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3009N606

Candidate's Seat No :_____

B.Sc Sem.-6 (Rep) Examination

CC 310

Computer Science

Time : 2-30 Hours] **September-2024** **[Max. Marks : 70**

Q1(A)	Explain different CPU scheduling algorithms (FCFS, SJF, Round Robin, Priority Scheduling) with examples. Discuss their advantages and disadvantages.	(7)
Q1(B)	Describe the process states and transitions in an operating system. How does the operating system manage these states?	(7)
	OR	
Q1(A)	Discuss the concept of multithreading. Explain the difference between user-level and kernel-level threads.	(7)
Q1(B)	What is deadlock? Explain the necessary conditions for deadlock and the strategies used for deadlock prevention, avoidance, detection, and recovery.	(7)
Q2(A)	Compare and contrast different types of process synchronization mechanisms, such as semaphores, monitors, and spinlocks.	(7)
Q2(B)	Explain the concept of paging and segmentation in memory management. How do they differ in terms of implementation and usage?	(7)
	OR	
Q2(A)	Discuss the different page replacement algorithms (FIFO, LRU, Optimal) and their performance in different scenarios.	(7)
Q2(B)	What is virtual memory? Describe the working of demand paging and explain the benefits of using virtual memory.	(7)
Q3(A)	Explain how memory fragmentation occurs in an operating system. Discuss techniques used to mitigate fragmentation (both internal and external).	(7)
Q3(B)	Describe the role of the Translation Lookaside Buffer (TLB) in memory management and how it improves the performance of the paging mechanism.	(7)
	OR	
Q3(A)	Discuss different file allocation methods (contiguous, linked, indexed) used in file systems. Compare their advantages and disadvantages.	(7)
Q3(B)	What are the main components of a file system? Describe the process of mounting and unmounting file systems.	(7)
Q4(A)	Discuss the different disk scheduling algorithms (FCFS, SSTF, SCAN, C-SCAN, LOOK). Explain their performance in different scenarios.	(7)
Q4(B)	Explain how the operating system manages secondary storage devices. Discuss the importance of disk caching and buffering.	(7)
	OR	
Q4(A)	What is disk fragmentation? How does it affect system performance, and what strategies are used to prevent or mitigate it?	(7)
Q4(B)	Explain the concept of intrusion detection systems (IDS) and intrusion prevention systems (IPS). How do they enhance system security?	(7)
Q5	**MCQ Attempt any seven out of twelve.(2 Marks each)**	**(14)**

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1) Which of the following is not a goal of an operating system?
   A) Manage hardware resources
   B) Provide a user interface
   C) Manage the execution of applications
   D) Manage network protocols
2) What does the "fork" system call do in Unix/Linux?
   A) Terminates a process
   B) Creates a new process
   C) Waits for a process to terminate
   D) Allocates memory to a process
3) In a paging system, what is the role of a page table?
   A) To translate virtual addresses to physical addresses
   B) To manage the file system
   C) To schedule processes
   D) To handle input/output operations
4) Which scheduling algorithm may lead to the "convoy effect"?
   A) Round Robin
   B) First-Come, First-Served (FCFS)
   C) Shortest Job First (SJF)
   D) Priority Scheduling
5) In a system using demand paging, what is a page fault?
   A) An attempt to access a page not in the page table
   B) An error in the page replacement algorithm
   C) A system crash caused by excessive paging
   D) An access violation in the memory
6) Which of the following is true about a process control block (PCB)?
   A) It contains the process's program code
   B) It is used to keep track of CPU scheduling information
   C) It stores data files for the process
   D) It holds the process's I/O operations
7) What is "thrashing" in the context of virtual memory systems?
   A) Excessive page swapping between main memory and disk
   B) The allocation of memory to a process
   C) A high rate of page faults without any page replacement
   D) A type of process synchronization problem
8) What type of operating system structure allows for easy extension and modification of the system functionalities?
   A) Monolithic Kernel
   B) Microkernel
   C) Layered Architecture
   D) Virtual Machine Monitor
9) In which scheduling algorithm do processes get executed in the order of their arrival time?
   A) Shortest Job First (SJF)
   B) Round Robin
   C) First-Come, First-Served (FCFS)
   D) Multilevel Queue Scheduling

10) Which of the following best describes a 'deadlock'?

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A) A situation where all processes are waiting for I/O operations to complete
B) A state where no process can make progress due to waiting for each other to release resources
C) A condition where a process is suspended due to lack of memory
D) A scenario where a process is indefinitely waiting for a CPU.

11) What does 'virtual memory' allow an operating system to do?
A) Use physical memory more efficiently by simulating additional memory
B) Access more physical memory than is actually installed
C) Increase the speed of memory access
D) Provide direct access to hardware memory

12) Which of the following strategies is used to prevent deadlock?
A) Circular Wait
B) Hold and Wait
C) Banker's Algorithm
D) Resource Allocation Graph

BEST OF LUCK