OPERATING SYSTEM (OS)

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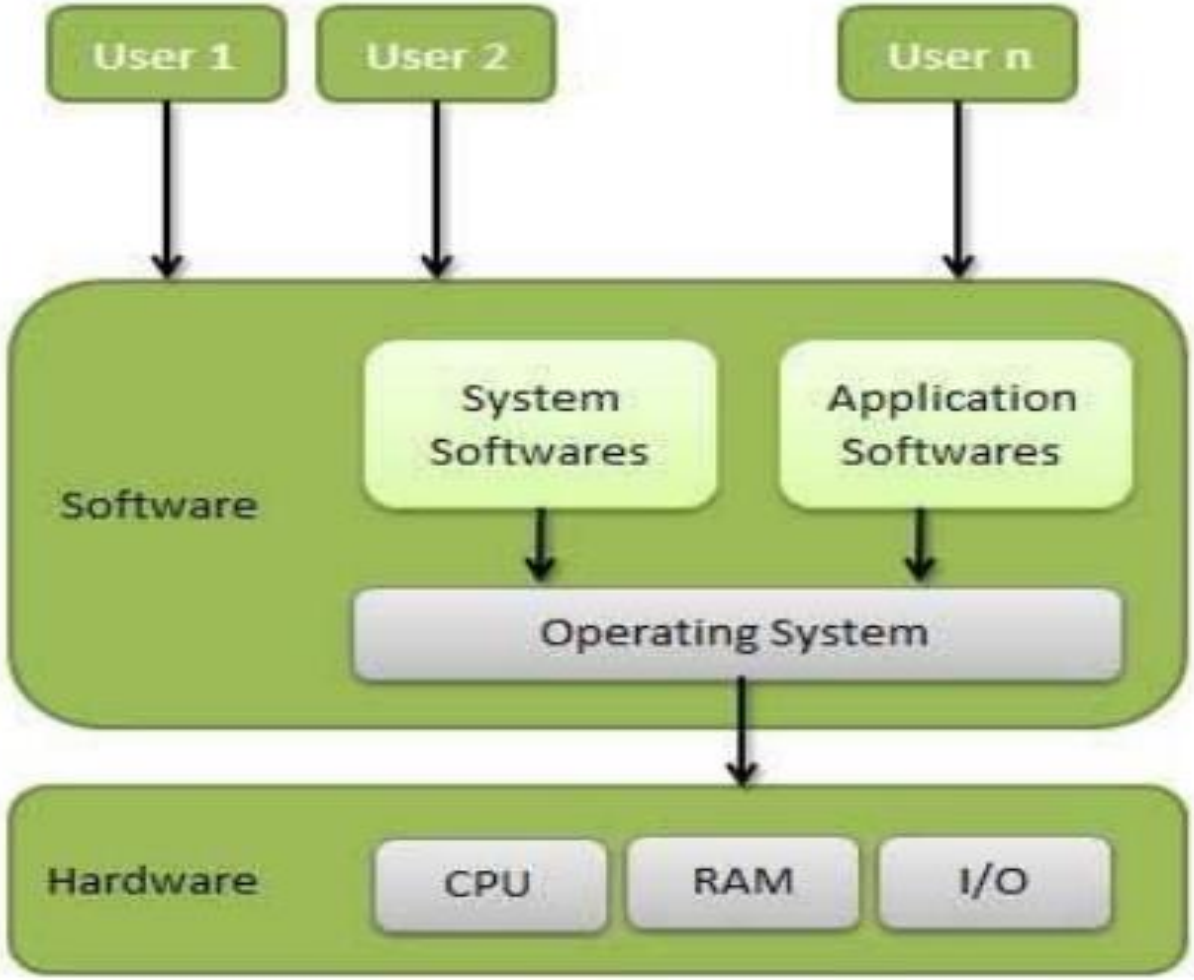
Lectures



WHAT IS AN OPERATING SYSTEM?

Definition: An operating system is a program that acts as an interface between the user and the computer hardware and controls the execution of all kinds of programs.

