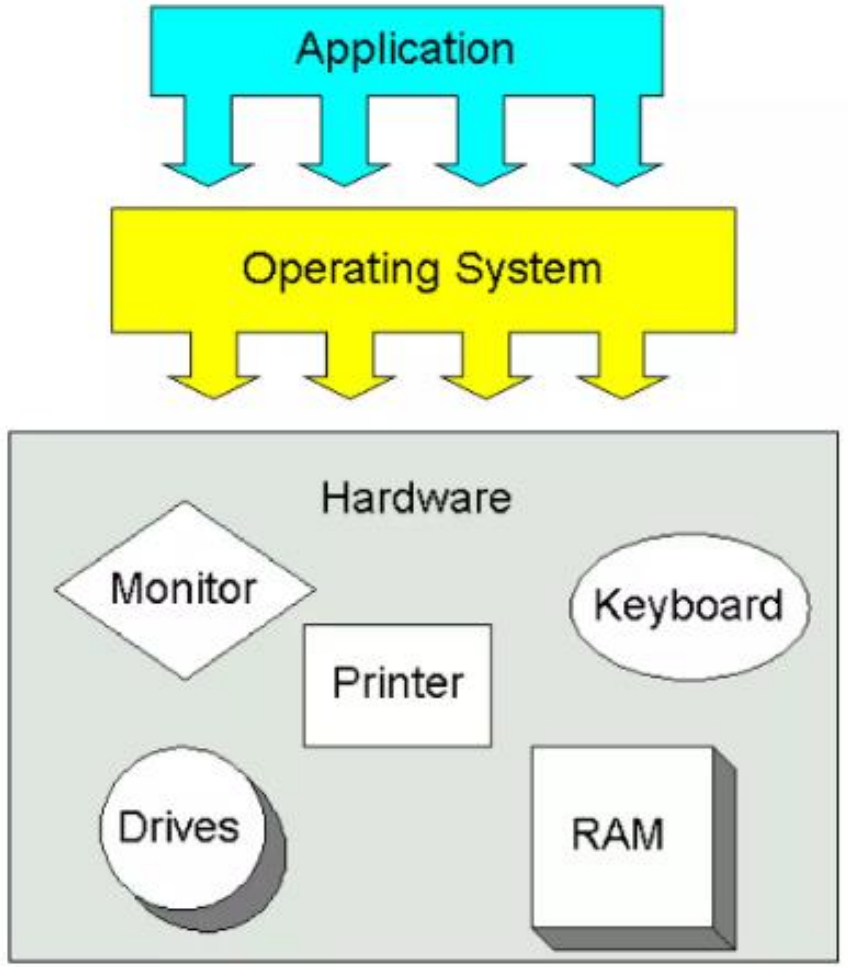
Unit 2

Introduction to Operating Systems and Networking: Definition of an Operating System - Different types of PC Operating Systems. Computer Networks- categories of networks - LAN, WAN,MAN. The Internet - Working of Internet - Major Features of Internet.

