YOU HAVE TO ANSWER ALL QUESTIONS

Q1: Identify which statement is True and which is False, then correct the wrong statements. (20 Marks)

1. [ ] Kernel threads need not be associated with a process whereas every user thread belongs to a process.

2. [ ] There are three models of multi-threading which are many-to-one, one-to-one, and many-to-many.

3. [ ] Dispatch latency is a time takes for the dispatcher to stop one process and start another running.

4. [ ] SJF is optimal because it gives maximum average waiting time for a given set of processes.

5. [ ] FCFS has the difficulty to know the length of the next CPU request.

6. [ ] While scheduling competition is within the process in Process-Contention Scope (PCS), competition among all system's threads in System-Contention Scope (SCS).

7. [ ] Ready queue is partitioned into separate two queues that are foreground and background.

8. [ ] In Round Robin scheduling algorithm; each process gets a small unit of CPU time (time quantum), usually 10-100 milliseconds.

9. [ ] Aging is considered a solution for starvation in the priority scheduling.
10. [ ] SJF is a priority scheduling where priority is the predicted next CPU burst time.

11. [ ] When one process is executing in its critical section, no other process is to be allowed to execute in its critical section at all.

12. [ ] Each process may request permission to enter its critical section.

13. [ ] Some systems provide hardware support for critical section code

14. [ ] Not all Operating Systems do (prevent or deal) with deadlocks

15. [ ] Deadlock may occur if a system is in unsafe state.

16. [ ] Cache always sits between main memory and CPU registers.

17. [ ] Main memory and registers are only storage CPU can access directly.

18. [ ] Logical and physical addresses are the same in compile-time and load-time address-binding schemes; logical and physical addresses differ in execution-time address-binding scheme.

19. [ ] First-fit and best-fit better than worst-fit in terms of speed and storage utilization during dynamic Storage-Allocation.

20. [ ] Paging is one of the memory-management schemes by which a computer can store and retrieve data from secondary storage for use in main memory.
Q2: CPU scheduling decisions may take place when a process is in one of four states/cases. List down those states/cases. (4 Marks)

1. Switches from running to waiting state
2. Switches from running to ready state
3. Switches from waiting to ready
4. Terminates

Q3: Define the following terms of the scheduling criteria: (5 Marks)

(a) CPU utilization:

(b) Throughput:

(c) Turnaround time:

(d) Waiting time:

(e) Response time:

Q4: Write the full state (full name) for the given abbreviations (3 Marks):

(a) SJF: .........................................................................................................................

(b) MMU: ....................................................................................................................... 

(c) FCFS: .........................................................................................................................
Q5: Fill-up the given processes based on priority of multilevel queue scheduling:
Batch Processes, Student Processes, Interactive Editing Processes, System Processes, Interactive Processes. (5 Marks)

<table>
<thead>
<tr>
<th>Priority</th>
<th>System Processes</th>
<th>Interactive Processes</th>
<th>Interactive Editing Processes</th>
<th>Batch Processes</th>
<th>Student Processes</th>
</tr>
</thead>
</table>

Q6: You have five processes as follow:

<table>
<thead>
<tr>
<th>Process</th>
<th>Burst Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>4</td>
</tr>
<tr>
<td>P2</td>
<td>7</td>
</tr>
<tr>
<td>P3</td>
<td>9</td>
</tr>
<tr>
<td>P4</td>
<td>6</td>
</tr>
<tr>
<td>P5</td>
<td>5</td>
</tr>
</tbody>
</table>

Suppose that the processes arrive in this order: P2, P5, P1, P3, P4

Draw the Gantt chart and calculate the average waiting time. (7 Marks)
Q7: Describe the following concepts: (6 Marks)

(a) Semaphore:

(b) Deadlock:

(c) Deadlock Avoidance:

(d) Logical address:

(e) Physical address:

(f) Swapping:

Q8: List three methods for handling Deadlocks. (3 Marks)

(a)

(b)

(c)
Q9: Fill each blank with a proper word to complete the sentence. (7 Marks)

   (a) Each process utilizes a resource as follows: ______________, ______________, and ______________.

   (b) If a system is in safe state, means no ______________.

   (c) Program must be brought from __________ into __________ and placed within a process for it to be run.

   (d) A pair of ___________ and ___________ registers define the logical address space.

   (e) Address binding of instructions and data to memory addresses can happen at three different stages that are: ______________, ______________, or ________________.

   (f) ______________ is a block of available memory; holes of various size are scattered throughout memory.

   (g) Reduce external fragmentation by ________________.

   (h) To run a program of size n pages, need to find _______________ free frames and load program.


Best Regards

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