Quiz 02

The key challenge under partitioned multiprocessor scheduling is?

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- ○ How to schedule processes on individual CPU cores?
- ○ All of the others are key challenges.
- ○ How to do time-synchronization across CPU cores?
- ◉ How to map and partition the processes to CPU cores?

Describe one advantage and one disadvantage of Shortest-Job First (SJF) scheduling

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- ◉ efficient way to handle convoy effect; not implementable due to lack of information on CPU burst lengths
- ○ optimal in terms of maximizing average response time of all processes; not implementable due to lack of information on CPU burst lengths
- ○ optimal in terms of minimizing average response time of all processes; not implementable due to lack of information on I/O burst lengths.
- ○ optimal in terms of maximizing average response time of all processes not implementable due to lack of information on I/O burst lengths

The difference between non-preemptive Shortest-Job First (SJF) and Shortest Remaining Time First (SRTF) is that

The difference between non-preemptive Shortest-Job First (SJF) and Shortest Remaining Time First (SRTF) is that

- ◉ SJF is unaffected by newly admitted processes when a process is "running"; In SRTF if the current CPU burst of the newly admitted process is shorter than the remaining CPU burst of the running process, then a context-switch is triggered.
- ○ SRTF is unaffected by newly admitted processes when a process is "running"; In SJF if the total CPU duration of the newly admitted process is shorter than the remaining CPU duration of the running process, then a context-switch is triggered.
- ○ SJF is unaffected by newly admitted processes when a process is "running"; In SRTF if the total CPU and I/O duration of the newly admitted process is shorter than the remaining total CPU and I/O duration of the running process, then a context-switch is triggered.
- ○ SRTF allows random preemption of processes, whereas SJF does not.

Waiting Time is defined as

Waiting Time is defined as:

- ◉ Time spent by a process in the "ready" state.
- ○ Time spent by a process in the "waiting" state.
- ○ Time taken between transition 4 and transition 5 minus the time spent in the "running" state (in the process state transition diagram).
- ○ Time spent in the "ready" and "waiting" states combined.

What is Aging?

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- ◉ A technique in which the priority of processes that are unable to execute is slowly increased over time to avoid starvation.
- ○ A technique in which the priority of processes that are unable to execute is slowly decreased over time to avoid starvation.
- ○ A technique in which the priority of all processes is slowly increased over time to avoid starvation.

Multi-level queue scheduling can be either preemptive or non-preempitive, but not both

Multi-level queue scheduling can be either preemptive or non-preempitive, but not both

- ◉ False, it can be both (e.g., one queue can use RR while the other can use FCFS).
- ○ False, it can be both (e.g., one queue can use RR while the other can use SRTF).
- ○ True, e.g., if one queue uses RR, the others can use SRTF but not SJF or FCFS.

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Round-Robin (RR) scheduling has lower average waiting time for processes when compared to Shortest Remaining Time First (SRTF) scheduling

Round-Robin (RR) scheduling has lower average waiting time for processes when compared to Shortest Remaining Time First (SRTF) scheduling.

- (●) False, SRTF has the lowest average waiting time among all preemptive scheduling algorithms.
- ( ) False, but it has lower average turnaround time than SRTF.
- ( ) True, because RR has the lowest average waiting time among all preemptive scheduling algorithms.
- ( ) False, RR has the lowest average response time among all preemptive scheduling algorithms.

In a nonpreemptive CPU scheduler, when does scheduling happen?

In a nonpreemptive CPU scheduler, when does scheduling happen?

- (●) Upon transitions 1 and 5 and ocassionally upon transition 4 (in the process state transition diagram).
- ( ) Upon transitions 2, 3 and 4 (in the process state transition diagram).
- ( ) Upon any of the five transitions (in the process state transition diagram).
- ( ) Upon any of the five transitions (in the process state transition diagram) and even at other time instants.

Turnaround Time is defined as:

Turnaround Time is defined as:

- (●) Time taken between transition 4 and transition 5 (in the process state transition diagram).
- ( ) Time taken between transition 2 and transition 5 (in the process state transition diagram).
- ( ) Time taken between transition 4 and the first occurrence of the transition from "ready" to "running" (in the process state transition diagram).
- ( ) Time taken between transition 2 and the next occurrence of the transition from "ready" to "running" (in the process state transition diagram).