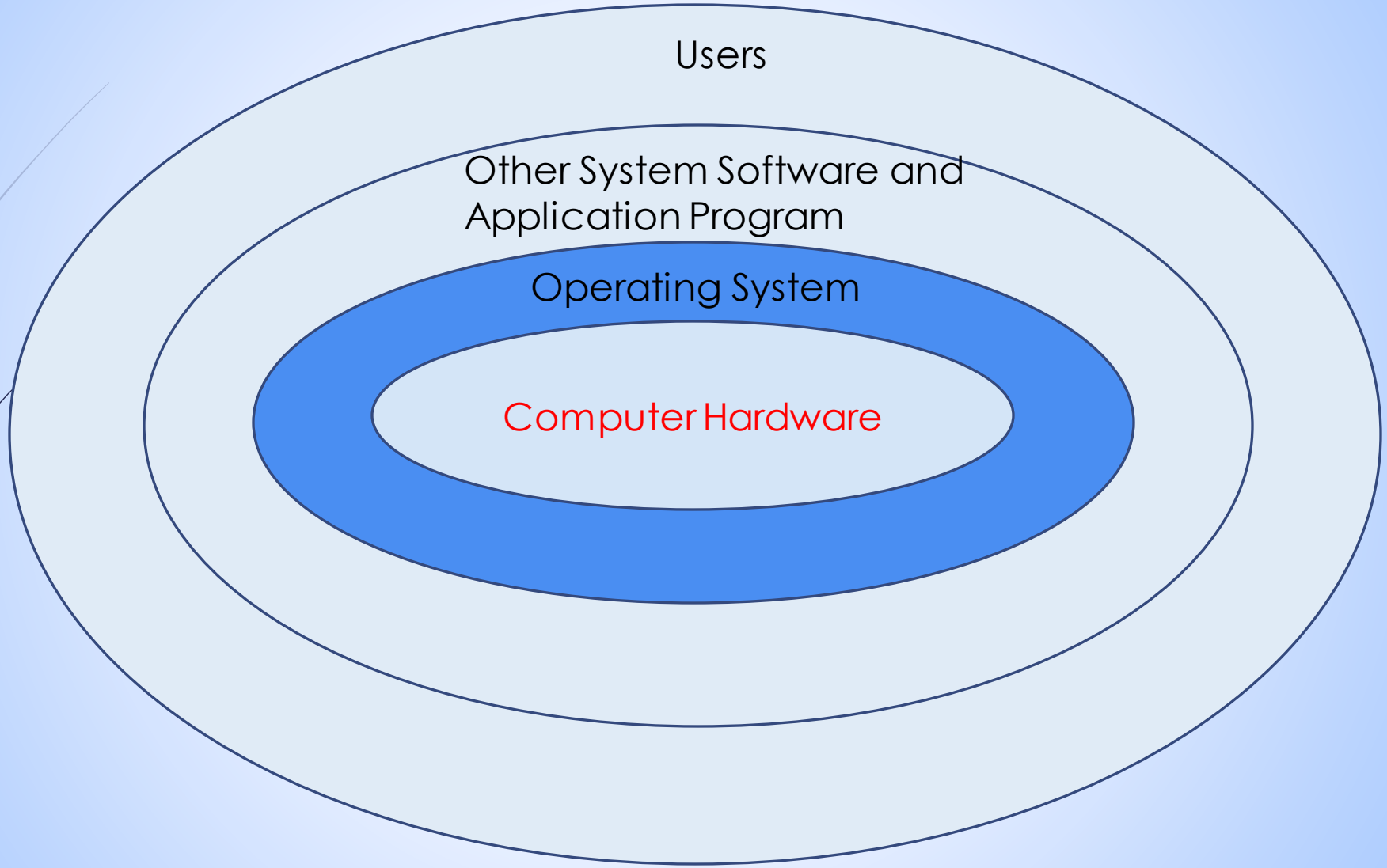
What is an Operating System (OS)

- An operating system (OS) is a collection of software that manages computer hardware resources and provides common services for computer programs. The operating system is a vital component of the system software in a computer system. Application programs usually require an operating system to function.



Operating System is an integrated set of programs that control the resources (CPU, memory, I/O devices, etc) of a computer system and provide its users with an interface. The two **primary objectives** of an OS are

1. **Make a computer system easier to use** : A computer system consists of one or more processors, main memory and many types of I/O devices. Writing programs for using these hardware resources correctly and efficiently is an extremely difficult job requiring in-depth knowledge of functioning of these resources. Hence to make a computer system usable by a large number of users, computer systems need some mechanism to shield the programmers and users from the complexity of hardware resources.



Logical Architecture of an OS

2. **Manage the Resources of a computer system** :- An OS manages all the resources of a computer system. This involves performing such tasks as keeping track of who is using what resources, granting resource requests, accounting for resource usage etc.

Main Functions of OS

1. **Process Management**
2. **Memory Management**
3. **File Management**
4. **Device Management**
5. **Security Management**
6. **Command Interpreter**

1.Process management

- **By process management OS manages many kinds of activities :-**
  - All process from start to shut down
  - Creation and deletion of user and system processes.

