

# PRINCIPLES OF OPERATING SYSTEMS

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# **LECTURE- 4**

# **TYPES OF OPERATING SYSTEM**

# WHAT IS AN OPERATING SYSTEM?

An Operating System is an interface between user and hardware of a computer system.

# OPERATING SYSTEM

An Operating System is a system software which may be viewed as an organized collection of software consisting of procedures for operating a computer and providing an environment for execution of programs.

# OTHER DEFINITIONS

- An Operating System is a control program.
- An Operating System is similar to a Government.
- An Operating System can be defined as a Resource Manager.

# OTHER DEFINITIONS

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This program controls the execution of user programs to prevent errors and improper use of the computer.

- An Operating System is a Government

- An Operating System can be defined as a Resource Manager.

# OTHER DEFINITIONS

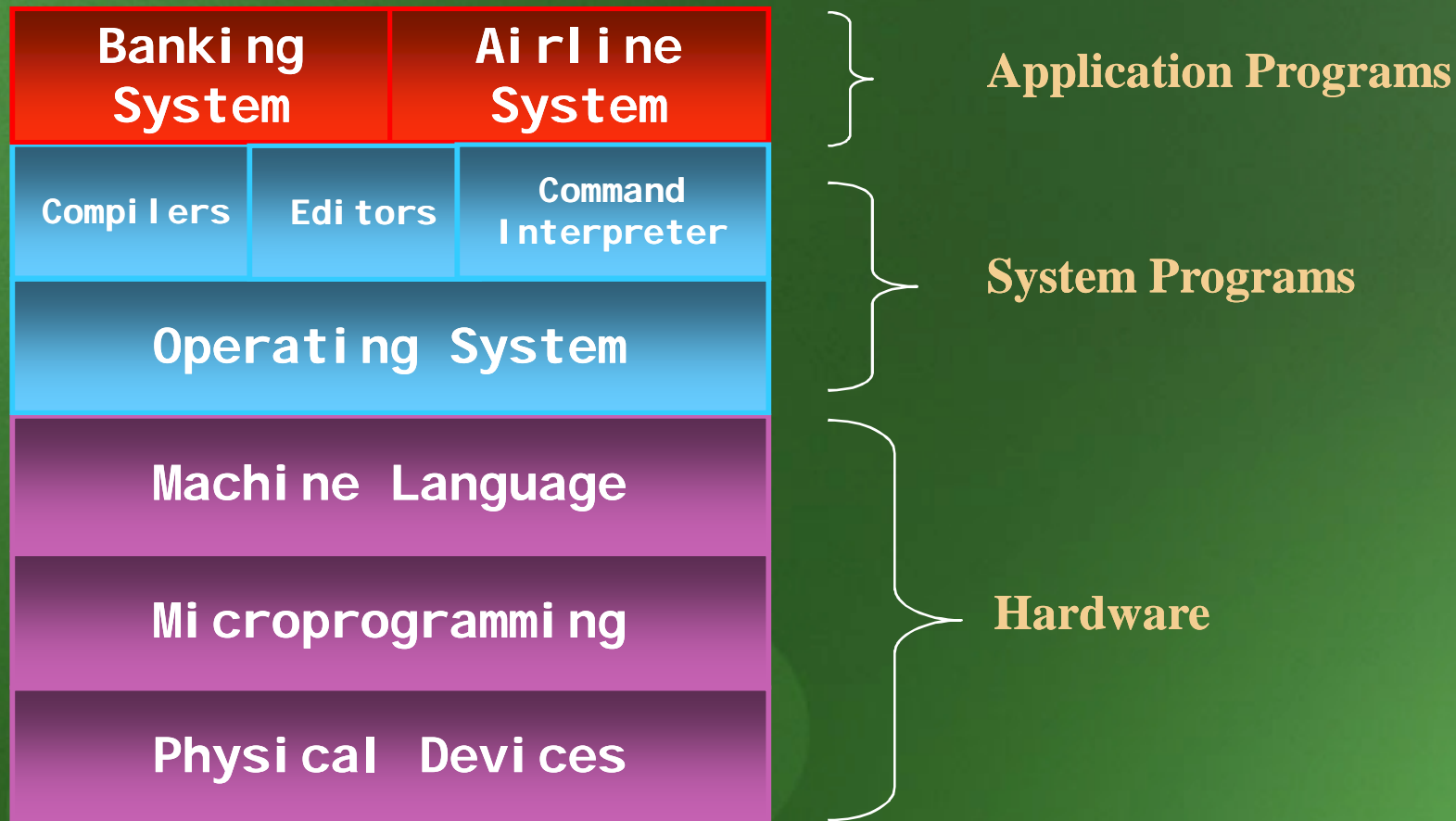
- An OS is a program that acts as a resource manager and allocator. As a resource manager and allocator, the OS will resolve the conflicting request for computer resources(CPU time, memory space, files storage space, input/output devices, etc) from various users or programs.
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# OPERATING SYSTEM

