



VIT

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

Reg. Number:

Continuous Assessment Test(CAT) – I - JAN 2024

Programme	:	B.Tech. (CSE and Specialisation)	Semester	:	Winter 2023-24
Course Code & Course Title	:	BCSE303L & Operating Systems	Class Number	:	CH2023240501867 CH2023240501869 CH2023240502684 CH2023240502685 CH2023240502686 CH2023240502687 CH2023240503355 CH2023240501871
Faculty	:	PRADEEP K V, BHANU CHANDER BALUSA, PRADEEP K, KIRUTHIKA ANANDAN P, VALLIDEVI K, ANGELIN BEULAH S, SUDHARSON S	Slot	:	D1+TD1
Duration	:	90 Minutes	Max. Mark	:	50

General Instructions:

- 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		The Apple Inc company upgrades their Mac Operating System for laptops and desktops every year and releases a newer version. Discuss the new design issues and features that need to be considered by the development team with respect to the enhancement of performance. Also draw and explain the structure of the kernel that can be used in their operating system for obtaining an optimal performance.	10
2		In a Unix-based operating system, Ramesh's task is to create multiple processes as presented in this figure. In the figure, A is the parent process for B and C processes; B is the parent process for D and E processes. Describe the sequence of system calls and its individual functionalities involved in creating and terminating these multiple processes. Write a C program with appropriate system calls to do this task efficiently.	10

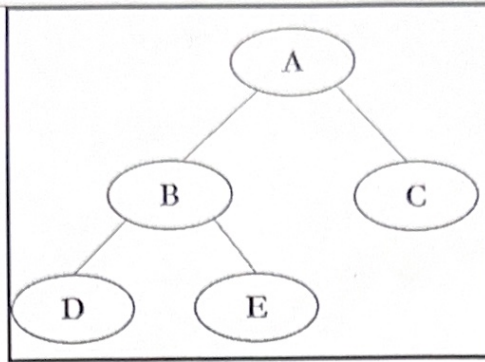


Fig: Processes Hierarchy

3

Describe the thread concept in the context of an operating system and its requirement to distinguish between kernel-level and user-level threads. Discuss the advantages and disadvantages of using threads in an operating system that supports multiple threads.

10

As the number of consumers is high, the producer has decided to maintain the queue to process the request raised by the consumers. Provide the Gantt chart to visualise the optimal order of requests handled by the producer and also estimate the waiting time and delivery time for each consumer for the following scenarios.

a) The producer wants to immediately deliver to the consumer who requested in the larger number of quantity, as the profit is high for him. Each quantity requires 2 hours of manufacturing time. (5 Marks)

b) The producer wants to deliver the items based on order of request received (5 Marks)

The requirements of various consumers are listed in the below Table.

4

Consumer ID	Quantity required	Manufacturing Time	Order of request received
0	3	6	1
1	2	4	4
2	6	12	3
3	4	8	2
4	1	2	5

10

5

In an auto repair shop, five cars, labelled A to E, require maintenance and arrive at the mechanic's garage at times 3, 2, 1, 4, and 5 minutes, respectively. Each car has an estimated repair time of 9, 6, 1, 4, and 7 minutes. The objective is to assess the mean turnaround time and waiting time for each car for the following scenarios.

a) The cars are allowed to undergo maintenance one after the other, with each car spending 3 minutes in the mechanic's garage during its turn. (5 Marks)

b) A car is allowed to undergo maintenance until the newly arrived car repair time is less as compared with its remaining repair time. Accordingly all the cars will complete their maintenance. (5 Marks)

10

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