OPERATING SYSTEMS

Module2_Part7

Textbook : Operating Systems Concepts by Silberschatz

Scheduling algorithms

CPU scheduling deals with the problem of deciding which of the processes in the ready queue

is to be allocated the CPU. There are many different CPU-scheduling algorithms. Some of

them are

First-Come, First-Served Scheduling

Shortest-Job-First Scheduling

shortest-remaining-time-first

Priority Scheduling

Round-Robin Scheduling

Shortest remaining time first scheduling algorithm

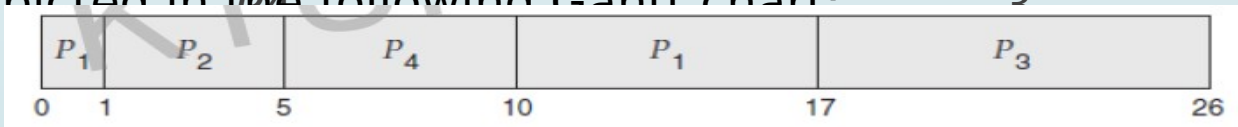
- The SJF algorithm can be either preemptive or nonpreemptive.
- The choice arises when a new process arrives at the ready queue while a previous process is still executing.
- The next CPU burst of the newly arrived process may be shorter than what is left of the currently executing process.
- A preemptive SJF algorithm will preempt the currently executing process, and allow the shorter process to run whereas a nonpreemptive SJF algorithm will allow the currently running process to finish its CPU burst.
- Preemptive SJF scheduling is sometimes called shortest-remaining-time-first scheduling.

SRTF

- As an example, consider the following four processes, with the length of the CPU burst given in milliseconds:

Process	Arrival Time	Burst Time
*P*1	0	8
*P*2	1	4
*P*3	2	9
*P*4	3	5

If the processes arrive at the ready queue at the times shown and need the indicated burst times, then the resulting preemptive SJF schedule is as depicted in the following Gantt chart:



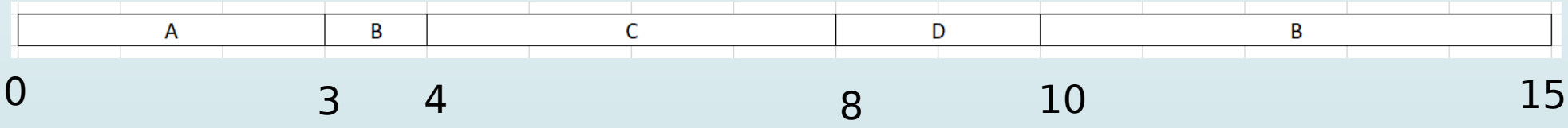
Process P1 is started at time 0, since it is the only process in the queue. Process*P2* arrives at time 1. The remaining time for process P1 (7 milliseconds) is larger than the time required by process *P2* (4 milliseconds), so process P1 is preempted, and process *P2* is scheduled. The average waiting time for this example is [(10- 1) + (1 - 1) + (17- 2) +(5-3)]/ 4 = 26/4 = 6.5 milliseconds.

Nonpreemptive SJF scheduling would result in an average waiting time of 7.75 milliseconds.

SRTF

For the processes listed draw gantt chart illustrating their execution

process	Arrival time	Processing time
A	0.000	3
B	1.001	6
C	4.001	4
D	6.001	2

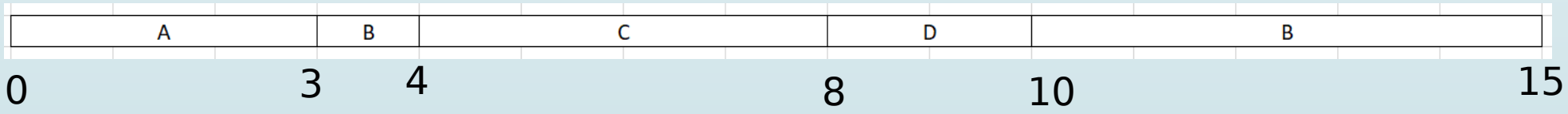


Process A start executing at time 0. It remains running when process B arrives because remaining time is less.At time 3 process B is the only process in the queue.At time 4.001, process C arrives and start running because its remaining time(4) is less than B's remaining time(4.999),At 6.001 process B remains running because its remaining time (1.999) is less than D's remaining time. When process C terminates process D runs its remaining time is less than that of process B. Then process B runs

SRTF

- For the process listed what is the average turn around time?

Process	Arrival time	Processing time	Completion time	Turn around time
A	0.000	3	3	3
B	1.001	6	15	14
C	4.001	4	8	4
D	6.001	2	10	4



Turn around time=completion time –arrival time

Average turn around time=((3-0)+(15-1)+(8-4)+(10-6))/4 = 6.25

SRTF

- For the processes listed what is the waiting time for each process?

Process	Arrival time	Processing time	Completion time	Turn around time	Waiting time
A	0.001	3	3	3	0
B	1.001	6	15	14	8
C	4.001	4	8	4	0
D	6.001	2	10	4	2

Waiting time=turn around time – execution time

A:(3-3)=0 B:(14-6)=8 C:(4-4)=0 D:(4-2)=2