OPERATING SYSTEM

INTRODUCTION

OBJECTIVES

- To define the term Operating System.
- Computer System layers.
- Types of Operating Systems.
- Interpret the basic functions of Operating System.

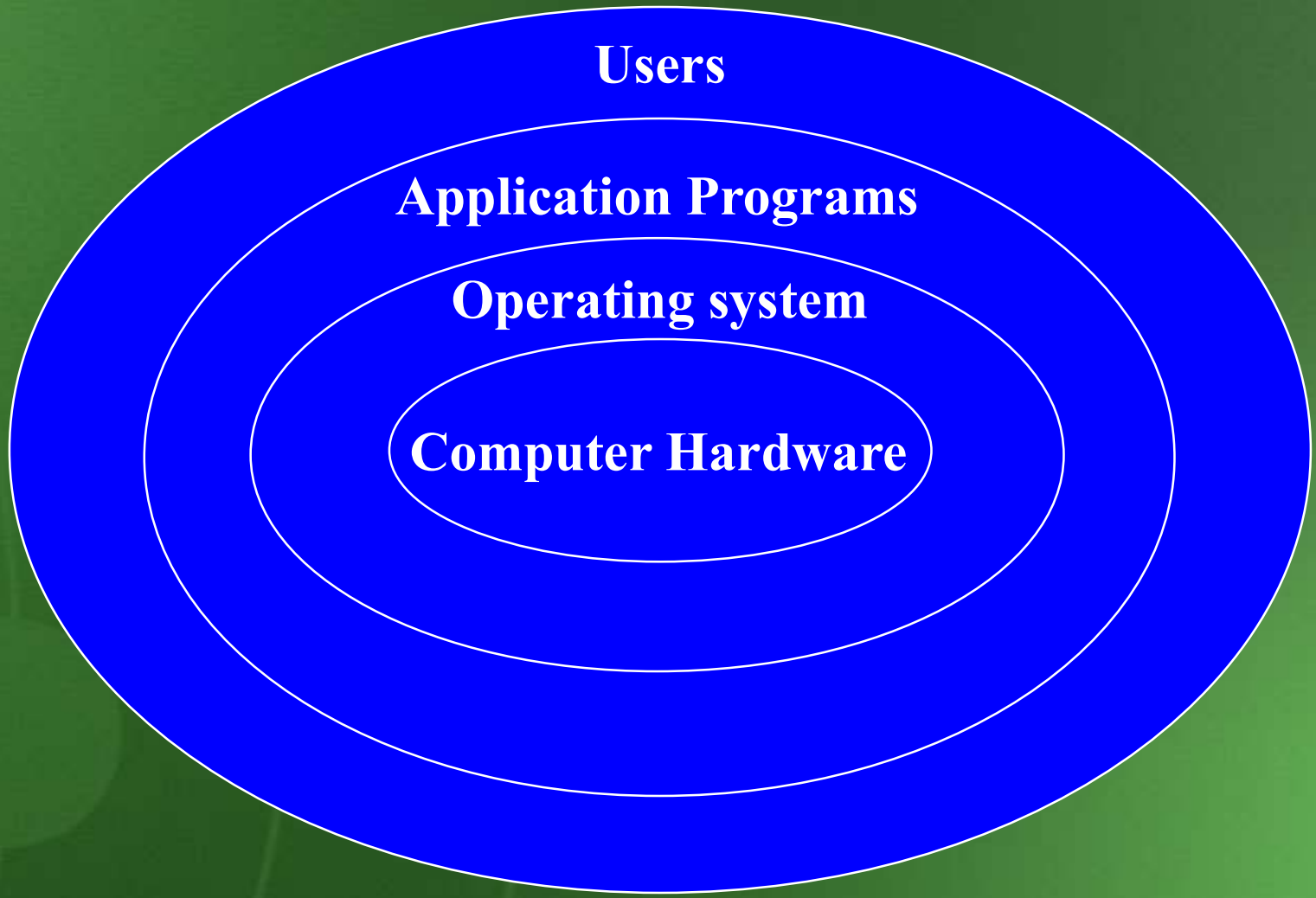
GOALS OF AN OPERATING SYSTEM

- To make the computer system *convenient to use.*
- To use the computer hardware in *an efficient manner.*

