Code No: 862AB

R19

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MCA I Semester Examinations, July/August - 2021
OPERATING SYSTEMS

Time: 3 Hours **Max.Marks:75**

Answer any five questions
All questions carry equal marks
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1.a) Describe how operating systems evolved from simple batch to multi-programmed and time sharing systems.
b) State and explain the various types of system calls in detail. [9+6]

2.a) Explain the differences among short-term, medium-term, and long term scheduling.
b) Consider the following set of processes, with the length of the CPU burst given in milliseconds: [5+10]

Process	Burst Time	Priority
P1	10	3
P2	1	1
P3	2	3
P4	1	4
P5	5	2

The processes are assumed to have arrived in the order P1, P2, P3, P4, P5 all at time 0.
i) Draw four Gantt charts that illustrate the execution of these processes using the following scheduling algorithms: FCFS, SJF, non-preemptive priority (a smaller priority number implies a higher priority), and RR (quantum= 1).
ii) What is the turnaround time of each process for each of the scheduling algorithms?
iii) What is the waiting time of each process for each of these scheduling algorithms?
iv) Which of the algorithms results in the minimum average waiting time (over all processes)?

3.a) Describe how the Swap() instruction can be used to provide mutual exclusion that satisfies the bounded-waiting requirement.
b) Consider the following snapshot of a system: [5+10]

	Allocation	Max	Available
	A B C D	A B C D	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?

4.a) Explain the following allocation algorithms,
i) First fit ii) Best fit iii) Worst fit
b) What is paging? Explain the basic method for implementing paging. [9+6]

5.a) Explain the following two directory structures with diagrams:
i) Tree structured ii) Acyclic graph
b) State and explain four approaches to free space management. [8+7]

6.a) What is distributed system? List out the differences between distributed systems and conventional operating system.
b) Write short notes on operating system structure. [7+8]

7.a) What are two differences between user-level threads and kernel-level threads? Under what circumstances is one type better than the other?
b) Describe the attributes of the process. Describe the typical elements of process control block. [7+8]

8.a) Explain how semaphores can be used to control access to a given resource consisting of finite number of instances.
b) Explain page replacement algorithms with example. [7+8]

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