



University of Engineering & Management, Kolkata

End Semester Examination, May - June, 2018

Course: B.Tech(CSE)

Semester: 6<sup>th</sup>

Paper Name: Operating System

Paper Code: CS603

Full Marks: 70

Date: 04/06/2018

Time: 2:00pm – 5:00pm

**Group - A (10 marks)**

Answer any 5. Each question is of 2 marks.

1. A) The working of an Operating System is event driven-explain.  
B) What is kernel?  
C) Using Priority Scheduling algorithm, find the average waiting time for the following set of processes given with their priorities in the order: Process : Burst Time : Priority respectively.  
P1 : 10 : 3 ; P2 : 1 : 1 ; P3 : 2 : 4 ; P4 : 1 : 5 ; P5 : 5 : 2  
D) What is the task of relocation register?  
E) What is the main principle of best fit algorithm?  
F) Explain some methods of non - contiguous memory allocation with fixed partitioning.  
G) What is the advantage of RAID 1+0 over RAID 0+1?  
H) If *chmod 756* is applied on a file running on a linux platform, what access will be allocated to the different groups of users accessing that file?

**Group - B (15 marks)**

Answer any 3. Each question is of 5 marks.

2. Differentiate between `fork()` and `exec()`.
3. Distinguish Preemptive and non-preemptive scheduling. Mention whether FCFS, Priority and Round-Robin are of preemptive or non-preemptive scheduling.
4. If the contents of the reference string is: 7,0,1,2,0,3,0,4,2,3,0,3 and there are 3 frames available in the memory then calculate the no of page fault and page fault rate for the following algorithms: FIFO, LRU and OPTIMAL PAGE REPLACEMENT .

5. In the following table, if a page is to be replaced on a page fault, which page will it be?

PAGE NUMBER	TLU	R BIT
0	1002	1
1	1100	1
2	980	1
3	1020	0
4	1102	0
5	990	1
CUT_TIME = 1200 $\tau$ = 60		

6. Implement following memory allocation policies with given data

FCFS

First Fit

Best Fit

Available memory: 35 units

OS : 10 units

User process : 25 units

Time of arrival (units)	0	3	7	12	18	25	29
Processing Time (units)	5	3	9	10	16	2	8
Memory Required (units)	3	5	8	12	2	6	9

7. Differentiate between :

A) Viruses and Worms

B) Symmetric and Asymmetric Encryption

**Group - C (45 marks)**

Answer any 3. Each question is of 15 marks.

8. Describe the differences between Symmetric and Asymmetric Multiprocessing. What are the advantages and disadvantages of Multiprocessor System? What are the five major activities of an Operating System with regard to file management?

5+5+5

9. Consider the following scenario of processes with time quantum = 4; Draw the gnat chart for the execution of the processes, showing their start time and end time using SJF and RR scheduling strategies. Calculate turnaround time and response time for each process for both the scheduling strategies. Also calculate average waiting time for the system for both the scheduling strategies.

Process	Arrival Time	Execution Time
P1	0	18
P2	1	3
P3	2	4
P4	3	5
P5	4	3

10. Consider a system with the following information. Determine the order of processes such that the system is in safe state.

R1	R2	R3
15	8	8

Process	Max			Alloc		
	R1	R2	R3	R1	R2	R3
P1	5	6	3	2	1	0
P2	8	5	6	3	2	3
P3	4	9	2	3	0	2
P4	7	4	3	3	2	0
P5	4	3	3	1	0	1

11. A) If 3 processes P1, P2 and P3 of size 21900, 21950 and 21990B, respectively, need space in the memory. If equal sized partitions of 22000B are allocated to P1, P2 and P3 will there be any fragmentation in this allocation?

B) 3 processes P1, P2 and P3 of size 67000, 65000 and 60000B respectively, need space in the memory. If partitions of equal size, that is 70000B are allocated to P1, P2 and P3 will there be any fragmentation in this allocation?

C) Three processes P1, P2 and P3 of size 19900, 19990 and 19888B respectively need space in memory. If partitions of equal size that is 20000B are allocated to P1, P2 and P3 will there be any fragmentation in this allocation? Can a process of 200B be accommodated? 5+5+5

12. Given a hard disk of 200 tracks (Track 0-199) with Track 0 being the innermost track. Write down the track numbers the disk head will travel for the following 5 disk scheduling algorithms with the following sequence of disk track requests: 103, 110, 95, 130, 143, 55, 50, 147, 40. The disk head has just finished a request at track 105 and is currently at track 100. For this exercise, which disk-scheduling algorithm (FIFO, SSTF, SCAN, C-SCAN) is most effective? 15

13. A) What are the ways of implementing access matrix? Brief on each.

B) What is the utility of using access matrix?

C) What do you mean by revocation of access rights? What can be the proposed methods of revocation?

D) What do you mean by language based protection system? Give example. (4\*2)+2+3+2

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