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15CS64

Sixth Semester B.E. Degree Examination, June/July 2018
Operating Systems

Time: 3 hrs.   Max. Marks: 80

Note: Answer any FIVE full questions, choosing one full question from each module.

Module-1

1   a. Define Operating System. with a neat diagram, explain the dual-mode operation of operating system. **(06 Marks)**

   b. Explain the services of operating system that are helpful for user and the system. **(06 Marks)**

   c. Define the following terms :
     i) Virtual Machine
     ii) CPU scheduler
     iii) System call
     iv) Context switch. **(04 Marks)**

OR

2   a. With a neat diagram, explain the different states of a process. **(05 Marks)**

   b. Explain the layered approach of operating system structure, with supporting diagram. **(05 Marks)**

   c. What is interprocess communication? Explain direct and indirect communication with respect to message passing system. **(06 Marks)**

Module-2

3   a. Explain multithreading models, Also list the benefits of multithreaded programming. **(06 Marks)**

   b. Consider the following set of processes given in table

Processes	Arrival Time (m sec)	Burst Time (m sec)	Priority
P_1	0	10	4
P_2	3	5	2
P_3	3	6	6
P_4	5	4	3

Consider larger number as highest priority. Calculate average waiting time and turn around time and draw Gantt chart for preemptive priority scheduling and preemptive SJF scheduling. **(06 Marks)**

   c. Explain multiprocessor scheduling. **(04 Marks)**

OR

4   a. What are the requirements to critical section problem? Explain Peterson's solution to critical section problem. **(06 Marks)**

   b. Explain Dining-philosophers problem with semaphores. **(05 Marks)**

   c. Explain the syntax and schematic view of monitors. **(05 Marks)**

Module-3

5 a. Consider the following snapshot of a system

	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P_0	0	0	2	0	0	4	1	0	2
P_1	1	0	0	2	0	1			
P_2	1	3	5	1	3	7			
P_3	6	3	2	8	4	2			
P_4	1	4	3	1	5	7			

Find the need matrix and calculate safe sequence using Banker's algorithm. Mention the above system is safe or not safe. **(08 Marks)**

   b. What are the necessary conditions for deadlock? Explain different methods to recover from deadlock. **(08 Marks)**

OR

6 a. What is paging? Explain paging hardware with translation look-aside buffer. **(06 Marks)**

   b. Explain the structure of page table with respect to hierarchical paging. **(06 Marks)**

   c. Given the 5 memory partitions 100 KB, 500 KB, 200 KB, 300 KB and 600 KB, how each of the first fit, best fit and worst fit algorithms place processes of 212 KB, 417 KB, 112KB and 426KB size. Which algorithm makes efficient use of memory? **(04 Marks)**

Module-4

7 a. What is a page fault? With a supporting diagram explain the steps involved in handling page fault. **(06 Marks)**

   b. Consider the page reference string for a memory with three frames, how many page faults will occur for FIFO, LRU and optimal page replacement algorithms. Which is most efficient?

   Reference string : | 7 | 0 | 1 | 2 | 0 | 3 | 0 | 4 | 2 | 3 | 0 | 3 | 2 | 1 | 2 | 0 | 1 | 7 | 0 | 1 | **(06 Marks)**

   c. Explain copy-on-write process in virtual memory. **(04 Marks)**

OR

8 a. What are the different allocation methods in disk? Explain in detail any two methods. **(06 Marks)**

   b. List the different directory structure. Explain acyclic – graph directory and tree structured directory. **(07 Marks)**

   c. What is a file? Also list different file operations. **(03 Marks)**

Module-5

9 a. List the different disk scheduling techniques, explain any two scheduling, considering the following disk queue requests.
98, 183, 37, 122, 14, 124, 65, 67. **(06 Marks)**

   b. What is an access matrix? Explain the different methods of implementing access matrix. **(06 Marks)**

   c. Explain bad – block recovery in disk. **(04 Marks)**

OR

10 a. Explain the design principle of Linux. **(06 Marks)**

   b. Explain the process management in Linux platform. **(06 Marks)**

   c. Explain the interprocess communication mechanisms in Linux. **(04 Marks)**