IJCSE International Journal of Computer Sciences and Engineering Open Access
Research Paper Vol.-6, Issue-8, Aug 2018 E-ISSN: 2347-2693

Study of Comparison of Scheduling Algorithms Based On Priority and Complexity

Vivek Chaplot

Dept. of Computer Science & Application Faculty of Science Bhupal Nobles University. Udaipur, India

*Corresponding Author:krishrupal@gmail.com

Available online at: www.ijcseonline.org

Accepted: 15/Aug/2018, Published: 31/Aug/2018

Abstract- Scheduling algorithms identify which process will be given cpu at a particular point of time There are different scheduling algorithms available each have its own advantages and disadvantages we have to decide which scheduling algorithm is best suited to our current application.We compare scheduling algorithm on following factors: waiting time, response time, turn around time resource consumption, throughput, fairness, primitiveness, predictability, one to decide which threads are given to resource from moment to moment. Names of commonly used scheduling algorithm are First-Come-First-Served (FCFS), Round Robin (RR), Shortest Job First (SJF), Shortest Remaining Time First (SRTF), Priority Based Scheduling, Multi level Queue Scheduling. In those paper we will discuss each algorithm and they will be compared with regards to 7 Parameters.

Keywords- Scheduling, Priority, Process, Waiting Time, Turn Around time, CPU

I. INTRODUCTION

Operating System (OS) is system software and acts as an interface between a user and the hardware of computer system .Operating System is also called as resource manager because it manages all the resources of computer system . Scheduling is a very important function of operating system .Scheduling means set of rules which defines how resources will be allocated to running process and deal located from running process In scheduling multiple queues are maintained . Scheduling should guarantee that no process should wait infinitely. In thus paper we are scheduling CPU because it is the most important resource which is to be scheduled, There ia tool in operating system called as scheduler which manages task of scheduling. Most of the resources are scheduled before they can be used. fundamental and most important OS Function which is essential to an operating system's design. Scheduling refers to set of rules, policies and mechanism that govern the order in which resource is allocated to the various processes and the work is to be done. [1]The scheduling is a methodology of managing multiple queues of processes in order to minimize delay and to optimize performance of the system. A scheduler is an OS module that implements the scheduling policies. Scheduling optimises the system performance by keeping all the resources busy and managing that no device should remain idle. Selection of efficient scheduling algorithm minimize overall lay time and improves the performance of system to a very high degree.

There are three different types of schedulers' used. Long term schedular, Short term schedular, Medium term scheduler. The responsibility of long term scheduler is to select process from batch queue and to place them in ready queue. Long term scheduler should place proper mix of CPU bound process and IO bound process. The responsibility of short term scheduler is to place process from ready queue to cpu.When process is executing inside CPU it may need some resources so it is place in device queue ,when those resources are available it is responsibility if medium term scheduler to place process from device queue to ready queue.[3]

All scheduling algorithms have their own properties, and selection of particular algorithm may be convenient to one process or not to other process. We have to clearly understand the properties of different algorithm before using them.

Different process have different requirement and we maintain different queue for different types of process .When a new process is created it is placed in that queue which is suitable to it. Different queue are maintained on the basis of priority , deadline ,real time behaviour, timeliness, cpu intensively etc.

II. TYPES OF SCHEDULING ALGORITHM

FCFS Scheduling algorithm is simplest to implement. This algorithm favours that process which has arrived earlier. her is very important drawback of this algorithm i.e if some process arrives late and requires very small services from

CPU,it has to wait for very long amount of time. This algorithm do not provide fair behaviour.

SJF Scheduling: This means shortest job first. In this that process is allocated CPU which needs smallest service time from CPU .All the process are placed in the queue and their service time is compared and smallest one is given CPU firstly. If two process are having same service time than that process ia given CPU who arrived earlier.[2] This algorithm is beneficial to that process which needs less service time but it is unfavourable to that process which arrived earlier but has requirement of more service time.

