


MAKEUP EXAMINATIONS – FEBRUARY 2019

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

Instructions to the Candidates:

- Answer one full question from each unit.

UNIT- I

1. a) Consider the following set of processes with arrival time and burst time: CO2 (08)

Process	Arrival-Time	Burst-Time	Priority
P1	0	7	1
P2	1	5	2
P3	2	10	0
P4	2	3	3

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

- i) FCFS algorithm ii) Preemptive Priority algorithm (Lowest number is highest priority).
- b) Illustrate concurrency problems in multi-threaded technique with a program. CO1 (06)
- c) Discuss the different design goals in designing and implementing an operating system. CO1 (06)
2. a) List out and explain different APIs (Application Program Interface) used in managing the processes. CO1 (06)
- b) Illustrate with a program fork () and wait () system calls. CO1 (06)
- c) With an example, show that "Shortest Time to Completion First (STCF) is provably optimal compare to Shortest –Job First algorithm". CO2 (08)

UNIT- II

3. a) With a neat diagram, describe briefly address space layout created by OS to use abstraction of physical memory. CO2 (08)
- b) With a code snippet, explain how to access memory using paging technique. CO2 (06)
- c) Explain how priority boosting helps to resolve the problem of starvation in Multi-level feedback queue scheduling. CO2 (06)
4. a) Is the statement "Multi-Queue Scheduling increases throughput than single-queue scheduling" is true,? If yes then prove with an example. CO2 (08)
- b) Identify the cache affinity problem in multi-processor systems and provide the solution for the same. CO2 (06)
- c) Explain how operating system manages gaming the scheduler problem in multilevel feedback queue with necessary diagrams. CO2 (06)

UNIT- III

5. a) Differentiate between fine-grained and coarse-grained segmentation techniques. CO3 (06)
- b) An operating system supports a virtual memory with TLB. With a TLB lookup time of 5nano sec and memory access time is 100nano sec, calculate the effective memory access time for TLB Hit ratios of 80% and 98%. CO3 (06)

- c) Explain the working of optimal page replacement algorithm with an example. CO3 (08)
6. a) Discuss the support required from the hardware to support sharing of a segment among multiple processes. CO3 (06)
- b) Illustrate the effect of thrashing on multiprogramming operating system. CO3 (06)
- c) Consider the following page reference string CO3 (08)
0 1 3 6 2 4 5 2 5 0 3 1 2 5 4 1 0
How many page faults would occur for the following page replacement algorithms assuming 3 frames?
i) LRU replacement ii) FIFO replacement iii) Optimal replacement.

UNIT- IV

7. a) With a program, explain the working of pthread_join() function. CO4 (06)
- b) With an example, show how resource-allocation graph is used to avoid deadlock for the system with single instance resources. CO4 (06)
- c) Describe the structure of semaphore highlighting how it can be used for process synchronization. CO4 (08)
8. a) With necessary routines, show the problems of using locks by the multiple threads. CO4 (08)
- b) Consider the following snapshot of a system, with total resources of R1(5), R2(12) and R3(9). CO4 (12)

Processes	Allocation			Maximum Request		
	R1	R2	R3	R1	R2	R3
P1	1	4	1	2	5	1
P2	0	2	2	0	2	5
P3	1	1	0	5	4	3
P4	0	2	1	1	5	3
P5	1	1	3	3	0	3

Using the Banker's algorithm answer the following.

- i) Calculate the need matrix
- ii) Determine whether system is in deadlock state or not.
- iii) If a request from P2 is made for the resources (0,2,0), can it be granted?

UNIT- V

9. a) Illustrate with neat diagram the structure of inode data structure associated with files. CO5 (08)
- b) With reference to file systems, explain how journaling helps in file management. CO5 (06)
- Explain with necessary diagrams the FSCCK journaling scheme in detail. CO5 (06)
10. a) Illustrate the following disk scheduling algorithm with suitable examples. CO5 (10)
- i) FCFS ii) SSTF iii) SCAN iv) C-SCAN.
- b) List and explain various solutions for crash consistency problem in file systems. CO5 (10)
