

END TERM EXAMINATION

FIFTH SEMESTER (BCA) JANUARY-2024

Paper Code: **BCA-301** Subject: **Operating System & Linux Programming**
(Batch-2021 Onwards)

Time: **3 Hours**

Maximum Marks : **75**

Note: **Attempt five questions in all including question no.1 which is compulsory. Select one question from each unit.**

- Q1. Answer the following (any five) (5x5=25)
- Explain the role of Operating System. Give example of each type of Operating System.
 - What is Thrashing? Mention possible solutions for this problem.
 - Explain Process State Transition with the help of diagram.
 - Explain the scheduling and performance criteria of various scheduling algorithm.
 - Explain the disk structure of secondary storage.
 - Explain the three modes of vi Editor. Explain how to write, save and execute a shell script in vi Editor.
 - Explain deadlock and four necessary conditions for its occurrence.

UNIT I

- Q2
- Explain Multi Programming, Time sharing, Distributed System and Real Time System in terms of memory management, process management and processor scheduling. (6)
 - Write a shell program to find the factorial of a number accepted from user. (6.5)
- Q3
- Explain the Linux Architecture with diagram. Describe the basic directory structure of Linux. (6)
 - Explain the following Linux commands with syntax and the output of the command. (6.5)
i) cat ii) mv iii) who iv) pwd v) tty vi) apropos

UNIT II

- Q4
- What is process synchronisation? Explain how reader-writer problem can be solved using semaphore with the help of pseudocode. (6)
 - Consider the following five process, with the length of the CPU burst time given in milliseconds. (6.5)

Process	Arrival Time	Burst Time
P1	0	3
P2	1	2
P3	3	6
P4	4	5
P5	5	3

- Draw five Gantt charts that illustrate the execution of these process using the following scheduling algorithms: FCFS, SJF, Pre-emptive SJF(SRTN), RR (quantum=2).
- What is average turnaround time and average waiting time for each of the scheduling algorithm in part a.

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- Q5
- What is critical section problem? How it can be solved using semaphore. (3)
 - Explain the Linux command to view currently running processes on the system. (3)
 - Explain Nice and Renice Command in Linux with Examples. (3)
 - Explain three different types of schedulers in operating system with the help of neat diagram. Explain specific role of each type of scheduler. (6.5)

UNIT III

- Q6
- Explain Continuous and Non-Continuous Memory Allocation with diagram. (6)
 - Consider the following page reference string: 7,2,3,1,2,5,3,4,6,7,1,0 Assuming demand paging with four frames, how many page faults would occur for the following replacement algorithms?
i) LRU replacement
ii) FIFO replacement
iii) Optimal replacement (6.5)
- Q7
- Explain segmentation in memory management. With a neat diagram explain hardware required to implement segmentation. (6)
 - Consider the following snapshot of a system at time T₀. (6.5)

	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P ₀	0	1	0	7	5	3	3	3	2
P ₁	2	0	0	3	2	2			
P ₂	3	0	2	9	0	2			
P ₃	2	1	1	2	2	2			
P ₄	0	0	2	4	3	3			

Answer the following questions using the banker's algorithm:

- What is the content of the matrix **Need**?
- Is the system in a safe state. If yes, mention the safe sequence?
- If a request from process P1 arrives for (1,1,2) can the request be granted immediately?

UNIT IV

- Q8
- Explain layered design of file system with diagram. (6)
 - Explain the symbolic and numeric method of changing the permission of file and directory. What is the use of -R, -V options of the command. (6.5)
- Q9
- Explain the file protection mechanism of operating system. (6)
 - Explain three types of file access methods in operating system with diagram. (6.5)

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