- It is the most fundamental of all the system programs, which controls all the computer's resources and provides the base upon which the application programs can be written.
- It is a layer of s/w on the top of the bare h/w, which will shield programmers from the complexity of the h/w.

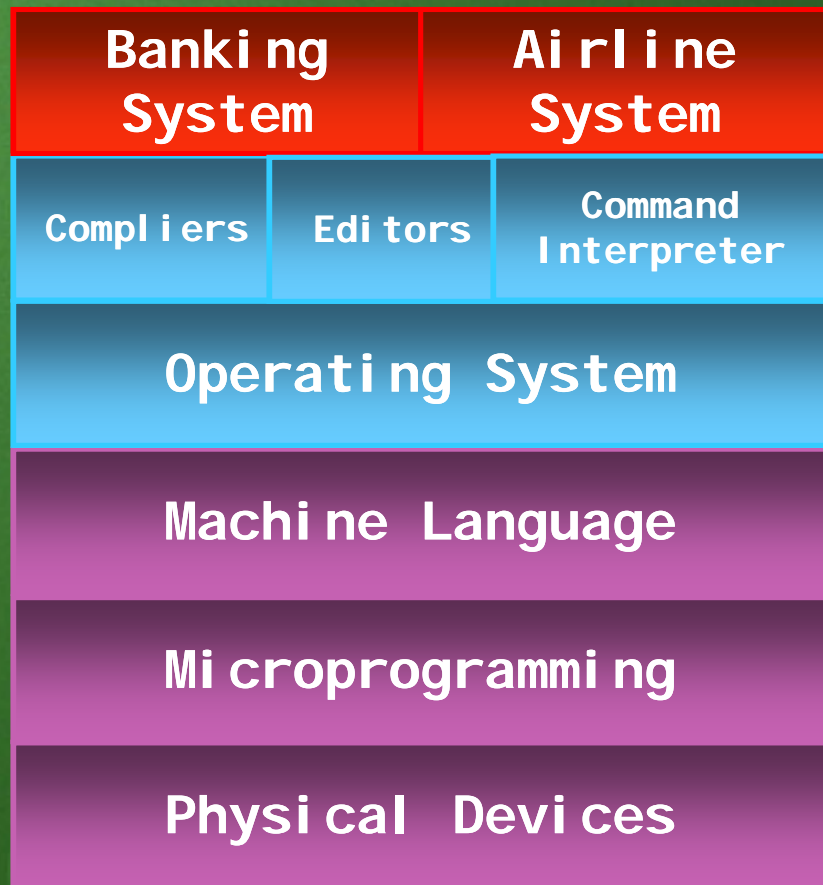


# COMPUTER SYSTEM



A Computer system consists of Hardware, System Programs and Application Programs

