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IT'S HARD TO BEAT A PERSON
WHO NEVER GIVES UP.

Babe Ruth, American professional baseball player

NagpurStudents

B.E.Fourth Semester (Computer Science Engineering) (C.B.S.)

Operating Systems

P. Pages : 3

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0675

NKT/KS/17/7295

Time : Three Hours

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. Assume suitable data whenever necessary.

1. a) What is OS? Explain Batch and Distributed operating system in brief. **6**

b) What is system call? Explain different types of system calls. **7**

OR

2. a) Explain different types of services provided by operating system. **6**

b) Explain the different hardware requirements for modern operating system. **7**

3. a) Explain contiguous and Index allocation methods. **5**

b) Suppose that a disk drive has 5000 cylinders numbered from 0 to 4999. The drive is currently serving a request at cylinder 143 and previous request was at cylinder 125. the queue of pending request in FIFO is 86, 1470, 913, 1774, 948, 1509,1022, 1750,130 starting from the current head position, what is the total distance that the disk arm moves to satisfy all the pending request for each of the following disk scheduling algorithms **9**
1) FCFS   2) SSTF
3) SCAN   4) C-SCAN
5) LOOK   6) C-LOOK

OR

4. a) Discuss the various file Access methods **4**

b) What is the need of file system? Explain various operations associated with files. **7**

c) Define file system. What are the various components of file system? **3**

5. a) Explain the concept of process control Block, with neat diagram. **6**

b) Consider the following set of processes. Calculate the average waiting time and turnaround time for following algorithms   **7**
   1) FCFS   2) SJF   3) RR (time slice = 2)

Process	CPU Burst Time	Arrival Time
P_1	3	0
P_2	5	1
P_3	2	2
P_4	5	3
P_5	5	4

OR

6. a) Define Thread. Explain the various Multithreaded Models.   **5**

   b) Draw the state transition diagram of process and Explain each state in detail.   **4**

   c) What is scheduler? Explain different types of schedulers.   **4**

7. a) What is fragmentation? Explain Internal fragmentation and External Fragmentation.   **6**

   b) Explain the hardware implementation of paging in detail with neat sketch.   **7**

OR

8. a) What is Thrashing? What is the causes of thrashing? How can the system eliminates the problem of thrashing?   **7**

   b) Consider the following page reference string 1, 2, 3, 4, 1, 2, 5, 1, 2, 3, 4, 5 for a memory with 3 frames. How many page fault would occurs for the following page replacement algorithms.   **6**
   1) LRO
   2) FIFO
   3) Optimal replacement.

9. a) What is mutual exclusion? How the semaphore used to solve the critical section problem.   **7**

   b) Explain any two classical problems of synchronization.   **6**

OR

10. a) What is the critical section problem. Explain the three conditions that a solution to a critical section problem must satisfy.   **6**

   b) Define monitor. Give the solution to dining philosopher problem using monitor.   **7**

11. a) Define Deadlock. What are the necessary condition for occurrence of deadlock.   **4**

b) Solve the following using Banker's Algorithm and find out whether resultant system state is safe or not **10**

	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P_0	0	1	0	7	5	3	3	3	2
P_1	2	0	0	3	2	2			
P_2	3	0	2	9	0	2			
P_3	2	1	1	2	2	2			
P_4	0	0	2	4	3	3			

i) Find out if system state is safe, if safe find out safe sequence.
ii) If P1 makes a request – P1 (1, 0, 2) is the resulting state safe?
iii) If P4 makes a request – P4 (3, 3, 0), can it be granted? Solve

OR

12. a) Explain the access matrix in details along with its Implementation. **7**

b) Describe Resource allocation graph. Prove that if a graph contain a cycle still there is no deadlock. **7**

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High expectations are the key to everything.

~ Sam Walton