

Code No: V3222

R07**Set No: 1**

III B.Tech. II Semester Supplementary Examinations, December - 2012

OPERATING SYSTEMS

(Computer Science and Engineering)

Time: 3 Hours**Max Marks: 80**

Answer any FIVE Questions

All Questions carry equal marks

- 1
 - a) Explain the concept of time sharing in OS.
 - b) What are the responsibilities of OS in process management?
 - c) What is file system mounting? How it is done?
 - d) Explain the process of booting the system.

- 2
 - a) What are the objectives of process schedulers? What are different types of schedulers? Explain queueing-diagram representation of process scheduling.
 - b) Explain the process scheduling in Linux.

- 3
 - a) What is critical section problem? Write a solution to the Bounded-buffer producer-consumer problem using semaphores.
 - b) What is a serializable schedule? Explain the locking protocol to ensure serializability.

- 4
 - a) On a simple paging system with 2^{20} bytes of physical memory, 512 pages of logical address space and a page size of 2^8 bytes
 - (i) How many bits are in a logical address?
 - (ii) How many bits are in a physical address?
 - (iii) How many entries are in the page table (How long is the page table)?
 - (iv) How many bits are needed to store an entry in the page table?
 - b) Discuss about the paging hardware with TLB.

- 5
 - a) Explain the services provided by kernel I/O subsystem.
 - b) Explain the different options for breaking a deadlock.

- 6
 - a) Explain the following methods of allocating disk space
 - i) Linked allocation
 - ii) Indexed allocation
 - b) Explain the schemes of defining the logical structure of the directory system.

- 7
 - a) Discuss the following about disk management.
 - i) Disk Formatting
 - ii) boot block
 - b) Discuss some of the tertiary-storage devices.

- 8
 - a) Discuss about revocation of access rights in detail.
 - b) Discuss the different security threats and attacks.

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R07**Set No: 2**

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Answer any FIVE Questions

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- 1 a) Explain the layered approach and microkernel approach to system design.
b) List and explain the different operating system services.
- 2 a) What is a process? What are its different states? Explain CPU switching from process to process.
b) Explain the multithreaded models for user and kernel threads.
- 3 a) What is meant by atomic transactions? Explain log-based recovery algorithm to ensure atomicity.
b) What is a semaphore? How it can be used in a solution to the critical-section problem? How to overcome the need for busy waiting?
- 4 a) A process references five pages A,B,C,D, and E in the following order:
A, B, C, D, A, B, E, A, B, C, D, E. Find the number of page faults if the page frame size is 3 for LRU ii) Optimal. Show all calculations.
b) What is segmentation? Explain
- 5 a) What is safe state and unsafe state? Discuss about the deadlock avoidance.
b) Discuss about the deadlock prevention approach.
- 6 a) What is file-control block? Explain.
b) What are the different file attributes?
c) Explain the linked method of allocating disk space with its advantages and disadvantages.
- 7 a) Suppose the read-write head is at track 36, moving towards track 399 (the highest numbered track on the disk) and disk request queue contains read/write requests for sectors on tracks : 120, 312, 12, 296, 10, 390, 37, and 50 respectively. What is the total number of head movements to satisfy the requests in the queue using:i) FCFS ii) SSTF iii) SCAN iv) C-SCAN
b) Explain the different RAID levels.
- 8 a) Discuss about the implementation of access matrix in detail.
b) Explain the symmetric and asymmetric encryption algorithms.

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R07**Set No: 3**

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Answer any FIVE Questions
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- 1
 - a) What is client-server system? How it differs from peer-to-peer systems?
 - b) Explain the layered approach of designing the OS.
 - c) Discuss the operating-system services provided for users.

- 2
 - a) What are the different scheduling criteria for comparing CPU scheduling algorithms?
 - b) Consider the following set of processes, with the length of the CPU-burst time given in milliseconds:

Process	Burst Time
P1	3
P2	1
P3	5
P4	2
P5	7

The processes are assumed to have arrived in the order P1, P2, P3, P4, P5 all at time 0.