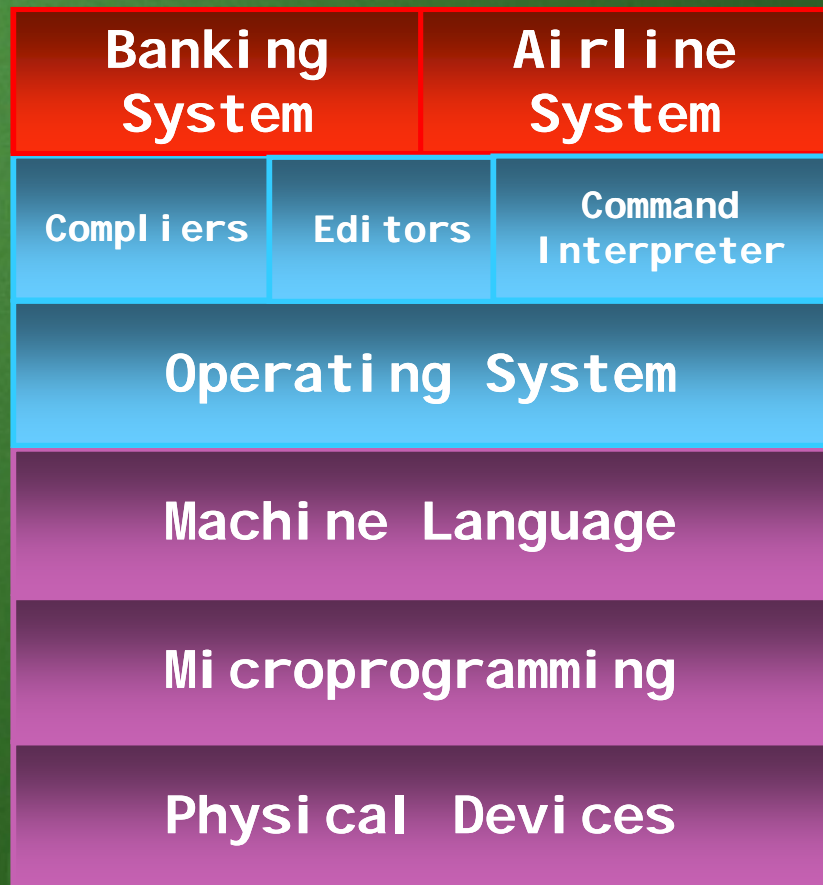
# COMPUTER SYSTEM



Integrated circuit chips, wires, power suppliers, cathode ray tube, etc.

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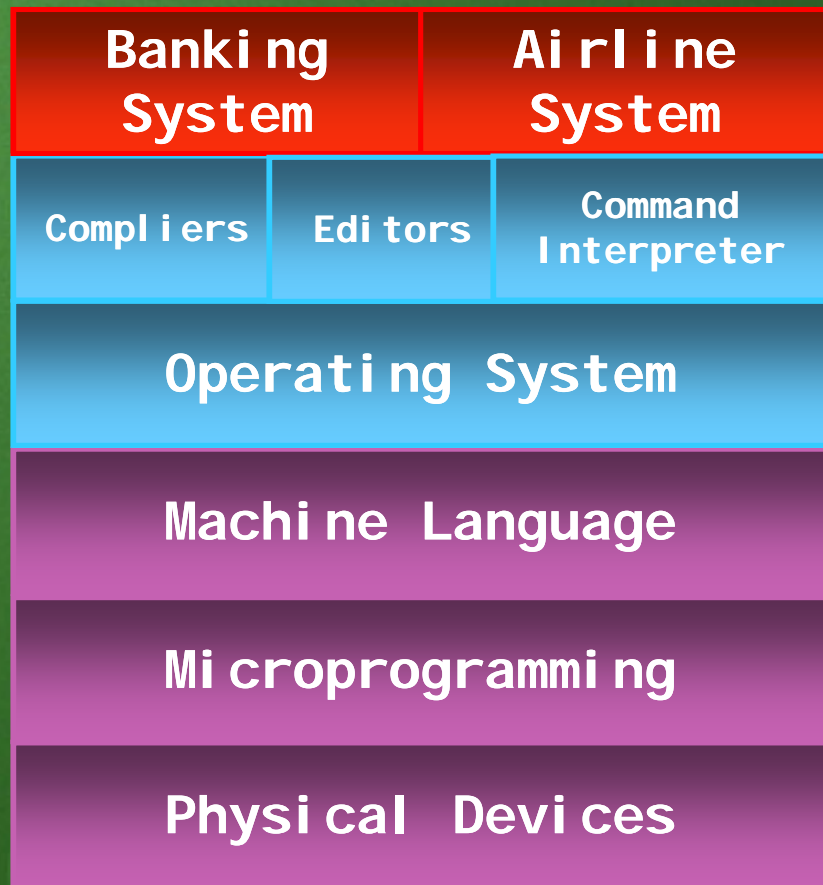
# COMPUTER SYSTEM



Directly controls the physical devices and provides a cleaner interface to the next layer. It interprets the instructions from the above layer and carry out them.

