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Fifth Semester B.E. Degree Examination, Jan./Feb. 2021

Operating Systems

Time: 3 hrs.

Max. Marks: 100

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

PART – A

- 1
 - a. List and explain two sets of operating system services that are helpful to user as well as efficient operation of system. (08 Marks)
 - b. Describe the differences between symmetric and asymmetric multiprocessing. What are the three advantages of multiprocessor systems? (06 Marks)
 - c. What is virtual machine? With a neat diagram, explain the Just-In-Time (JIT) compiler, used in a JAVA virtual machine. (06 Marks)
- 2
 - a. Define IPC (Interprocess Communication). What are the different methods used for logical implementation of a message passing system? Explain any one. (06 Marks)
 - b. Explain various multithreading models and the benefits of multithreading programs. (06 Marks)
 - c. Consider the following set of processes:

Process	Arrival Time	Burst Time	Priority
P ₁	0	7	3
P ₂	3	2	2
P ₃	4	3	1
P ₄	4	1	1
P ₅	5	3	3

- (i) Draw Gantt charts to illustrate execution using preemptive Shortest Job First (SRTF), Priority (preemptive), Round Robin (TS = 1 ms).
 - (ii) Which of these CPU scheduling algorithms gives minimum Average Waiting Time (AWT) and Minimum Average Turn Around Time (ATT)? (08 Marks)
- 3
 - a. Define Race Condition. Explain the requirements that a solution to a critical section problem must satisfy. (04 Marks)
 - b. Discuss how Reader-Writer problem can be solved using semaphores with an example and also write the structure for Reader and Writer process. (10 Marks)
 - c. What is monitor? Explain the solution to the classical dining Philosopher's problem, using monitor. (06 Marks)
 - 4
 - a. Describe the necessary conditions for a deadlock situation to arise, in a system. (04 Marks)
 - b. What are the different methods for handling deadlocks? Explain Banker's algorithm. (10 Marks)
 - c. Discuss the various approaches, used for deadlock recovery. (06 Marks)

PART – B

- 5
 - a. What is paging and swapping? (06 Marks)
 - b. Discuss steps in handling a page fault with the help of a neat diagram. (06 Marks)
 - c. Consider the following page reference string 5, 4, 3, 2, 1, 4, 3, 5, 4, 3, 2, 1, 5. Assume there are three memory frames. How many page faults would occur in the case of (i) FIFO (ii) LRU (iii) Optimal Algorithms? Note that initially all frames are empty. Which is the most efficient among them and also calculate the page fault rate for each algorithm? (08 Marks)

- 6 a. With the help of neat diagram, describe:
(i) Tree-structures directory (08 Marks)
(ii) Acyclic-graph directory (12 Marks)
b. Explain contiguous, linked and indexed methods of allocating disk space. (12 Marks)
- 7 a. Given the following queue 95, 180, 34, 119, 11, 123, 62, 64 with head initially at track 50 and ending at 199. Calculate the number of moves using FCFS, SSTF, Elevator and C-look algorithms. Also calculate the average head movements. (12 Marks)
b. What are access matrix? Discuss the strengths and weaknesses of implementing an access matrix using access list that are associated with an object. (08 Marks)
- 8 Write short notes on the following:
a. LINUX design principles
b. Process management in LINUX
c. Network structure in LINUX
d. Different interprocess communication mechanism available in LINUX (20 Marks)
