U.G. 4th Semester Examination - 2022

COMPUTER SCIENCE

[HONOURS]

Course Code : COM.SC-H-CC-L-408

(Operating System)

Full Marks : 60   Time : $2\frac{1}{2}$ Hours

The figures in the right-hand margin indicate marks.

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

GROUP–A

1. Answer any **ten** questions: 2×10=20

    a)   What is the problem in preemptive priority scheduling?

    b)   What is the difference between turnaround time and response time?

    c)   What do you mean by degree of multiprogramming?

    d)   What is the accounting information stored in the PCB of a process?

    e)   Draw a segment table (only) by considering an example.

    f)   What is aging?

    g)   What is counting semaphore?

    h)   Differentiate between internal and external fragmentation.

    i)   What is the demerit of FCFS scheduling?

    j)   If logical address is 10100011 and physical address is 11000010, what is the content of the relocation register?

    k)   What do you mean by associative look-up?

    1)   What is spooling?

    m)   What is the meaning of safe state in Banker's algorithm?

    n)   What is the difference between logical address and physical address?

    o)   Why job scheduler is called as Long-term scheduler?

GROUP–B

Answer any **four** questions: 5×4=20

2.   a)   What happens in context switch?

     b)   Differentiate among job queue, ready queue and device queue.   2+3

3. What happens if each of the necessary conditions of deadlock is denied to avoid deadlock? 5

4. Consider four holes of size 220KB, 410 KB, 120KB and 200 KB in the order. Three processes PI, P2, P3 of sizes 180KB, 200KB and 150 KB are arriving in the memory for allocation in the respective order. Find out the memory allocation following the first-fit, best-fit and worst-case strategy. 5

5. a) Explain safe state in Banker's algorithm with an example.

   b) What is Belady's Anomaly? 3+2

6. a) If cache miss occurs 7 times out of 10, then what is the value of hit ratio?

   b) In a paging system with TLB, it takes 40ns to search the TLB and 70 ns to access memory. If hit ratio is 50%, find the effective access time. 1+4

7. a) What is busy waiting?

   b) Write down the wait and signal operation of a binary semaphore. 2+3

GROUP–C

Answer any **two** questions: 10×2=20

8. a) Consider a system with the following information:

Process	Burst Time	Priority
P1	12	5
P2	25	1
P3	3	3
P4	9	4
P5	13	2

   Draw Gantt chart and calculate the average turnaround time for each of the following:
   i) SJF scheduling
   ii) Priority scheduling
   iii) RR scheduling (quantum =3)

   b) Consider a system with the following information:

Process	Arrival time	Burst Time	Priority
P1	0	12	5
P2	2	25	1
P3	3	3	3
P4	5	9	4
P5	6	13	2

   Draw Gantt chart and calculate the average waiting time for SRTF scheduling. 7+3

9. a) Consider a system with the following information:

Process	Loan				Max			
	A	B	C	D	A	B	C	D
P1	0	0	1	2	0	0	1	2
P2	1	0	0	0	1	7	5	0
P3	1	3	5	4	2	3	5	6
P4	0	6	3	2	0	6	5	2
P5	0	0	1	4	0	6	5	6

Find the need matrix and find the safe sequence, if any, with available resources as: A=l, B=5, C=2, D=0.

b) "If quantum size is large, RR scheduling becomes FCFS"– Explain with an example.
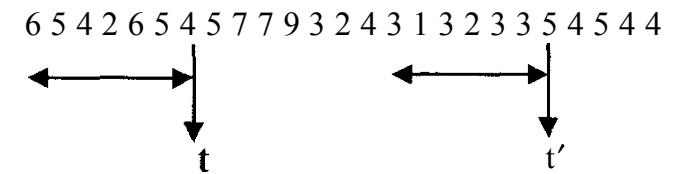
6+4

10. Consider the following Database:

a) Consider the following page-reference string and calculate the page fault for LRU, FIFO, and Optimal Algorithm Also draw the page-replacement steps considering available frame as three.

1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6.

b) Consider the following working set model:

6 5 4 2 6 5 4 5 7 7 9 3 2 4 3 1 3 2 3 3 5 4 5 4 4

Find out WSS (t) and WSS (t′).   8+2

11. a) Consider SSTF Disk Scheduling algorithm and draw the graph of cylinder movement for the following request queue(consider the initial head portion is at 42):

45 32 92 43 22 67 32 78 83 55 82 45.

b) Compare and contrast among various allocation technique in File management.

5+5

_____