Process management module takes care of creation and deletion of processes, scheduling of system resources to different processes and providing mechanism for synchronization and communication among processes.

2. Memory Management

- **The major activities of an operating regard to memory-management are:-**
  - Decide which process are loaded into memory when memory space becomes available.
  - Allocate and deallocate memory space as needed.

3.File Management

- **The file management system allows the user to perform such tasks:-**
  - Creating files and directories
  - Renaming files
  - Coping and moving files
  - Deleting files

4.Security Management

- **By security management OS manages many tasks such as:-**
  - Alert messages
  - Dialogue boxes
  - Firewall
  - Passwords

Security module protects the resources and information of a computer system against destruction and unauthorized access. It also ensures that when the system executes several disjoint processes simultaneously, one process does not interfere with others.

Device Management :- Normally a computer system consists of several I/O devices such as printer, disk and tape. The device management module controls all I/O devices. It keeps track of I/O requests from processes, issues command to I/O devices, and ensures correct data transmission to/from an I/O device.

5.Command Interpreter

- **A command interpreter is an interface between system and the user. There are two types of user interface:-**
  - Command line
  - Graphical user interface

The command interpreter module interprets user commands and direct system resources to process the commands. This module allows the user to communicate with the operating system using commands.

Different Types of Operating Systems

TYPES OF OS [1]

Distinguished by the response time and how data is entered into the system

- Single user
- Multi user
- Multitasking
- Multi processing
- Embedded
- Real time

[1] SINGLE USER [1]

TWO TYPES:

- Single user, single task
- Single user, multi tasking

Single user, single task

- Designed to manage the computer so that one user can effectively do one thing at a time.
- Example: The Palm OS for Palm handheld computers

Single user, multi tasking

- Designed with a single user in mind but can deal with many applications running at the same time
- Type of operating system most people use on their desktop and laptop computers today

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- Examples: Microsoft's Windows and Apple's Mac OS platforms

- For Example: It's entirely possible for a Windows user to be writing a note in a word processor while downloading a file from the Internet while printing the text of an e-mail message.

[2] MULTI USER [2]

- Allows many different users to take advantage of the computer's resources simultaneously
- Allows multiple users to access the computer system at the same time
- Time Sharing system and Internet servers as the multi user systems

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- Examples: UNIX, VMS and Mainframe Operating systems

[3] MULTI TASKING [3]

- Allows more than one program to run concurrently.
- The tasks share common processing resources, such as a CPU and main memory
- In the process, only one CPU is involved, but it switches from one program to another so quickly that it gives the appearance of executing all the programs at the same time.

[4] MULTI PROCESSING [3]

- Multiprocessing, in general, refers to the utilization of multiple CPUs in a single computer system
- Enables several programs to run concurrently
- The term also refers to the ability of a system to support more than one processor and/or the ability to allocate tasks between them

