Hall Ticket No | | | | | | | | | | | Question Paper Code: ACS007

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

B.Tech IV Semester End Examinations (Regular / Supplementary) - May, 2019

Regulation: IARE – R16

OPERATING SYSTEMS

Time: 3 Hours **(Common to CSE | IT)** **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. (a) Describe in detail about system calls and system programs. Discuss the merits of peer to peer systems over client server systems? **[7M]**

   (b) How do you distinguish between the Kernel mode and User mode function as a rudimentary form of protection (in security) system. Justify. **[7M]**

2. (a) Sketch the structure of operating system with its different layers? Discuss the necessity of switching of operating system between kernel and user modes? **[7M]**

   (b) Differentiate between tightly coupled systems and loosely coupled systems. Explain why the idleness in CPU occurs. **[7M]**

UNIT – II

3. (a) Compose and contrast any two scheduling algorithms with their limitations. **[7M]**

   (b) Consider that four jobs to be executed on a single processor system arrived at time 0 in the order A,B,C,D. Their CPU burst time requirements are 4, 1, 8, 1 time units respectively. Find the completion time of A under Round Robin scheduling with time slice of one time unit. **[7M]**

4. (a) Explain the structure of Process Control Block(PCB) in process scheduling? Illustrate process state diagram with clear explanation? **[7M]**

   (b) Consider the following set of process in Table 1, with their length of CPU burst time given in milliseconds.

Table 1

Process	Burst time	Arrival Time
P1	2	0
P2	3	10
P3	1	15
P4	5	18

Draw the Gantt chart that illustrates the execution of these processes using these First Come First Serve(FCFS) and Shortest Job First(SJF). Analyze the waiting time for each of these scheduling algorithms. **[7M]**

UNIT – III

5. (a) Explain the concept of Thrashing. Discuss why Thrashing should be avoided in a system? **[7M]**

   (b) Given five memory partitions of 100 KB, 500 KB, 200 KB, 300 KB, and 600 KB (in order), How would each of the First-Fit, Best-Fit, and Worst-Fit algorithms place the processes of 212 KB, 417KB, 112 KB, and 426 KB (in order)? Suggest the most efficient algorithem to avoid fragmentation. **[7M]**

6. (a) What is paging? Discuss the basic paging techniques in detail. **[7M]**

   (b) Consider the following page reference string
   1,2,3,4,5,3,4,1,6,7,8,7,8,9,7,8,9,5,4,5,4,2.
   How many page faults would occur for the following replacement algorithm. Calculate the Least Recently Used(LRU) and First In First Out(FIFO). Calculate the Hit ratio assuming four and six frames respectively. **[7M]**

UNIT – IV

7. (a) Explain the Block read ahead and Reducing disk arm motion techniques to improve file system performance. List out the different types of directory structure. **[7M]**

   (b) Discuss the reasons why the operating system might require accurate information on how blocks are stored on disk. How could operating system improves file system performance with this knowledge **[7M]**

8. (a) Explain the file attributes, file operations, file types, internal file structure file concepts. **[7M]**

   (b) Suppose that the disk rotates at 7200 rpm. Identify the following.
   i. What is the average rotational latency of the disk drive?
   ii. Identify the seek distance that covered in the time?

UNIT – V

9. (a) What are the necessary conditions for Deadlock? Summarize how resource allocation graph is useful in Deadlock detection? **[7M]**

   (b) A system contains three programs and each requires three tape units for its operation. Explain the minimum number of tape units which the system must have such that deadlocks never arise. **[7M]**

10. (a) The separation of policy and mechanism is important for flexibility in providing protection. Comment on it. **[7M]**

    (b) Two shared resources R_1 and R_2 are used by processes P_1 and P_2. Each process has a certain priority for accessing each resource. Let Tij denote the priority of P $_i$ for accessing R_j .
    A process P_i can snatch a resource R_h from process P_j if T_{ik} is greater than T_{jk}.
    Given the following :
    A. $T_{11} > T_{21}$ B. $T_{12} > T_{22}$
    C. $T_{11} < T_{21}$ D. $T_{12} < T_{22}$
    Which of the following conditions ensures that P_1 and P_2 can never deadlock?
    (i) (A) and (D) (ii) (B) and (C) (iii) (A) and (B) **[7M]**

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