

Practice Set
End Semester Examination, Dec- 2025

Program: BCA
Subject Code: 3CCC203

Subject: Operating System
Semester: III

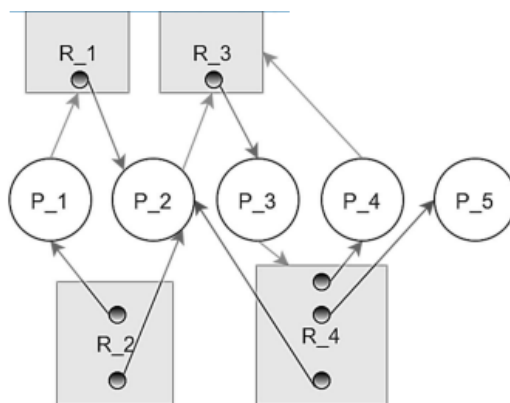
Course Outcomes	Description
CO1	Create processes and threads
CO2	Develop algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time
CO3	For a given specification of memory organization develop the techniques for optimally allocating memory to processes by increasing memory utilization and for improving the access time
CO4	Design and implement file management system

Section A

(26 x 5= 130 Marks)

1. List any five functions of an operating system. [CO1] [Unit 1] [Remember, LOT]
2. Differentiate between [CO1] [Unit 1] [Understand, LOT]
 - i. Multiprocessing operating System and Multiprogramming operating system
 - ii. Batch Operating System and Distributed operating system
3. State the significance of system calls. [CO1] [Unit 1] [Remember, LOT]
4. Define process. List the states of Process. [CO1] [Unit 1] [Understand, LOT]
5. Differentiate between hard real time systems and soft real time systems. [CO1] [Unit 1] [Understand, LOT]
6. Explain system calls. [CO1] [Unit 1] [Understand LOT]
7. Describe the functions of DMA. [CO1] [Unit 1] [Understand LOT]
8. Describe starvation and aging. [CO2] [Unit 2] [Understand LOT]
9. Define scheduler. List the types of schedulers. [CO2] [Unit 2] [Remember LOT]

10. Explain critical section problem. [CO2] [Unit 2] [Understand LOT]
11. State the various scheduling criteria for CPU scheduling. [CO2] [Unit 2] [Understand LOT]
12. Discuss the term: a)swapping b) overlays [CO2] [Unit 2] [Understand LOT]
13. State and explain the necessary conditions to occur a deadlock. [CO2] [Unit 2] [Understand LOT]
14. Define resource allocation graph with example. [CO2] [Unit 2] [Understand LOT]
15. Define race condition. [CO2] [Unit 2] [Remember LOT]
16. Explain the hierarchy of memory in detail. [CO3] [Unit 3] [Understand LOT]
17. What does this RA graph signify? [CO2] [Unit 2] [Apply LOT]



18. Demonstrate demand paging in memory management. [CO3] [Unit 3] [Understand LOT]
19. Explain thrashing. How it can be controlled? [CO3] [Unit 3] [Understand LOT]
20. Define Virtual memory. Describe the need of virtual memory. [CO3] [Unit 3] [Remember LOT]
21. Differentiate between paging and segment. [CO3] [Unit 3] [Understand LOT]
22. Describe compaction. [CO3] [Unit 3] [Understand LOT]
23. State the various access methods of a file. [CO4] [Unit 4] [Understand LOT]

24. List out the objectives of file management system. [CO4] [Unit 4] [Understand LOT]
25. Differentiate between device driver and device controller. [CO4] [Unit 4] [Understand LOT]
26. Describe different file operations. [CO4] [Unit 4] [Remember LOT]

Section B

(12 x 10=120 Marks)

27. Classify different multithreading models, its advantages and disadvantages with suitable illustration. [CO1] [Unit 1] [Analyze HOT]
28. Analyze how the different components of a Process Control Block (PCB) work together to manage process execution and ensure efficient context switching in an operating system. [CO1] [Unit 1] [Analyze HOT]
29. Consider the following set of processes with the CPU-burst time given in milliseconds. [CO2] [Unit 2] [Apply LOT]

Process ID	Arrival Time	Burst Time
P1	0	9
P2	1	4
P3	2	9
P4	3	5

Draw the Gantt charts explaining the execution of these processes using FCFS and RR (q=2ms) Scheduling.

