Exam.Code:0931
Sub. Code: 33694

2124

B.E. (Electronics and Communication Engineering)
Seventh Semester
EC-711: Operating Systems

Time allowed: 3 Hours **Max. Marks: 50**

NOTE: Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Section.

x-x-x

1.

a. Draw a general structure of operating system.
b. Differentiate Preemptive scheduling from non Preemptive scheduling by giving example for each.
c. Differentiate logical address space from physical address space by giving example for each.
d. What are resource allocation graphs? Give examples and uses.
e. Explain the storage and retrieval of data from secondary storage. (10)

Section-A

2.

a. Draw and explain the process state diagram. (3)
b. Consider the following set of processes, with the length of the CPU burst given in milliseconds: (7)

Process	Burst Time	Priority
P1	10	3
P2	1	1
P3	2	3
P4	1	4
Ps	5	2

The processes are assumed to have arrived in the order P1, P2, P3, P4, Ps, all at time 0.

i. Draw four Gantt charts that illustrate the execution of these processes using the following scheduling algorithms: FCFS, SJF, non preemptive priority (a smaller priority number implies a higher priority), and RR (quantum = 1).
ii. What is the turnaround time of each process for each of the scheduling algorithms in part i?
iii. What is the waiting time of each process for each of the scheduling algorithms in part i?
iv. Which of the algorithms in part a results in the minimum average waiting time (over all processes)?

3.

a. A certain computer provides its users with a virtual-memory space of 2^{32} bytes. The computer has 2^{18} bytes of physical memory. The virtual memory is implemented by paging, and the page size is 4,096 bytes. A user process generates the virtual address 11123456. Explain, by drawing the suitable diagram, how the system establishes the corresponding physical location. Distinguish between software and hardware operations. (6)
b. Discuss situations under which the least frequently used page replacement algorithm generates fewer page faults than the least recently used page-replacement algorithm. Also discuss under what circumstance the opposite holds. (4)

4.

a. Draw a suitable diagram to explain the segmentation with paging by taking a suitable example. (5)
b. Write and explain two approaches for implementation of mutual exclusion in a distributed environment. (5)

P.T.O.

Section -B

5.

a. Suppose that a disk drive has 5,000 cylinders, numbered 0 to 4999. The drive is currently serving a 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, calculate the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests for each of the following disk-scheduling algorithms: FCFS, SSTF, SCAN, LOOK, C-SCAN and C-LOOK. (6)

b. Explain in context with free space management: bit vector, linked lists and grouping. (4)

6.

a. Under what circumstances does the wait-die scheme perform better", than the wound-wait scheme for granting resources to concurrently executing transactions? (4)

b. Consider the following snapshot of a system:

	Allocation	*Max*	*Available*
	A B C D	A B C D	A B C D
P_0	0 0 1 2	0 0 1 2	1 5 2 0
P_1	1 0 0 0	1 7 5 0	
P_2	1 3 5 4	2 3 5 6	
P_3	0 6 3 2	0 6 5 2	
P_4	0 0 1 4	0 6 5 6	

Answer the following questions using the banker's algorithm:

a. What is the content of the matrix *Need*?

b. Is the system in a safe state?

c. If a request from process P_1 arrives for (0,4,2,0), can the request be granted immediately?

(6)

7.

a. Differentiate by giving architecture for each: Android, iOS and Windows. (5)

b. Give some mechanism for recovery from a possible deadlock scenario. Consider suitable scenario for explanation of the given approach. (5)

x-x-x