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**SCHOOL OF COMPUTING AND INFORMATICS**

**CONTINUOUS ASSESSMENT TEST 1&2**

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**UNIT NAME: OPERATING SYSTEMS**

**UNIT CODE: BIT 2104**

1. Briefly describing six main types of operating systems (12 marks)

**Batch operating system**

The users of a batch operating system do 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. To speed up processing, jobs with similar needs are batched together and run as a group. The programmers leave their programs with the operator and the operator then sorts the programs with similar requirements into batches.

**Time-sharing operating systems**

Time-sharing is a technique which eLast In First Out (LIFO):nables many people, located at various terminals, to use a particular computer system at the same time. Time-sharing or multitasking is a logical extension of multiprogramming. Processor's time which is shared among multiple users simultaneously is termed as time-sharing.

**Distributed operating System**

Distributed systems use multiple central processors to serve multiple real-time applications and multiple users. Data processing jobs are distributed among the processors accordingly. The processors communicate with one another through various communication lines (such as high-speed buses or telephone lines). These are referred as loosely coupled systems or distributed systems. Processors in a distributed system may vary in size and function. These processors are referred as sites, nodes, computers, and so on.

**Network operating System**

A Network Operating System runs on a server and provides the server the capability to manage data, users, groups, security, applications, and other networking functions. The primary purpose of the network operating system is to allow shared file and printer access among multiple computers in a network, typically a local area network (LAN), a private network or to other networks.

**Real Time operating System**

A real-time system is defined as a data processing system in which the time interval required to process and respond to inputs is so small that it controls the environment. The time taken by the system to respond to an input and display of required updated information is termed as the response time. So in this method, the response time is very less as compared to online processing. Real-time systems are used when there are rigid time requirements on the operation of a processor or the flow of data and real-time systems can be used as a control device in a dedicated application.

**Hard real-time systems**

Hard real-time systems guarantee that critical tasks complete on time. In hard real-time systems, secondary storage is limited or missing and the data is stored in ROM. In these systems, virtual memory is almost never found.

**Soft real-time systems**

Soft real-time systems are less restrictive. A critical real-time task gets priority over other tasks and retains the priority until it completes. Soft real-time systems have limited utility than hard real-time systems.

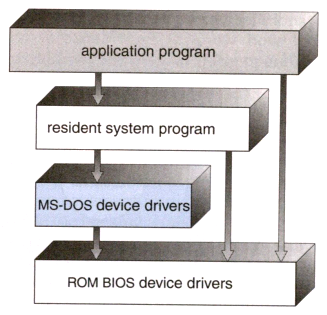
1. Description of any three memory replacement policies. (6 Marks)

**First In First Out (FIFO):** - The page to be replaced is the "oldest" page in the memory, the one which was loaded before all the others

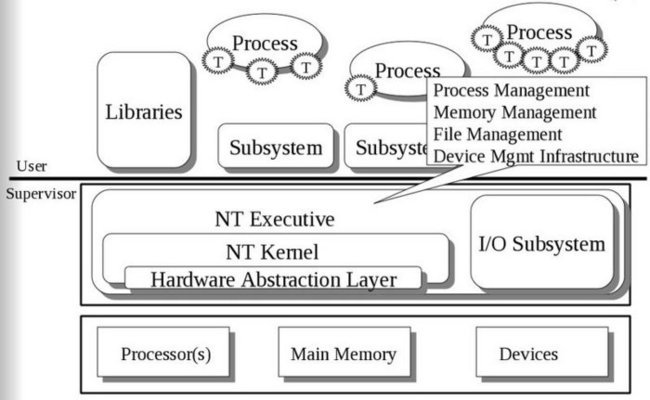
**Least Recently Used (LRU):** The page to be replaced is the one which has not been referenced since all the others have been referenced

**Last In First Out (LIFO):** The page to be replaced is the one most recently loaded into the memory

1. With the aid of clearly labeled diagrams explain the three Operating System structures (9 Marks)



**Simple Structure**: Operating systems such as MS-DOS and the original UNIX did not have well-defined structures. There was no CPU Execution Mode (user and kernel), and so errors in applications could cause the whole system to crash.



**Layered Structure:** This approach breaks up the operating system into different layers. This allows implementers to change the inner workings, and increases modularity.

1. Discussing any three methods of managing security in operating systems. (3 Marks)
2. Performing regular OS patch updates to vulnerabilities
3. Installing updated antivirus engines and software
4. Scrutinizing all incoming and outgoing network traffic through a firewall
5. Creating secure accounts with required privileges only (i.e., user management)