- a) Find the average Turnaround Time

b) Find the average Waiting Time

30. Explain different methods to recover from deadlock. [CO2] [Unit 2] [Understand LOT]
31. Define Semaphore. What are the different types of semaphore? Describe the properties of semaphores. [CO2] [Unit 2] [Understand LOT]
32. Describe mutual exclusion. Explain Peterson's solution for mutual exclusion problem. [CO2] [Unit 2] [Analyze HOT]
33. What is segmentation? Explain the basic method of segmentation with an example. [CO3] [Unit 3] [Understand LOT]
34. Analyse how contiguous and non-contiguous memory allocation strategies differ in terms of memory utilization, access time, and fragmentation. Explain how these differences impact the overall system performance. [CO3] [Unit 3] [Analyze HOT]
35. Discuss the memory fragmentation issues with the contiguous partitioning scheme. In what respect segmentation differs from contiguous partitioning? Consider a process address-space divided into pages of size 1-KB, what will be the page number and offset for a byte at a relative address 42095. [CO3] [Unit 3] [Analyze HOT]
36. Illustrate paging. Discuss the structure of the page table with a suitable diagram. [CO3] [Unit 3] [Analyze HOT]
37. Provide a comparative study of contiguous, linked and indexes implementation of files. [CO4] [Unit 4] [Understand LOT]
38. Explain the concept of a Disk Scheduling Algorithm and describe the working principles of any two disk scheduling algorithms with suitable examples. [CO4] [Unit 4] [Understand LOT]

Section C

(4 x 20= 80 Marks)

39. Consider the page reference string: 1,0,7,1,0,2,1,2,3,0,3,2,4,0,3,6,2,1 for a memory with three frames. Determine the number of page faults using the FIFO, Optimal and LRU replacement algorithms. Compare which algorithm is most efficient. [CO3] [Unit 3] [Analyze HOT]
40. Evaluate the efficiency of First-Fit, Best-Fit, and Worst-Fit memory allocation algorithms for placing processes of 210 KB, 415 KB, 120 KB, and 350 KB into memory partitions of 150 KB, 400 KB, 300 KB, 600 KB, and 250 KB. Justify which algorithm provides the most

efficient memory utilization and explain it. [CO3] [Unit 3] [Analyze HOT]

41. Evaluate the performance of FCFS, SSTF, LOOK, and C-LOOK disk scheduling algorithms for the disk queue sequence 95, 180, 34, 119, 11, 123, 62, 64, with the initial head position at track 50 and the last track numbered. 199. Determine the total head movement for each algorithm and justify which algorithm provides the most efficient disk utilization. [CO4] [Unit 4] [Evaluate HOT]

42. Consider the following snapshot of the system: A system has five processes and four resource types (A, B, C,D)

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	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				

Evaluate whether the system is in a safe or unsafe state using the Banker's Algorithm and justify how your evaluation ensures deadlock avoidance. [CO2] [Unit 2] [Evaluate Hot]

Summary Sheet:

CO Wise

CO	Q. No	Marks
CO1	1,2,3,4,5,6,7,27,28	55
CO2	8,9,10,11,12,13,14,15,17,29,30,31,32,42	105
CO3	16,18,19, 20,21,22,33,34,35,36,39,40	110
CO4	23,24,25,26,37,38,41	60
Total		330

Unit Wise

Unit	Q. No	Marks
Unit 1	1,2,3,4,5,6,7,27,28	55
Unit 2	8,9,10,11,12,13,14,15,17,29,30,31,32,42	105
Unit 3	16,18,19,20,21, 22,33,34,35,36,39,40	110
Unit 4	23,24,25,26,37,38,41	60
Total		330

Blooms Taxonomy Level (BTL) Wise

BT L	Q. No	Mar ks
LO T	1,2,3,4,5,6,7,9,10,11,12,13,14,15,16,18,19,20,22,23,24,25,26,29, 30,31,33,37,38	190
HO T	27,28,32,34,35,36,,39,40,41,42	140
Total		330

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Disclaimer: - This is a Practice Set. The Question in End term examination will differ from the Practice set. This Practice set is meant for practice only.