- (i) Draw four Gantt charts illustrating the execution of these processes using SJF, and RR (quantum = 1) scheduling.
 - (ii) What is the waiting time of each process for each of the scheduling algorithms in part (i)?
-
- 3
 - a) What are the requirements for a solution to a critical section problem? Explain Peterson's solution to the critical section problem.
 - b) What is concurrency control? Discuss the time-stamp based protocol.

 - 4
 - a) Consider the following page address sequence with 100 bytes page.
0190, 0324, 0101, 0622, 0102, 0103, 0124, 0451, 0256, 0411, 0102, 0103, 0104, 0610, 0103, 0243, 0104, 0312, 0613
How many page faults will occur for the following replacement algorithms if three frames are available and all frames are initially empty.
(i) LRU (ii) FIFO
 - b) Explain the following techniques for structuring the page table in detail.
i) Hierarchical paging ii) Inverted page table

 - 5
 - a) What are the necessary conditions for deadlock? Explain briefly.
 - b) Explain the concept of blocking and non-blocking I/O.
 - c) Explain the life cycle of an I/O request.

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- 6 a) What are the data structures used for a file directory?
b) Discuss the free-space list implementation by bit-vector.
c) Explain the concept of file mounting.
- 7 a) Suppose the read-write head is at track 96, moving towards track 299 (the highest numbered track on the disk) and disk request queue contains read/write requests for sectors on tracks : 86, 142, 172, 69, 290, 29, 17, and 120 respectively. What is the total number of head movements to satisfy the requests in the queue using:
i) FCFS ii) SSTF iii) SCAN iv) C-SCAN
b) What is RAID? How it improves performance?
- 8 a) Discuss the performance issues of tertiary-storage.
b) Explain the different file access control methods

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Answer any FIVE Questions
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- 1
 - a) Explain the process of transition from user to kernel mode using mode bit.
 - b) What is meant by peer-to-peer system?
 - c) Discuss about the operating system components.

- 2
 - a) Consider the following four processes represented as (Process, Burst Time, Priority) with the length of CPU burst in milliseconds. { (P1, 5, 3), (P2, 10, 1), (P3, 3, 3), (P4, 5, 4), (P5, 1, 2) }. The processes are assumed to have arrived in the order P1, P2, P3, P4, P5, all at time 0. Using nonpreemptive priority scheduling (a smaller priority number implies a higher priority) i) Draw Gantt chart. ii) Calculate average waiting time.
 - b) What is meant by preemptive and nonpreemptive scheduling algorithms? Which algorithms are preemptive and nonpreemptive? Explain RR scheduling and effect of quantum size on its performance.

- 3
 - a) What is the need of process synchronization? Explain the hardware-based solution for process synchronization.
 - b) What is semaphore? What is meant by counting semaphore and binary semaphore?
Discuss mutual exclusion implementation using semaphore.

- 4
 - a) Consider a logical-address space of eight pages of 1024 words each, mapped onto a physical memory of 32 frames.
 - (i) How many bits are in the logical address?
 - (ii) How many bits are in the physical address?
 - b) What do you mean by virtual memory? What is its need?
 - c) Explain the concept of demand paging in detail.

- 5
 - a) Explain about the deadlock prevention briefly.
 - b) What is Wait-for graph? Explain with example.
 - c) Explain in detail the Banker's algorithm with suitable example.

- 6
 - a) What is file-control block? Explain.
 - b) Explain the direct access method of a file.
 - c) Discuss the schemes for defining logical structure of a directory.

- 7
 - a) With suitable example, explain SSTF disk scheduling algorithm.
 - b) What is a stable storage? How to implement such storage?

- 8
 - a) Explain the different system and network threats in detail.
 - b) Discuss about the security provision in Linux.

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