International Journal of Advanced Science and Technology
Vol. 29, No. 11s, (2020), pp. 576-578

A Modified Version of Round Robin Algorithm "Modulo Based Round Robin Algorithm"

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Abstract

Process scheduling is a very important task of Multiprogramming operating system[1]. Multiprogramming operating system allows a single time unit to enter n number of processes into the executable memory and these n numbers of processes share the CPU. At this stage process scheduler manages the processes according to various process scheduling algorithms such as- FCFS, SJF, SRTF, Round robin etc. In this paper we propose a new variant of round robin algorithm which is called "Modulo Based Round Robin Algorithm". In this proposed algorithm by applying some mathematical calculation we assign priority to the processes and after that assign the processes to the processor according to round robin algorithm. Simply we can say that new proposed algorithm inherits the properties of round robin as well as priority scheduling algorithm.

Keywords: Process Scheduling, FCFS, SJF, Round Robin Algorithm, Priority Scheduling, Context Switch, Time Quantum, Acerage Waiting Time, Turnaround Time.

1. INTRODUCTION

Multiprogramming operating systems allowed multiple processes to enter in a memory for execution, but processor handle a single process at a time. At this stage the role of process scheduler is very important because scheduler decides that which process arrives first to the processor for execution and for how much time the processor will handle that process. For this scheduling, process scheduler uses some scheduling algorithms some of them are- FCFS, SJF, SRTF, RR etc.

1.1. FCFS: It is one of the simplest scheduling algorithms in which scheduler allocates the process for execution to the processor according to their arrival means to say which process arrives first allocate to the processor first and so on. The main drawbacks of this algorithm are, it does not consider priority and it suffers from convoy effect.

1.2. SJF: According to this, processor is assigned to the process which has smallest burst time. If there are two processes which have same burst time than the processor is allocated to the process which arrives first. This algorithm can be used in preemptive and non-preemptive manner. Main drawback of this algorithm is that sometimes it leads to starvation.

1.3. Priority Scheduling: According to this algorithm, priority is assigned to all the processes and these processes are allocated to processor by scheduler according to their priorities. If there is any case where two or more processes having same priority, arrive in execution queue than those processes are executed according to FCFS manner. The main drawbacks of this algorithm are : if a high priority process takes lot of CPU time then the low priority process is in waiting state for a long time. If a new higher priority process enters in a queue then the processor is allocated to that higher priority process and the low priority process goes into the waiting state.

1.4. Round Robin Scheduling: It is pre-emptive process scheduling algorithm in which a fix time period is assigned to the process and each process is assigned to the processor for this time period in FCFS manner. If assigned process completes its execution in allocated time period then that process is exit from the queue and processor is assigned to the next process. Otherwise the processor is allocated to the next process and the running process is assigned at the last in queue. Main drawbacks of this algorithm are, if the time quantum is

low it works as FCFS and hence more time is spent on context switches and priorities can't be assigned to the processes.

2. PROPOSED APPROACH

Our new proposed approach is same as Round Robin approach having some amendments. In this approach we inherit the concept of priority scheduling in simple round robin algorithm. We can say it is a mash up of round robin and priority scheduling algorithm.

2.1. Assumption: In this proposed approach we assume some points which are as following-

- Arrival time of all the processes is same which is 0.
- We have all the processes and their burst time in advance. None of the process arrives at execution time.
- The ready queue is empty.

2.2. Input Values: There are two values which we have to input, total number of processes and the burst time of all the processes.

2.3. Result: After applying the new proposed algorithm we get following result values-

- Smart Time Quantum
- Number of Context Switches
- Average Waiting Time
- Average Turnaround Time.

2.4 Flowchart: The below mentioned flowchart explain the concept and process flow of our new proposed algorithm "Modulo Based Round Robin Algorithm".

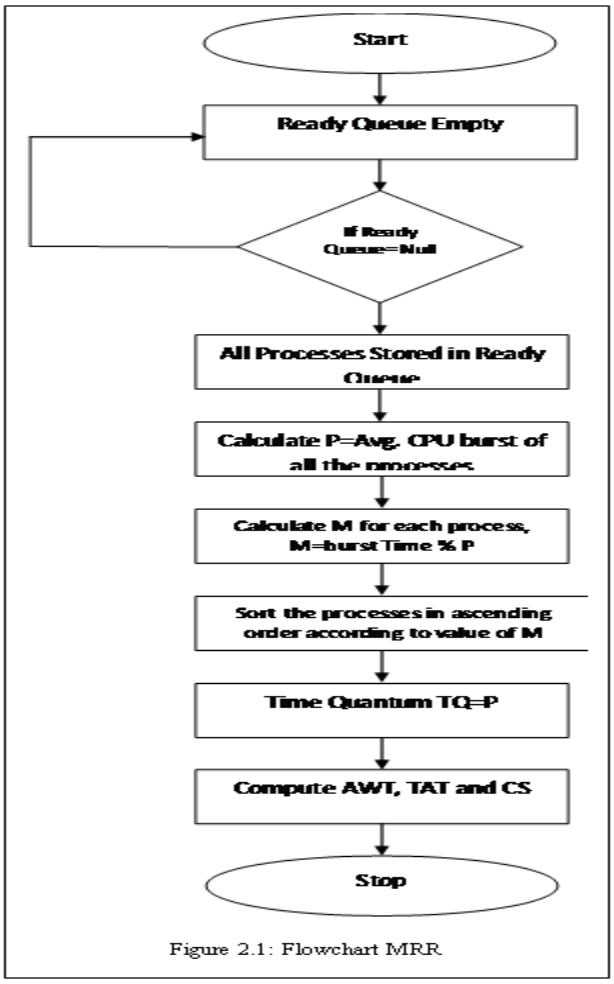

Figure 2.1: Flowchart MRR

3. CONCLUSION

In this research after comparing different scheduling algorithms we have tried to propose an algorithm that tries some alternate procedures and calculations to have the best outputs as are expected from a scheduling algorithms.

4. FUTURE SCOPE

Since the approach is purely theoretical until now, we will try to add practical aspect to the concept for which the steps are depicted in the form of a flowchart for which code will be generated in C++ or Python. After getting the code we will try different values to draw a comparison between the simple round robin algorithm and the proposed one. This comparison will help in deciding that which algorithm out of the general and the proposed one provides better results for the number of cases tried so far.

REFERENCES

[1] Silberschatz, A., Galvin, P.B., Gagne, G.: Operating Systems Concepts, 9th ed. Wiley.