There are two variants of SJF Pre-emptive and Non Pre-emptive.
In Non pre-emptive variant if a process is given CPU because it needs less service time and when that process is executing and some other process arrives which has less service time requirement than currently executing process but this new process will not be given service at this point of time, it will be given service only after the current process finishes execution.

In Preemptive variant if a process is given CPU because it needs less service time and when that process is executing and some other process arrives which has less service time requirement than currently executing process will be removed from CPU and new process with less service time requirement will be given CPU,and when this process finishes than the suspended process will be executed.

Round Robin Algorithm
This algorithm is most widely adopted CPU scheduling algorithm. In this algorithm we have advantages of both FCFS and SJF.A time quantum is generated dynamically, this is maximum time for which process will get services of CPU. When time quantum is finished but process is not finished ,the process will be removed from CPU and will be placed in suspended state and next process in the queue will be scheduled. After all process in queue have executed their time quantum in FCFS manner, the suspended process will again get chance to execute its time quantum .[5]This process will continue till the process is finished. This scheduling is most commonly used algorithm. There is on problem in this scheduling algorithm i.e some amount of time is wasted in swap in and swap out. The most important thing in this algorithm is what should be value of time quantum, this value can not be very less or more. If value is very less than lot of time will be wasted in swap In and swap Out. If value is large it will behave like FCFS. This problem can be solved by using dynamic time quantum in this time quantum can be adjusted according to burst time of CPU. Our aim of this scheduling is to maximize throughput and CPU utilization ,minimize waiting time, minimize turn around time and response time. Time quantum is also called as time slice. This algorithm is considered as optimal algorithm in multi programming environment. There is one variant of round robin algorithm called as adaptive round robin algorithm in this algorithm we arrange process according to their burst time, and the process with lowest burst time is given highest priority.[4] Now time quantum is given according to burst time and priority. This concept considerably reduces context switching time and waiting time.This algorithm is not suitable for real time operating system because of high context switching ,more waiting time and more response time.

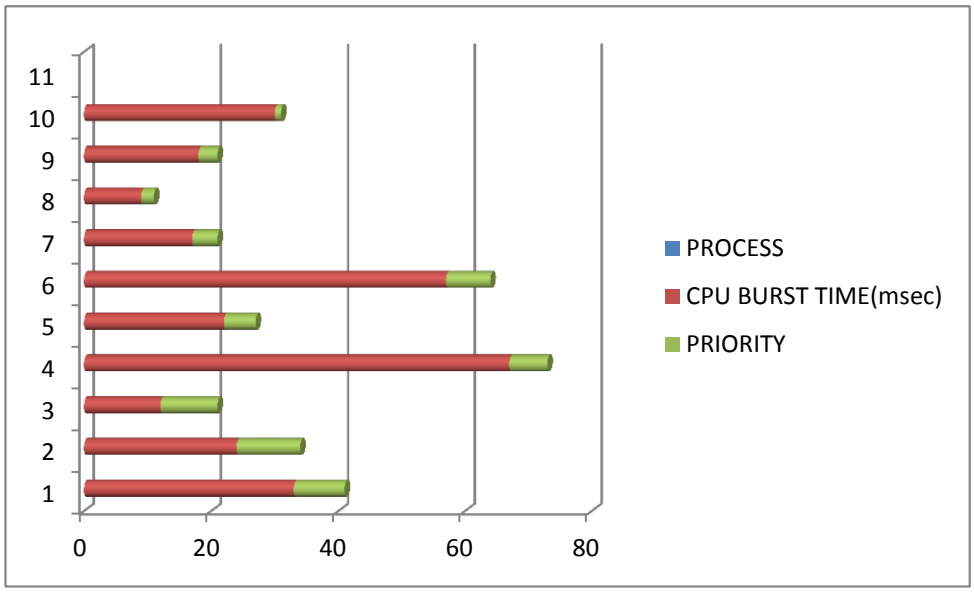
Multi Level Queue Scheduling
This scheduling algorithm separates process according to their CPU requirement. Process moves between various queues. Different queue can have different scheduling policy like SJF FCFS, ROUND ROBIN .This scheduling algorithm is implemented on preemptive basis and in this priority plays major role. Process can move from lower queue to upper queue or from upper queue to lower queue.This algorithm is suited for multiprocessing. In this aging concept is used ,in aging if waiting time of process increases then its priority increases. This algorithm removes starvation problem of different process but this is not suitable for real-time system. In this process with giher priority will be given more chance to execute thanthe process with lower priority.In this we assign unique scheduling algorithm to each queue. The first queue is given highest priority and than second queue and so on. This scheduling algorithm is used to implement foreground and back ground process, foreground process have higher priority than back ground process so they are placed in first queue and back ground process are placed in second queue in two level queue system. There are different criteria for placing process into queue like priority,weight,deadline value etc .Number of queues in multilevel queue scheduling is not fixed ,number of queue is decided dynamically i.e there may be more queue according to more process ir more queue according to different priority level.This scheduling algorithm provides fairness behaviour to every process and try to minimize resource starvation. Computational complexity is another factor which decides in which queue process must be placed.

