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10CS53

Fifth Semester B.E. Degree Examination, July/August 2022
Operating Systems

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions, selecting atleast TWO questions from each part.

PART – A

1. a. Define operating system. List and explain the services of operating systems. (08 Marks)
b. With a neat diagram, explain the concept of virtual machine. (08 Marks)
c. Explain system calls and system programs. (04 Marks)
2. a. Define process. Explain different state of process with process state diagram. (08 Marks)
b. Explain different types of schedulers. Discuss the types of scheduling criteria used in operating system. (06 Marks)
c. For the following example, calculate the average waiting time and average turnaround time using FCFS.

Processes	Arrival time	Burst time
P ₀	0	6
P ₁	1	3
P ₂	2	1
P ₃	3	4

(06 Marks)

3. a. What is critical section problem? Explain semaphore and monitor. (06 Marks)
b. Explain dining philosophers problem using monitors. (06 Marks)
c. What do you mean by RACE condition? Explain readers writers problem with semaphore. (08 Marks)
4. a. What is deadlock? What are necessary condition in operating systems for a deadlock to occur? (05 Marks)
b. What are three different methods to handle deadlock? Also explain deadlock prevention and deadlock avoidance. (06 Marks)
c. For the following snapshot. Find the safe sequence using Banker's algorithm.

	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P ₀	0	0	2	0	0	4	1	0	2
P ₁	1	0	0	2	0	1			
P ₂	1	3	5	1	3	7			
P ₃	6	3	2	8	4	2			
P ₄	1	4	3	1	5	7			

- i) Is the system in safe state?
- ii) If a request from process P₂ arrives for (0, 0, 2) can the request be granted immediately? (09 Marks)

PART – B

- 5 a. Define locality of reference? Difference between paging and segmentation. (06 Marks)
b. What is transition look Aside Buffer? Explain TLB in detail with a simple paging system With a neat diagram. (08 Marks)
c. Consider the following reference string 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1 using FIFO replacement algorithm find the number of page fault [no of frames = 3]. (06 Marks)
- 6 a. What is file? Explain allocation methods of file. (06 Marks)
b. Explain different access methods. (08 Marks)
c. What is directory? List the different type of directories and explain any two directories structure with example. (06 Marks)
- 7 a. What is disk scheduling? Discuss different disk scheduling techniques. (12 Marks)
b. Explain capability lists methods of implementing access matrix. (08 Marks)
- 8 a. Explain the different system components of Linux operating system. (10 Marks)
b. Explain the different IPC mechanism available in Linux. (10 Marks)
