OXFORD COLLEGE OF ENGINEERING & MANAGEMENT
FACULTY OF SCIENCE & TECHNOLOGY
ASSIGNMENT

Program: BCA **Semester: 4th**

Course Title : Operating System

Assignment Number : BCA/OS/Assign/2018

Part – A [Numerical Questions]

1. Calculate the turnaround time, waiting time, average turnaround time, average waiting time, throughput and processor utilization for the given set of processes that arrive at a given arrival time shown in the table, with the length of processing time given in milliseconds:

Process	Arrival Time	Processing Time
P1	0	3
P2	2	3
P3	3	1
P4	5	4
P5	8	2

   a. Shortest – Job First (SJF)
   b. Round Robin (RR) Quantum = 4 milliseconds
   c. Shortest Remaining Time Next (SRTN)

2. For given processes, their arrival time, service time and process priority is given in the table below.

Process	Service Time	Process Priority
P1	12	3
P2	5	1
P3	2	4
P4	8	5
P5	6	2

Draw a Gantt chart to schedule the above process using

- FCFS
- Round Robin (with Time Quantum = 2)
- Priority scheduling

Also calculate the average waiting time.

3. For given processes, their arrival time, service time and process priority is given in the table below. Calculate the avg. waiting and turnaround time for following algorithm[Where the 4 being highest and 1 being lowest priority]

Job	Arrival Time	Service Time	Process Priority
0	0	40	4
1	0	61	2
2	11	27	5
3	23	41	3
4	25	5	1

   i. FCFS
   ii. SJF
   iii. Priority scheduling
   iv. Round robin scheduling

4.

A system has four processes and five allocable resources. The current allocation and maximum needs are as follows.

	Allocated	Maximum	Available
Process A	1 0 2 1 1	1 1 2 1 3	0 0 x 1 1
Process B	2 0 1 1 0	2 2 2 1 0	
Process C	1 1 0 1 0	2 1 3 1 0	
Process D	1 1 1 1 0	1 1 2 2 1	

Calculate the smallest value of x for which this is a safe state.

5. How many page faults occurs for each of the following page replacement algorithm for the reference strings 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1 with four page frames. Suppose all frames are initially empty.
    a. Optimal Replacement
    b. FIFO replacement
    c. LRU replacement
    d. Clock replacement
6. What is page fault? Consider the following page reference string: 3, 3, 5, 4, 7, 1, 5, 5, 1, 4, 3, 7, 6, 3, 4, 1. How many page faults would occur for each of the following page replacement algorithms assuming 4 page frames?
    a. LRU page replacement
    b. FIFO page replacement
    c. Optimal page replacement
    d. Clock replacement
7. Given references to the following pages by a program, 1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6. How many page faults will occur if the program has three page frames available to it and use LRU, FIFO and OPT page replacement algorithms?
8. Given the following queue: 95, 180, 34, 119, 11, 123, 62, 64 with the Read-write head initially at the track 50 and the tail track being at 199. Calculate total head moved for the following algorithm:
    a. First come first serve (FCFS)
    b. Shortest Seek Time First (SSTF)
    c. Elevator (SCAN)
    d. Circular Scan (C-SCAN)
    e. LOOK
    f. C-LOOK
9. Suppose that the disk drive has 50 cylinders, numbered from 0 to 49. The drive currently serving the request at cylinder 20 and the previous request was at cylinder 25. The queue of pending request is 10, 22, 20, 2, 40, 6 and 38 in the order. How much seek time is needed for the following disk scheduling algorithms if a seek takes 6 msec per cylinder moved.
    a. First-Come, First-Served
    b. Shortest Seek Time First
    c. SCAN
    d. LOOK
10. Suppose the head of a moving – head disk with 200 tracks, numbered 0 to 199 is currently serving request at tracks 143 and has finished a request at track 125. The queue it requests is kept in the FIFO order 86, 147, 91, 177, 94, 150, 102, 175, 130. What is the total head movement needed to satisfy these request for the following disk-scheduling algorithms?
    a. FCFS
    b. SSTF
    c. SCAN
    d. LOOK

Part – B [Theory Questions]

11. Describe how multithreading improve performance over a single-threaded solution.
12. Students working at individual PCs in a computer laboratory send their files to be printed by a server which spools the files on its hard disk. Under what conditions may a deadlock occur if the disk space for print spool is limited? How may the deadlock be avoided?
13. What is device independence I/O software? Define.
14. Why operating system is treated as resource manager and extended machine? Explain.
15. Define file and directories. Explain about protection mechanism.
16. Differentiate between internal and external fragmentation with example.
17. What is DMA? Explain how it works.
18. How does process differ from program? Explain process state with the help of block diagram.
19. What is thrashing? Explain with figure.
20. Explain device driver and device controller. Also differentiate it.
21. What is cryptography? Explain two methods of cryptography.
22. What is distributed OS? Explain its advantages and disadvantages.
23. What is memory wall? Write its causes.
24. Explain different file and directory operations.
25. What is paging? Explain hashed page table with diagram.

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