CS51

MAKEUP EXAMINATIONS – FEBRUARY 2020

Program	:	B.E. : Computer Science and Engineering	**Semester** :	**V**
Course Name	:	Operating Systems	**Max. Marks** :	**100**
Course Code	:	**CS51**	**Duration** :	**3 Hrs**

Instructions to the Candidates:
- Answer one full question from each unit.

UNIT- I

1. a) Explain the steps taken by the operating system in creation of a process.   CO1   (06)
    b) With a data structure demonstrate the type of information an OS needs to track about each process.   CO1   (06)
    c) Determine the working of Round Robin Scheduling by considering time slice as very large and very small?   CO2   (08)

2. a) With a program explain exec ( ) system call.   CO1   (06)
    b) Discuss how "Shortest Time to Completion First scheduling algorithm" (STCF) is useful in utilizing the system resources in a better way.   CO2   (06)
    c) Consider the following set of processes with arrival time and burst time   CO2   (08)

Process	Burst-Time	Arrival Time
P1	6	0
P2	5	1
P3	3	2
P4	5	3

    Draw the Gantt chart and find the average waiting time and turnaround time by using the following scheduling algorithms
      i) Preemptive Shortest Job First algorithm
      ii) Round-Robin algorithm(time slice=3ms)

UNIT- II

3. a) With a neat diagram show the translation of a given virtual address to its equivalent physical address.   CO2   (06)
    b) With basic rules explain the working of Multi level feedback scheduling technique (MLFQ).   CO2   (06)
    c) With an example show how hybrid approach of paging minimizes the space required to store page table.   CO2   (08)

4. a) Justify the statement "thrashing affects the degree of multiprogramming".   CO3   (06)
    b) Briefly explain the issues related to Multi Queue Multi Processor Scheduling with necessary diagrams.   CO3   (06)

c)	Imagine in a multilevel paging scheme, system maintains a small address space of size 16KB, with 64-byte pages. The pages 0, 1, 25, 254 and 255 contains valid data. Answer the following with respect to multilevel paging. i) Write the no of bits for each filed in virtual address. iii) How many page tables are possible and how many entries are in each page table? iv) What is the size of the page table? v) How many entries are there in directory? vi) Find the physical address of the valid pages.	CO3	(08)

UNIT- III

5.	a)	Explain the concept of fine-grained VS course grained segmentation. Also describe the support for sharing using segmentation technique.	CO3	(06)
	b)	Consider the following page reference string 0123012301234567. How many page faults would occur in case of frame size of 3? i. LRU ii. Optimal.	CO3	(06)
	c)	What are TLBs? Explain in detail how TLBs are useful in increasing the memory access speed.	CO3	(08)

6.	a)	Compare Linear and multilevel page tables.	CO3	(06)
	b)	Write and explain the page fault control flow algorithm.	CO3	(08)
	c)	With an example, demonstrate how FIFO replacement algorithm suffer from Belady's Anomaly.	CO3	(06)

UNIT- IV

7.	a)	Explain "binary semaphore as a lock" and also show the traces using two threads.	CO4	(08)
	b)	Describe the various techniques for the recovery from the deadlock.	CO4	(06)
	c)	Illustrate the following concurrency terms with suitable examples: i) Race Condition ii) Mutual Exclusion iii) Atomicity.	CO4	(06)

8. a) Consider the following resource allocation state of a system, with total resources of R1(10), R2(5) and R3(7).   CO1   (10)

Process	Allocation			Max		
	R1	R2	R3	R1	R2	R3
P1	0	1	0	7	5	3
P2	2	0	0	3	2	2
P3	3	0	2	9	0	2
P4	2	1	1	2	2	2

Using the Deadlock detection algorithm answer the following.

i) Determine whether system is in deadlock state or not.

ii) Suppose process p4 makes one additional request for an instance of typeR2, will the system grant the resource?

	b)	Describe the producer-consumer problem and provide its solution in detail.	CO4	(10)

UNIT- V

9. a) Discuss the iterative and recursive traversal operations on a file stored in a disk. CO5 (06)

   b) Summarize the working of FSCK tool to find the inconsistency in file system. CO5 (06)

   c) Suppose that a disk drive has 100 cylinders numbered from 0-100. The drive is currently serving a request at cylinder 50, the following is the queue of pending requests in FIFO order, 78, 17, 90, 52, 36, 72, 15
   Starting from the current head position, what is the total distance that the disk arm moves to satisfy the pending requests for each of the following disk-scheduling algorithms?
   i. Shortest Seek Time First
   ii. SCAN CO5 (08)

10. a) Identify the application of Multi-level Index implementation of a file system. CO5 (06)

   b) i) Consider a disk with 10K RPM then how do you set up the dimensional analysis so that a user get time per rotation in milliseconds?
   ii) Consider a disk with 100MB/second then how long does it take to transfer a 512KB block (in milliseconds)? With dimensional analysis. CO5 (06)

   c) Explain the working of data journaling technique with respect to write operation on the disk. CO5 (08)

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