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Comparative Study of CPU Scheduling Algorithms based on Markov Chain

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Abstract - CPU Scheduling is the process of scheduling. Different CPU scheduling algorithms are played a vital role in Markov Chain concept. It also describes analysis of scheduling algorithms which includes the algorithms such as, single processor, multi processor, round robin, multilevel feedback, hybrid lottery multi level scheduling, scheduling based task Probability-Based, Priority-Driven Stride Scheduling etc. In Distributed System, priority based, lottery scheduling, Prediction of Ready Queue processing time in Multiprocessor Environment Using Lottery Scheduling are used. Identification the best algorithm from CPU scheduling in Markov chain is very tedious job. To address this issue the comparison of different CPU scheduling algorithm in Markov Chain is performed in this paper. This comparison is also helpful for future researchers, users and academicians.

Keyword: - FCFS, SJF, Priority Scheduling, RR, MLQS, MLFQS, and LS.

I. INTRODUCTION

CPU scheduling is a process that enables one procedure to utilize the CPU. It also ensures execution of another procedure which is on hold because of inaccessibility of any resource such as, I/O and so forth, in this manner making full utilization of CPU. The point of CPU planning is to make the structure productive, quick and reasonable. At whatever point the CPU ends up sit out of gear, the working structure must choose one of the procedures in the prepared process to be executed. The determination procedure is completed by the short-term scheduler (or CPU scheduler). The scheduler chooses from among the procedures in memory that are prepared to execute, and allocates the CPU to one of them.

CPU scheduling algorithm's attributes have a considerable effect through which calculation is judged to be ideal. The conditions that useful and efficient to keep the CPU occupied 100% of the time with helpful work are throughput, turnaround time, holding up time, decency, and reaction time. Throughput is the quantity of occupied the resource every hour. Turnaround time is the time between starting and ending time of the process. Holding up time is the sum of times spent in prepared line. Reaction Time is the time from place till the primary reaction is created and it also limits the reaction time. Decency ensures each procedure gets a decent amount of the CPU scheduler at whatever point the CPU sit ideal. The working structure must choose one of the procedures in the prepared queue to be executed in decency. It also determines the procedure is completed by the transient scheduler. The scheduler chooses from among the procedures in the memory that are prepared to execute and allocates the CPU to one of them. CPU Scheduling includes various types algorithms. They are FCFS, SJF, Priority Scheduling, RR, MLQS, MLFQS, LS etc. These algorithms are briefly described in consequent subsections.

In CPU scheduling comparison of different algorithms is the leading challenge in the field of research. It is very difficult to choose the best algorithm among all algorithms of Markov Chain. The rest of the paper is organized as follows. The Section 2 states literature review of different Markov Chain algorithms along with their certain properties. In Section 3, we compared different Markov Chain algorithms. In Section 4, we state the conclusion.

II. LITERATURE REVIEW

Shweta Jain et al., describes that a numerous processors are fundamentally trying to control resources and processor time. There is no structure which can be totally deterministic, regardless of whether the structure has enough ability to deal with all solicitations and loads inside the imperative time. Multiprocessor framework planning is having two kinds of line based booking: (SQMS) and (MQMS). It examines both these multiprocessor planning plans and their progress conduct of procedures over lines for adjusting the heap of a framework. And furthermore portrayed stochastic model with recreation examine. Shweta Jain et al., multilevel analysis queue managed with an alternate assortment of procedures. In this paper is given different plans under a likelihood based model and scheduler has randomly moved over the procession. And also outline general progress demonstrate for the distinctive s planning plan. And also clarify diverse sort of reproduction think about in various kind cases. Shweta et al., presented the idea of multilevel queue with lottery scheduling, which will be given choices to the further up degree to the procedures which are in execution part. And

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also clarify Marko chain display based examination has been done to manage changes of procedures into processor under this proposed scheme.