SOME OF IMPORTANT FUNCTIONS OF AN OPERATING SYSTEM

- Memory Management (Primary or Main memory)
- Processor Management
- Device Management
- File Management
- Security
- Control over system performance
- Job accounting
- Error detecting aids
- Coordination between other software and users

HISTORY AND EVALUTION OF OPERATING SYSTEM

- **The First Generation (1940's to early 1950's)**
  - No Operating System
  - All programming was done in absolute machine language, often by wiring up plug-boards to control the machine's basic functions.
- **The Second Generation (1955-1965)**
  - First operating system was introduced in the early 1950's.It was called GMOS
  - Created by General Motors for IBM's machine.
  - Single-stream batch processing systems **>> Batch Operating System**
- **The Third Generation (1965-1980)**
  - Introduction of multiprogramming **>> Multiprogramming Operating System**
  - Development of Minicomputer
- **The Fourth Generation (1980-Present Day)**
  - Development of PCs **>>Time-Sharing Operating Systems**
  - Birth of Windows/MaC OS **>>Multiprocessor and >> Distributed Operating System**

EXAMPLE:

Suppose when working with LINUX OS we use To delete a single file, use the rm or unlink command followed by the file name:

- $ unlink filename
  or
  $ rm filename

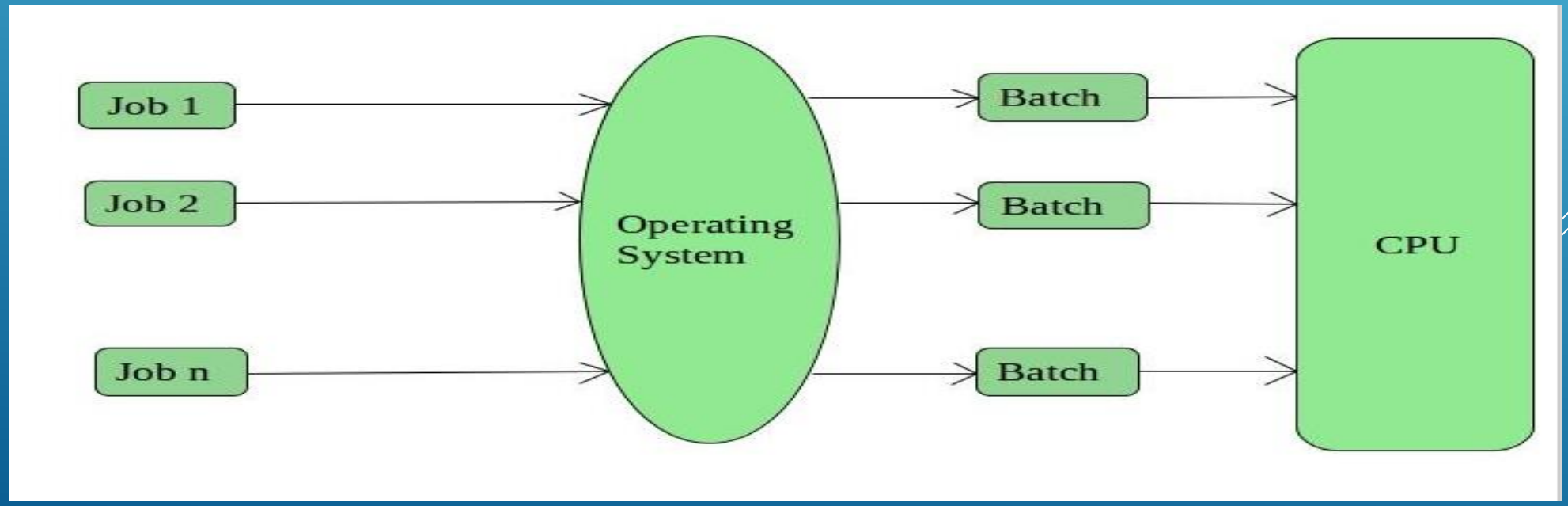
Suppose user want to delete the file without using OS.
Then he has to write separate program for rm command perfume to operation.

