Operating Systems Concepts

Chapter 3

Operating system components

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CHAPTER 3

3. O/S System Components

3.1 Process Management

- **Process**: is a program in execution.
- **Process**: is a unit of work within the system.
- **Process**: is an active entity.
- **Program**: is a passive entity.

-Process components:

A process includes: 1- Code to execute. 2- Data to manipulate.

The O/S is responsible for the following activities in connection with process management:

1- Creation and deletion of both user and system processes.

2- Suspension and resumption processes.

3- Providing mechanisms for process synchronization.

4- Providing mechanisms for process communication.

5- Providing mechanisms for process deadlocks handling.

3.2 Memory Management

The O/S is responsible for the following activities in connection with memory management:

1- Keep track of which parts of memory are currently being used and By whom.

2- Decide which processes are to be loaded into memory when space becomes available.

3- Allocate and de-allocate memory space as needed.

3.3 File Management

- **File**: is a collection of related information defined by its creator.

- **Files** represent programs and data.

The O/S is responsible for the following activities in connection with file management:

1- Creation and deletion files.

2- Creation and deletion directories.

3- Mapping files onto secondary storage.

4- backup files on stable (nonvolatile) storage media.

3.4 I/O System Management

I/O Subsystem consists of:

a- Memory management include buffering, catching and spooling.

b- General device driver interface.

c- Driver for hardware devices.

3.5 Secondary Storage Management.

The O/S is responsible for the following activities in connection with secondary storage management:

a- Free Space management.
b- Storage Allocation.
c- Disk scheduling.

3.6 Networking

Collection of processes, each process has its local memory and clock, the processors communicates with one another through communication lines, such as high speed buses or telephone lines.

3.7 Protection

Controlling the access of program, processes.

3.8 Command Interpreter System.

Interface between the user and the O/S.

System Structure

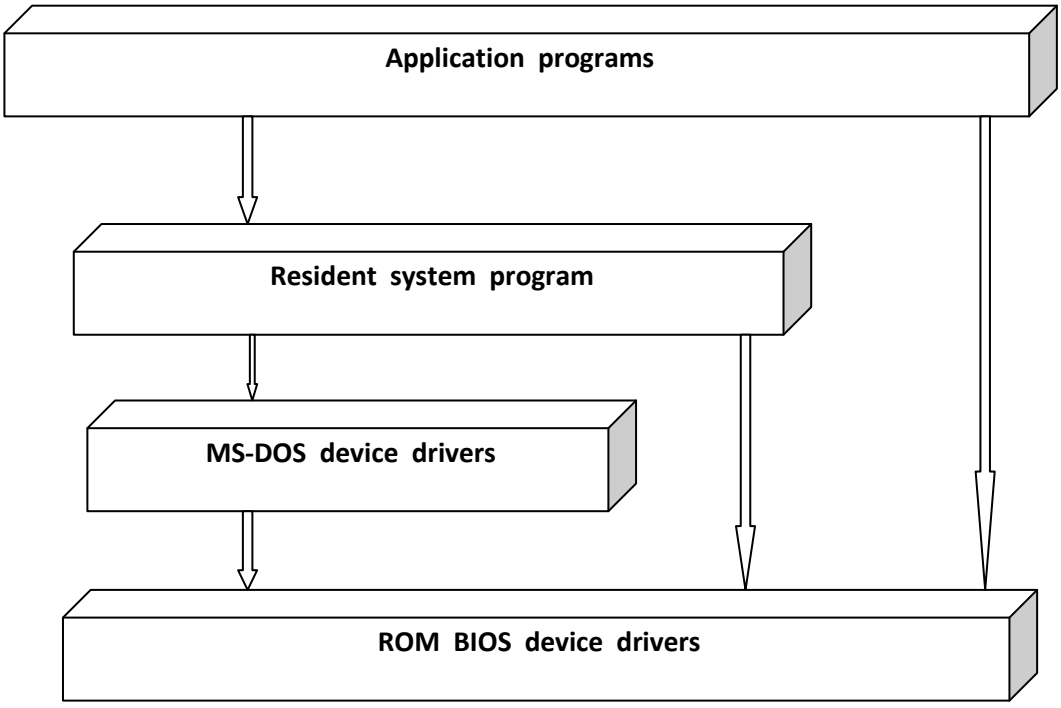
There are two approaches for the O/S structure:

2.1 Simple Structure

Small, simple, and limited systems.

The interfaces and levels of functionality are not well separated.

Example: MS-DOS.



2.2 Layered Approach

Consists of breaking the O/S into number of Layers (levels), each built on top of lower layers. The bottom layer (layer 0) is the H/W, the highest (layer N) is the user interface.

Layer 5:	user program
Layer 4:	buffering for input and output devices
Layer 3:	operator-console device driver
Layer 2:	memory management
Layer 1:	CPU scheduling
Layer 0:	Hardware

The layer structure

Advantages:

a- modularity: The layers are selected such that each uses functions (operations) and services of only lower-level layers.

b- simplifies debugging and system verification: The first layer can be debugged without any concern for the rest of the system.

CHAPTER 3 QUESTIONS

1. State five activities of File- management. (وزاري ٢٠١٦)
2. What is the difference between process and program?
3. state three activities the OS is responsible in connection with process management.
4. state three activities the OS is responsible in connection with process management.
5. state three activities the OS is responsible in connection with secondary storage management.