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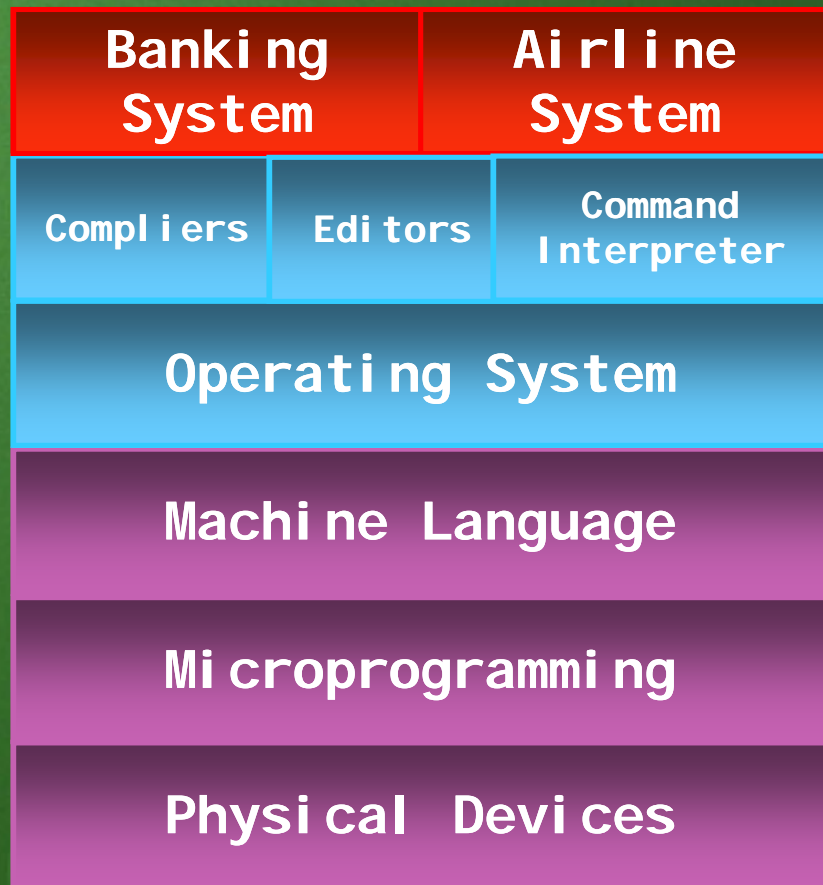
# COMPUTER SYSTEM



Instructions for moving data around the machine, doing arithmetic and comparing values. I/O devices are controlled by loading values into specified device registers.

