Bilkent University

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CS 342 Operating Systems

Project 2 Report

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1. Introduction

In this project, a program that simulates four different CPU scheduling algorithms is implemented. As a ready queue, heap implementation of priority queue is used in order to perform more efficient push and pop operations. Also in order to represent a single burst, a struct called Burst with burst no, remaining time, and arrival time is implemented.

2. Experiment Setup

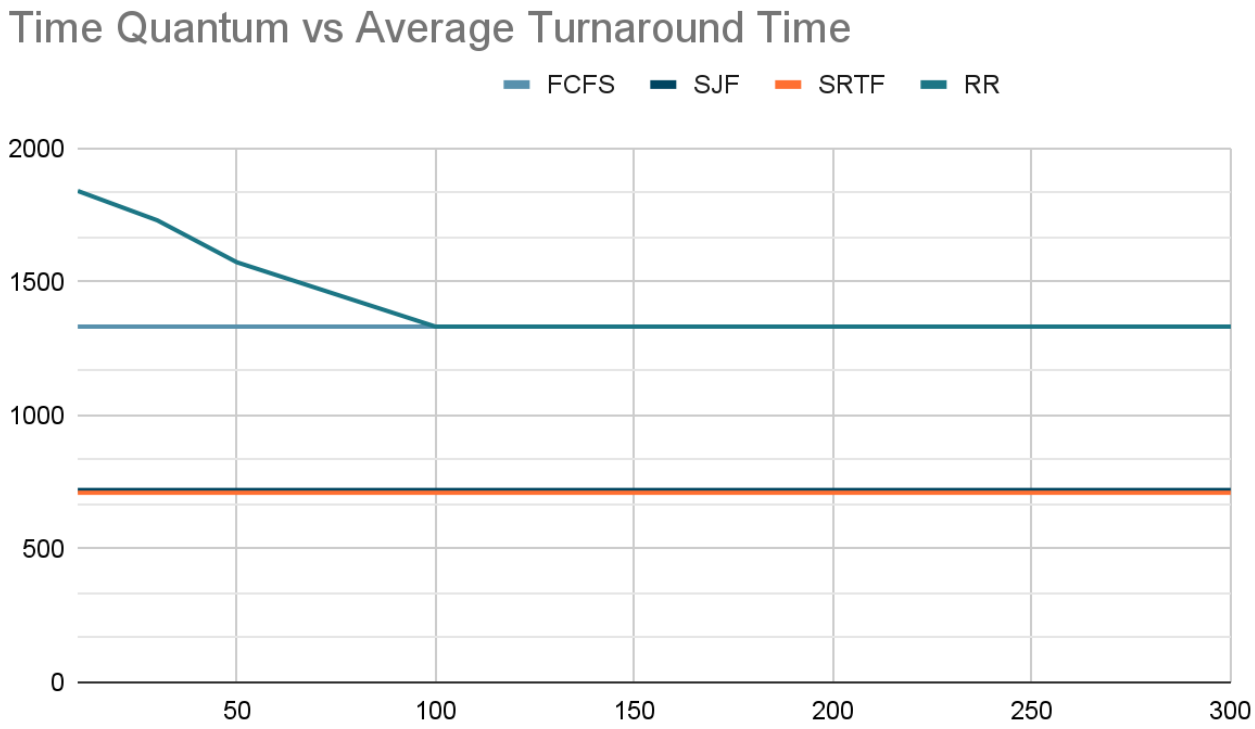
In order to test the results, an input file with 1000 bursts each having a burst size [1, 100] and arrival time (previous arrival time + [0, 100]) was generated using the Python script below.

```
from random import randint

no_of_bursts = 1000
filename = 'input.txt'
burstSizeRange = [1, 100]
biggest_burst_step = 100

prev = 0
file = open(filename, "w")

for i in range(no_of_bursts):
   file.write(str(i+1) + " ")
   if i != 0:
       prev += randint(0, biggest_burst_step)
   file.write(str(prev) + " ")
   file.write(str(randint(burstSizeRange[0], burstSizeRange[1])) + "\n")

file.close()
```

Later, schedule.c file is executed using this input file with time quantums 10, 30, 50, 100, 200, and 300. Results are saved on a time quantum vs average turnaround time plot.

3. Results

The plot below shows the results of the experiment described.



By examining the plot, it is possible to say that the results of FCFS, SJF, and SRTF were constant and they do not depend on time quantum.

However, as time quantum increases, the average turnaround time for RR decreases. When the time quantum reaches maximum burst size, the average turnaround time for RR becomes the same as FCFS. When quantum is higher than max burst time, average turnaround time remains constant in RR too. This is as expected, because if maximum burst size is known, for any time quantum greater than or equal to maximum burst time, RR becomes the same as FCFS because each burst started processing is executed until the termination without any pause.

Lastly, it is possible to examine that average turnaround times for SJF and SRTF are close to each other and significantly smaller compared to FCFS and RR.