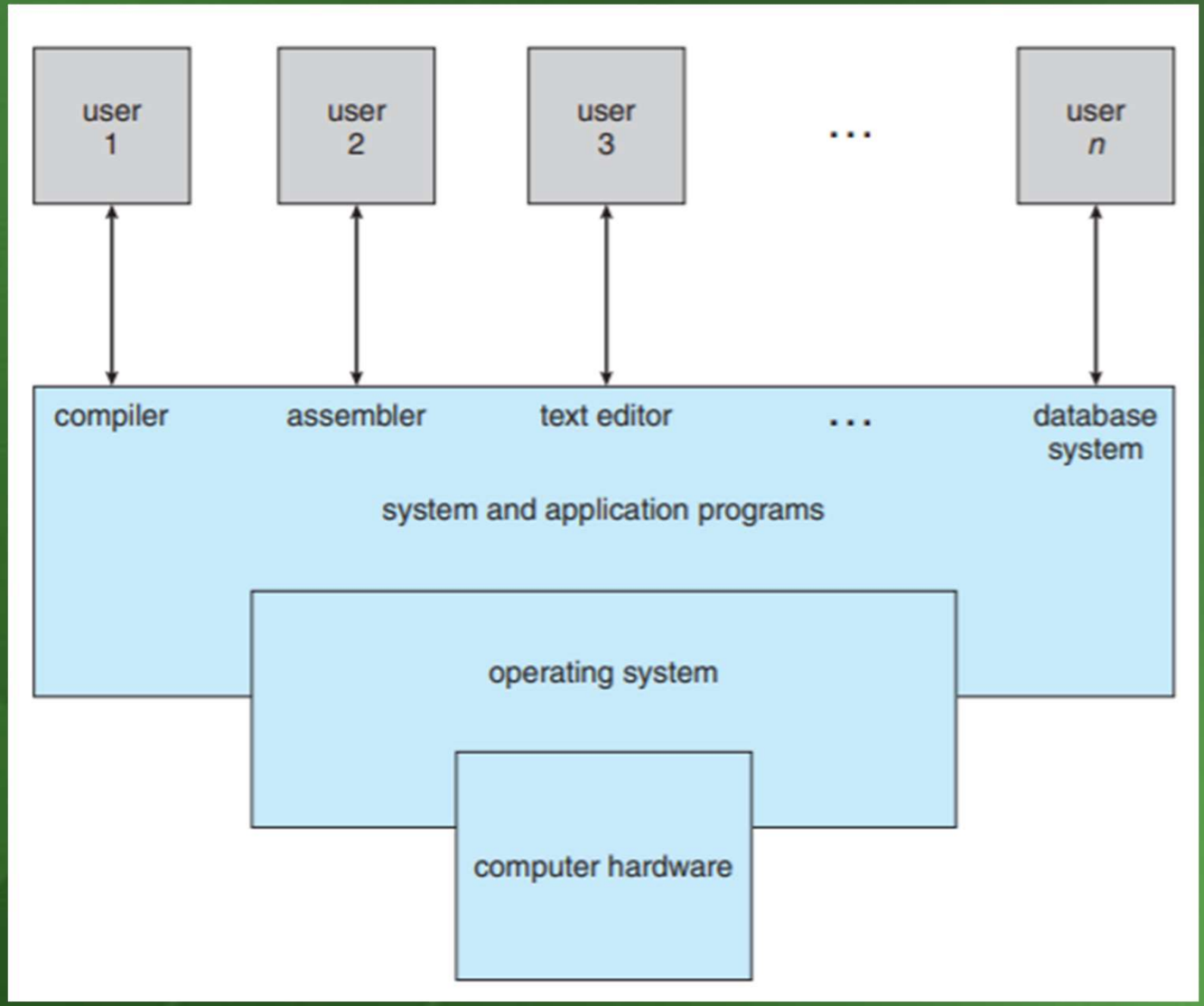
PURPOSE OF AN OPERATING SYSTEM

The purpose of an operating system is to provide an environment in which a user may execute programs.

Abstract view of the components of a computer system



Abstract view of the components of a computer system



Abstract view of the components of a computer system

The hardware - the Central Processing Unit (CPU), the Memory, and the Input/ Output (I/O) Devices - provides the basic computing resources for the system. The application programs - such as word processors, spreadsheets, compilers, and Web browsers - define the ways in which these resources are used to solve users' computing problems. The operating system controls the hardware and coordinates its use among the various application programs for the various users.

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.

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

OTHER DEFINITIONS

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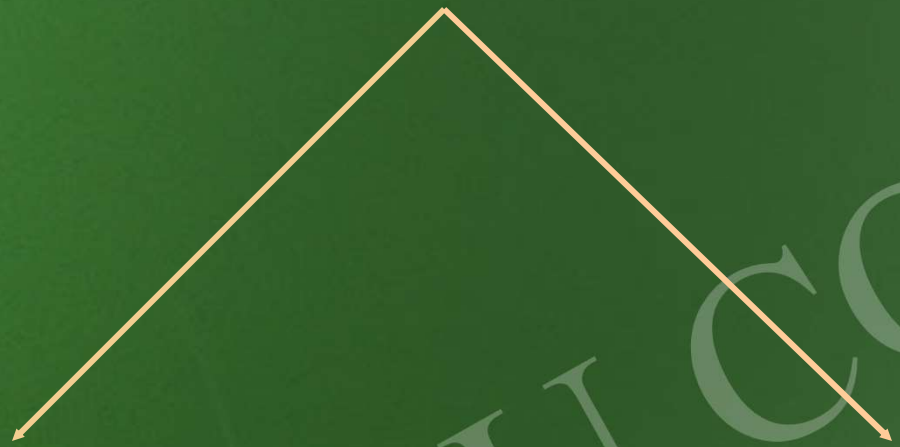
- An Operating System can be defined as a Resource Manager.

