



SUPPLEMENTARY SEMESTER EXAMINATIONS – AUGUST 2019

Course & Branch : **B.E : Computer Science and Engineering** Semester : **V**
Subject : **Operating System** Max. Marks : **100**
Subject Code : **CS51/CS1551** Duration : **3 Hrs**

Instructions to the Candidates:

- Answer one full question from each unit.

UNIT- I

- Describe limited direct execution protocol for restricted operations with time-line diagram. CO1 (08)
 - Consider the following set of processes with arrival time and burst time; CO1 (06)

Process	Arrival Time	Execute Time
P0	0	5
P1	1	3
P2	2	8
P3	3	6

Draw the Gantt chart and find the average waiting time and turnaround time by using the following scheduling algorithms

- Preemptive Shortest Job First algorithm
 - First come-first serve scheduling algorithm.
- Illustrate concurrency problems in multi-threaded technique with a program. CO1 (06)
- Explain the steps taken by the operating system in creation of a process. CO1 (08)
 - Identify the problems of using Direct Execution Protocol without limits and provide the solution for the same. CO1 (06)
 - Consider the following set of processes with arrival time and burst time; CO1 (06)

Process	Burst-Time	Arrival Time
P1	10	0
P2	4	1
P3	9	2
P4	5	3

Draw the Gantt chart and find the average waiting time and turnaround time by using the following:

- Shortest Time to Completion First(STCF) First algorithm
- Round-Robin algorithm(time slice=2ms)

UNIT- II

- Briefly explain the merits and demerits of using Single Queue scheduling with necessary diagrams. CO2 (06)
 - With an diagram, show how hybrid approach can be used to design efficiently page table. 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. CO3 (08)
- i) Write the no of bits for each field 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.
4. a) Describe inverted page table technique used to implement page table. CO3 (06)
- b) Explain how priority boosting helps to resolve the problem of starvation in Multi level feedback queue scheduling. CO2 (06)
- c) With an address format of multilevel paging show the conversion of virtual address to physical address. Illustrate with suitable examples. CO3 (08)
- UNIT- III**
5. a) Differentiate between fine-grained and coarse-grained segmentation techniques. CO3 (06)
- b) Consider the following page reference string:
0,1,2,3,0,1,2,3,0,1,2,3,4,5,6,3,2,3,1,2,7.
How many page faults would occur for the following page replacement algorithms assuming 3 frames?
i) LRU replacement ii) FIFO replacement iii) Optimal replacement. CO3 (08)
- c) With a neat diagram, explain the contents of a MIPS TLB entry. CO3 (06)
6. a) Illustrate with an example how a segment can be shared among multiple processes. CO3 (06)
- b) With an algorithm, explain TLB Control Flow to access physical memory. CO3 (08)
- c) Discuss in brief the implementation of different LRU approximation algorithms. CO3 (06)
- UNIT- IV**
7. a) Explain the bounded buffer problem and also provide a semaphore-based solution to the bounded buffer problem. CO4 (08)
- b) List and explain the deadlock prevention methods in operating systems. CO4 (06)
- c) Give the solution for Dining philosophers problem. CO4 (06)
8. a) Explain with code the solutions for following classical problems
i) Readers-writers problem ii) Bounded Buffer problem. CO4 (10)
- b) Describe the uses of following strategies to handle deadlocks.
i) Deadlock detection ii) Deadlock recovery CO4 (10)
- UNIT- V**
9. a) With a file creation timeline diagram explain how OS performs write operation on a disk. CO5 (10)
- b) Explain the Inode bitmap and a data bitmap file system structures on the disk with suitable diagram. CO5 (10)
10. a) Illustrate the following disk scheduling algorithm with suitable example.
i. FCFS ii. SSTF iii. SCAN iv. C-SCAN. CO5 (10)
- b) Explain the working of data journaling technique with respect to write operation on the disk. CO5 (10)
