Question Paper

Exam Date & Time: 03-Dec-2018 (09:30 AM - 12:30 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

INTERNATIONAL CENTRE FOR APPLIED SCIENCES
IV SEMESTER B.S. ENGG. END SEMESTER EXAMINATION - NOV./ DEC. 2018
Operating Systems [CS 245A]

Marks: 100 **Duration: 180 mins.**

Answer 5 out of 8 questions.

1) A) Explain dual mode operation and the role of mode bit in dual mode operation. (10)

B) What do you mean by state of a process? Explain the various states of a process with a neat diagram. (5)

C) Write a note on virtual machine with the help of a neat diagram. (5)

2) A) Explain how inter-process communication takes place using shared memory. (4)

B) What are system calls? List and explain any 4 types of system calls with examples for each. (10)

C) Explain the different multithreaded models. (6)

3) A) Use FCFS Scheduling for the set of processes shown in the following table to find the turnaround time and waiting time for each process. (6)

Processes	Burst Time (CPU Time) in msec	Arrival Time
P1	10	0
P2	20	0
P3	30	0
P4	24	0

B) What are the data structures used in Banker's algorithm? Use (10)

Banker's algorithm for the following table and find any one safe sequence of process execution.

Processes	Max			Allocation			Available		
	A	B	C	A	B	C	A	B	C
P1	4	4	4	3	3	3	4	4	4
P2	4	4	4	3	3	3			
P3	4	4	4	2	2	2			
P4	5	5	5	1	1	1			

C) Define 4 necessary conditions for the occurrence of deadlock? (4)

4) Give the monitor solution to dining philosopher problem. (8)

A)

B) Write a note on Linux scheduling (5)

C) What is race condition? Explain with an example. (7)

5) Write a note on swapping (5)

A)

B) Explain the difference between internal and external fragmentation. (5)

C) Explain with a neat diagram, the paging hardware with TLB (10)

6) What is Demand paging? Explain. Also explain the steps in handling the page fault with a neat diagram. (10)

A)

B) Explain the components of a LINUX System (6)

C) Explain the purpose of the open () and close () file operations (4)

7) Explain sequential and direct access methods of accessing a file. (6)

A)

B) Why do we need page replacement? Illustrate the FIFO page replacement algorithm considering the following reference stream for a memory with three frames. Also find the number of page faults. (10)
7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1

C) Write a note on Access Matrix (4)

8) A) Consider the disk queue with requests for I/O to blocks on cylinders 98, 183, 37, 122, 14, 124, 65, 67. The disk head is initially at cylinder 53. Find the total distance (in cylinders) that the disk arm moves to satisfy the requests. (4)

B) What are the benefits of multithreaded programming? Explain (8)

C) Explain any four scheduling criteria. (8)

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