III. EXPERIMENT PERFORMED

To evaluate the performance of our proposed algorithm, we have taken a set of ten processes in four different cases. We have compared FCFS,SJF,ROUND ROBIN and PRIORITY based scheduling algorithm.

Table.1 Process With Burst Time And Priority

PROCESS	CPU BURST TIME(msec)	PRIORITY
P1	33	8
P2	24	10
P3	12	9
P4	67	6
P5	22	5
P6	57	7
P7	17	4
P8	09	2
P9	18	3
P10	30	1



AVERAGE WAITING TIME FCFS :132 .5
AVERAGE WAITING TIME SJF: 80.2
AVERAGE WAITING TIME ROUND ROBIN: 157.8
AVERAGE WAITING TIME PRIORITY: 122.3

Table.2

SCHEDULING ALGORITHM	CPU UTILIZATION	THROUGHPUT	TURN AROUND TIME	WAITING TIME
FCFS	HIGH	LOW	HIGH	HIGH
SJF	MEDIUM	HIGH	MEDIUM	LOW
ROUND ROBIN	HIGH	MEDIUM	HIGH	HIGH
PRIORITY	HIGH	LOW	HIGH	MEDIUM

IV. CONCLUSION

From this analysis, we showed that there is actually no scheduling algorithm satisfying the conditions of an ideal algorithm and concluded that further studies which improve current scheduling algorithms need to be done. We cannot predict the performance of scheduling algorithm unless it is tested on system at real time.

System designers have many complex situations before finalizing their designs. The selections of the appropriate processor scheduling algorithms is very important to them for better performance .

REFERENCES

[1] Bidgoli .Amir M, Zahra Masoudi Nezad: A new scheduling algorithm design for grid computing tasks, 5th Symposium on Advances in Science and technology, Iran

[2] Cho-Chin Lin and Chun-Wei Shih, An Efficient Scheduling Algorithm for Grid Computing with Periodical Resource Reallocation.

[3] Jain, S., Shukla, D. and Jain, R. Linear Data Model Based Study of Improved Round Robin CPU Scheduling algorithm, International Journal of Advanced Research in Computer and Communication Engineering, 4(6), June 2015, 562-564.

[4] Suranauwarat, S., A CPU Scheduling Algorithm Simulator, IEEE Proceedings (Frontiers in Education Conference - Global Engineering: Knowledge without Borders, Opportunities without Passports, 2007. FIE '07. 37th Annual), 19-24.

[5] Sindhu, M., Rajkamal, R. and Vigneshwaran, P., An Optimum Multilevel CPU Scheduling Algorithm, IEEE (International Conference on Advances in Computer Engineering (ACE)), 2010, 90-94.