As a resource manager and allocator, the OS will resolve the confliting request for computer resources(CPU time, memory space, files storage space, input/output devices, etc) from various users or programs.

COMPUTER HARDWARE & SOFTWARE

- H/w - Physical Components of a Computer.
- S/w – Set of Computer Programs.

COMPUTER SOFTWARE



System Programs

- Which manages the operations of the computer

Application Programs

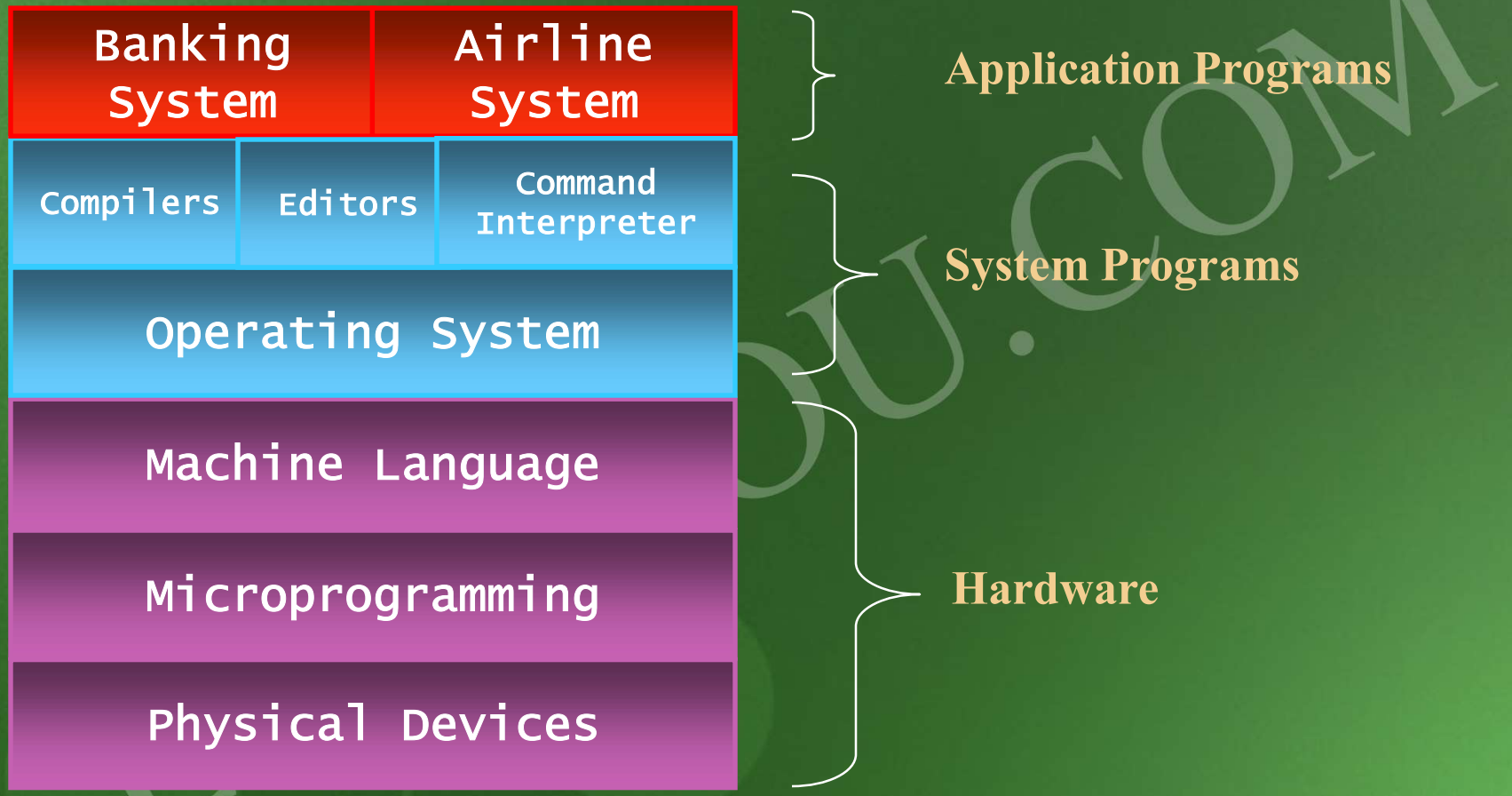
- Which solve problems for their users

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.

