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INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

B.Tech IV Semester End Examinations (Regular/Supplementary) - July, 2021

Regulation: R18

OPERATING SYSTEMS

Time: 3 Hours

(CSE|IT)

Max Marks: 70

Answer FIVE Questions choosing ONE question from each module
(NOTE: Provision is given to answer TWO questions from any ONE module)

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

MODULE – I

- Write short note on system programs. Describe multiprocessor systems with neat diagram. [7M]
 - What is a distributed operating system? Explain the advantages of a distributed operating system. [7M]
- Enumerate different operating system structures and explain layered structure with neat sketch. [7M]
 - List and explain the generations of operating system. Discuss about protection and security functions of operating system. [7M]

MODULE – II

- Write about scheduling queues. Describe a solution to the dining philosopher problem using monitors. [7M]
 - Show how wait() and signal() semaphore operations could be implemented in multiprocessor environments using the test and set instruction with an illustration. [7M]
- Describe how monitors help in process synchronization? Explain the method of application of semaphore for process synchronization. [7M]
 - Consider the set of processes in Table 1, with the length of the CPU – burst time and arrival time given in ms:

Table 1

| Process | Burst time (B T) | Arrival time (A T) |
|---------|------------------|--------------------|
| P1 | 8 | 0.00 |
| P2 | 4 | 1.001 |
| P3 | 9 | 2.001 |
| P4 | 5 | 3.001 |
| P5 | 3 | 4.001 |

Draw Gantt charts illustrating the execution of these processes using priority with burst time and RR (quantum=2) scheduling. Also calculate waiting time and turnaround time for each scheduling algorithm. [7M]

MODULE – III

5. (a) List various page replacement algorithms. Write in detail about segmentation with paging with a neat sketch. [7M]
(b) Explain how paging supports virtual memory. With a neat diagram explain how logical address is translated into physical address. [7M]
6. (a) Consider the following page reference string 1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6. Number of frames equal to 4. Find out the number of page faults in case of i) LRU ii) FIFO [7M]
(b) What is the cause for thrashing? How does the system detect thrashing? Once it detects, what can the system do to eliminate this problem? [7M]

MODULE – IV

7. (a) Describe the linked list file allocation method with neat diagram. Mention its advantages and disadvantages. [7M]
(b) Estimate the maximum file size supported by a file system with 16 direct blocks, single, double, and triple indirection. The block size is 512 bytes. Disk block numbers can be stored in 4 bytes. [7M]
8. (a) Describe the concept of file sharing. What are the criteria to be followed in systems which implement file sharing? [7M]
(b) Explain and compare FCFS and SSTF disk scheduling algorithms with examples. [7M]

MODULE – V

9. (a) Write in detail about Bankers algorithm for deadlock avoidance with an example. [7M]
(b) What is the deadlock? Explain the necessary conditions for its occurrence. Discuss how deadlocks could be detected in detail. [7M]
10. (a) Explain the role of access matrix for protection in files. Compare the various access matrix implementation techniques. [7M]
(b) Discuss the various issues that need to be considered through the process of revocation of access rights. [7M]