Response Time is defined as

Response Time is defined as:

- (●) Time taken for a process between transition 4 and the first occurrence of transition from "ready" to "running" (in the process state transition diagram)
- ( ) Time taken for a process between transition 2 and the next occurrence of transition from "ready" to "running" (in the process state transition diagram)
- ( ) Time taken for a process between transition 4 and transition 5 (in the process state transition diagram)
- ( ) Time taken for a process between transition 3 and the next occurrence of transition from "ready" to "running" (in the process state transition diagram)

In a preemptive CPU scheduler, when does scheduling happen

In a preemptive CPU scheduler, when does scheduling happen?

- ( ) Upon any of the five transitions (in the process state transition diagram).
- (●) Upon any of the five transitions (in the process state transition diagram) and even at other time instants.
- ( ) Upon transitions 1 and 5 and ocassionally upon transition 4 (in the process state transition diagram).
- ( ) Upon transitions 2, 3 and 4 (in the process state transition diagram).

Under First-Come First-Served (FCFS) scheduling, what is convoy effect

Under First-Come First-Served (FCFS) scheduling, what is convoy effect?

- (●) A long process is in the "running" state, while several short processes are waiting in the "ready" state
- ( ) A long process is in the "running" state, while several short processes are waiting in the "waiting" state.
- ( ) A long process is in the "ready" state, while several short processes are waiting in the "ready" state behind this long process.

Quiz 02

Under global multiprocessor scheduling, a process may execute on two cores at the same time

Under global multiprocessor scheduling, a process may execute on two cores at the same time.

- (●) False, a process can only execute on one core at any time. Under global scheduling, it may migrate between cores over time.
- ( ) False, a process can only execute on one core at any time. Under global scheduling, a process is assigned to a core when it arrives in the system and is always executed only on that core.
- ( ) True, under global scheduling, a process may migrate between cores over time and execute on them in parallel.
- ( ) True, under global scheduling, a process may execute on two cores in parallel, but never on three or more cores in parallel.

Shortest-Job-First (SJF) is optimal in the sense that it

Shortest-Job-First (SJF) is optimal in the sense that it,

- (●) Minimizes the average waiting time for all processes.
- ( ) Maximizes the average waiting time for all processes.
- ( ) Minimizes the average response time for all processes.
- ( ) Maximizes CPU utilization.

Turnaround time of processes decreases as the quantum size in Round-Robin (RR) scheduling increases

Turnaround time of processes decreases as the quantum size in Round-Robin (RR) scheduling increases.

- (●) False, there is no direct correlation between turnaround time and quantum size.
- ( ) False, it increases as the quantum size increases.
- ( ) False, it is always fixed independent of the quantum size.
- ( ) True, and further it remains fixed once the quantum size is larger than the maximum CPU burst length.

Under Round-Robin scheduling, if quantum size is q, average CPU burst length is B, average number of CPU bursts per process is N, and average number of processes in the ready queue is R, then the average response time for a process is

Under Round-Robin scheduling, if quantum size is q, average CPU burst length is B, average number of CPU bursts per process is N, and average number of processes in the ready queue is R, then the average response time for a process is?

- (●) (R-1) x q
- ( ) q x (B x N x R)
- ( ) (B x N x R)/q
- ( ) (N-1) x q

What is the need for multi-level queue scheduling

What is the need for multi-level queue scheduling?

- (●) Processes with different requirements can be mapped to different queues and each queue can have a different scheduling policy (e.g., RR for interactive processes and FCFS for background).
- ( ) This is necessary to minimize the average waiting time of all processes.
- ( ) Processes with different requirements can be mapped to different queues and each queue can have a different scheduling policy (e.g., FCFS for interactive processes and RR for background).
- ( ) It is only useful for multiprocessing (i.e, CPU with multiple cores).

What is an I/O burst

What is an I/O burst?

- ( ) Time taken by all the I/O system calls executed by a process.
- (●) Time taken by a single I/O system call executed by a process.
- ( ) Time taken by the I/O device controller to process a request.