Survey on Different Scheduling Algorithms Of Processes in Operating System

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Abstract- *The paper includes various scheduling algorithm, which include First-Come, First-Served (FCFS) Scheduling Shortest-Job-Next (SJN) Scheduling Priority Scheduling Shortest Remaining Time Round Robin (RR) Scheduling Multiple-Level Queues Scheduling Each algorithm has some advantages or disadvantages. In order to take all the factors, such as first come job, shortest job, longest job, highest response ratio job, and etc. the paper put forward a new operating system scheduling algorithm median-time slice-Highest Response Ratio Next, the method was proved to be feasible and effective after tested the five process sequence.*

Keywords- Scheduling Algorithm, FCFS, SJF, RR, Operating System.

I. INTRODUCTION

These algorithms are either non-preemptive or preemptive. Non-preemptive algorithms are considered so that once a process enters the running state; it cannot be preempted until it completes its executing time, whereas the preemptive scheduling is based on priority where a scheduler may preempt a low priority running process anytime when a high priority process enters into a ready state.

II. DIFFERENT SCHEDULING ALGORITHMS

A typical process involves both I/O time and CPU time. In a uni programming system like MS-DOS, time spent waiting for I/O is wasted and CPU is free during this time. In multiprogramming systems, one process can use CPU while another is waiting for I/O. This is possible only with process scheduling.

There are mainly following scheduling algorithms.1.First Come First Serve (FCFS). 2. Shortest Job First (SJF) 3.Priority Scheduling 4.Round Robin (RR).In FCFS Jobs are executed on first come, first serve basis. It is a non-preemptive, pre-emptive scheduling algorithm, Easy to understand and implement, its implementation is based on FIFO queue. It has Poor in performance as average wait time is high.

For example four processes want to access CPU and arrived at same time with burst time 2, 4, 5, 6.Then average waiting time and Average turnaround time for all processes are counted as

Average waiting time (AWT) =entry time -arrival time

Average turnaround time (ATT) =waiting time + burst time

This is also known as shortest job first, or SJF.This is a non-preemptive, pre-emptive scheduling algorithm. Best approach to minimize waiting time. Easy to implement in Batch systems where required CPU time is known in advance. It is impossible to implement in interactive systems where required CPU time is not known. The processer should know in advance how much time process will take for executing its work. The advanced version of SJF is Shortest remaining time Next (SRTN), is the preemptive version of the SJN algorithm. The processor is allocated to the job closest to completion but it can be preempted by a newer ready job with shorter time to completion. It is impossible to implement in interactive systems where required CPU time is not known. It is often used in batch environments where short jobs need to give higher priority.

In Priority scheduling, it is a non-preemptive algorithm and one of the most common scheduling algorithms in job based systems. Each process is assigned a priority by scheduler. Process with highest priority is to be executed first and so on. Processes with same priority are executed on first come first served basis. Priority can be decided based on memory requirements, time requirements or any other resource requirement.

Round Robin is the preemptive process scheduling algorithm. Each process is provided a fix time slot to execute; it is called a time quantum. Once a process is executed for a given time period, it is preempted and other process executes for a given time period. Context switching is used to save states of preempted processes.

III. COMPARISON BETWEEN ALL

Every scheduling algorithm has a type of a situation where it is the best choice. Let's look at different such situations:

Situation 1:

The incoming processes less CPU time and there is no need for the processes to execute in a specific order. In this case, FCFS works best when compared to SJF and RR because the processes are short which means that no process will wait for a longer time. When each process is executed one by one, every process will be executed eventually.

Situation 2:

The processes are a mix of long and short burst time processes and the task will only be completed if all the processes are executed successfully in a given time. Round Robin scheduling works efficiently here because it does not cause starvation and also gives equal time quantum for each process.

Situation 3:

The processes are a mix of user based and kernel based processes. Priority based scheduling works efficiently in this case because generally kernel based processes have higher priority when compared to user based processes. For example, the scheduler itself is a kernel based process; it should run first so that it can schedule other processes.

IV.COCLUSION

The comparison of all algorithms shows the different average waiting time. The FCFS is better for a small burst time. The SJF is better if the process comes to processor simultaneously. The last algorithm, Round Robin, is better to adjust the average waiting time desired. Round Robin quantum time will set it towards more SJF or FCFS value. All algorithms is good, but the speed of the process depends on the processor load.

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