WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 3rd Semester Examination, 2019

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 from the following:

   $2\times4 = 8$

   (a) What is the main advantage of multiprogramming?

   (b) What is the purpose of system calls?

   (c) What actions are taken by a kernel to switch context between processes?

   (d) Is it possible to have a deadlock involving only one process? Explain your answer.

   (e) Differentiate between Long term and Short term job scheduler.

   (f) What is Spooling?

   (g) What is a Lazy Swapper?

   (h) Compare between Logical and Physical address.

GROUP-B

Answer any *four* questions from the following

$8\times4 = 32$

2. (a) What are the main disadvantages of SJF Scheduling? For which situations this algorithm is mainly used?

   $2+2$

   (b)

Process	Burst Time
P_1	6
P_2	8
P_3	3
P_4	2
P_5	5

   4

   For the adjacent problem, calculate average waiting time for FCFS and SJF.

3. (a) Describe the Bounded-Buffer Problem.

   2

(b) Consider the following snapshot of a system.   1+3+2

	Allocation	Max	Available
	A B C D	A B C D	A B C D
P_0	0 0 1 2	0 0 1 2	1 5 2 0
P_1	1 0 0 0	1 7 5 0	
P_2	1 3 5 4	2 3 5 6	
P_3	0 6 3 2	0 6 5 2	
P_4	0 0 1 4	0 6 5 6	

Answer the following questions using the banker's algorithm:

(i) What is the content of the matrix need?

(ii) Is the system in safe state? — Justify.

(iii) If a request from process P_1 arrives for $(0, 4, 2, 0)$ can the request be granted immediately?

4. (a) What is the meaning of overlays?   2

(b) A paging scheme uses a Translation Look-aside Buffer (TLB). A TLB-access   3
takes 10 ns and a main memory access takes 50 ns. What is the effective access
time (in ns) if the TLB hit ratio is 90% and there is no page-fault?

(c) Consider a logical address space of 8 pages of 1024 words mapped into memory   3
of 32 frames. How many bits are there in the logical address?

5. (a) Explain the basic method of Paging.   5

(b) Consider a virtual page reference string 1, 2, 3, 2, 4, 2, 5, 2, 3, 4. Suppose 3
LRU page replacement algorithm is implemented with 3 page frames in main
memory. Then find the number of page faults.

6. (a) What is a process? With a suitable diagram, explain various process states and 1+4
how it changes from one state to another states.

(b) What are the role of PCB?   3

7. (a) What is Seek Time and Rotational Delay?   4

(b) Suppose a disk drive has 300 cylinders, numbered 0 to 299. The current position 4
of the disk arm is 90 (upward direction). Consider the following Input-Output
requests

        98, 183, 41, 122, 14, 124, 65, 207

Calculate the total head movement for Shortest-Seek-Time First (SSTF).

8.   Write short notes on any *two*:   4×2 = 8

(a) Semaphore

(b) Real Time Operating System

(c) Threads

(d) Inter Process Communication.

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