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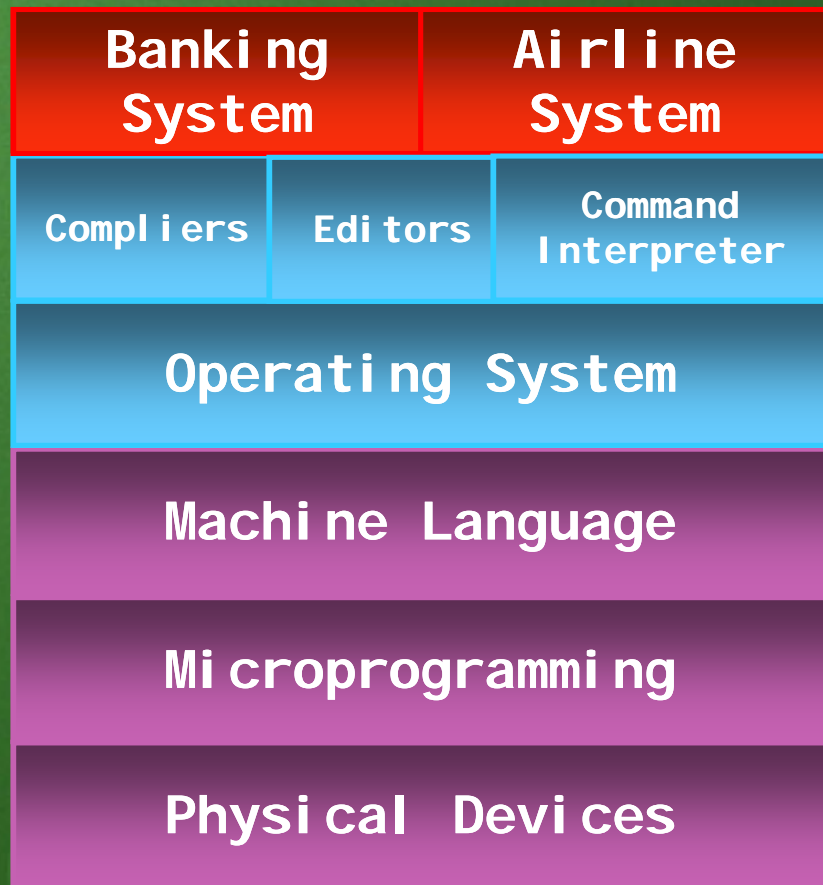
# COMPUTER SYSTEM



Major function is to hide all h/w complexity and give the programmer a more convenient set of instructions to work with.

A Computer system consists of Hardware, System Programs and Application Programs

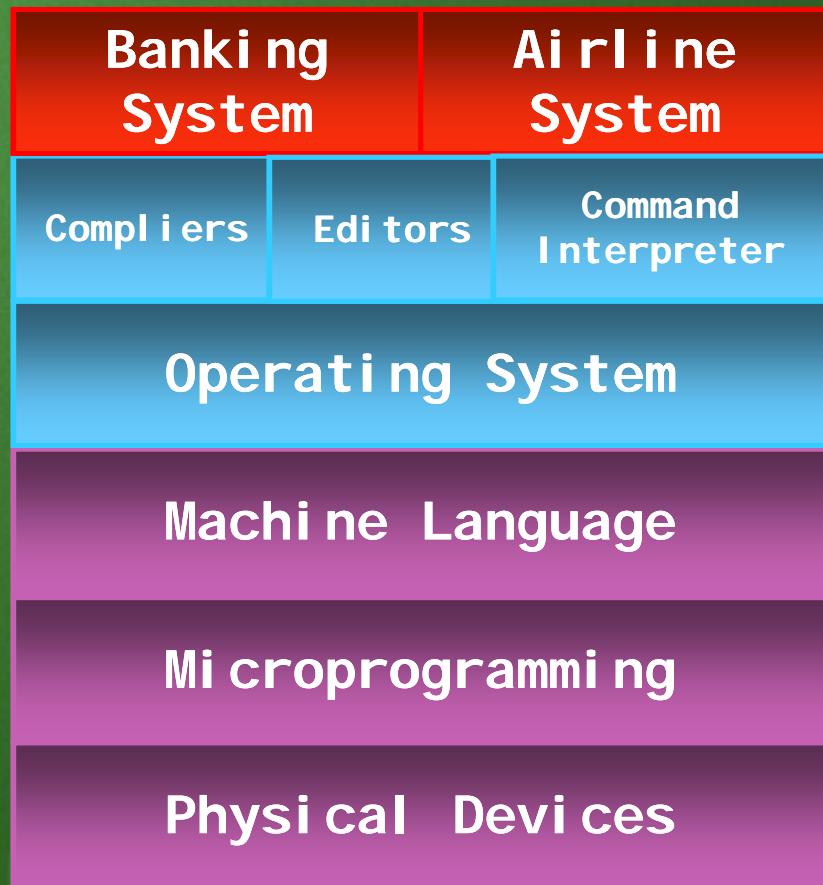
# COMPUTER SYSTEM



The OS runs in kernel mode but the compilers and editors run in user mode. If a user does not like a particular compiler, the user is free to write his own but he is not free to write his own disk interrupt handler, which is part of the OS.

