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15EC553

Fifth Semester B.E. Degree Examination, July/August 2021 Operating System

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions.

- 1 a. Define computational structure. Explain and list computational structures and OS responsibilities. (08 Marks)
 b. Explain the strategies for resource allocation. Also explain CPU sharing and memory sharing. (08 Marks)
- 2 a. Why I/O bound programs should be given higher priority in a multiprogramming class of OS? Illustrate with timing diagram. (08 Marks)
 b. Write short notes on real time operating system and distributed class of OS. (08 Marks)
- 3 a. With fundamental state transition diagram, explain the functions of states and causes of fundamental state transitions for a process. (08 Marks)
 b. Explain scheduling of user level threads. Illustrate with example how thread library manages threads in a process. (08 Marks)
- 4 a. Define the terms:
 i) Response ratio
 ii) Turn around time
 iii) Preemption
 iv) Throughput. (04 Marks)
 b. What are the functions of long, medium and short term scheduling in a time sharing system? (05 Marks)
 c. Determine mean turnaround time and mean weighted turnaround time using LCN preemptive scheduling policy for the following process. Assume time slice of 1sec.

| Process | P1 | P2 | P3 | P4 | P5 |
|--------------|----|----|----|----|----|
| Arrival time | 0 | 2 | 3 | 5 | 9 |
| Service time | 3 | 3 | 2 | 5 | 3 |

(07 Marks)

- 5 a. With neat sketch, explain how to calculate effective memory address in non-contiguous loading of process. (08 Marks)
 b. Define external fragmentation and internal fragmentation. Compare contiguous and non-contiguous memory allocation techniques. (08 Marks)
- 6 a. Explain the concepts involved in demand loading of a page with example. (08 Marks)
 b. Consider the following page reference and reference time string for a process:

| | | | | | | | | | | | | | |
|-----------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|-----------------|-----------------|-----------------|
| Page reference string | 5 | 4 | 3 | 2 | 1 | 4 | 3 | 5 | 4 | 3 | 2 | 1 | 5 |
| Reference time string | t ₁ | t ₂ | t ₃ | t ₄ | t ₅ | t ₆ | t ₇ | t ₈ | t ₉ | t ₁₀ | t ₁₁ | t ₁₂ | t ₁₃ |

Calculate the number of page fault generated by using FIFO and LRU page replacement policy for allocation = 4. (08 Marks)

- 7 a. Explain sequential and index sequential file organization in file system. Also write fields in the file control block. (08 Marks)
- b. Explain the methods involved in the allocation of disk space. (08 Marks)
- 8 a. Explain file types, file attributes and file operations. (08 Marks)
- b. Explain the file system actions at a file operation with example. (08 Marks)
- 9 a. Write the issues in message passing. Explain delivery of interprocess messages with kernel actions to implement message passing using symmetric naming and blocking sends. (08 Marks)
- b. Define mailbox and mention its advantages with neat figure, explain message passing using a mailbox. (08 Marks)
- 10 a. Define deadlock Explain deadlock detection algorithm with example. (08 Marks)
- b. With necessary figure, explain the different deadlock prevention approaches. (08 Marks)

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