TYPES OF OPERATING SYSTEMS

1. Batch Operating System
2. Time-Sharing OS
3. Multiprogramming Operating System
4. Multiprocessing OS
5. Distributed OS
6. Network OS
7. Real Time OS
8. Embedded OS

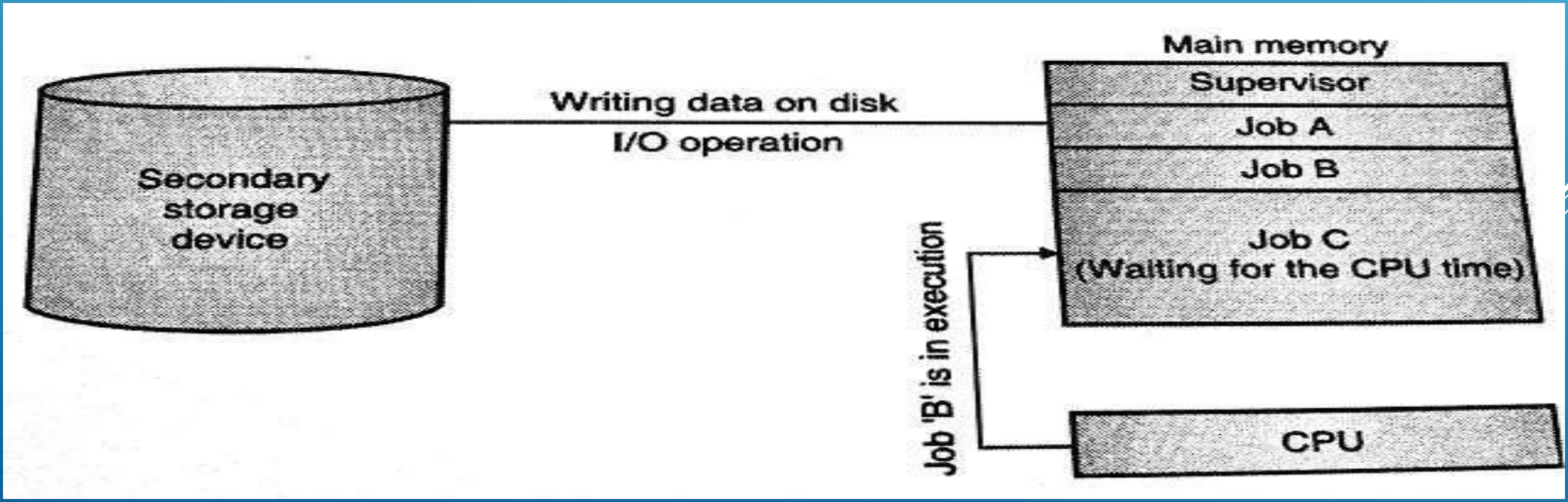
>> BATCH OPERATING SYSTEM

- The users of this type of operating system does not interact with the computer directly.
- Each user prepares his job on an off-line device like punch cards and submits it to the computer operator
- There is an operator which takes similar jobs having the same requirement and group them into batches.



