NEW

2018

BCA

4th Semester Examination

OPERATING SYSTEM

PAPER—2202

Full Marks : 100

Time : 3 Hours

The figures in the right-hand margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

Answer Q. No. *1* and any *four* from the rest.

1. Answer any *five* questions :   5×2

   (a) Find out the number of page fault occured in LRU algorithm with this reference string

   7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1.

   Assume 3 frames.

(b) What do you mean by 'Swapping'?

(c) A semaphore count of negative n, then how many waiting processes does the queue contain? For how many process which are common sharing data, the Deckers algorithm implements mutual Exclusion.

(d) Difference between User level threads and Kernel level threads.

(e) What is preemptive scheduling algorithm?

(f) What is virtual memory.

(g) What is spooling?

2. (a) Consider a process executing on a CPU. Give an example scenario that can cause the process to undergo.

   (i) A voluntary context switch.

   (ii) An involuntary context switch.   2½+2½

   (b) Answer Yes/No, and provide a brief explanation.

(Continued)

    (i)   Is it necessary for threads in a process to have seperate stacks ?

    (ii)   Is it necessary for threads in a process to have seperate copies of the program executable ?

$2\frac{1}{2}+2\frac{1}{2}$

(c) Provide one reason why a DMA-enabled device driver usually gives better performance over a non-DMA interrupt-driven device driver. $2\frac{1}{2}$

(d) Suppose n processes P_1, P_2, ... P_n share m identical resource units, which can be reserved and released one at a time. The maximum resource requirement of process P_i is S_i, where $S_i > 0$. Write down a sufficient conditon for ensuring that deadlock does not occur ? $2\frac{1}{2}$

3. (a) Consider a demand paging system-measured utilizations are

CPU utilization   20%

Paging disk   97.7%

Other I/O devices   5%

4

Which of the following will improve CPU Utilization ? Why ?

(i) Install a faster CPU.

(ii) Install a bigger paging disk.

(iii) Increase the degree of multiprogramming.

(iv) Install more main memory.

(v) Install a faster hard disk or multiple controllers with multiple hard disks.

(vi) Increase the page size. 5

(b) In a paged memory management algorithms, the hit ratio is 70%, If it takes 30 ns to search TLB to access memory. What is the effective access time ? 3

(c) Explain the problem of Dinning–philosopher with the help of Semaphore. 4

(d) Define : Buddy System, Magic Number. 1½+1½

4. (a) Suppose a disk drive has 300 cylinders, numbered 0 to 299. The current position of the drive is 90. The queue of pending requests in FIFO order is 36, 79,

C/18/BCA/4th Sem/2202 *(Continued)*

15, 120, 199, 270, 89, 170. Calculate the average cylinder movements for the following algorithm

(i) FCFS, (ii) SSTF, (iii) SCAN, (iv) C-SCAN, (v) LOOK. 5×2

(b) Consider the following segment table,

Segment	Base	Length
0	219	600
1	2300	14
2	90	100
3	1327	580
4	1952	96

What are the physical addresses for the following logical addresses ?

(i) 0, 430, (ii) 1, 10, (iii) 2, 500, (iv) 3. 400, (v) 4, 112. 1+1+1+1+1

5. (a) What is preemptive and non-preemptive scheduling ?

(b) What is PCB ?

(c) Assume you have the following jobs to execute with 1 processor using preemtive SJF scheduling—

Process	Arrival Time	CPU Burst Time
P_1	0	5
P_2	1	2
P_3	3	3
P_4	4	1
P_5	7	2

Draw the Gantt chart. Also find out average waiting time and average turn-around time.

(d) What is starvation ?   3+4+6+2

6. (a) What is safe state and unsafe state ?

(b) Write down the Banker's algorithm.

(c) Consider the following snapshot of a system :

Process	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P_1	0	0	1	2	0	0	1	2	2	1	0	0
P_2	2	0	0	0	2	7	5	0				
P_3	0	0	3	4	6	6	5	6				
P_4	2	3	5	4	4	3	5	6				
P_5	0	3	3	2	0	6	5	2				

Answer the following questions using Banker's Algorithm :

(i) Calculate the need matrix.

(ii) Is the ststen in a safe state or not ? 4+4(3+4)

7. Write short notes on (any *three*) : 3×5

(a) GUI ;

(b) Dining philosophers problem ;

(Turn Over)

(c) SSTF ;

(d) Competing process v/s Co-operating process ;

(e) Zombie process.

[*Internal Assessment — 30 Marks*]

———