Question Paper

Exam Date & Time: 30-Nov-2019 (02:00 PM - 05:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

INTERNATIONAL CENTRE FOR APPLIED SCIENCES END SEMESTER THEORY EXAMINATION NOVEMBER/DECEMBER 2019 IV SEMESTER B.Sc. (Applied Sciences) in Engg. OPERATING SYSTEMS [ICS 243]

Marks: 100

Duration: 180 mins.

Answer 5 out of 8 questions.

- With the help of neat diagram, explain different states of a process. Mention the ⁽¹⁰⁾ role of Process Control Block along with all the pieces of information that it stores related to the process.
 - B) Write a note on java virtual machine.

(5)

- C) Mention any 3 responsibilities of operating system with respect to each of the (5) following
 (i) Storage management.
 (ii) Memory management.
- ²⁾ With the help of a Gantt Chart for the data shown in Table 2A, calculate Average ⁽¹⁰⁾ Waiting Time and Turnaround Time for FCFS and non- preemptive SJF.

A)

Process	Arrival Time	Burst Time
P1	0	8
P2	4	5
P3	3	2
P4	2	1

- ^{B)} Explain the many-to-one and one-to-one threading models with diagrams. Why ⁽⁵⁾ is multithreaded programming preferred than multiprogramming?
- ^{C)} Define system call. What are different types of system calls? ⁽⁵⁾
- ³⁾ Explain dual mode operation with a neat diagram.

A)

^{B)} What is fork? Explain the different ways in which a parent can terminate the (5) execution of one of the children for a variety of reasons.

(10)

	C)	Differentiate between shared memory and message passing.	(5)
4)	A)	Explain different multithreaded models with neat diagram. Mention their advantages and disadvantages.	(10)
	B)	Differentiate between multilevel queue and multilevel feedback scheduling. Explain with an example for each.	(5)
	C)	Explain Peterson's solution for solving critical section problem.	(5)
5)	A)	Suppose that a disk drive has 200 cylinders, numbered from 0 to 199. The disk head is initially at cylinder 100. The queue of pending requests, in FIFO order is 23, 89, 132, 42, 187. 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? Assume SCAN algorithm starts from left to right. a) FCFS b) SSTF c) Scan (Elevator) d) SSTF e) C-IOOK	(10)
	B)	Explain thrashing and the causes for thrashing? How can we limit the effects of thrashing?	(5)
	C)	Mention the different file attributes constituting for the file management.	(5)
6)	A)	Consider a paging scheme where reference string is given as 1 1 3 1 1 6 4 2 3 7 2 5 6 4 3 4 2 7 6. Given the total number of frames in memory are 4 and the first two frames are loaded with pages 1 and 3. Calculate the number of page faults and page replacements that occur when LRU algorithm is used. (Use FIFO for resolving any tie and do not reset the counter whenever the page is replaced)	(5)
	B)	Explain in detail the strategies applied by Deadlock Detection to ensure at least one of the four necessary conditions cannot hold?	(10)
	C)	Explain the different Accessing Methods of a File?	(5)
7)		Explain the components of a Linux system	(5)
	A) B)	Explain the three structures of a page table with a neat diagram	(10)
	C)	Explain any two methods for implementing access matrix?	(5)
8)	Cor four A) requ	sider the following snapshot of a system with five processes (P1, P2, P3, P4, P5) a resources (R1, R2, R3, R4). There are no current outstanding queued unsatisfied uests.	and ⁽¹⁰⁾

R1	R2	R3	R4		Current Allocation	Max	
							-

2	1	2	0

Process	R1	R2	R3	R4	R1	R2	R3	R4
P1	0	0	1	2	0	0	3	2
P 2	2	0	0	0	2	7	5	0
P3	0	0	3	4	6	6	5	6
P4	2	3	5	4	4	3	5	6
P 5	0	3	3	2	0	6	5	2

i) Is this system currently deadlocked, or can any process become deadlocked?ii) If a request from a process P1 arrives for (0, 4, 2, 0), can the request be immediately granted? Justify. If yes, show an execution order

iii) If a request from a process P2 arrives for (0, 1, 2, 0), can the request be immediately granted? Justify. If yes, show an execution order.

- ^{B)} When will the page faults occur? What is the procedure for handling the page ⁽⁵⁾ fault?
- C) Explain two-level directory structure and tree-structured directories?

(5)

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