TE | SEM-II | CBGS | IT | MAY-17 17/05/2017

SUB. :- O.S.

Q.P. Code : 594200

(3 Hours) **[Total Marks : 80**

N.B.: (1) Question No. **1** is **compulsory.**
(2) Solve any **three** questions out of remaining **five.**
(3) Figures to **right** indicate **full** marks.
(4) Assume suitable **data** where **necessary.**

1. (a) Describe the file systems of Windows. [5]
(b) Write the deadlock detection algorithm [5]
(c) What are the differences between user level-threads and kernel-level threads? Under what circumstances one better than the other? [5]
(d) Describe how does critical section avoid race condition? What are the properties which data item should possess to implement critical section? [5]

2 (a) A page size of 4096 bytes and following page table [10]

Page No	In/out	Frame
0	out	333
1	in	300
2	in	1000
3	out	100
4	out	500
5	in	120
6	out	412
7	in	740

Which of the following virtual addresses would generate a page fault? For those that do not generate page fault , to what physical address would they translate?
i) 21610 ii)35410 iii)27012 iv)10234

(b) What is semaphore? Explain the counting semaphore with the help of example. [10]

3 (a) Consider a system running 10 I/O bound tasks and one CPU bound task. Assume that I/O bound task issues an I/O operation once for every millisecond of CPU computing and that each I/O operation takes 10 milliseconds to complete. Also assume that the context switching overhead is 0.1 millisecond and that all processes are long running tasks. What is the CPU utilization for a round robin scheduler when : [10]
i)The time quantum is 1 millisecond ii) The time quantum is 10 milliseconds

(b) Show that Peterson's algorithm satisfies the requirements of a mechanism to control access to a critical section [10]

TURN OVER

4 (a) Consider the following snapshot of the process to be executed. Draw the Gantt chart and determine the average waiting time and average turnaround time for FCFS, SJF(pre-emptive), SJF(nonpreemptive) and round robin (quantum=2) scheduling algorithm. [10]

Process	Arrival Time	Burst Time
P1	0	7
P2	1	4
P3	3	3
P4	5	1
P5	7	5

(b) What is a kernel? Describe briefly the approaches of designing kernel [10]

5 (a) On a simple paging system with 2^{24} bytes of physical memory, 256 pages of logical address space, and a page size of 2^{10} bytes. [10]

i) How many bytes are in page frame?

ii) How many bits in the physical address specify the page frame?

iii) How many entries in the page table?

iv) How many bits are in the logical address?

(b) What criteria should be adopted for choosing type of file organization? Describe the implementation of file allocation techniques? [10]

6 (a) Consider the following snapshot of the system:- [10]

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

Answer the following questions using Banker's algorithm?

i) Determine the total amount of resource of each type. ii) What is the content of need matrix? iii) Determine if the system is in safe state using safety algorithm. iv) If a request from process p1 arrives for (1,1,0) can the request be granted immediately.

(b) Explain the Android operating system. [10]
