VIT

Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)
CHENNAI

Reg. Number: 21BLC1122

Continuous Assessment Test(CAT) – I - FEB 2024

Programme	:	**B.Tech. (Computer Science and Engineering)**	Semester	:	**Winter 2023-24**
Course Code & Course Title	:	**BCSE303L & Operating Systems**	Class Number	:	**CH2023240501868 CH2023240501870 CH2023240502688 CH2023240502689 CH2023240502690 CH2023240501872 CH2023240502691(BCSE303L)/ CH2023240502853(CSE2005)**
Faculty	:	**PRADEEP K V, BHANU CHANDER BALUSA, PRADEEP K, KIRUTHIKA ANANDAN P, SUDHARSON S, VALLIDEVI K**	Slot	:	**D2+TD2**
Duration	:	**90 Minutes**	Max. Mark		50

General Instructions: < Use this space to provide additional information such as graph sheet, data book etc.>

- Write only your registration number on the question paper in the box provided and do not write other information.
- Use statistical tables supplied from the exam cell as necessary
- Use graph sheets supplied from the exam cell as necessary
- Only non-programmable calculator without storage is permitted

Answer all questions

Q. No	Sub Sec.	Description	Marks
1		As an operating system developer for AR and VR enabled PlayStation console, you are asked to find out and elaborate the functionalities that are needed for the gaming console, having a high performance and an interactive experience. (5 Marks) Design an appropriate OS structure as per the functionalities listed above with proper justification. (5 Marks)	10
2		Ram's objective is to read the contents from the file "Temp.txt" and list out the number of vowels, consonants and words from the parent process. Write a C program using comprehensive sequence of system calls would be necessary to accomplish this task proficiently. (5 Marks) Delineate the distinct system calls essential for this operation and elucidate their individual functionalities in detail. (5 Marks)	10
3		As a programmer, build the pseudo code to construct two threads, one for creating the list of even numbers and the other for generating the list of odd numbers (for example, call them Thread1, Thread2). Explain in detail the required thread predefined functions that were used to initiate the thread and all of its additional predefined functions using POSIX API. (8 Marks) Also calculate the execution time of each thread. (2 Marks)	10
4		Suppose that the following processes arrive for execution at the times	10

indicated. Each process will run for the amount of time listed. In answering the questions, use non pre-emptive scheduling, and base all decisions on the information you have at the time the decision must be made.

Process	Arrival Time	Burst Time
P1	0	7
P2	4	3
P3	1	1
P4	5	6
P5	3	8

a) Compute the average waiting time & turnaround time for these processes with the SJF scheduling algorithm? (Gantt Chart-2 marks, Average Waiting time-1 Mark and Average Turnaround time-1 Mark)

b) Whether the pre-emptive SJF will give a better result as compared to the previous SJF algorithm? Compute and compare the average waiting time and turnaround time (in both cases). (Gantt Chart-2 marks, Average waiting time-1 Mark and Average Turnaround time-1 Mark)Suggest a new scheme to improve the CPU utilization further when compared with the mentioned two algorithms in a) and b). (2 Marks)

5

Assume four students [S1, S2, S3, S4] would like to take an OS book from the library. Unfortunately, only one copy is available for reference. Assuming S1 will read the book for 10m, S2 for 12m, S3 for 2m, and S4 for 6m. All the students arrive the library at the same time. Analyse the scenario with appropriate short term scheduler and determine the (a) Completion Time (b) Average Turn Around Time (c) Average Waiting Time of the students in library, if,

a) The students are allowed to read the book based on the priority 5, 3, 2, 4, 1 respectively. (Gantt Chart-2 marks, Completion time-1 Mark, Average Waiting time-1 Mark and Average Turnaround time-1 Mark)

b) The students are allowed to read the book one after the other for 3m in each of their turn. (Gantt Chart-2 marks, Completion time-1 Mark, Average Waiting time-1 Mark and Average Turnaround time-1 Mark)

10

**********All the best **********