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**Department of Computer Science & Engineering**

**MODULE -2**

**MULTITHREADED PROGRAMMING**

1. Explain multithreading models, Also list the benefits of multithreaded programming.
2. Consider the following set of processes given in table

|  |  |  |  |
| --- | --- | --- | --- |
| Processes | Arrival Time (ms) | Burst Time (ms) | Priority |
| P1 | 0 | 10 | 4 |
| P2 | 3 | 5 | 2 |
| P3 | 3 | 6 | 6 |
| P4 | 5 | 4 | 3 |

Consider larger number as highest priority. Calculate average waiting time and turn around time and draw Gantt chart for preemptive priority scheduling and preemptive SJF scheduling.

1. Following is the snapshot of CPU

|  |  |  |
| --- | --- | --- |
| Processes | CPU Burst | Arrival Time |
| P1 | 10 | 0 |
| P2 | 29 | 1 |
| P3 | 03 | 2 |
| P4 | 07 | 3 |

Draw Gantt charts and calculate the waiting and turnaround time using FCFS, SJF and RR with time quantum 10 scheduling algorithms.

1. Consider the following set of processes with CPU burst time (in ms)

|  |  |  |
| --- | --- | --- |
| Processes | Arrival time | Burst Time |
| P0 | 0 | 6 |
| P1 | 1 | 3 |
| P2 | 2 | 1 |
| P3 | 3 | 4 |

1. Draw Gantt chart illustrating the execution of above processes using SRTF and non preemptive SJF
2. Find the turnaround time for each processes for SRTF and SJF. Hence show that SRTF is faster than SJF.
3. Consider the following set of processes, with the length of the CPU burst given in milliseconds.

|  |  |  |
| --- | --- | --- |
| Processes | 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.

1. Draw Gantt charts for the following scheduling algorithms, FCFS, SJF and RR (quantum = 1)
2. Find out turnaround time and waiting time of each process for each of these scheduling algorithm and also find out average turn around time and average waiting time.
3. Explain different scheduling criteria that must be kept in mind while choosing different scheduling algorithms.
4. Expain multiprocessor scheduling.
5. What are the requirements to critical section problem? Explain Peterson’s solution to critical section problem.
6. Explain Reader’s – writers problem and provide a semaphore solution using semaphore’s for reader’s priority problem.
7. Explain Dining-philosophers problem with semaphores.
8. Explain Dining-philosophers solution using monitors.
9. Explain the syntax and schematic view of monitors.
10. Define Semaphores. Explain its usage and implementation.