CBCS SCHEME

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17CS64

Sixth Semester B.E. Degree Examination, Jan./Feb.2021
Operating Systems

Time: 3 hrs.   Max. Marks: 100

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

Module-1

1 a. What is an operating system and explain its role from user and system point of view? **(06 Marks)**
   b. Explain the concept of virtualization with an example and its benefits. **(08 Marks)**
   c. Discuss the two fundamental models of IPC with neat diagram. **(06 Marks)**

OR

2 a. Explain the dual mode operation with a neat diagram. **(06 Marks)**
   b. List different services provided by the operating system and explain any 3 in detail. **(08 Marks)**
   c. Define process and explain PCB with a neat diagram. **(06 Marks)**

Module-2

3 a. Explain the different multithreading models. **(06 Marks)**
   b. Construct the Gantt chart, find average wait and turnaround time for FCFS, SJF and RR algorithms. Consider given set of processes, with the length of the CPU burst time given in milliseconds. The processes are assumed to have arrived in the order P_1, P_2, P_3, P_4, P_5 all at time 0. Consider quantum = 1 ms. **(10 Marks)**

Process	Burst time
P_1	10
P_2	1
P_3	2
P_4	1
P_5	5

   c. Which requirements do the solutions to critical-section problem needs to satisfy? **(04 Marks)**

OR

4 a. Briefly discuss the threading issues. **(08 Marks)**
   b. What are the criteria to be considered for the CPU scheduling algorithms? **(06 Marks)**
   c. Explain how semaphore can be used to solve the Readers-Writers problem. **(06 Marks)**

Module-3

5 a. Discuss the alternatives for deadlock recovery. **(06 Marks)**
   b. Explain the necessary conditions for deadlock occurrence. **(06 Marks)**
   c. What is paging, explain different structures of the page tables? **(08 Marks)**

OR

6 a. Inspect the given system using Banker's algorithm and identify if it is in a safe state. Provide the content of "Need" matrix and safe sequence, if any. **(10 Marks)**

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

   b. What is segmentation; explain the memory access using a segment table? **(06 Marks)**
   c. Explain fragmentation. **(04 Marks)**

Module-4

7 a. With a neat diagram, explain the steps involved in handling the page fault. **(08 Marks)**
   b. Describe the various file access methods. **(06 Marks)**
   c. Explain in brief the major methods of allocating disk space for the files. **(06 Marks)**

OR

8 a. How many page faults would occur for the LRU, FIFO and optimal replacement algorithms. Consider the page reference string as 1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6? **(09 Marks)**
   b. Write the different file operations. **(06 Marks)**
   c. How free space management is performed? Explain any 2 implementations. **(05 Marks)**

Module-5

9 a. Explain the below mentioned disk scheduling algorithms with example,
   (i)   FCFS
   (ii) SSTF
   (iii) SCAN scheduling **(09 Marks)**
   b. Explain domain structure of protection and how it is realized. **(05 Marks)**
   c. Discuss the components of Linux system with a neat diagram. **(06 Marks)**

OR

10 a. Describe the working of a magnetic disk with neat diagram. **(06 Marks)**
    b. Explain access matrix model of protection and given an example of implementation. **(06 Marks)**
    c. Write a brief note on Linux Kernel modules. **(08 Marks)**

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