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| **SESSION** | **SEPTEMPER 2024** |
| **PROGRAM** | **BACHELOR OF COMPUTER APPLICATIONS (BCA)** |
| **SEMESTER** | **II** |
| **COURSE CODE & NAME** | **DCA1201 OPERATING SYSTEM** |
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**Set-I**

**1. Discuss the types of operating systems. Write a brief note on operating system structures**

**Ans 1.**

**Types of Operating Systems**

Operating systems (OS) are a fundamental component of computer systems, managing hardware and software resources while providing essential services to users and applications. Depending on their design and use cases, operating systems can be categorized into several types:

**Batch Operating System** In batch systems, similar tasks are grouped together into batches and executed sequentially. Users do not interact directly with the computer. Instead, jobs are prepared offline and submitted to the OS. These systems were prominent in the early days of computing, where the main focus was on maximizing resource utilization.

**Time-Sharing Operating System** Time-sharing systems allow multiple users to share computer

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**2. Discuss the CPU scheduling algorithms. Why is scheduling important?**

**Ans 2.**

**CPU Scheduling Algorithms and the Importance of Scheduling**

CPU scheduling is a crucial process in operating systems, determining which process gets access to the CPU when multiple processes are ready to execute. Efficient CPU scheduling optimizes system performance, ensuring fair resource allocation and minimizing waiting time, response time, and turnaround time. Various algorithms are used for CPU scheduling, each with unique advantages and applications.

**Types of CPU Scheduling Algorithms**

**First-Come, First-Served (FCFS)** FCFS is the simplest scheduling algorithm, where processes

**3. Discuss Interprocess Communication and critical-section problem along with use of semaphores.**

**Ans 3.**

**Interprocess Communication, the Critical-Section Problem, and the Role of Semaphores**

Interprocess Communication (IPC) is a fundamental mechanism in operating systems, enabling processes to exchange data and coordinate their activities. Processes in modern systems often work concurrently, necessitating efficient communication to share resources or synchronize operations. IPC mechanisms include message passing (where processes exchange messages) and shared memory (where processes communicate by accessing common memory regions). These techniques allow processes to collaborate while maintaining independence, but they also give

**Set-II**

**4. What is a Process Control Block? What information does it hold and why? What are monitors? What is it role?**

**Ans 4.**

**Process Control Block (PCB) and Monitors in Operating Systems**

A **Process Control Block (PCB)** is a crucial data structure used by the operating system to manage and track processes. Every process in a system is uniquely represented by its PCB, which contains all the information necessary for process execution and management. When a process is created, its PCB is initialized, and it is updated throughout the process lifecycle. The PCB allows the OS to maintain control over active processes, ensuring efficient multitasking,

**5. Discuss the different File Access Methods. What are I/O Control Strategies?**

**Ans 5.**

**File Access Methods and I/O Control Strategies**

Files are fundamental entities in an operating system, used to store and retrieve data. The method by which files are accessed determines how data can be read, written, or modified. Efficient file access methods and I/O control strategies are crucial for system performance and user satisfaction.

**File Access Methods**

**Sequential Access** Sequential access is the simplest and most common method. Data is read or written in a linear order, starting from the beginning of the file and proceeding sequentially. This

**6. Explain Paging and Segmentation along with page map table and internal external fragmentation details.**

**Ans 6.**

**Paging and Segmentation with Fragmentation Details**

**Paging** and **segmentation** are memory management techniques used by operating systems to efficiently allocate and manage memory while allowing multiple processes to run concurrently. These techniques address the limitations of contiguous memory allocation and ensure better memory utilization.

**Paging**

Paging divides physical memory into fixed-size blocks called **frames** and logical memory into