Code No: R31056

R10

Set No: 1

III B.Tech. I Semester Supplementary Examinations, May 2013
OPERATING SYSTEMS
(Common to Computer Science and Engineering & Information Technology)

Time: 3 Hours **Max Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
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1. (a) Distinguish between the client server and peer-to-peer models of distributed systems.
   (b) Define the essential properties of the batch and time sharing Operating Systems.

2. (a) What is difference between a program and a process? Explain the different process states.
   (b) Consider the following four processes represented as (Process, Arrival Time, Burst Time) with the length of CPU burst in milliseconds.
   { (P1, 0, 10), (P2, 1, 7), (P3, 2, 13), (P4, 3, 11) }. Using preemptive SJF scheduling
       i) Draw Gantt chart.
       ii) Calculate average waiting time.

3. (a) What is critical section problem? Write a solution to the Bounded-buffer producer-consumer problem using semaphores.
   (b) Discuss the classic problems of synchronization.

4. (a) What is internal and external fragmentation?
   (b) Explain the first-fit, best-fit, and worst-fit allocation algorithms. Which one is better?
   (c) Explain the concept of swapping.

5. (a) Explain the concept of demand paging in detail.
   (b) 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
       (i) FIFO (ii) LRU. Show all calculations.
   (c) When does page fault occurs? State the steps in handling a page fault.

6. (a) What is safe state and unsafe state? Discuss about the deadlock avoidance.
   (b) Discuss the ways to prevent deadlock.
   (c) Explain in detail the Banker's algorithm with suitable example.

7. (a) Explain the free space list implementations in detail.
   (b) Discuss about the tree-structured directory structure.

8. (a) With suitable example, explain SSTF disk scheduling algorithm.
   (b) What is CLV, in what way it is different from CAV? Briefly describe Host attached storage.

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R10

Set No: 2

III B.Tech. I Semester Supplementary Examinations, May 2013
OPERATING SYSTEMS
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Time: 3 Hours   **Max Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
*****

1. (a) What is system call? Discuss the types of system calls.
   (b) Explain the dual-mode operation of operating system.

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 single threaded and multithreaded process? What are the benefits of multithreded programming?

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 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) List and explain the techniques for structuring the page table.
   (b) On a simple paging system with 2^{24} 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?

5. (a) Explain the second-chance replacement algorithm.
   (b) Explain the concept of Translation Lookaside Buffer.
   (c) What is virtual memory? Discuss about demand paging in detail.

6. (a) Explain about the deadlock prevention briefly.
   (b) What is deadlock? What are the necessary and sufficient conditions for deadlock? How can it be avoided?

7. (a) Explain the schemes of defining the logical structure of the directory system.
   (b) What is file system mounting? How it is done?

8. (a) What is SCSI initiator? Briefly describe Network-Attached storage.
   (b) Suppose the read-write head is at track 90, moving towards track 299 (the highest numbered track on the disk) and disk request queue contains read/write requests for sectors on tracks: 86, 242, 171, 26, 281, 92, 13, and 150 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

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Code No: R31056

R10

Set No: 3

III B.Tech. I Semester Supplementary Examinations, May 2013
OPERATING SYSTEMS
(Common to Computer Science and Engineering & Information Technology)

Time: 3 Hours   **Max Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
*****

1. (a) What is the purpose of interrupts? What are the differences between a trap and an interrupt? Can traps be generated intentionally by a user program? If so, for what purpose?
   (b) Write a note on operating system generation.

2. Discuss the different CPU scheduling algorithms with a suitable example of each scheduling.

3. (a) What is race condition? Explain with an example.
   (b) Discuss dining philosopher's problem and a solution for it.

4. (a) Explain the following techniques for structuring the page table in detail.
               (i) Hierarchical paging   (ii) Inverted page table
    (b) Describe a mechanism for enforcing memory protection in order to prevent a program from modifying the memory associated with other programs.

5. (a) Consider the following page address sequence with 100 bytes page.
   0100, 0432, 0101, 0612, 0102, 0103, 0104, 0451, 0256, 0611, 0102, 0103, 0104, 0610, 0103, 0234, 0104, 0321, 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) OPTIMAL
   (b) Explain the concept of demand paging in detail.

6. (a) Explain in detail the Banker's algorithm with suitable example.
   (b) How to recover from a deadlock? Explain.

7. (a) Explain the indexed method of allocating disk space with its advantages and disadvantages.
   (b) What is file-control block? Explain.

8. (a) What is ISCSI & Briefly describe SAN.
   (b) What is Disk attachment? Briefly describe Swap-Space management.

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Code No: R31056

R10

Set No: 4

III B.Tech. I Semester Supplementary Examinations, May 2013
OPERATING SYSTEMS
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Time: 3 Hours **Max Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
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1. (a) Discuss the operating-system services provided for users.
   (b) What do you mean by virtual machine? Discuss its implementation.

2. (a) What are the different scheduling criteria for comparing CPU scheduling algorithms?
   (b) What are the objectives of process schedulers? What are different types of schedulers?
   (c) Explain queueing-diagram representation of process scheduling.

3. (a) What is the need of process synchronization? Explain the hardware-based solution for process synchronization.
   (b) Make a comparison of semaphores & monitors.

4. (a) Explain the concept of segmentation in detail.
   (b) Explain about the inverted page table.
   (c) Explain the difference between external fragmentation and internal fragmentation.

5. (a) What is thrashing? What are the causes of thrashing?
   (b) Consider a logical-address space of eight pages of 2048 words each, mapped onto a physical memory of 16 frames.
      (i) How many bits are in the logical address?
      (ii) How many bits are in the physical address?
   (c) What do you mean by virtual memory? What is its need?

6. (a) What for Banker's algorithm is used? How it is applied? Explain with example.
   (b) What are the necessary conditions for deadlock?

7. (a) Explain the following methods of allocating disk space
      (i) Linked allocation   (ii) Indexed allocation
   (b) Explain the different options for breaking a deadlock.

8. (a) With suitable example, explain SCAN disk scheduling algorithm.
   (b) Discuss about swap-space management.

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