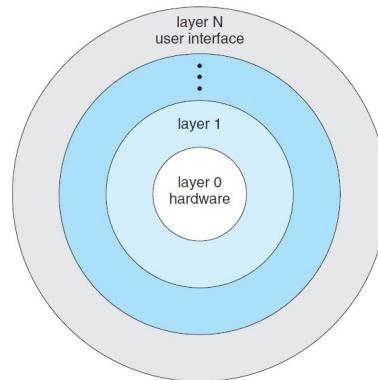


Operating System Structure

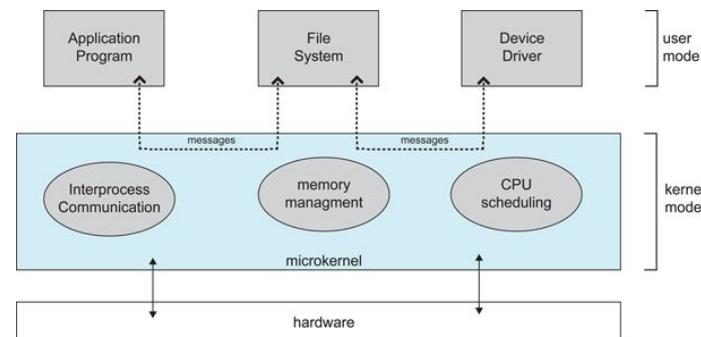
Simple/Monolithic structure



Layered structure



Microkernel structure



Operating System Services

- OS provides an environment for the execution of programs.
- Specific services provided, differ from one operating system to another, but there are some common classes
- Services are provided for the convenience of the programmer

