Faculty of Engineering

Mid Sem-I Examination February-2024

CS3CO36 Operating Systems

Programme: B.Tech

Branch/Specialization: CSE

Duration: 1.5 Hrs.

Maximum Marks: 30

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

			Marks	BL	CO	PO	PSO
Q.1	i.	The program in the operating system that does processor management is called...... a) Traffic Controller b) Processor scheduler c) Dispatcher d) Job Schedular	1	BL03	CO01	PO01	
	ii.	Which of the following type of operating system is non-interactive? a) Multi-tasking operating system b) Multi-User operating system c) Batch operating system d) Multi-Programming operating system	1	BL01	CO02	PO02	
	iii.	With respect to operating systems, which of the following is valid process state? a) Ready b) Waiting c) Running d) Starving	1	BL03	CO02	PO02	
	iv.	Consider three CPU-intensive processes, which require 10, 20 and 30 time units and arrive at times 0, 2 and 6, respectively. How many context switches are needed if the operating system implements a shortest remaining time first scheduling algorithm? Do not count the context switches at time zero and at the end. a) 1 b) 2 c) 3 d) 4	1	BL02	CO01	PO01	
	v.	Which of the following process scheduling algorithm may lead to starvation? a) FIFO b) Round Robin c) Shortest Job Next d) None of the above	1	BL03	CO02	PO02	
	vi.	The interval from the time of submission of a process to the time of completion is termed	1	BL02	CO01	PO01	

as?
a) waiting time   b) turnaround time
c) response time   d) throughput

Q.2	i.	Differentiate between time-sharing and multi-programming operating system.	2	BL01 CO01 PO01	
	ii.	What are the various types of schedulers? Explain with neat and clean diagram showing where and which schedular works.	3	BL01 CO01 PO01	
	iii.	Describe and elaborate various states of a process along with a process transition state diagram.	7	BL01 CO01 PO01	
OR	iv.	Explain Critical Section problem with its requirement. Also provide a solution with semaphore and its types.	7	BL01 CO01 PO01	

Q.3	i.	Differentiate between Preemptive and non-preemptive scheduling.	2	BL01 CO02 PO02	
	ii.	Explain Process Scheduling.	2	BL01 CO02 PO02	
	iii.	Explain the concept of Shortest Job First. An operating system uses shortest remaining time first scheduling algorithm for pre-emptive scheduling of processes. Consider the following set of processes with their arrival times and CPU burst times (in milliseconds):	8	BL03 CO02 PO02	

Process	Arrival Time	Burst Time
P1	0	12
P2	2	4
P3	3	6
P4	8	5

a) Draw the Gantt Chart.
b) What is the average waiting time (in milliseconds) of the processes?
c) What is the average Turn Around time (in milliseconds) of the processes?

OR   iv. What is DeadLock? Explain necessary conditions of deadlock to occur. Also Describe Resource Allocation Graph with suitable example and diagram.   8   BL01 CO02 PO02

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Total No. of Questions: 3

Enrollment No. EN22CS301175

Faculty of Engineering
Mid Sem-II Examination April-2024
CS3CO36 Operating System

Programme: B.Tech   Branch/Specialization: CSE All
Duration: 1.5 Hrs.   Maximum Marks: 30

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

			BL	CO	PO	PSO

Q.1 i. A computer has 1000K of main memory. The jobs arrive and finish in the following sequence.
        Job 1 requiring 200 K arrives
        Job 2 requiring 350 K arrives
        Job 3 requiring 300 K arrives
        Job 1 finishes
        Job 4 requiring 120 K arrives
        Job 5 requiring 150 K arrives
        Job 6 requiring 80 K arrives
        Among best fit and first fit, which performs better for this sequence?   **1 BL.03 CO03 PO01**
        a) First fit
        b) Best fit
        c) Both perform the same
        d) None of the above

    ii. When memory is divided into several fixed sized partitions, each partition may contain ___   **1 BL.03 CO03 PO01**
        a) exactly one process
        b) at least one process
        c) multiple processes at once
        d) None of the mentioned

    iii. In multiprogramming with fixed partitions, if a process requires more memory than is available in a partition, it may lead to: **1 BL.03 CO03 PO02**
        a) Fragmentation
        b) Deadlock
        c) Priority inversion
        d) Starvation

iv. FIFO policy is used in a system for page replacement. It consists of 4-page frames, and no pages loaded, to start with. This system initially accesses 100 separate pages in a particular order. It then accesses these same 100 pages. The difference is that now they are in the reverse order. Considering this, how many page faults would occur here?

    a) 192   b) 195
    c) 196   d) 197

v. Consider a system that has 4K pages of 512 bytes in size in the logical address space. The number of bits of logical address?

    a) 21   b) 20
    c) 19   d) 17

vi. What is Thrashing?
    a) A high paging activity is called thrashing.
    b) A high executing activity is called thrashing
    c) An extremely long process is called thrashing
    d) A extremely long virtual memory is called thrashing

Q.2 i. What is the difference between contiguous and non-contiguous memory management techniques?

    ii. Compare and contrast the paging with segmentation. In particular, describe issues related to fragmentation.

    iii. Consider a logical address space of 8 pages of 1024 addressable words each mapped onto a physical memory of 32 frames. How many bits are there in the logical address? How many bits are there in physical address?

OR iv. Consider six memory partitions of sizes 200 KB, 400 KB, 600 KB, 500 KB, 300 KB and 250 KB, where KB refers to kilobyte. These partitions need to be allotted to four processes of sizes 357 KB, 210 KB, 468 KB and 491 KB in that order. If best fit, worst fit and next fit is used, which partitions are NOT allotted to any process?

Q.3 i.   Explain the concept of demand paging and page **2**   BL03   CO04   PO03
          fault.

     ii. Write a short note on: Cache memory.   **2**   BL03   CO04   PO03

     iii. Consider the following reference string: **8**   BL03   CO04   PO03
          1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3,
          6.
          How many page faults would occur for the
          following algorithms, assuming three, five and
          six frames?
          (i) LRU Replacement
          (ii) Optimal Replacement
          Remember all frames are initially empty, so
          first unique pages will all cost one fault each.

OR   iv. For the page reference string as 0, 2, 4, 2, 1, 9, **8**   BL03   CO04   PO03
          4, 3, 5, 7, 4, 5, 7, 8, 6, 3, 0, 2, 1 and with 3
          memory frames, calculate the number of page
          faults using:
          (i) OPT
          (ii) FIFO
          Page Replacement algorithms. Compare the
          result obtained from both the algorithms.

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