लक्ष्यं विश्वमानम्

WEST BENGAL STATE UNIVERSITY

B.Sc. Honours 3rd Semester Examination, 2023-24

CMSACOR06T-COMPUTER SCIENCE (CC6)

Time Allotted: 2 Hours | Full Marks: 40

The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.

GROUP-A

1. Answer any ***four*** questions: $2\times4 = 8$

(a) Define time shared system.

(b) Explain job scheduling.

(c) Describe the process creation fork() system call.

(d) Write the difference between compile time and load time address binding.

(e) What is multiprogramming?

(f) What is kernel?

(g) Explain cache coherence.

GROUP-B

Answer any *four* questions $8\times4 = 32$

2. Which one or more of the following CPU scheduling algorithms can potentially cause starvation? First-in First-Out, Round Robin, Priority Scheduling or Shortest Job First. Justify your answer. What are the different terminologies to take care of in any CPU Scheduling algorithm? Explain. What are the disadvantages of SRTF? 3+3+2

3. Explain the Bounded-Buffer Problem in process synchronization. What is the purpose of using semaphores or mutex locks for synchronization in these synchronization problems? Can the solutions to these synchronization problems be implemented using mutex locks instead of semaphores? 5+2+1

4. A computer has six tape drives, with n processes competing for them. Each process may need two drives. What is the maximum value of n for the system to be deadlock free? 4+4

Suppose n process, $P1, \cdots, Pn$ share m identical resource units, which can be reserved and released one at a time. The maximum resource requirement of process Pi is Si where $Si > 0$. What will be the condition for ensuring that deadlock does not occur?

5. What is the average memory access time for a machine with a cache hit rate of 80% and cache access time of 5 ns and main memory access time of 100 ns when: 5+3

(i) Simultaneous access memory organization is used

(ii) Hierarchical access memory organization is used

Explain the structure of SRAM.

6. Consider the following reference string; find out the number of page fault for FIFO, LRU and optimal page replacement algorithm, assuming four-page frames: 3+3+2

7 0 1 2 0 3 0 4 2 3 0 3 2 1 2 0 1 7 0 1

7. Write short notes on (any *two*): 4+4

(a) SCAN algorithm in disk scheduling

(b) Memory hierarchy

(c) Segmentation.

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