Exam.Code:0931
Sub. Code: 6929

1079

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

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. VII (Section-C) which is compulsory and selecting two questions each from Section A-B.

x-x-x

SECTION-A

1)

a) **Describe the main differences between microkernel designs for operating systems and the so called monolithic designs. Give reasons why most modern general-purpose operating systems have moved to microkernel.**

b) **Give example of a real-time OS. What is the difference between a multiprogramming and a multiprocessing OS/architecture?** **(5, 5)**

2)

a) **Draw a typical process state diagram. Include the states: being created, ready to run, running, waiting, finishing. Label the transitions between the states and briefly describe what causes a process to move from one state to another. Each description of a transition should be no longer than two sentences.**

b) **Given here are the arrivals and burst times for a number of processes:**

Process	Arrival Time	Burst Time
P1	0	6
P2	2	4
P3	3	2
P4	5	5
P5	8	4

i) **Draw a Gantt chart showing a Shortest Job First (SJF) schedule without preemption and calculate the average waiting time.**

ii) **Draw a Gantt chart showing a SJF schedule with preemption and calculate the average waiting time. If there are two or more processes with the same shortest remaining burst time and one is currently running, then do not preempt it.** **(5, 5)**

3)

a) **What does thrashing mean in the context of virtual memory? When does it occur?**

b) **This is a string of memory page references: 1, 2, 3, 4, 3, 2, 1, 5, 3, 2, 5. Draw tables showing the frame usage at each memory reference for each of the a) FIFO – first-in-first-out b) LRU – least recently used page replacement algorithms. Also give the number of page faults generated by each algorithm. Assume the system uses pure demand paging and starts with no pages in real memory. There are three frames of real memory.** **(4, 6)**

SECTION-B

4)

a) **Some file space allocation methods are suitable for direct access to data in files and some are suitable for sequential access to data in files. Describe a file allocation method that is suitable for sequential access but not suitable for direct access. Explain why it is not suitable for direct access** **(5, 5)**

b) **Briefly describe two ways of keeping track of free blocks on a disk device.**

5) **What is disk scheduling? Suppose a disk queue with requests for I/O to blocks on cylinders:- 100, 175, 50, 120, 120, 20, 150, 75, and 200. If the disk head is currently at 60, find out the total disk head movement for the following algorithms: -**

a) **FCFS**
b) **SSTF**
c) **LOOK**
d) **C-SCAN**

(10)

P.T.O.

6)

a) Highlight features of Android as Mobile OS.

b) What are the four necessary conditions for deadlock? What is resource ordering and how does it prevent deadlock happening? Describe Dijkstra's Banker's Algorithm to avoid deadlock by taking an example. (4, 6)

SECTION-C (Compulsory Question)

7)

a) What is a Process Control Block and what is its purpose?

b) What is busy waiting and why is it not generally a good thing?

c) The semaphore's wait and signal operations are defined as indivisible (or atomic) operations. Why do they have to be indivisible?

d) Briefly explain what a system call (or supervisor call) is and give an example.

e) What is swap space? (5x2=10)

x-x-x