GANPAT UNIVERSITY

B. Tech Semester - IV Computer Engineering/Information Technology

Regular Examination April - June 2015

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) Consider the following set of processes, with the length of the CPU-burst time given in milliseconds: **[5]**

Process	Arrival Time	Service Time	Priority
P1	0	6	3
P2	2	4	1
P3	3	10	2
P4	7	9	4

Calculate average Turnaround time and average waiting time using FCFS,SJF-non preemptive, and SJF-preemptive, RR(Time Quantum=3),Priority Scheduling algorithm.

(B) Explain Producer consumer problem in details. Write a solution to the problem using semaphore. **[4]**

(C) Is waiting to running state transition is possible? Draw and explain Process state transition Diagram. **[3]**

OR

Q.1. (A) Consider the following set of processes, with the length of the CPU-burst time given in milliseconds. All Process arrives at the same time. Here 5 is the highest priority. **[5]**

Process	Service Time	Arrival Time	Priority
A	10	0	3
B	6	2	4
C	2	4	2
D	4	6	1

For each of the following scheduling algorithm determine the average turn-around time and average waiting time.

(A)Round robin (Time quantum=2) (B)Priority scheduling

(C)FCFS (D) Shortest job first (non preemptive) (E) Shortest Remaining time first.

(B) Explain Sleeping barber problem in detail. Write a solution to the problem using semaphore. **[4]**

(C) malloc function used in which segment of process in memory ? Explain structure of process in memory. **[3]**

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	1	5	2	0
P1	1	0	0	0	1	7	5	0				
P2	1	3	5	4	2	3	5	6				
P3	0	6	3	2	0	6	5	2				
P4	0	0	1	4	0	6	5	6				

Answer the following questions using the banker's algorithm:

a. What is the content of the matrix Need?

b. Is the system in a safe state?

c. If a request from process P1 arrives for (0,4,2,0), can the request be granted immediately?

(B) Define Critical section. Explain different methods of implementing mutual exclusion. **[4]**

(C) Explain Batch, multiprogramming and multitasking Operating system in brief. **[2]**

OR

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

Process	Allocation					Max					Available				
	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E
P0	1	0	2	1	2	1	1	2	1	3	0	0	X	1	2
P1	2	0	1	1	0	2	2	2	1	0					
P2	1	1	0	1	0	2	1	3	1	0					
P3	1	1	1	1	0	1	1	2	2	1					

What is a smallest value of X for which this is a safe state? Show all the calculations for your answer. [3]

(B) Explain Dead lock recovery in details. [3]

(C) Explain Difference between microkernel, monolithic and hybrid kernel. [5]

Q.3. (A) Define the following term:
(1)Process (2) Semaphore (3) Race condition (4) context switch (5) busy waiting [4]

(B) Explain types of Scheduler and types of queue in operating system. [3]

(C) Describe the use of wait for graph with an example.

SECTION-II

Q.4. (A) What is virtual memory? How it can be implemented? Explain any one method. [4]

(B) Explain Internal and External Fragmentation with an example [4]

(C) How many page fault would occur with using FIFO, LRU and optimal page replacement algorithm for following reference string: 1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6. Frame size is 4 [4]

OR

Q.4. (A) Explain Hashed Page table with diagram. [4]

(B) What is page fault? Explain and write step in handling page fault. [4]

(C) Given memory partition of 150k,525k,200k,300k and 600k (in order).How First Fit, Best fit and worst fit algorithm work for place process 250k, 427k, 142k, and 426k in order. [4]

Q.5. (A) Explain thrashing with an example [4]

(B) Explain paging method with TLB. [3]

(C) Explain Contiguous and Index file allocation method In details.

OR

(A) Describe disk (secondary memory) structure with diagram. [4]

(B) Explain different types of directory structures. [4]

(C) Calculate Effective Access time when Hit ratio is 85%, memory access time is 155 nano second and TLB access time is 30 nano second. [3]

Q.6. (A) Define following: [5]
1. seek time 2. Rotational latency 3. Hit ratio 4. Pure demand paging 5. Segmentation

(B) Suppose that a disk drive has 500 cylinders, numbered 0 to 499. The drive is currently serving a request at cylinder 143, and the previous Request was at cylinder 143. The queue of pending requests, in FIFO order, is 86, 300, 211, 17, 37, 100, 40, 311, 385 Starting from the current head position, what is the total distance ((in cylinders) that the disk arm moves to satisfy all the pending requests, for each of the following disk scheduling:
FCFS, C-SCAN, SCAN, SSTF [2]

(C) What is Belady's Anomaly? Explain it with example.

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