Shukla et al., a round robin algorithm with help of Markov chain model based on random jump. In this model, two types of approaches used such as restricted and un restricted with it is uses a high level stability system with general model. The main problem with approach is load balancing. Shukla et al., demonstrates a Prediction of Ready Queue Processing Time in Multiprocessor Environment Using Lottery Scheduling and furthermore clarify a lottery resource idea with holding up line. Shweta Jain et al., presented the idea of multilevel level with lottery scheduling, which will be given alternatives to the further up degree to the procedures which are in execution part. And also clarify Marko chain show based investigation has been done to manage changes of procedures into processor under this proposed conspire.

Vyas et al., a Markov chain under the two plans with characterized and examination. And it is provides a better platform to scheduler for job processing and uses transition matrix of CPU for elaborating RR. The main problem with approach is load gridlocked. Shukla.et al., a data model is used to compare under the setups of model through a proposed deadlock waiting index and shared resources logical error and deadlock. The outcomes of transition phenomenon compared through different setups of model with deadlock-waiting index measures. It also gives a quantum time for processing and waiting processes in queue. Shukla et al., demonstrates a Prediction of Ready Queue Processing Time in Multiprocessor Environment Using Lottery Scheduling and furthermore clarify a lottery resource idea with holding up line.

Manish Vyas et al., examined customary lottery scheduling scheme is designed and expanded out alongside a few conditions to get new planning plans. And process to move different queue with different ready queue. And also depicted a Stochastic model with connected for study and investigation. Singhai.et al., engaged a study for new Researches to discover the future trend in a similar field. With Markov chain model Shweta et al., depicted with the issue of choosing which of the procedures in the prepared line is to be assigned the CPU. Consequently, the execution of the framework relies upon which planning calculation utilized. They have examined the different methodologies that can be utilized for this reason and expand the exploration investigation in this field. A likelihood based Markov chain examination is done keeping in mind the end goal to decide the execution of these calculations. Chavan et al., Presented a CPU scheduling algorithms calculation called an Optimum Multilevel Dynamic Round Robin Scheduling Algorithm. This algorithm computes smart time slice and changes after each round of execution. Shukla et al., Presented a proficient technique to forecast the aggregate time expected to process the whole prepared line if just few are handled in a predetermined time. Certainty internals are computed in view of PPS-LS and contrasted and SRS-LS. The PPS-LS discovered better finished SRS-LS. From Table 1, we can conclude the comparison between the various CPU scheduling algorithms used in Markov Chain. With this comparison, user can choose the best CPU scheduling of Markov Chain.

Table 1: Comparison between the various CPU scheduling algorithms used in Markov Chain.

Paper	Markov chain based algorithm	Random based techniques	Approaches	Features	Limitation	Outcomes	Common factor in algorithms
[1]	SQMP and MQMP	Random jump	It is uses various types of approaches in general model (restricted and un restricted).	1. The number of processor increases in MQMP simultaneously other than SQMP. 2. They do not contain lock and cache contention problems. 3. They also provide resemblance.	Load balancing, And no move Sequentially	The outcomes of the approach are: 1. True load balance can be achieved. 2. Process can be easily migrating a process from one CPU to another.	Deployed and simulation Can be achieved through Markov Chain
[2]	RR	Random jump	It is uses various types of approaches in general model (restricted and un restricted).	1. It is uses a high level stability system approaches. 2. It is a highly restricted and unrestricted approach in term of security 3. General class of multilevel feedback queue with free	Load balancing, And no move Sequentially	MLFQ scheduling manages a variety of processes among various queues.	Deployed and simulation Can be achieved through Markov Chain