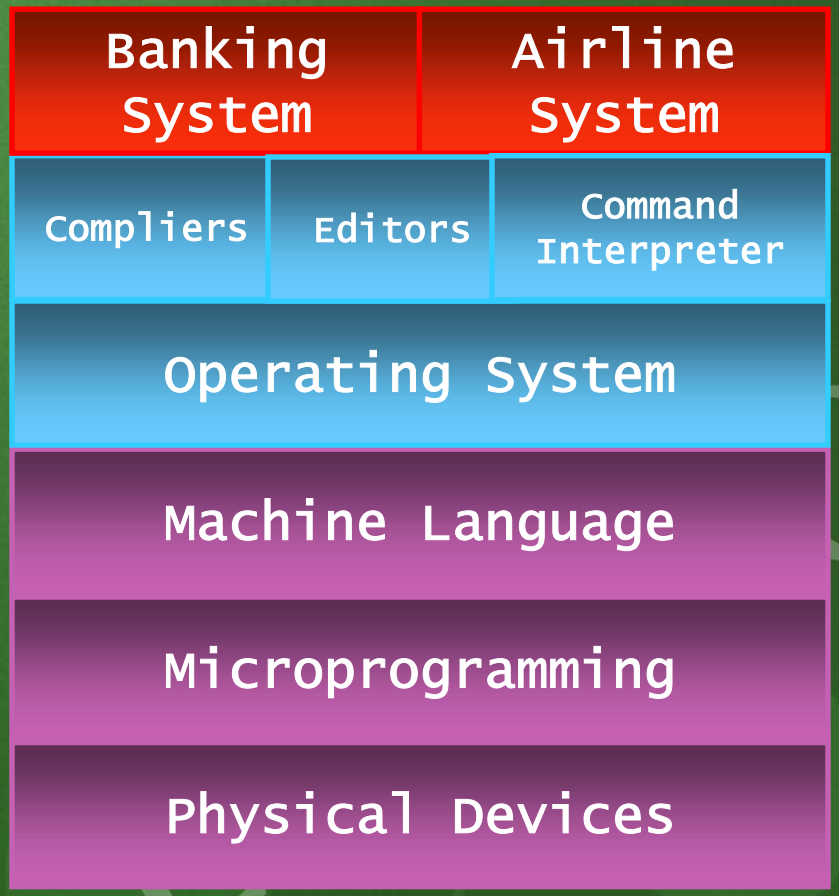
- It is a layer of s/w on the top of the bare h/w, which will shield programmers from the complexity of the h/w.

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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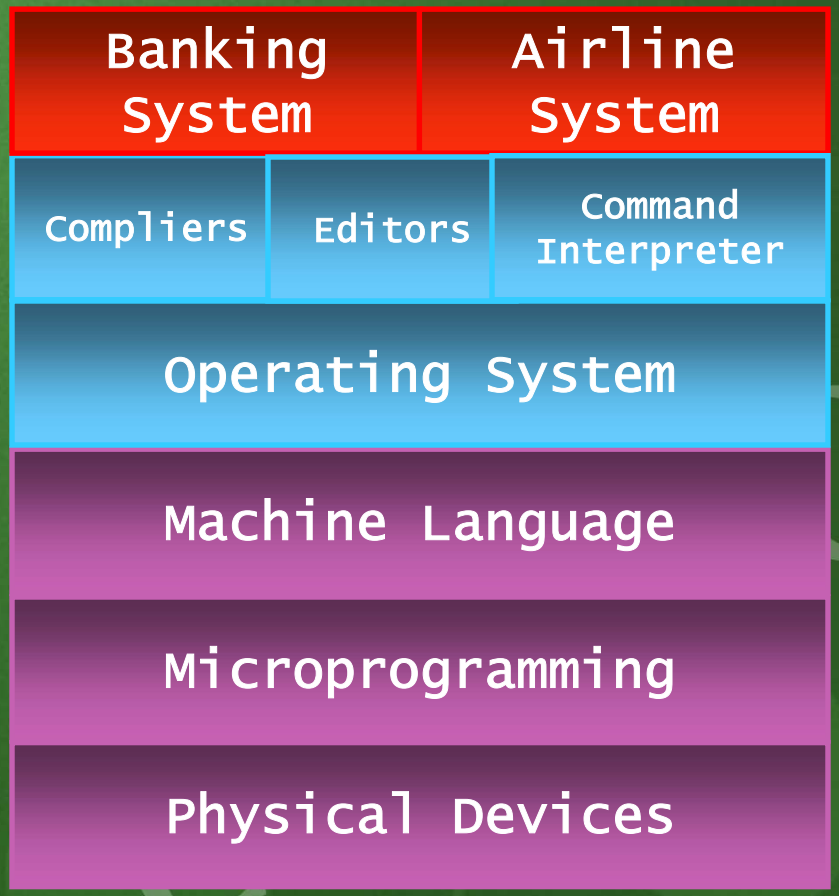

Directly controls the physical devices and provides a cleaner interface to the next layer. It interprets the instructions from the above layer and carry out them.

