

APJ ABDULKALAM TECHNOLOGICAL UNIVERSITY
08 PALAKKAD CLUSTER

Q. P. Code : CS-1A-19-1

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Name:

Reg. No:

FIRST SEMESTER M.TECH. DEGREE EXAMINATION DEC 2019

Branch: Computer Science and Engineering Specialization: Computer Science and Engineering

08CS6011 : OPERATING SYSTEM DESIGN

Time: 3 hours

Max. marks: 60

Answer all six questions.

Modules 1 to 6: Part 'a' of each question is compulsory and answer either part 'b' or part 'c' of each question.

Q.no.	Module 1	Marks
1.a	What happens when an interrupt occurs	3
	Answer b or c	
b	Illustrate the flow of control during a system call	6
c	With a neat sketch, explain the flow of control during process switching	6
Q.no.	Module 2	Marks
2.a	Draw a resource allocation graph with two processes and two resources i) where the two processes are deadlocked. ii) where both resources are allocated but the processes are not deadlocked	3
	Answer b or c	
b	Explain the relationship between signaling, rendezvous and producer consumer problem	6
c	Discuss in detail about the strategies for dealing with deadlocks	6
Q.no.	Module 3	Marks
3.a	Suppose that your memory management hardware supports neither reference bits nor modified bits, but does support read-only/read-write bits and valid/invalid bits. Explain how you can use the existing hardware to implement a software solution that will emulate the functionality of the other bits.	3

Answer b or c

- b** Consider a reference string 1, 2, 3, 4, 2, 5, 6, 2, 3, 2, 1, 6, 7 ; and a system with only 4 frames, pure demand paging, and all frames initially empty. **6**
- i. How many page faults would occur with a FIFO replacement scheme? What are the identities of pages in the frames when the reference string has completed?
- ii. How many page faults would occur with a perfect LRU replacement scheme? What are the identities of pages in the frames when the reference string has completed?
- c** With suitable example explain the List and Bitmap methods of keeping track of blocks. List the advantages of each methods. **6**

Q.no.	Module 4	Marks
4.a	What are the various ways in which primary memory can be used to enhance performance of disks?.	3

Answer b or c

- b** 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 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 FCFS, SSTF, SCAN. **6**
- c** What is the average time to read or write a 512-byte sector for a typical disk rotating at 7200 RPM? The advertised average seek time is 8ms, the transfer rate is 20MB/sec, and the controller overhead is 2ms. Assume that the disk is idle so that there is no waiting time. **6**

Q.no.	Module 5	Marks
5.a	Give a scenario where choosing a large file system block size might be a benefit; give an example where it might be a hindrance.	4

Answer b or c

- b** List the main data structures in a file system and with a neat sketch show how they are connected to each other. Show the control flow for open system call **8**
- c** Explain how file blocks are located on disk **8**

Q.no.	Module 6	Marks
6.a	List the types of protection failures that can happen to the resources in a computer system	4

Answer b or c

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|----------|---|----------|
| b | Discuss the naming of objects. Write an algorithm for creating unique names without race condition. | 8 |
| c | Explain the mechanism for protecting hardware and software resources. | 8 |