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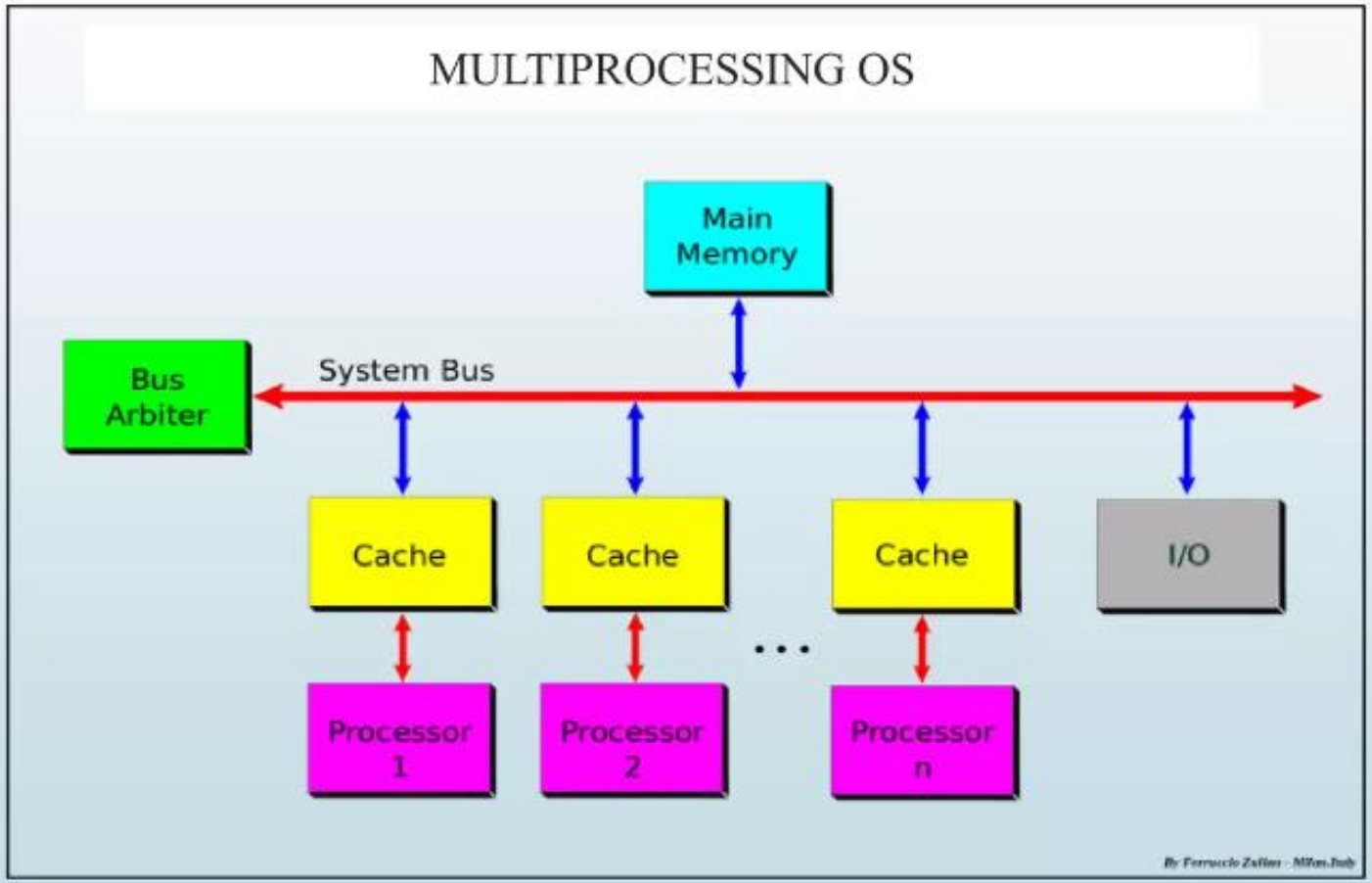
MULTIPROCESSING OS
Main Memory
Bus Arbiter
System Bus
Cache
Cache
Cache
I/O
Processor 1
Processor 2
Processor n

5. Embedded Operating System

What is Embedded Operating System?

An embedded operating system is a computer operating system designed for use in embedded computer systems. It has limited features. The term "embedded operating system" also refers to a "real-time operating system". The main goal of designing an embedded operating system is to perform specified tasks for non-computer devices. It allows the executing programming codes that deliver access to devices to complete their jobs.

An embedded operating system is a combination of software and hardware. It produces an easily understandable result by humans in many formats such as **images, text**, and **voice**. Embedded operating systems are developed with programming code, which helps convert hardware languages into software languages like **C** and **C++**.

The embedded operating system improves overall efficiency by controlling all hardware resources and minimizing response times for specific tasks for which devices were built.

[6] REAL TIME OPERATING SYSTEM [6]

- is a multitasking operating system that aims at executing real-time applications
- The main objective of real-time operating systems is their quick and predictable response to events
- In it, the time interval required to process and respond to inputs is so small that it controls the environment

- Examples: QNX, RTLINUX
- Are used to control machinery, scientific instruments and industrial systems