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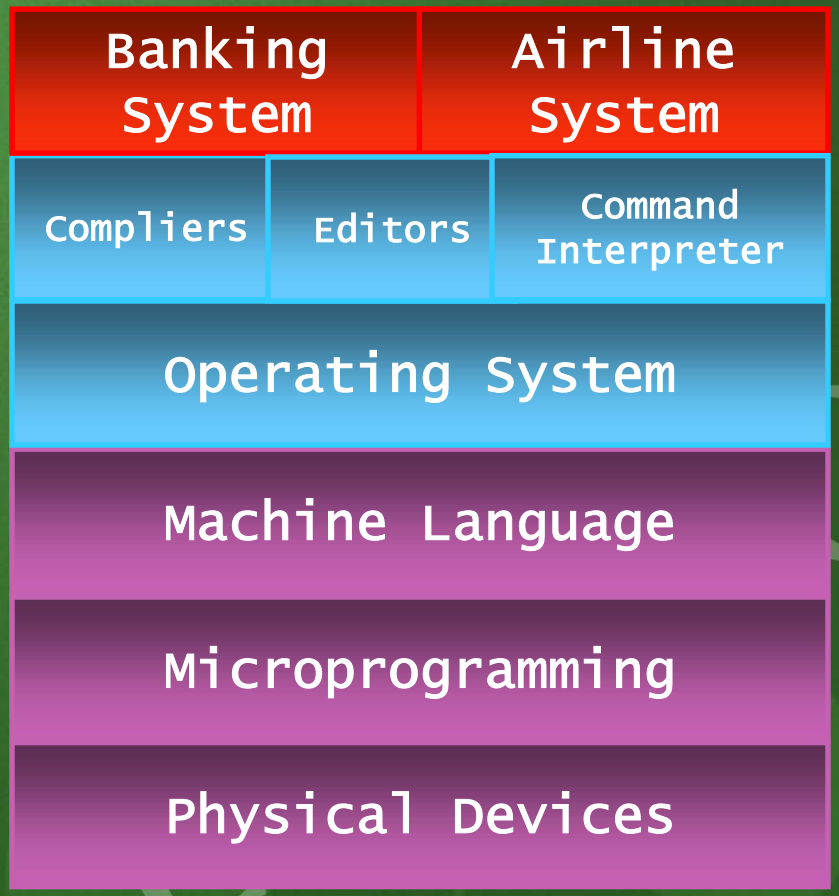

Instructions for moving data around the machine, doing arithmetic and comparing values. I/O devices are controlled by loading values into specified device registers.

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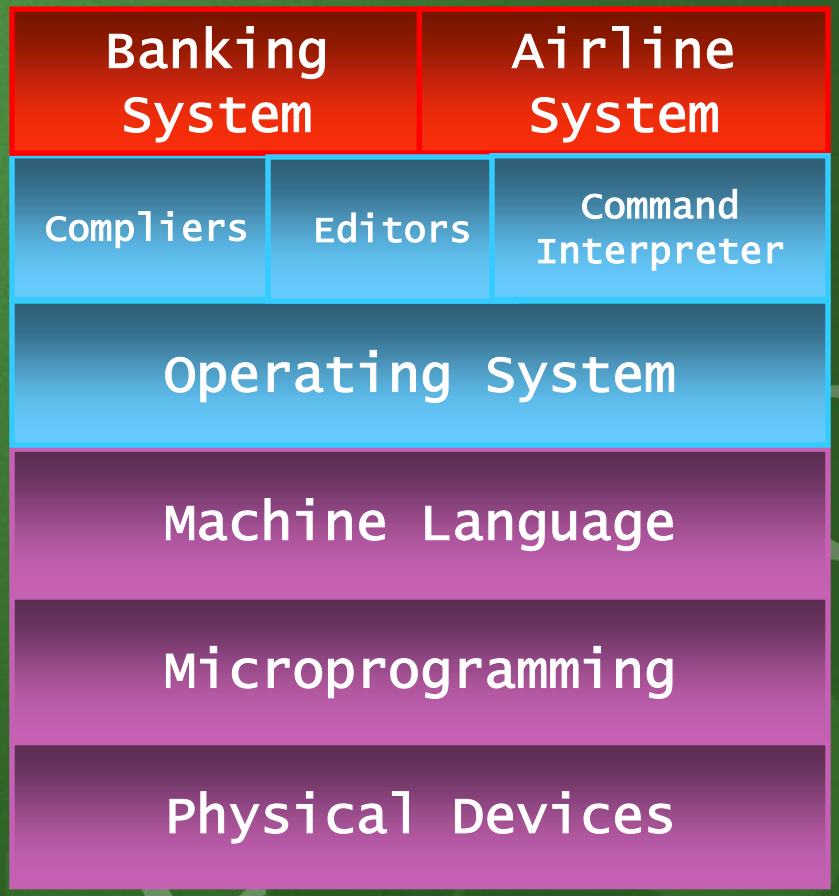

Major function is to hide all h/w complexity and give the programmer a more convenient set of instructions to work with.

