INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
Dundigal-500043, Hyderabad

B.Tech IV SEMESTER END EXAMINATIONS (REGULAR/SUPPLEMENTARY) - AUGUST 2023
Regulation: UG-20
OPERATING SYSTEMS

Time: 3 Hours   (COMMON TO CSE | CSIT | IT)   **Max Marks: 70**

Answer ALL questions in Module I and II
Answer ONE out of two questions in Modules III, IV and V
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

MODULE – I

1. (a) List the different operating system structures. Elucidate the operating system structure of linux.

    [BL: Understand| CO: 1|Marks: 7]

   (b) Write a sequence of a system call to extract the data from one file to another file and justify how the system call is different from function call.   [BL: Apply| CO: 1|Marks: 7]

MODULE – II

2. (a) What is critical section? Specify the requirements for a solution to critical section problem.

    [BL: Understand| CO: 2|Marks: 7]

   (b) Calculate the average turnaround time (ATAT) of the processes using first come first serve (FCFS) for the data given in Table 1.   [BL: Apply| CO: 2|Marks: 7]

Table 1

Scheduling. Process	Arrival Time	Burst Time
P1	0	24
P2	2	3
P3	1	4

MODULE – III

3. (a) With neat diagram elucidate the concept of segmentation with paging. Explain the need for page-replacement.   [BL: Understand| CO: 3|Marks: 7]

   (b) Given memory partitions of 100KB, 500KB, 200KB, 300KB and 600KB(in order), how would each of the first-fit, best-fit and worst-fit algorithms place processes of 212KB, 417KB, 12KB and 426KB(in order)? Which algorithm makes the most efficient use of memory?

    [BL: Apply| CO: 3|Marks: 7]

4. (a) Distinguish between internal and external fragmentation. Describe dynamic storage allocation strategies in contiguous memory allocation schemes.   [BL: Understand| CO: 4|Marks: 7]

(b) Assume there are three frames and given page reference string as 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1. Apply FIFO and optimal page replacement algorithm and find page faults.

[BL: Apply| CO: 4|Marks: 7]

MODULE – IV

5. (a) Classify various file directory structures. Illustrate the free space management with neat diagram.

[BL: Understand| CO: 5|Marks: 7]

(b) Summarize about disk scheduling and any of its two algorithms with suitable example.

[BL: Understand| CO: 5|Marks: 7]

6. (a) How dynamic memory allocation can be effectively used in linux operating system? Elucidate.

[BL: Understand| CO: 5|Marks: 7]

(b) Consider that a disk drive has 5,000 cylinders, numbered 0 to 4,999. The drive is currently serving request at cylinder 143, and the previous request was at cylinder 125. The queue of pending requests, in FIFO order, is: 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130. Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all pending requests for each of the following disk scheduling algorithms.
i) FCFS ii) SSTF iii) SCAN

[BL: Apply| CO: 5|Marks: 7]

MODULE – V

7. (a) What is an access matrix? Briefly discuss about the deadlock handling methods with suitable diagram.

[BL: Understand| CO: 6|Marks: 7]

(b) Summarize the following concepts used for deadlock prevention.
i) Mutual exclusion   ii) Hold and wait
iii) No preemption   iv) Circular wait

[BL: Understand| CO: 6|Marks: 7]

8. (a) Describe the principles and methods used for protection in operating system.

[BL: Understand| CO: 6|Marks: 7]

(b) Explain how deadlocks could be detected in operating systems. Write with example about deadlock avoidance with bankers algorithm.

[BL: Understand| CO: 6|Marks: 7]

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