

Operating Systems

P. Pages : 3

Time : Three Hours



KNT/KW/16/7346

Max. Marks : 80

- 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.
 9. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) What are the different services provided by operating system ? **6**
- b) Define essential properties of the following types of operating system. **8**
- i) Batch OS
 - ii) Time sharing OS
 - iii) Real time OS
 - iv) Distributed OS

OR

2. a) Differentiate between preemptive and nonpreemptive process scheduling. **3**
- b) Write short note on:- **8**
- i) PCB (Process Control Block)
 - ii) Context Switching
- c) Define thread. How it differs from process. **3**

3. a) Assume that you have the following jobs to execute with one processor : **9**

Job	CPU	Burst Time	Arrival Time
0		75	0
1		50	10
2		25	10
3		20	80
4		45	85

Calculate average waiting time and turnaround time for each algorithm.

- 1) FCFS
- 2) SJF (Preemptive & Non-Preemptive)
- 3) RR (Time Slice = 15)

- b) Explain process synchronization in short. **4**

OR

4. a) Discuss the following. 8
 i) Race condition.
 ii) Critical section.
- b) Explain one of the classical problem of synchronization. 5
5. a) Consider the following snapshot of a system. 9

Process	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			

Use the Banker's algorithm to solve the following.

- i) Find out the contents of matrix need.
 ii) Is the system in a safe state.
 iii) If a request from process P₀ for (3, 3, 0) ariver, can if be grated immediately ?

- b) Explain the Resource Allocation graph algorithm. 4

OR

6. a) What are several method for enforcement of protection and security threats ? Also compare Access list and capability list. 8
- b) What is deadlock ? Give necessary conditions for occurrence of Deadlock. 5
7. a) Differentiate between Internal and External fragmentation. 4
- b) Discuss the following 10
 i) Thrashing.
 ii) Translation look a side buffer.
 iii) Segmentation with paging memory management technique.

OR

8. a) Consider the page of reference string 7
 1 2 3 4 5 3 4 1 6 7 8 7 8 9 7 8 9 5 4 5 9 2
 Assume page frame size = 4, Find out the algorithm having minimum page fault rate:
 i) FIFO ii) LRU
 iii) Optimal
- b) Explain the following concepts. 7
 i) Demand paging.
 ii) Advantages of using virtual memory from users and system point of view.

9. a) Write a short note on Disk Caching. 3
b) Write short note on:
i) Disk allocation methods. 10
ii) File access methods.

OR

10. a) Suppose that a disk drive has 2000 cylinders. The drive is currently serving a request at cylinder 190 and the previous request was at cylinder 145. The queue of pending request, in FIFO order is.
86, 1890, 913, 1679, 945, 1500, 1020, 1745, 180.
Starting from the current head position, what is the total distance (in cylinder) that disk arm moves to satisfy all the pending requests for each of the following disk scheduling algorithms?
i) FCFS
ii) SSTF
iii) LOOK
iv) C-LOOK
v) SCAN
vi) C-SCAN
- b) What are the pieces of information associated with open file ? Explain each of them. 3

11. Write short notes on:
i) DMA. 3
ii) I/O controller 3
iii) Shared device. 3
iv) Device driver. 2
v) Interrupt controlled I/O. 2

OR

12. a) Explain the concept "transforming I/O to hardware operations". 5
b) Describe RAID level in detail. 8



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