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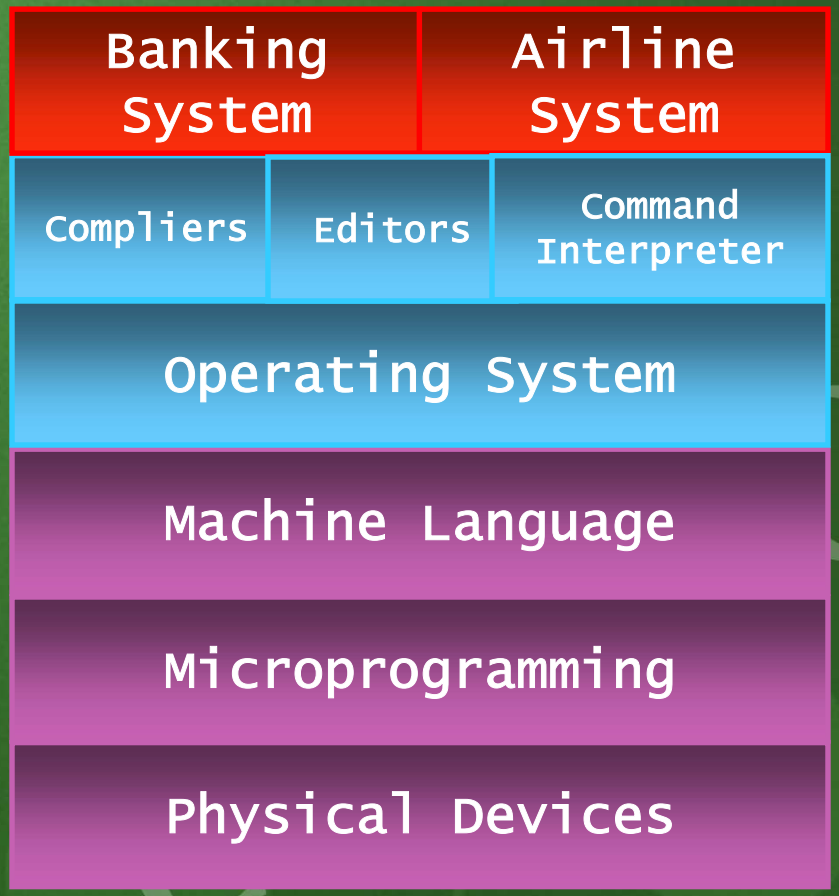
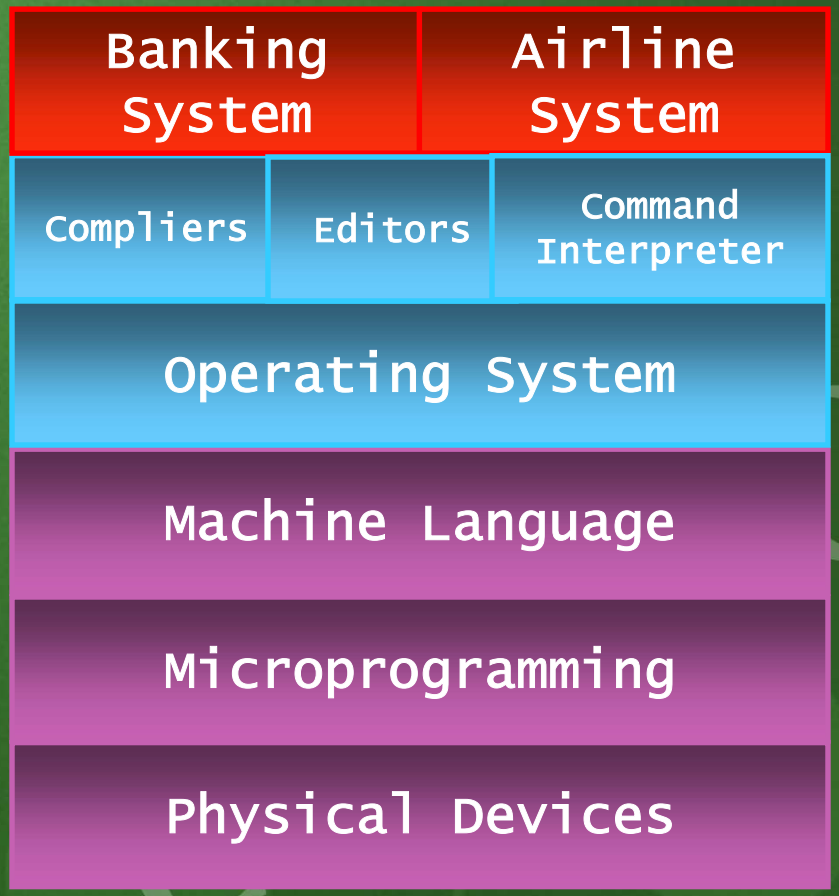


The OS runs in kernel mode but the compilers and editors run in user mode. If a user does not like a particular complier, the user is free to write his own but he is not free to write his own disk interrupt handler, which is part of the OS.

