Code :R7320501

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III B.Tech II Semester(R07) Regular & Supplementary Examinations, April/May 2011
OPERATING SYSTEMS
(Computer Science & Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE questions
All questions carry equal marks

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1. (a) Define the essential properties of the following types of operating systems:
    i. Time sharing
    ii. Distributed
   (b) Give a note on system calls used for process control.

2. (a) Explain the two fundamental models for interprocess communication.
   (b) Explain evaluation of CPU schedulers by simulation.

3. (a) What is monitor? Give the syntax of a monitor? Explain how conditional construct provides additional synchronization mechanisms.
   (b) Explain the mechanisms adopted in Solaris to control access to critical sections.

4. (a) What is relocation? Explain dynamic relocation using a relocation register.
   (b) Explain the concept of virtual memory.

5. (a) Write the algorithm which determines whether a request can be safely granted.
   (b) Explain how the operating system transforms I/O requests to hardware operations?

6. Mention the three major methods of allocating disk space. Explain each in detail with examples.

7. Suppose that a disk drive has 5000 cylinders, numbered 0 to 4999. The drive is currently serving a request at cylinder 143 and the previous request was at cylinder 125. The queue of pending requests in FIFO order is:
   86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130
   Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for each of the following disk-scheduling algorithms?
   (a) FCFS (b) SSTF (c) SCAN (d) LOOK

8. (a) Discuss in detail about the domain structure.
   (b) What is the difference between a threat and attack? Explain about the various security attacks.

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1. (a) Explain with an example how system calls are used.

   (b) With a neat diagram explain the structure of traditional UNIX operating system.

2. (a) Solve producer-consumer problem using shared-memory.

   (b) Write about process management in UNIX.

3. (a) What are the various types of errors generated when programmers use semaphores incorrectly to solve the critical section problem?

   (b) Explain Peterson's solution to critical section problem.

4. (a) What is meant by memory protection? Explain how memory is protected by using base register and limit register.

   (b) Discuss the hardware support required to support demand paging.

5. Consider the following snapshot of a system

	Allocation	Max	Available
	A B C D	A B C D	A B C D
P_0	0 0 1 2	0 0 1 2	1 5 2 0
P_1	1 0 0 0	1 7 5 0	
P_2	1 3 5 4	2 3 5 6	
P_3	0 6 3 2	0 6 5 2	
P_4	0 0 1 4	0 6 5 6	

   Answer the following questions using the Banker's algorithm:
   (i) What is the content of the matrix need?
   (ii) Is the system in Safe State?
   If a request from process P1 arrives for (0,4,2,0), can be request be granted immediately?

6. (a) Discuss about general graph directory structure? What are its advantages and disadvantages?

   (b) Discuss about allocation method in detail. Mention its advantages and disadvantages.

7. Explain the differences between SCAN, C-SCAN, LOOK, and C-LOOK disk scheduling algorithm with an example.

8. (a) Discuss the goals of system protection.

   (b) Explain the significance of cryptograph as a security tool.

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1. (a) What are the goals of an operating system?
   (b) Explain the services provided by the operating system to the user?

2. (a) Explain how a process creates a new process.
   (b) Explain multilevel queue scheduling.

3. (a) What is a semaphore? Explain the usage and implementation of semaphores.
   (b) What are the drawbacks of log-based recovery?

4. (a) Explain the concept of swapping.
   (b) Discuss LRU Page replacement algorithm.

5. What is deadlock? What are the necessary conditions for the deadlock to occur? Explain various deadlock prevention techniques?

6. (a) Discuss about general graph directory structure? What are its advantages and disadvantages?
   (b) Compare and contrast contiguous allocation and linked allocation techniques.

7. (a) How do system designers choose a RAID level?
   (b) Discuss the ways a computer can access disk storage in detail. Mention their limitations.

8. (a) What do you mean by protection? What are the goals of protection?
   (b) Illustrate the concept of access matrix with an example

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1. Explain the following:

    (a) Multimedia Systems

    (b) Handheld Systems

    (c) Microkernels

    (d) Operating-system generation.

2. (a) Describe the actions taken by a kernel to context-switch between process.

    (b) What are the benefits of multithreaded programming.

3. (a) What is readers-writers problem? Solve the problem using semaphores.

    (b) What is priority inversion? What is the solution for it?

4. (a) Explain the concept of dynamic loading.

    (b) What is demand paging? Explain the hardware support for demand paging.

5. Consider the deadlock situation that could occur in the dining philosopher's problem when the philosophers obtain the chopsticks one at atime. Discuss the four conditions for deadlocks indeed hold in the setting. Discuss how deadlocks could be avoided by eliminating any one of the four conditions.

6. Give a detailed description of various techniques of implementing free space list.

7. (a) Why is it difficult to map a logical block number onto the sectors of the disk?

    (b) Explain the following RAID levels with diagrams:

        i. Memory-style error-correcting code organization

        ii. Bit-interleaved parity organization

        iii. Block-interleaved parity organization

8. (a) Discuss about the ways of realizing a domain.

    (b) Give a note on major methods, tools, and techniques that are used to improve resistance to threats.

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