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				entry uses in this approach.			
[3]	MLQF	Random jump	It is uses various types of approaches in general model (restricted and un restricted).	1. It performs performance analysis. 2. It compares between three different schemes of the multilevel feedback queue scheduling under Markov chain model. 3. It involves equal and unequal probability matrix.	Load balancing, And no move Sequentially	It manages a variety of processes among various queues in a better and efficient manner.	Deployed and simulation Can be achieved through Markov Chain
[4]	Hybrid lottery multilevel queue scheduling (HLMLQS)	Randomization	It is uses various types of approaches in general model (restricted and un restricted).	1. It differentiates queue from each other on the basis of priority, preference, and timestamps. 2. Features of this new types scheduling system are coming into light without affecting the overall performance of the system. 3.It have accurate control over the quality of service	1.CPU hogging and starvation 2.Very long job queue And no move Sequentially	1. It is provides a solution that may be different depending on the specific context. 2. It provides good throughput and response time.	Deployed and simulation Can be achieved through Markov Chain
[5]	Probability-Based Priority-Driven Stride Scheduling In Distributed System	Random jump	1. It are various types approaches used General model Restricted and un restricted with different parameter parameter in fair share and stride scheduling for then quantum	1. It provides a priority that characterizes an order of each client. 2. It also defines the overall performance and analysis of proposed scheduling algorithm with various schemes.	It is over headed and complicated in terms executing transitions to a priority policies for each client	The outcomes for implementing priorities based approach for analysis of the system using stochastic model study.	Deployed and simulation Can be achieved through Markov Chain
[6]	Extensive Round Robin Scheduling	Random choose	It is uses various types of approaches in general model (restricted and un restricted). With over extensive round robin scheme	1. It provides a better platform to scheduler for job processing. 2. It uses transition matrix of CPU for elaborating round robin scheduling. .	Gridlocked (Queue congestions) And no move Sequentially .	In these scheme outcomes the pattern of probabilities for variance states is increasing consistently	Deployed and simulation Can be achieved through Markov Chain
[7]	MLFQ with dead lock and waiting queue	Random jump	It is uses various types of approaches in general model (restricted and un restricted).	A data model compared under the setups of model through a proposed deadlock-waiting index.	1.Shared resources or overlap of instructions 2.Logical error 3.The deadlock	1. The outcomes of transition phenomenon compared through different setups of model with deadlock-waiting index measure.	Deployed and simulation Can be achieved through Markov Chain

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						2. It gives a quantum time for processing and waiting processes in queues.	
[8]	Prediction of Ready Queue Processing Time in Multiprocessor Environment Using Lottery Scheduling (ULS)	Random jump	K-processors environment	1.Lottery scheduling based concept with waiting queu 2.Processes are moved different scheduler and Transferring to ready queue time.	1.With waiting queue of processes generates a problem of scheduling for Processors 2. Queue lengths are also a major problem in this approach.	1. It is proves the efficiency of the estimation procedure of ready queue under the Lottery Scheduling With k processors. 2. describe a standard plan for system failure management	Deployed and simulation Can be achieved through Markov Chain
[9]	Lottery Scheduling using Proportion Reformation with Stochastic model	Random jump	Different Structural Scheme	1. Lottery scheduling based concept with their respective weights. 2. Lottery scheduling approaches are designed and extended along with some conditions to get new scheduling approaches 3. Lottery will determine that which process will get to run next. 4.The fundamental Objective of scheduling is to provide efficient and fair Scheduling by modular resource management with ensuring.	1.Process management 2. Allocation of resources.	It provides a flexible and useful concept for multiplexing scarce resources among processes.	Deployed and simulation Can be achieved through Markov Chain

III. Conclusion

In this paper, we address the different types Of CPU scheduling. In this paper, we only focus CPU scheduling algorithms. This paper is describe analysis of scheduling algorithms (single processor, multi processor, round robin, multilevel feedback, hybrid lottery multi level scheduling, scheduling based task, Probability-Based Priority-Driven Stride Scheduling In Distributed System , priority based, lottery scheduling, Prediction of Ready Queue Processing Time in Multiprocessor Environment Using Lottery Scheduling (ULS)) with Markov chain and also explain comparison different aspects. As future work, we intend to study approaches based on different aspects to handle Markov Chain constraints.

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