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

Buffering & Spooling

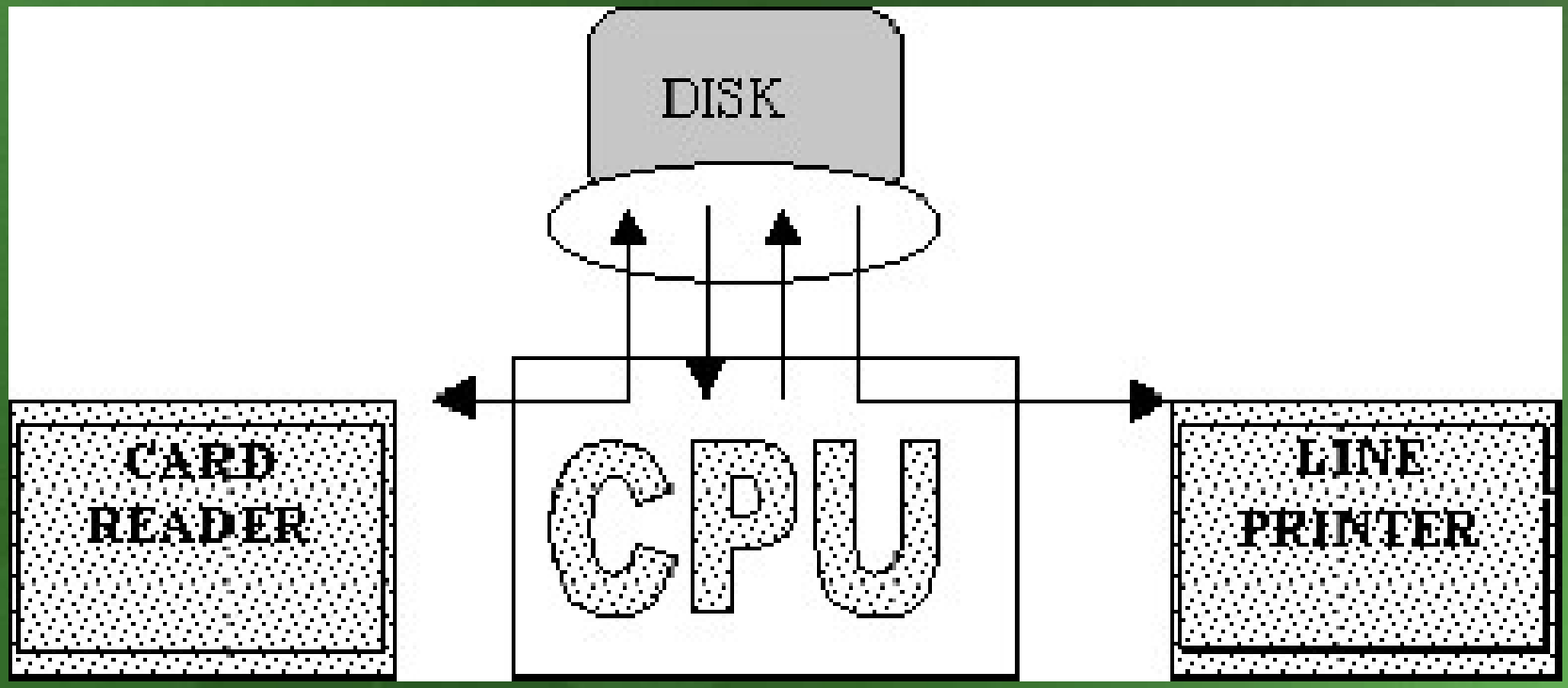
Buffering and Spooling:

More ways to overlap CPU with slower operations.

Buffering:- overlap computing with I/O for same job.

Spooling:- overlap computing with I/O for different jobs.

Spooling



MULTI PROGRAMMING

A multiprogramming operating system is a system that allows more than one active user program to be stored in main memory simultaneously.

Time-sharing systems are multiprogramming systems.

MULTI PROGRAMMING

Multiprogramming:

- Multiprogramming was used as a technique to enhance the throughput efficiency.
- More than one job is “ready” at the same time.

Different types of Multiprogramming Operating System

- Multitasking operating system
- Multiprocessing operating system
- Multi-user operating system

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A computer hardware configuration that includes more than one independent processing unit.