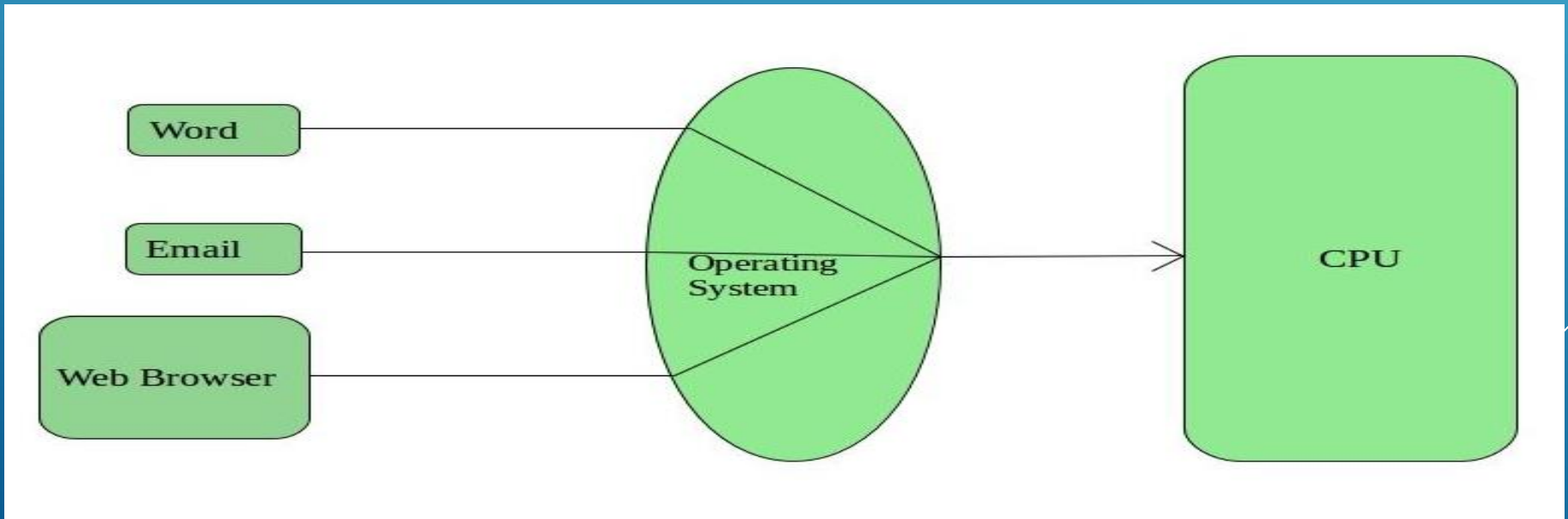
>> MULTIPROGRAMMING OPERATING SYSTEM:

- This type of OS is used to execute more than one jobs simultaneously by a single processor.
- It increases CPU utilization by organizing jobs so that the CPU always has one job to execute.
- Multiprogramming operating systems use the mechanism of job scheduling and CPU scheduling.



>> TIME-SHARING OPERATING SYSTEMS

- Each task is given some time to execute so that all the tasks work smoothly.
- These systems are also known as **Multi-tasking Systems.**
- The task can be from a single user or different users also.
- The time that each task gets to execute is called quantum.
- After this time interval is over OS switches over to the next task.

