R13

Code No: 812AG

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MCA II Semester Examinations, April/May - 2019
OPERATING SYSTEMS

Time: 3 Hours   **Max. Marks: 60**

Note: This question paper contains two parts A and B.
  Part A is compulsory which carries 20 marks. Answer all questions in Part A. Part B
  consists of 5 Units. Answer any one full question from each unit. Each question carries
  8 marks and may have a, b, c as sub questions.

PART - A

5 × 4 Marks = 20

1.a)   Explain about the virtual memory.   [4]
  b)   Explain the process state transition diagram with neat sketch.   [4]
  c)   Explain the concept of thrashing and why thrashing should be avoided in a system? [4]
  d)   List the common file types along with their extensions and describe each file
       type?   [4]
  e)   Describe the conditions under which a deadlock situation may arise?   [4]

PART - B

5 × 8 Marks = 40

2.a)   State and explain various types of computer systems?
  b)   Distinguish between multiprogramming, multitasking and multiprocessing?   [4+4]

OR

3.   Describe the functionalities listed below?
     a) Batch programming   b) Virtual Memory   c) Time sharing   [8]

4.a)   Describe dining-philosophers problem? Derive an algorithm to solve the problem using
       semaphores?
  b)   State the requirements that a solution to the critical section problem must satisfy? [4+4]

OR

5.   Consider the following set of processes with the length of the CPU burst time given in
     milliseconds

Process	Burst Time	Priority
P1	10	3
P2	1	1
P3	2	3
P4	1	4
P5	5	2

     The processes are assumed to have arrived in the order p1, p2, p3, p4, p5 all at time 0.
     a) Draw four Gantt charts illustrating the execution of these processes using FCFS, SJF,
     anon pre-emptive priority (a smaller priority number implies a higher priority) and RR
     (quantum=1)scheduling.
     b) What is the turnaround time of each process for each of the scheduling algorithms in
     part?
     c) What is the waiting time of each process for each of the scheduling algorithms in part?
     Which of the schedules in part a results in the minimal average waiting time?   [8]

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6. Given memory partitions of 100K, 500K, 200K, 300K, and 600K (in order), how would each of the First-fit, Best-fit, and Worst-fit algorithms place processes of 212K, 417K, 112K, and 426K (in order)? Explain which algorithm makes the most efficient use of memory? [8]

OR

7.a) State and explain about virtual memory concept with neat diagram?

b) Explain the basic Scheme of page replacement and about the various page replacement strategies with examples? [4+4]

8.a) Explain about the structure of Directory.

b) Explain about the Free space management in file system. [4+4]

OR

9. Explain the following in detail with respect to disk?
   a) Seek time
   b) Latency
   c) Access time
   d) Transfer time [8]

10.a) List the implementation techniques of access matrix?

b) List any two example systems that implement capability-based protection? [4+4]

OR

11. Consider the following snapshot of a system Answer the following questions using the banker's algorithm:

	Allocation	Max	Available
	A B C D	A B C D	A B C D
P1	0 0 1 3	0 0 1 2	1 5 2 0
P2	1 0 0 0	1 7 5 0	
P3	1 3 5 4	2 3 5 6	

a) What is the content of matrix "Need"?
b) Is the system in a safe state?
c) If a request from process P1 arrives for (0, 4, 2, 0) can the request be granted immediately? [8]

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