10CS53

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

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions, selecting atleast TWO questions from each part.*

PART – A

1   a. Define operating system. Explain the role of operating system with user and system viewpoints.   **(07 Marks)**
    b. What are operating system activities connected with :
       i) Process management   ii) Memory management.   **(06 Marks)**
    c. With a neat diagram, explain the concept of virtualization and its advantages.   **(07 Marks)**

2   a. Describe the process states with the help of a neat diagram.   **(06 Marks)**
    b. Define thread. Explain different threading models with neat diagram.   **(06 Marks)**
    c. Given below is the snapshot of processes. Draw Gantt charts using preemptive and non preemptive priority scheduling algorithm. (A smaller number has a higher priority) Also, calculate the average waiting time for both.

Process	Arrival time	Burst time	Priority
P_1	0	6	4
P_2	3	5	2
P_3	3	3	6
P_4	5	5	3

                                                                              (08 Marks)

3   a. What is race condition? Explain three requirements to be satisfied for critical section problem.   **(04 Marks)**
    b. Give a solution to the bounded buffer problem using semaphores. Write the structure of producer and consumer processes.   **(08 Marks)**
    c. Give a solution to the dining Philosoper's problem using monitor.   **(08 Marks)**

4   a. What is deadlock? What are the necessary conditions for a deadlock situation?   **(05 Marks)**
    b. How can deadlock be prevented? Describe any three of them.   **(06 Marks)**
    c. Consider the following snapshot of a system.

	Allocation			Maximum			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			

Answer the following questions using Banker's algorithm.
   i) What is the content of the matrix–Need?
   ii) Is the system in a safe state?
   iii) If a request from P1 arrives for (1, 0, 2), can the request be granted immediately?
                                                                              (09 Marks)

PART – B

5 a. Given five memory partitions of 100kb, 500kb, 200kb, 300kb and 600kb (in order), how would each of the first–fit, best–fit and worst–fit algorithms place processes of 212kb, 417kb and 426kb (in order)? Which algorithm makes the most efficient use of memory? **(04 Marks)**

   b. With a neat diagram, explain the concept of paging with TLB. **(08 Marks)**

   c. Consider the following page reference stream : 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0. Calculate the number of page faults when the number of frames is three, using FIFO and LRU page replacement algorithms. **(08 Marks)**

6 a. List and explain the file attributes and file operations. **(06 Marks)**

   b. Explain directory structures (any two) and list their advantages and disadvantages. **(06 Marks)**

   c. Explain with neat diagram, linked and indexed method of allocating disk space. **(08 Marks)**

7 a. Consider a disk queue with request for I/O to blocks on following cylinders in order 98, 183, 37, 122, 14, 124, 65, 67.
      If the disk head is initially at 53, calculate the total head movements when the following scheduling are used :   i) FCFS   ii) SSTF. **(08 Marks)**

   b. Explain goals of protection. **(04 Marks)**

   c. What is access matrix? Explain its implementation (any two). **(08 Marks)**

8   Write short notes on :
   a. Components of a Linux system
   b. Design principles of Linux system
   c. Internal and external fragmentation
   d   Thrashing with respect to memory management. **(20 Marks)**