*Scheduling Algorithm Report*

ROUND-ROBIN SCHEDULING ALGORITHM

Round-robin is one of the algorithms used by developers in computing. In this algorithm, time quantum is assigned to each process in equal portions, handling all processes without priority in a circular order. Each process in the queue is assigned a CPU for that time quantum. If the execution of the process is completed during that time, the process will end, otherwise the process will return to the waiting table and wait for the next turn to complete the execution. In this principle, each process gets an equal share of time, which is why this algorithm was named Round-robin. It is also very easy to implement and simple algorithm.

Program Result Example:

Num of processes: 4

Burst time: P1(3), P2(5), P3(1), P4(9)

Arrival time: P1(2), P2(3), P3(6), P4(8)

Time quantum: 3

CPU UTILIZATION: 90%

AVERAGE WAITING TIME: 2.75

Num of processes: 3

Burst time: P1(2), P2(7), P3(5)

Arrival time: P1(4), P2(9), P3(11)

Time quantum: 1

CPU UTILIZATION: 65%

AVERAGE WAITING TIME: 3.00

Time quantum in this algorithm plays a big role. When time quantum is very large, Round-robin becomes FCFS policy. On the other side, if time quantum is very small CPU loses its efficiency and it causes to many process switches.

FIRST COME FIRST SERVE ALGORITHM

First Come First Serve is a scheduling operating system algorithm that is considered the simplest and easiest to deploy CPU. This algorithm automatically executes processes in the order of their arrival. The first process that the requests CPU, gets the CPU first. It is managed using the FIFO order and is very easy to implement. In performance, this method or algorithm is very weak, and the waiting time is very long. Buying tickets at the counter is a good example of the FCFS algorithm in real life.

Program Result Example:

Num of processes: 4

Burst time: P1(3), P2(5), P3(1), P4(9)

Arrival time: P1(2), P2(3), P3(6), P4(8)

CPU UTILIZATION: 90%

AVERAGE WAITING TIME: 2.25

Num of processes: 3

Burst time: P1(1), P2(6), P3(5)

Arrival time: P1(3), P2(3), P3(6)

CPU UTILIZATION: 80%

AVERAGE WAITING TIME: 1.67

In order for this algorithm to work in the program, the programmer needs to set the arrival times of the process in the ascending order. The FCFS algorithm shows a convey effect that significantly reduces CPU utilization because other small processes have to wait a long time while large process is being executed.

SHORTEST REMAINING TIME FIRST ALGORITHM

Shortest Remaining Time algorithm serves to deploy the CPU in computing in which the processes with the least time to completion are executed first. This algorithm is very advantageous because short processes are processed very quickly. The advantage of this algorithm is that this method makes job processing much faster than the SJN algorithm. On the other hand, the disadvantage is that context switch is done a lot more times in SRTF than in SJN and consumes CPU’s valuable time for processing.

Program Result Example:

Num of processes: 4

Burst time: P1(2), P2(3), P3(5), P4(9)

Arrival time: P1(3), P2(1), P3(2), P4(8)

CPU UTILIZATION: 95%

AVERAGE WAITING TIME: 2.00

Num of processes: 3

Burst time: P1(1), P2(6), P3(5)

Arrival time: P1(3), P2(3), P3(6)

CPU UTILIZATION: 80%

AVERAGE WAITING TIME: 1.67

This algorithm sometimes can cause starvation because shorter processes may keep coming and long CPU burst process never gets CPU. SRT is much faster than SJF in execution but requires higher overhead costs.

SHORTEST JOB FIRST ALGORITHM

Shortest Job First is an algorithm in which the process with the shortest execution time is selected for the next execution. This significantly reduces the average waiting time for other awaiting processes. Shortest Job First method can be preemptive or non-preemptive. It is as well useful for batch processing, where waiting for jobs to complete is not critical.

Program Result Example:

Num of processes: 4

Burst time: P1(2), P2(3), P3(5), P4(9)

Arrival time: P1(3), P2(1), P3(2), P4(8)

CPU UTILIZATION: 95%

AVERAGE WAITING TIME: 2.00

Num of processes: 2

Burst time: P1(6), P2(7)

Arrival time: P1(1), P2(4)

CPU UTILIZATION: 92.86%

AVERAGE WAITING TIME: 1.50

Shortest Job First algorithm involves less overheads than Shortest Remaining Time First and it is slower in execution. It has less content switching then SRTF and as well may suffer from priority inversion.