Total number of printed pages–4

2023

OPERATING SYSTEM

Paper : BCA–HC–5026

Full Marks : 60

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Answer *any ten* questions : 2×10=20

   (a) What is process control block (PCB) ?

   (b) What is meant by context switch ?

   (c) Distinguish between demand paging and pre-paging.

   (d) What are necessary conditions which can lead to a deadlock situation in a system ?

(e) State the main difference between logical from physical address space.

(f) Explain Belady's Anomaly.

(g) What is binary semaphore ? What is its use ?

(h) Define latency, transfer and seek time with respect to disk I/O.

(i) What is the difference between hard and soft real-time systems ?

(j) What is DRAM ? In which form does it store data ?

(k) Define paging and segmentation.

(l) Write *two* main functions of operating system.

2. Answer *any four* questions : 5×4=20

(a) Explain Readers-Writers problem using semaphores.

(b) Name *three* types of schedulers and give functions of each.

(c) When does race condition take place? What are the three requirements that must be satisfied by any possible solution to a critical section problem?

(d) Assume, we have the workload as shown below (All 5 processes arrive at time 0, in the order given in milliseconds):

Process   : P1 P2 P3 P4 P5
CPU time : 10 30   3   6   12

Consider Round Robin ($q = 10\,ms$) scheduling algorithm. Prepare the Gantt chart and find out the average turnaround and waiting time.

(e) Briefly explain the LRU page replacement algorithm.

(f) Briefly explain the resource allocation graph with an example.

3. Answer **any two** questions : 10×2=20

(a) A snapshot of the resource information of a system is given below for processes :

Process ID	Allocation A B C D	MAX A B C D	Available A B C D
P0	0 0 1 2	0 0 1 2	1 5 2 0
P1	1 0 0 0	1 7 5 0	
P2	1 3 5 4	2 3 5 6	
P3	0 6 3 2	0 6 5 2	
P4	0 0 1 4	0 6 5 6	

If a request from P1 arrives for (0, 4, 2, 0), can the request be granted immediately ?

(b) Briefly explain any two disk scheduling algorithms with examples.

(c) Explain the file system structure and different types of file operations.

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