NETWORK OPERATING SYSTEM

The Software that enhances a basic Operating System by adding Networking Features.

Examples: Novell Netware,
WINDOWS NT

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 SYTEM

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
- Proc ss management
- Devi anagement
- Inform anagement
-
-

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

FUNCTIONS OF OPERATING SYSTEM

- Memory management
- Process management
- Dev[illegible]management
- [illegible]
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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
- I
-
-

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
- Inform[illegible]anagement
- Protection
- Error Handling

FUNCTIONS OF OPERATING SYSTEM

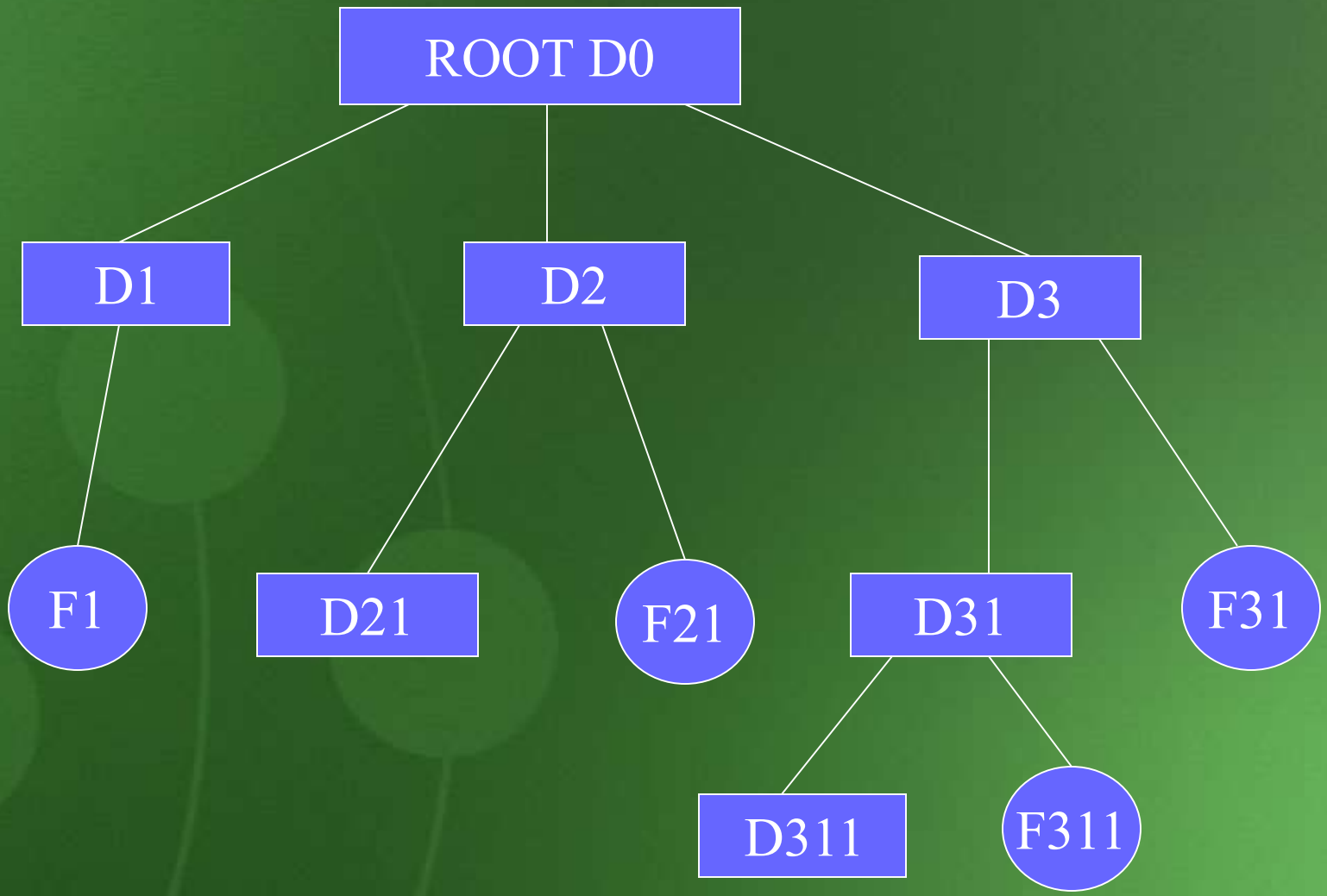
- Memory management
- Process management
-
-
-
- Protec
- Error Handling

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

FILE CONCEPT

- File is a collection of related information.
- It is named and is referred by its name.
- Files are organized into directories for easy access.

DIRECTORY STRUCTURE



SUMMARY:

- Operating system is an essential component of system software which consists of procedures for managing computer resources.

- Operating system functions primarily includes Memory, Process, Device and File management.

Thank You

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