B.E. Sixth Semester (Information Technology) (C.B.S.)

Operating Systems

P. Pages : 3

Time : Three Hours

0101

Max. Marks : 80

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Notes : 1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Due credit will be given to neatness and adequate dimensions.
9. Assume suitable data whenever necessary.
10. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) What are the different services provided by operating system? **5**

   b) Define the essential properties of the following operating systems. **9**
   i) Batch   ii) Real time
   iii) Distributed   iv) Multiprocessing

OR

2. a) What are the privileged instructions? Discuss. **4**

   b) How dual-mode operation can be achieved for hardware protection. **4**

   c) What is meant by a system cell? **6**
   How is it used by application program during execution?

3. Discuss the following with reference to file. **13**

   i) Pieces of information associated with an open file.

   ii) File attributes.

   iii) File operations.

OR

4. a) Suppose that a disk has 4000 cylinders, numbered 0 to 3999. The drive is currently serving a request at cylinder 140 and the previous request was at cylinder 115. The queue of pending request in FIFO is ordered as
   85, 1502, 913, 1666, 948, 1023, 1850, 125.
   What is the total distance that the disk arm moves for the following. **10**
   i) FCFS   ii) SSTF
   iii) LOOK   iv) C-LOOK
   v) SCAN   vi) C-SCAN

	b)	Explain the ways for directory implementation.	3

5.   a)   State and explain the attribute of process control Block.   **5**

     b)   Calculate the average waiting time and average turnaround time for the following situation.   **8**

Process	Burst time	Priority	Arrival time
P_0	5	1	1
P_1	7	3	5
P_2	6	2	0

     i)   SJF
     ii)   Priority
     iii)   RR (time quantum = 2)

OR

6.   a)   What are different performance criteria for deciding scheduling algorithms.   **4**

     b)   Discuss content switching in brief.   **3**

     c)   State the purpose and functioning of short-term, medium term and long-term scheduler.   **6**

7.   Discuss the following terms.   **14**

     i)   Logical and physical address space.

     ii)   Paging

     iii)   Segmentation

     iv)   Thrashing.

OR

8.   a)   Consider the following page reference string.   **9**
     7 0 1 2 0 3 0 4 2 3 0 3 2 1 2 0 1 7 0 1
     How many page faults would occurs for the following page replacement algorithm assuming three and four frames?
     i)   FIFO
     ii)   Optimal
     iii)   LRU

     b)   What is memory fragmentation? Explain internal and external fragmentation.   **5**

9.   a)   What do you understand by critical section problem? What requirement should be met by its solution?   **6**

     b)   Discuss the following.   **7**
     i)   Race condition
     ii)   P and V operation in process synchronization.

OR

10. Discuss **any two** of the classical problems of synchronization. **13**

    i)   Dinning philosopher.

    ii)   The Readers writers problem

    iii) The Bounded buffers problem.

11. a)   Consider the following snapshot of a system. **10**

Process	Allocation A B C D	Max A B C D	Available 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 Bankers algorithm.

    i)   What is the content of matrix.Need?

    ii)   Is the system in safe state?

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

    b)   Explain Resource Allocation Graph. **3**

OR

12. a)   What are the necessary conditions for a deadlock situation to arise. **4**

    b)   Differentiate between access list and capability list. **6**

    c)   Define protection and security in brief. **3**

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