GANPAT UNIVERSITY

B. Tech Semester - IV Computer Engineering/Information Technology
Regular Examination May - 2014
2CE402/2IT402: OPERATING SYSTEMS

Time: 3 Hours]   [Total Marks: 70

Instructions:
1. Attempt all questions.
2. Figures to the right indicate full marks
3. Each section should be written in a separate answer book

SECTION-I

Q-1. (A) Define critical section. Explain different techniques to provide mutual exclusion. [4]

(B) Describe process control block. Explain the context switching mechanism with an example. [4]

(C) Define producer consumer problem. Write the solution to the problem using semaphore. [4]

OR

Q-1. (A) Define semaphore. Explain the usage of semaphore with an example. [4]

(B) List out the preemptive scheduling algorithms. Explain anyone with an example. [4]

(C) Discuss the Sleeping barber problem in brief. Write a solution to the problem using semaphore. [4]

Q-2. (A) Define Deadlock. Describe necessary conditions for the deadlock. [4]

(B) Consider the following set of processes with the length of CPU burst time (service time) given in milliseconds. [4]

Process	Arrival Time	Burst Time	Priority
P1	0	10	3
P2	0	1	1
P3	1	2	3
P4	2	1	4

Calculate the average turnaround time and average waiting time using following algorithm: 1) SJF-Preemptive   2) Priority Preemptive

(C) Define process. Describe process state diagram. [3]

OR

Q-2. (A) Consider the following snapshot of a system. [5]

Process	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	0	0	1	2	0	0	1	2	2	1	0	0
P1	2	0	0	0	2	7	5	0				
P2	0	0	3	4	6	6	5	6				
P3	2	3	5	4	4	3	5	6				
P4	0	3	3	2	0	6	5	2				

Answer the following question using Banker's Algorithm:
i) What is the content of matrix Need? ii) Is the system in safe state? If yes then write a safe sequence. iii) If a request from process P2 arrives for (0,1,0,0), can the request be granted immediately?

(B) Describe the usage of resource allocation graph with reference to deadlock of the system [03]

(C) Differentiate long term, short term and medium term scheduler. [03]

Q-3. (A) Consider the following set of process. [4]

Process Name	Arrival Time	Burst (service) time
P0	0	3
P1	1	5
P2	3	2
P3	8	5
P4	9	4

Calculate Average waiting time and turn around time for following Algorithms:
(1) Round Robin (Time quantum =3)
(2) Shortest Job First (Non-Preemptive)
(3) FCFS

(B) Discuss and compare following Operating system structure: [4]
1. Simple Structure 2. Layered Approach 3. Micro-kernels

(C) Describe Dual Mode of an operating system. [2]

(D) Differentiate process and thread. [2]

Q-4. (A) Define the following terms. [4]
(1) Page Fault (2) ASIDs (3) Seek Time (4) Threshing

(B) Discuss Internal and External fragmentation with suitable example. [4]

(C) Compare the following [4]
(1) Paging and Segmentation
(2) Dynamic and Static loading

OR

Q-4. (A) Explain paging method with TLB. [4]

(B) Explain locality reference model (Working Set Model) to prevent thrashing. [4]

(C) Explain Hierarchical page table method for structuring page table. [4]

Q-5. (A) Discuss Second Chance Page replacement algorithm with suitable example. [4]

(B) Explain file system free-space management method in brief. [4]

(C) Define Hit Ratio. Calculate Effective Access Time (EAT) when Hit ratio is 85%, memory access time is 155 nanoseconds and TLB access time is 30 nanoseconds. [3]

OR

Q-5. (A) Consider 4 frame in main memory and memory reference string is : [4]
1 0 2 6 0 3 1 4 5 1 0 1 6 4 3 0 1 2 5 7
How many page faults will occur with LRU, FIFO and Optimal page replacement algorithms?

(B) Discuss acyclic graph directory structure. [4]

(C) Given memory partitions of 160k, 551k, 220k, 365k and 650k (in order). How First Fit, Best Fit and Worst Fit algorithms works to place processes of 205k, 427k, 144k and 482k (in order) in memory. [3]

Q-6. Answer the following (Any Three) [12]

(A) Discuss contiguous allocation and linked allocation method in brief.

(B) Define term: TLB Reach and discuss buddy system for allocating kernel memory.

(C) Suppose that disk drive has 400 cylinders numbered 0 to 399. The drive is currently serving a request at cylinder 97, and the previous request was at cylinder 100. The queue of pending request in FIFO order is 188, 81, 140, 15, 17, 134, 91, and 80. Calculate total head movement (in cylinder) using FCFS, SSTF, SCAN and LOOK disk scheduling algorithm.

(D) Discuss RAID storage structure in brief.

END OF PAPER