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ANALYTICAL EVALUATION OF ROUND ROBIN ALGORITHM TO FIND THE OPTIMAL QUANTUM SIZE

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A thesis submitted in partial fulfillment of the requirement for the degree of Master of Science in Computer Science and Information Technology

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To My Parents

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Abstract

There are a number of scheduling algorithms used in computer systems today. They all have their own characteristics. Thus selection of the particular scheduling algorithm depends upon the need of the system. One of the most widely used scheduling algorithms in multiprogramming operating system is round robin. Primitive round robin scheduling algorithm is simply first-come first-served with preemption included. But, now a days, several variations exist for round robin scheduling algorithm.

In this dissertation, as the title “An analytical evaluation of round robin scheduling algorithm to find the optimal quantum size” suggests, I am going to analyze the round robin scheduling algorithm. There exists different performance criteria to find the optimality of the quantum size but, here, I chose three of them, namely, processor utilization, turnaround time, and waiting time of the processes.

To analyze the round robin algorithm, I simply implemented a simulation of an operating system which we call here a multiprogramming operating system [1]. Different programs are designed for the analysis purpose which we call here the workload. With the help of simulator and the workload, I analyzed the different performance criteria for different quantum sizes and, came to the conclusion for this dissertation work.

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Abbreviations

CPU	Central Processing Unit
SI	Supervisor Interrupt
PI	Program Interrupt
TI	Timer Interrupt
IOI	Input Output Interrupt
RQ	Ready Queue
TQ	Terminate Queue
LQ	Load Queue
SQ	Swap Queue
IOQ	Input Output Queue
EB	Empty Buffer
EBQ	Empty Buffer Queue
IFB	Input Full Buffer
IFBQ	Input Full Buffer Queue
OFB	Output Full Buffer
OFBQ	Output Full Buffer Queue
IR	Instruction Register
IC	Instruction Counter
C	Boolean toggle

PTR	Page Table Resister
PCB	Process Control Block
CHST	Channel Status
LLC	Line Limit Counter
TLL	Total Line Limit
TTC	Total Time Counter
TTL	Total Time Limit
TSC	Time Slice Counter
TS	Time Slice