WEST BENGAL STATE UNIVERSITY

B.Sc. Honours 3rd Semester Examination, 2020, held in 2021

CMSACOR06T-COMPUTER SCIENCE (CC6)

OPERATING SYSTEM

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.

Answer any *four* from Questions 1(a-g) 2×4 = 8

1. (a) Why SJF scheduling is called special case of Priority scheduling?

   (b) Explain batch system.

   (c) What is the need of Counting Semaphore while we are already having Binary Semaphore?

   (d) Explain the role of Process Control Block (PCB) for a process.

   (e) What is Belady's Anomaly?

   (f) What is virtual address space?

   (g) State the main difference between logical address and physical address.

Answer any *four* from Questions 2 to Questions 8 8×4 = 32

2. Explain CPU scheduling criteria. Consider the following set of processes: 2+6

Process	CPU Burst Time	Priority	Arrival time
P0	80	3	0
P1	20	1	10
P2	10	3	10
P3	20	4	80
P4	50	2	85

   Draw the Gantt chart using RR (ts = 15) and for preemptive priority scheduling. Calculate the average waiting time.

3. (a) Define dead lock. 2

   (b) State and define the necessary conditions for deadlock occurrence. 4

   (c) What is safe state? 2

4. (a) Solve the producer-consumer problem by using counting semaphore. 5

   (b) What is thrashing? 1

   (c) Explain the two different ways of occurrences of external fragmentation for variable length partitions. 2

5. (a) What is Semaphore? 2

   (b) What are the different types of semaphore? 3

   (c) Explain starvation. 3

6. (a) State the difference(s) between Seek Time and Rotational Latency in Disk Scheduling. 2

   (b) Consider a disk queue with requests for I/O to blocks on cylinders 98, 183, 41, 122, 14, 124, 65, 67. The head is initially at cylinder number 53 moving towards larger cylinder numbers on its servicing pass. The cylinders are numbered from 0 to 199. If SSTF scheduling algorithm is used then find the total head movement (in number of cylinders) incurred while servicing these requests. 4

   (c) What is inode? 2

7. Consider the following reference string and find out the number of page faults for FIFO, LRU and Optimal Page Replacement algorithms assuming four page frames for each method. 8

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

8. (a) Why Paging is needed? 2

   (b) If page size is 4 kb and logical address is 22 bit then find the number of entries in the page table. 2

   (c) Four jobs are to be executed on a single processor system arrive at time 0 in the order A, B, C, and then D. Their CPU burst time are 400, 100, 800, and 100 nano-seconds respectively. If the CPU scheduling policy is Round Robin with time quantum of 200 nano-seconds, then calculate the average waiting time and average turn-around time. 4

N.B. : *Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.*

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