FOURTH SEMESTER

B. Tech

[CO]

SUPPLEMENTARY EXAMINATION   *Sept-2019*

CO 204: Operating Systems Design

Time: 3:00 Hours

Max. Marks: 40

Note: 1) Attempt **any five** questions.
2) All parts of a question must be attempted together.

Q.1. a) Write down the major difference between Real Time and Time-shared operating systems   with   suitable   example. [4]

b) What do you understand by race condition? Give few example of arising race condition in concurrent processing.   [4]

OR

Explain the difference between multiprogramming, multitasking, multiprocessing and multi-threading systems.   [4]

Q2. a) Describe Dining Philosopher problem with its solution.   [4]

OR

What is the optimistic assumption made in the deadlock-detection algorithm? How can this assumption be violated?   [4]

b) What is Demand Paging? Consider a system where the main memory access time is 20 ns and page fault service time is 100 ns and page hit ratio is 95%, calculate its effective memory access time.   [4]

Q3.   a) Consider a logical address space of 8 pages of 1024 words mapped into memory of 32 frames.

    i   How many bits are there in the logical address?
    ii How many bits are there in physical address?   [4]

b) Differentiate between the following:-

    i.   Long-term and short-term scheduler
    ii.   Process and Program   [4]

Q4. Attempt *any two*

a) Explain various file access methods with suitable examples.   [4]

b) Describe taking an example, the following hard disk scheduling algorithms:

    (i)   C-SCAN Scheduling
    (ii)   SSTF Scheduling.   [4]

c) What is Thrashing? Explain in brief. For the given reference string (page number referred by the process): 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2. What will be the total

number of Page Faults if FIFO and Optimal page replacement algorithm are used respectively. [4]

P.T.O

Q5. Consider the following set of processes, assumed to have arrived at time 0, in the order P1, P2,.., P5 with the length of the CPU burst time given in milliseconds:

Processes	Burst Time	Priority
P1	4	3
P2	1	1
P3	2	4
P4	1	5
P5	5	2

Assuming 1 to be highest priority, calculate the following: [8]
i) average waiting time and average turn-around Time using SJF, Priority (Preemptive) scheduling mechanism.
ii) Assume time quantum to be 1 unit of time. Calculate average waiting time and average turn-around time using Round-Robin Scheduling.

Q6. a) Describe the implementation of segmentation with a suitable example. Why is paging faster than segmentation. [4]

OR

Consider a computer system with 32-bit logical address and 4KB page size. The system supports up to 512MB of physical memory. How many entries will be there in a conventional single-level page table and in an inverted page table? [4]

b) Elaborate the term "critical section" in process synchronization with the help of a real time example. [4]

Q7. Describe the Banker's algorithm for safe allocation. Consider a system with three processes and three resource types and at time T_0 the following snapshot of the system has been taken: [8]

Process	Allocation			Maximum			Available		
	R1	R2	R3	R1	R2	R3	R1	R2	R3
P1	2	2	3	3	6	8	4	3	10
P2	2	0	3	4	3	3			
P3	1	2	4	3	4	4			

Answer the following questions using Banker's algorithm
i. What is the content of matrix Need?
ii. Is the system in a safe state?
iii. If a request from Process P2 arrives for (2, 1, 0), can the request be granted immediately?