

CS 342 – Operating Systems

Project 4

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1. Environment

Application is compiled and run on the machine which have the properties as follows:

- 64 bit Ubuntu 16.04.3 LTS with kernel 4.10.0-25-generic
- Intel(R) Core (TM) i5-3230M CPU @ 2.60 GHz
- NVIDIA GEFORCE GT 635M (2GB)
- 8 GB DDR3 RAM

2. Experiments

2.1 Experiment 1: Some of the test inputs and corresponding outputs will be given (unit: 1 time unit):

Input 1:

0	53
52	98
52	183
52	37
52	122
52	14
52	124
52	65
52	67

Output 1:

Algo	Time	Mean	Dev
FCFS	692	277.5	248.5
SSTF	288	71.11	75.83
LOOK	351	68.55	88.70
CLOOK	374	71.11	95.49

Input 2:

0	100
99	10
99	250
99	10
99	250
99	10
99	250
99	10
99	250
500	200

Output 2:

Algo	Time	Mean	Dev
FCFS	1919	703.9	589.2
SSTF	550	135.0	140.1
LOOK	740	282.4	280.0
CLOOK	930	301.4	260.3

Input 3:

0	100
99	20
99	40
99	60
99	80
99	120
99	140
99	160
99	180
99	200

Output 3:

Algo	Time	Mean	Dev
FCFS	359	128	84.9
SSTF	359	104	95.5
LOOK	379	102	100
CLOOK	439	120	128

Input 4:

0	100
99	200
99	40
99	160
99	80
99	120
99	140
99	60
99	180
99	20

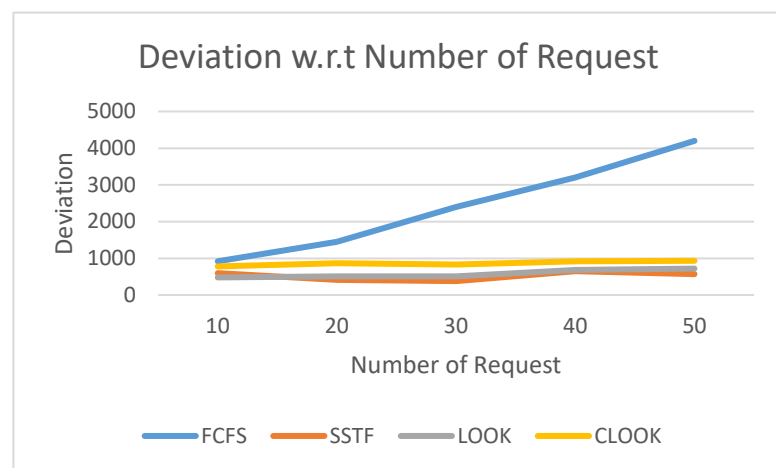
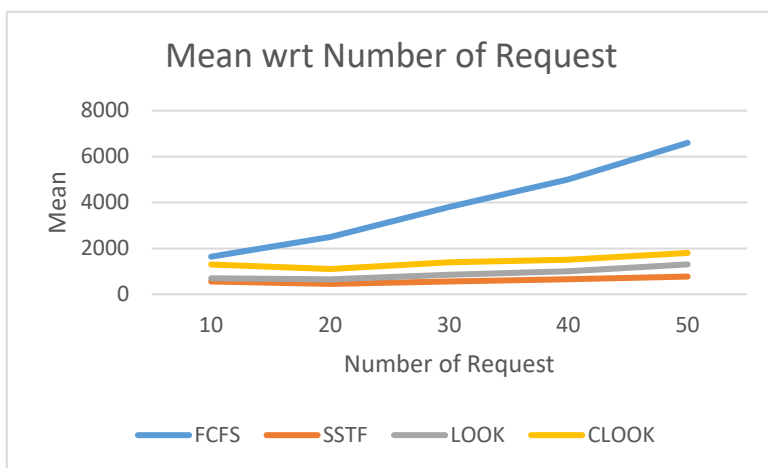
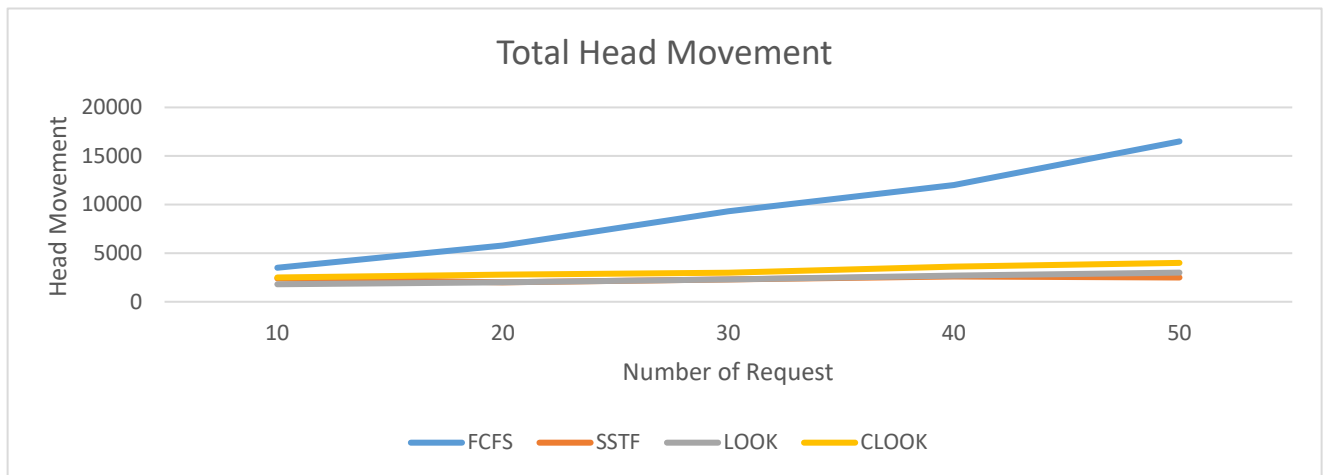
Output 4:

Algo	Time	Mean	Dev
FCFS	979	354	253
SSTF	359	104	95.5
LOOK	379	102	100
CLOOK	439	120	128

In this experiment, number of requests are same but the content and sequence is different. From the results, we can conclude that FCFS is too much affected from the input sequence and total head movement, mean and deviation is considerably high comparing to other algorithms. SSTF gives the best total head movement and less deviation in general. Look and Clook algorithms mostly gives the similar results. For the input 3 and 4, FCFS is so bad that the sequence is too important and not intelligent at all. For other 3 algorithms, results are same, because they make decision for each request.

2.2 Experiment 2: We implemented a Java program that creates random input files. This means, arrival times and requested disk blocks are randomly determined but the request number is given.

We tested the scheduler with different number of requests: 10, 20, 30, 40, and 50. Following graphs include the data from this experiment.



In this experiment, we see that THM, mean and deviation increases with the number of request for FCFS because the algorithm just considers the input sequence and randomness of the input is problematic. Therefore, serving the first comer first is not a good idea. However, in the other algorithms, input size does not matter that much, because of decision-making process.

3. Conclusion

After the experiments were conducted, we concluded that FCFS is not a good application of disk scheduling because of its sensitivity to randomness and size of the requests. In SSTF, LOOK and CLOOK algorithms, the total head movement, mean and deviation are close; however, SSTF serves faster in most of the cases, but it can cause a starvation in return.