JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MCA I Semester Examinations, April/May - 2019
OPERATING SYSTEMS

Time: 3hrs   Max.Marks:75

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A

5 × 5 Marks = 25

1.a) What are the characteristics and advantages of Real time operating system?   [5]
  b) Define the terms: Scheduler, Dispatcher, context switch, preemptive scheduler, non preemptive scheduler.   [5]
  c) How are named pipes differ from unnamed pipes? List out their merits and demerits.   [5]
  d) What is the "Locality of Reference" concept and why it is important?   [5]
  e) Give the syntax of lseek( ) system call and explain its functionality.   [5]

PART - B

5 × 10 Marks =50

2.a) What is an operating system? Explain the objectives and functions of an operating system.
  b) Differentiate between parallel system and distributed system.   [5+5]

OR

3. List and explain various disk utilities, process utilities and filters in Linux with clear syntax, options and example.   [10]

4.a) Compare and contrast the SJF and SRTF scheduling.
  b) Following is the snapshot of a CPU

Process	CPU Burst	Arrival Time	Priority
P1	12	0	1
P2	09	1	3
P3	18	2	5
P4	05	3	2
P5	20	4	4

Draw the Gantt chart and calculate the turnaround time and waiting time of the jobs for FCFS (First Come First Served), SJF (Shortest Job First), SRTF (Shortest Remaining Time First) and RR (Round Robin with time quantum 5) and priority scheduling algorithms.   [5+5]

OR

5.a) Discuss briefly about Resource-allocation graph.
  b) Consider the following snapshot of a system:

Processes	Allocation	Max	Available
A B CD	A B CD	A B C D	
P0	0 0 1 2	0 0 1 2	1 5 2 0
P1	1 0 0 0	1 7 5 0	
P2	1 3 5 4	2 3 5 6	
P3	0 6 3 2	0 6 5 2	
P4	0 0 1 4	0 6 5 6	

Answer the following questions using the banker's algorithm:
i) What is the content of the matrix Need?
ii) Is the system in a safe state?
iii) If a request from process P1 arrives for (0, 4, 2, 0), can the request be granted immediately? [5+5]

6. What is producer-consumer problem? Explain how semaphores are used to implement producer-consumer problem and address the issues raises due to lack of synchronization. [10]

OR

7. List and explain various APIs available to implement inter process communication using message queues. [10]

8. Explain the segmentation memory management scheme with relevant diagrams. [10]

OR

9. How many page faults occur for the following reference string with three and four page frames using FIFO, LRU and OPTIMAL page replacements algorithms? Assume that initially frames are empty.
3,2,4,3,4,2,2,3,4,5,6,7,7,6,5,4,5,6,7,2,1 [10]

10.a) Give the detailed description of DAG structure.
   b) Explain various techniques implemented for free space management with suitable examples. [5+5]

OR

11.a) What are the advantages and disadvantages of pile file organization over hash file organization?
    b) Explain briefly about directory management and directory implementation. [5+5]

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