Code No: R31056 **R10** **Set No: 1**

III B.Tech. I Semester Supplementary Examinations, June/July -- 2014

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) Discuss about the major operating systems components with its abstract view in detail.
   b) How are network computers different from traditional personal computers? Describe some usage scenarios in which it is advantageous to use network computers. [7+8]

2. a) Consider the following set of processes, with the length of the CPU burst given in milliseconds:

Process	Burst Time	Priority
P_1	10	3
P_2	1	1
P_3	2	3
P_4	1	4
P_5	5	2

   The processes are assumed to have arrived in the order P_1, P_2, P_3, P_4, P_5, all at time 0. Draw Gantt chart that illustrate the execution of these processes using the non preemptive priority (a smaller priority number implies a higher priority) scheduling algorithm. What is the turnaround time and waiting time of each process?
   b) Explain in detail about the techniques used for communication in client server systems.[8+7]

3. a) What is critical section problem? Explain about requirements that must satisfy for a solution to the critical-section problem.
   b) Describe in detail about mutual exclusion implementation with semaphores. [8+7]

4. a) Given five memory partitions of 100 KB, 500 KB, 200 KB, 300 KB, and 600 KB (in order), how would each of the first-fit, best-fit, and worst-fit algorithms place processes of 212 KB, 417 KB, 112 KB, and 426 KB (in order)? Which algorithm makes the most efficient use of memory?
   b) Describe in detail about the principles of the working-set model. [8+7]

5. (a) Discuss briefly about virtual memory management.
   (b) Explain in detail copy-on-write technique. [8+7]

6. a) Explain in detail about steps in a DMA transfer.
   b) Write the test for safety algorithm for Deadlock detection. [8+7]

7. a) Discuss in detail about different file access methods .
   b) What are the advantages and disadvantages of recording the name of the creating program with the file's attributes (as is done in the Macintosh operating system)? [7+8]

8. a) Explain in detail about Circular SCAN (C-SCAN) scheduling .
   b) Could a RAID Level 1 organization achieve better performance for read requests than a RAID Level 0 organization (with non-redundant striping of data)? If so, how? [7+8]

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Code No: R31056 **R10** **Set No: 2**

III B.Tech. I Semester Supplementary Examinations, June/July -- 2014

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) 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) How a modern computer system works? Explain in detail. [8+7]

2. a) Explain in detail about the benefits of multi threaded programming.
   b) Describe about scheduling criteria for comparing CPU scheduling algorithms. [7+8]

3. a) Describe in detail classical problems of synchronization.
   b) Show that the two-phase locking protocol ensures conflict serializability. [7+8]

4. a) Explain in detail about the structure of page table. What is the purpose of paging the page tables?
   b) Discuss in detail about n optimal page-replacement algorithm. [8+7]

5. a) Consider a system with five processes P_0 through P_4 and three resource types A,B,C. Resource type A has 10 instances ,resource type B has 5 instances and resource type C has 7 instances .Suppose that, at time T_0 the following snapshot of the system has been taken

	Allocation	Max	Available
	A B C	A B C	A B C
P_0	0 1 0	7 5 3	3 3 2
P_1	2 0 0	3 2 2	
P_2	3 0 2	9 0 2	
P_3	2 1 1	2 2 2	
P_4	0 0 2	4 3 3	

   Find whether this system is safe or not .Also find sequence that satisfies safety requirement.

   b) Describe about structure of an operating system's I/O subsystem. [8+7]

6. (a) What is demand paging ? Discuss in detail the steps in handling a page fault .Explain about performance of demand paging in detail.
   (b) What is the cause of thrashing? How does the system detect thrashing? Once it detects thrashing, what can the system do to eliminate this problem. [8+7]

7. a) Explain different allocation methods for f allocating disk space in detail.
   b) Discuss about implementing local file systems and directory structures file system implementation in detail. [7+8]

8. a) Describe in detail about disk attachment .
   b) Discuss about stable storage implementation in detail. [7+8]

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Code No: R31056 **R10** **Set No: 3**

III B.Tech. I Semester Supplementary Examinations, June/July -- 2014

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) Define the essential properties of the following types of operating systems:
   i) Batch
   ii)Interactive
   iii) Time sharing
   iv) Real time

   b) How do clustered systems differ from multiprocessor systems? What is required for two machines belonging to a cluster to cooperate to provide a highly available service? [8+7]

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

   b) Consider the following set of processes, with the length of the CPU burst given in milliseconds:

Process	Burst Time	Priority
P_1	10	3
P_2	1	1
P_3	2	3
P_4	1	4
P_5	5	2

   The processes are assumed to have arrived in the order P_1, P_2, P_3, P_4, P_5, all at time 0. Draw Gantt chart that illustrate the execution of these processes using the FCFS scheduling algorithm. What is the turnaround time and waiting time of each process? [7+8]

3. a) Explain about software-based Peterson's solution to the critical-section problem.

   b) Discuss in detail about implementing a Monitor using Semaphores. [8+7]

4. a) Explain why sharing a reentrant module is easier when segmentation, is used than when pure paging is used.

   b) What is the cause of thrashing? How does the system detect thrashing? Once it detects thrashing, what can the system do to eliminate this problem? [7+8]

5. (a) Discuss briefly about global versus local allocation of frames.
(b) Consider LRU, FIFO, Optimal page replacement algorithms. Rank these algorithms from bad to perfect according to their page fault rate. Separate those algorithms which suffer from Belady's anomaly from those which do not. [7+8]

6. a) Explain in detail about Interrupt-driven I/O cycle.
b) What is a dead lock? What are necessary conditions for a deadlock situation to arise? [7+8]

7. a) Explain about free space management in detail.
b) Explain in detail about operations that are to be performed on a directory and also describe the most common schemes for defining the logical structure of a directory. [7+8]

8. a) Explain about swap-space management in detail.
b) Explain the performance characteristics of mass-storage devices. [7+8]

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Code No: R31056 **R10** **Set No: 4**

III B.Tech. I Semester Supplementary Examinations, June/July -- 2014

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) In a multiprogramming and time-sharing environment, several users share the system simultaneously. This situation can result in various security problems.
   i) What are two such problems?
   ii) Can we ensure the same degree of security in a time-shared machine as in a dedicated machine? Explain your answer.
   b) Distinguish between the client-server and peer-to-peer models of distributed systems. [8+7]

2. a) Which of the following scheduling algorithms could result in starvation?
   i. First-come, first-served
   ii. Shortest job first
   iii. Round robin
   iv. Priority
   b) Discuss in detail about APIs for Phtreads and Win32 in detail. [8+7]

3. a) Describe about monitor solution to the dining-philosopher problem. [8+7]
   b) Discuss in detail about implementing a Monitor using Semaphores

4. a) Discuss in detail about demand paging.
   b) Describe in detail about paging in memory management scheme. [7+8]

5. a) Explain about transforming I/O requests to hardware operations in detail. [7+8]
   b) Consider the following snapshot of the 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	

Find whether this system is safe or not .Also find sequence that satisfies safety requirement.

6. (a) Explain in detail copy-on-write technique.
(b) Consider the following page reference string: 1,2,3,4,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6. How many page faults would occur for the FIFO replacement algorithm for 3 frames?

7. a) Describe in detail about variety of techniques used to improve the efficiency and performance of secondary storage.
b)What is a directory ? Explain in detail about implementation of directory. [8+7]

8. a) Explain about FCFS disk-scheduling algorithms.
b) Describe in detail about tertiary storage structure. [8+7]

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