A Computer system consists of Hardware, System Programs and Application Programs

# COMPUTER SYSTEM



These programs are written by the users to solve their particular problems, such as commercial data processing, engineering calculations, or game playing.

A Computer system consists of Hardware, System Programs and Application Programs

# PURPOSE OF AN OPERATING SYSTEM

A computer's Operating system is a group of programs designed to serve two basic purposes:

- To control the allocation and use of the computing system's resources among the various users and tasks.
- To provide an interface between the computer hardware and the programmer.



# TYPES OF OPERATING SYSTEM

Distinguished by the nature of interaction that takes place between the computer user and his/her program during its processing.

- Batch Operating System
- Time-Sharing Operating System
- Real-Time Operating System

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Distinguished by the nature of interaction that takes place between the computer user and his/her program during its processing.

- Batch Operating System

- Users submit jobs to a central place where these jobs are collected into a batch, and subsequently placed on an input queue at the computer where they will be run. The user has no interaction with the job during its processing. The computer's response time is the turnaround time—the time from submission of the job until execution is complete, and the results are ready for return to the person who submitted the job.

# TYPES OF OPERATING SYSTEM

Computer provides computing services to several or many users concurrently on-line. Various users are sharing the central processor, the memory and other resources of the computer system. The user has full interaction with the program during its execution.

- Time-Sharing Operating System
- Real-Time Operating System

# TYPES OF OPERATING SYSTEM

Distinguished by the nature of interaction

A RTOS is designed to support execution of tasks within specific wall clock time constraints. Use of RTOS is mostly limited to dedicated applications such as industrial control systems, weapon systems and computer-controlled products. RTOS is managing the resources so that a particular operation executes in precisely the same amount of time every time it occurs.

- Real-Time Operating System

# Networking Operating System

- A networked computing system is a collection of physical interconnected computers.
- The OS of each of the interconnected computers must contain provisions for handling communication and transfer of program and data among the other computers, in addition to its own stand-alone functionality.

# Distributed Operating System

A distributed computing system consists of a number of computers that are connected and managed so that they automatically share the job processing load among the constituent computers, or separate the job load as appropriate particularly configured processors.

# DISTRIBUTED OPERATING SYSTEM

Distributed operating system is one that looks to its users like an ordinarily centralized operating system but runs on multiple independent CPU's. Key concept is TRANSPARENCY.

# Networked vs. Distributed

In n/w os, the users are aware of the existence of multiple computers and can log in to remote machines and can copy files from one machine to another .....

D.os appears to its users as a traditional uni-processor system, even though it is actually composed of multiple processor..

Transparency- users should not be aware of where their programs are being run or where their files are located .....



# FUNCTIONS OF OPERATING SYSTEM

- Memory management
- Process management
- Device management
- Information management
- Protection
- Error Handling

# FUNCTIONS OF OPERATING SYSTEM

- Memory management



The o/s keeps track of the memory, what parts are in use and by whom.

# FUNCTIONS OF OPERATING SYSTEM

- Memory management
- Process management

The o/s keeps track of processors and the status of processes. It decides who will have a chance to use the processor.

# FUNCTIONS OF OPERATING SYSTEM

- Memory management
- Process management
- Device management

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The o/s keeps track of the devices, channels, control units and decides what is an efficient way to allocate the device.

# FUNCTIONS OF

O/S keeps track of the information, its location, use, status etc. and decides who gets use of the resources, enforce protection requirements



Information management

Protection

Error Handling

# FUNCTIONS OF OPERATING SYSTEM

An o/s is to protect the user from unauthorized access of his files or data. And also it should protect itself from users

- Protection

- Error Handling

# FUNCTIONS OF OPERATING SYSTEM

- Memory management

- Process management

An o/s must respond to errors by taking the appropriate actions.-\*

- Error Handling