SEMESTER 2
2020-2021

CS240FZ
Operating Systems, Communications and Concurrency.

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Time allowed: 2 hours

Answer at least seven questions
Your mark will be based on your best ***seven*** answers

All questions carry equal marks

Instructions

	Yes	No
Log Books allowed		X
Formula Tables allowed		X
Other allowed *(enter details)*		X

General *(Enter Details)*

QUESTION 1

What is a process control block(PCB)? Summarize the typical content of a PCB. (10 marks)

QUESTION 2

Compare and contrast the two Unix interprocess communication mechanisms:- message queues and pipes. (10 marks)

QUESTION 3

The following tasks arrive simultaneously for scheduling: (10 marks)

- TASK A with CPU burst requirement of 18
- TASK B with CPU burst requirement of 6
- TASK C with CPU burst requirement 3

Analyse the scheduling performance of a Round Robin Algorithm with quantum = 1 under the metrics of waiting time, response time and turnaround time.

QUESTION 4

Disk Head Scheduling Policy determines the amount of movement incurred by the disk head when servicing requests. Assuming the disk head is at track 53, compare the head movement incurred by the C-LOOK algorithm versus the SCAN algorithm and SSTF algorithm for the following series of track requests:- 96, 100, 183, 23, 122, 14, 124, 65, 67 (10 marks)

QUESTION 5

Give a psuedo code software solution to the n-process mutual exclusion problem indicating the entry code and exit code to be executed by each process. Explain the components of your code. (10 marks)

QUESTION 6

Write a note on socket communication over TCP/IP, and explain what the TCP three way handshake is. (10 marks)

QUESTION 7

A computer memory system is composed of a hierarchy of mechanical and electrical components. Describe such a hierarchy and explain the function of the hierarchical layers. (10 marks)

QUESTION 8

Describe the generic design requirements of a File System. List and explain some of the basic system calls typically provided for accessing and organising files. (10 marks)

QUESTION 9

The first readers/writers concurrency problem prioritises readers and requires that no reader be kept waiting unless a writer has already obtained permission to use the shared item. Define a psuedo code solution to this coordination problem using semaphores. (10 marks)