U.G. 4th Semester Examination - 2020

COMPUTER SCIENCE

[PROGRAMME]

Course Code : CMSP-CC-L-401D/T

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.

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

a) What are the contents of a Process Control Block?

b) What is processor bound program and I/O-bound program?

c) What are the different types of multi-processing?

d) Differentiate between multiprogramming and multiprocessing operating systems.

e) Discuss the Windows XP process scheduling technique.

f) Why threads are called light-weight processes?

g) What is a real-time operating system?

h) What is a kernel?

i) What is the difference between micro kernel and macro kernel?

j) What is segmentation?

k) Differentiate between external fragmentation and internal fragmentation.

l) Explain optimal page replacement algorithm.

m) What is locality of reference?

n) Explain shortest job first process scheduling strategy.

o) What do you understand by Belady's anomaly?

2. Answer any **four** questions: 5×4=20

a) What is the function of a dispatcher? Draw and explain the process state-transition diagram. 2+3

b) What are the various multi-threading models? Give some benefits of multithreaded programming. 3+2

c) What is compaction? What are the disadvantages of compaction? Consider the following page reference string: 1 1 2 1 2 4 3 3 4 4 4 3 5 5 4 5 3 6 6 2. If the number of free frames in memory

is 3 then find the number of page faults for the following page replacement strategies: FIFO and Least Recently Used (LRU). 2+3

d) What are the differences between preemptive and non-preemptive process scheduling? What do you understand by priority scheduling? 2+3

e) State the main difference between logical and physical address space. What is thrashing? Explain the memory hierarchy of a system. 2+1+2

f) What is shell? Describe different types of Shells. 1+4

3. Answer any **two** questions: 10×2=20

a) Prepare a Gantt chart considering the arrival times and execution times for the following processes applying FCFS, SJF, SRTF and RR with time quantum 10 as processes scheduling policies. Calculate the average waiting time for each case. 10

Process	**Execution time**	**Arrival time**
P1	20	0
P2	25	15
P3	10	30
P4	15	45

b) Explain Multi-level feedback queue in process scheduling. What are the differences between paging and segmentation? When page replacement is required? 5+3+2

c) What is the difference between a process and a program? What is the working of status registers? What is the working of program counter and instruction register? What is dirty bit? What is bootstrap program? 2+3+3+2

d) Explain write back and write through. Explain different memory allocation strategies in a fixed partitioning system. Explain page faults and hit ratio. 3+4+3

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