RA

Code No: 135SC

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, August - 2022
OPERATING SYSTEMS
(Computer Science and Engineering)

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

Answer any five questions
All questions carry equal marks
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1.a) Describe in detail about computer system architecture.
b) What system calls have to be executed by a command interpreter or shell in order to start a new process? [8+7]

2.a) Explain how operating systems are used in a variety of computing environments.
b) Under what circumstances would a user be better off using a time sharing system rather than a PC or single user workstations? [10+5]

3.a) With a neat sketch, explain process state diagram.
b) State and explain critical section problem with suitable examples. [7+8]

4.a) Illustrate the semaphore functions with suitable example.
b) What is the average waiting time and average turn-around times of all processes for FCFS, SJF algorithm? [5+10]

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

5.a) Discuss the hardware support required to support demand paging.
b) Consider a swapping system in which memory consists of the following hole sizes in memory order: 12 KB, 4 KB, 24 KB, 15 KB, 9 KB, 7 KB, 10 KB, and 11 KB. Which hole is taken for successive segment requests of : (i) 14 KB (ii) 8 KB (iii) 5 KB for first fit, best fit, worst fit, and next fit approaches. [6+9]

6.a) Consider the following reference string
7,0,1,2,0,3,0,4,2,3,0,3,2,1,2,0,1,7,0,1. Assume there are three frames. Apply LRU replacement algorithm to the reference sting above and find out how many page faults are produced. Illustrate the LRU page replacement algorithm in detail and also two feasible implementation of the LRU algorithm.
b) What is fragmentation? Explain the difference between internal and external fragmentation. [10+5]

7. Explain the following disk scheduling algorithm with proper diagram
   a) FCFS
   b) SSTF
   c) SCAN
   d) LOOK
   e) C-SCAN. [15]

8. Consider a system with three processes and four resources. Resource R1 and R3 with one instance, R2 with two instance, process P1 holding an instance of R2 and waiting for R1, process P2 is holding an instance of R1 and R2 and waiting for R3,process P3 is holding an instance of R3.
   a) Draw resource allocation graph to the given system.
   b) Is it possible to apply the Resource allocation graph algorithm to avoid deadlock? Explain. [7+8]

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