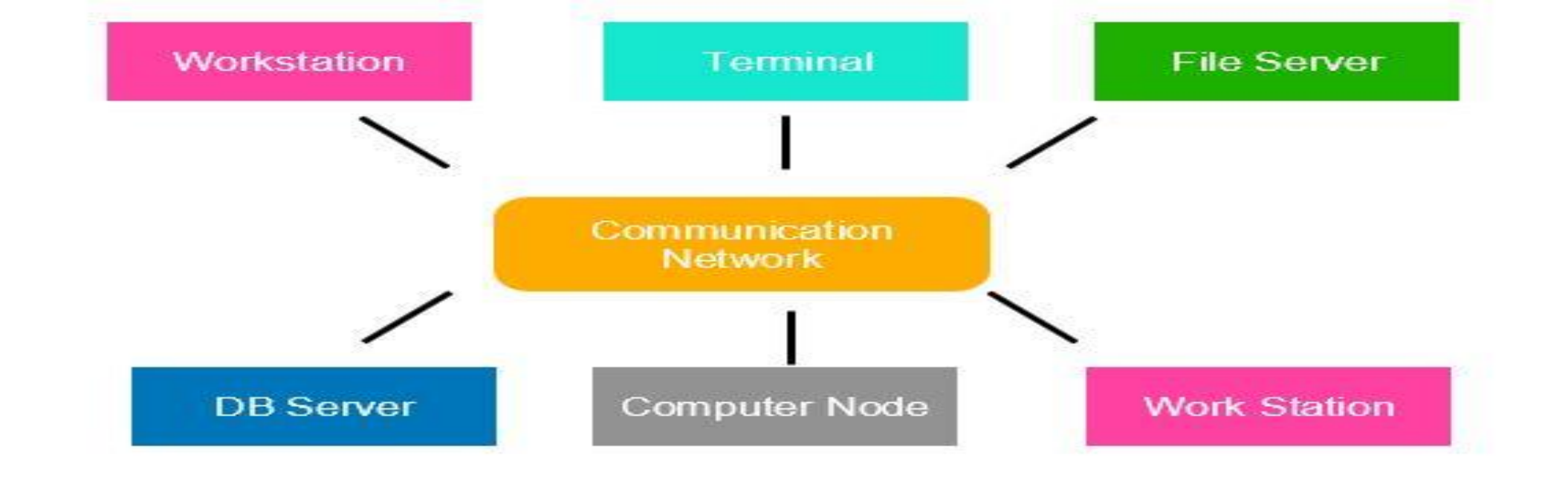


>>MULTIPROCESSOR OPERATING SYSTEMS

- Multiprocessor operating systems are also known as parallel OS or tightly coupled OS.
- Such operating systems have more than one processor in close communication that sharing the computer bus, the clock and sometimes memory and peripheral devices.

>>DISTRIBUTED OPERATING SYSTEM

- Various autonomous interconnected computers communicate with each other using a shared communication network.
- Independent systems possess their own memory unit and CPU.
- These are referred to as **loosely coupled systems**.
- Examples:- Locus, DYSEAC



>>NETWORK OPERATING SYSTEM

- These systems run on a server and provide the capability to manage data, users, groups, security, applications, and other networking functions.
- These types of operating systems allow shared access of files, printers, security, applications, and other networking functions over a small private network.
- The “ other" computers arc called client computers, and each computer that connects to a network server must be running client software designed to request a specific service.
- popularly known as **tightly coupled systems**.

Examples of Network Operating System are:
Microsoft Windows Server 2003/2008/2012, UNIX, Linux, Mac OS X, Novell NetWare, and BSD, etc.

>>EMBADED OPERATING SYSTEM

- An embedded operating system is one that is built into the circuitry of an electronic device.
- Embedded operating systems are now found in automobiles, bar-code scanners, cell phones, medical equipment, and personal digital assistants.
- The most popular embedded operating systems for consumer products, such as PDAs, include the following:
  - Windows XP Embedded
  - Windows CE .NET:- it supports wireless communications, multimedia and Web browsing. It also allows for the use of smaller versions of Microsoft Word, Excel, and Outlook.
  - Palm OS:- It is the standard operating system for Palm-brand PDAs as well as other proprietary handheld devices.
  - Symbian:- OS found in " smart" cell phones from Nokia and Sony Ericsson

POPULAR TYPES OF OS

- Desktop Class
  - Windows
  - OS X
  - Unix/Linux
  - Chrome OS
- Server Class
  - Windows Server
  - Mac OS X Server
  - Unix/Linux
- Mobile Class
  - Android
  - iOS
  - Windows Phone

MS-DOS

- Single User Single Tasking OS.
- It had no built-in support for networking, and users had to manually install drivers any time they added a new hardware component to their PC.
- DOS supports only 16-bit programs.
- Command line user interface.
- So, why is DOS still in use? Two reasons are its size and simplicity. It does not require much memory or storage space for the system, and it docs not require a powerful computer.

MICROSOFT WINDOWS

- The graphical Microsoft operating system designed for Intel-platform desktop and notebook computers.
- Best known, greatest selection of applications available.
- Current editions include Windows 7, 8, 8.1 and 10. 11

MAC OS

- User-friendly, runs on Mac hardware. Many applications available.
- Current editions include: Sierra, High Sierra, Mojave, Catalina & Big Sur—Version XI(Released in Nov 2020)

LINUX

- **Linux:** An open-source, cross-platform operating system that runs on desktops, notebooks, tablets, and smartphones.
  - The name *Linux* is a combination *Linus* (the first name of the first developer) and *UNIX (another operating system*.
- Users are free to modify the code, improve it, and redistribute it,
- Developers are not allowed to charge money for the Linux kernel itself (the main part of the operating system), but they can charge money for **distributions** (**distros** for short).

- **Chrome OS**. Is a popular thin client operating system.
- **Thin client** A computer with minimal hardware, designed for a specific task. For example, a thin web client is designed for using the Internet.

G

chromebook

SERVER OPERATING SYSTEMS

- Windows Server Familiar GUI interface for those experienced with Windows
- UNIX
  - Very mature server capabilities, time-tested, large user community, stable
- Linux
  - Free, customizable, many free services and utilities available