

CS342

Operating Systems

Project 4

15.05.2018

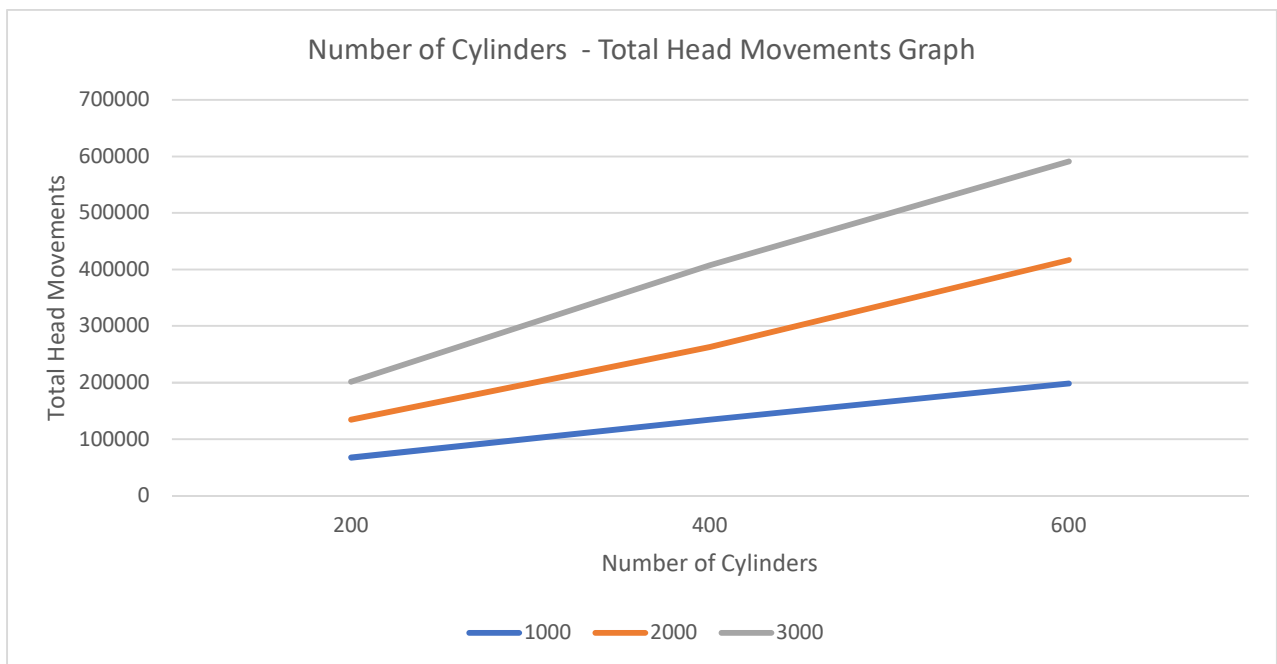
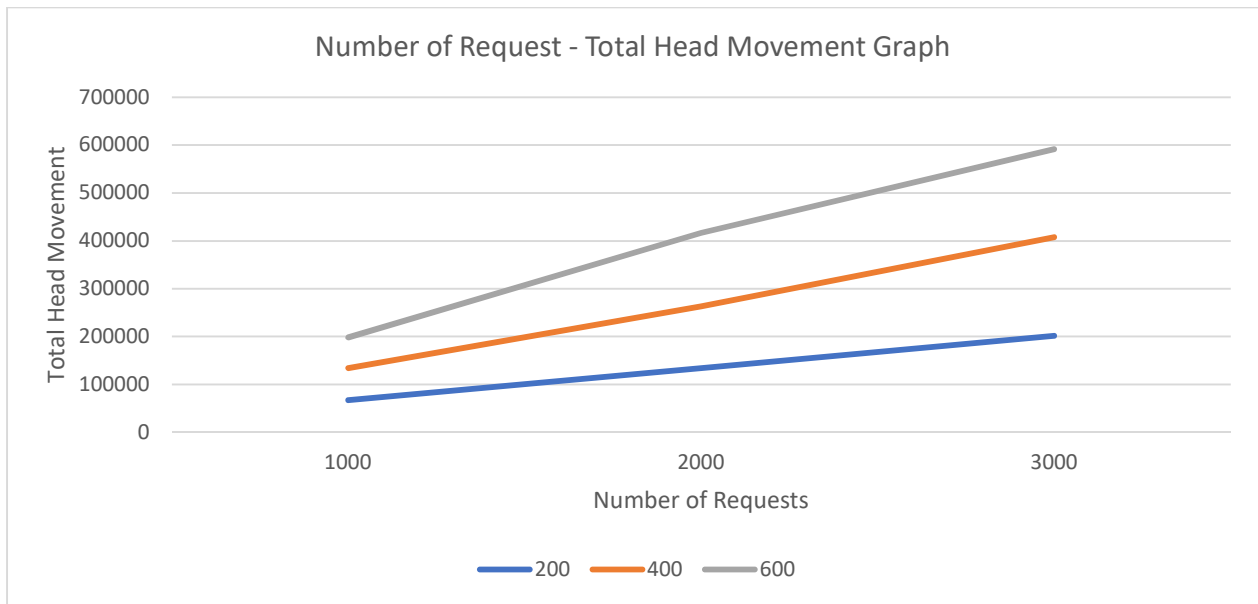
Sabit Gökberk Karaca - 21401862

Kaan Sancak - 21502708

1. Experiment Results

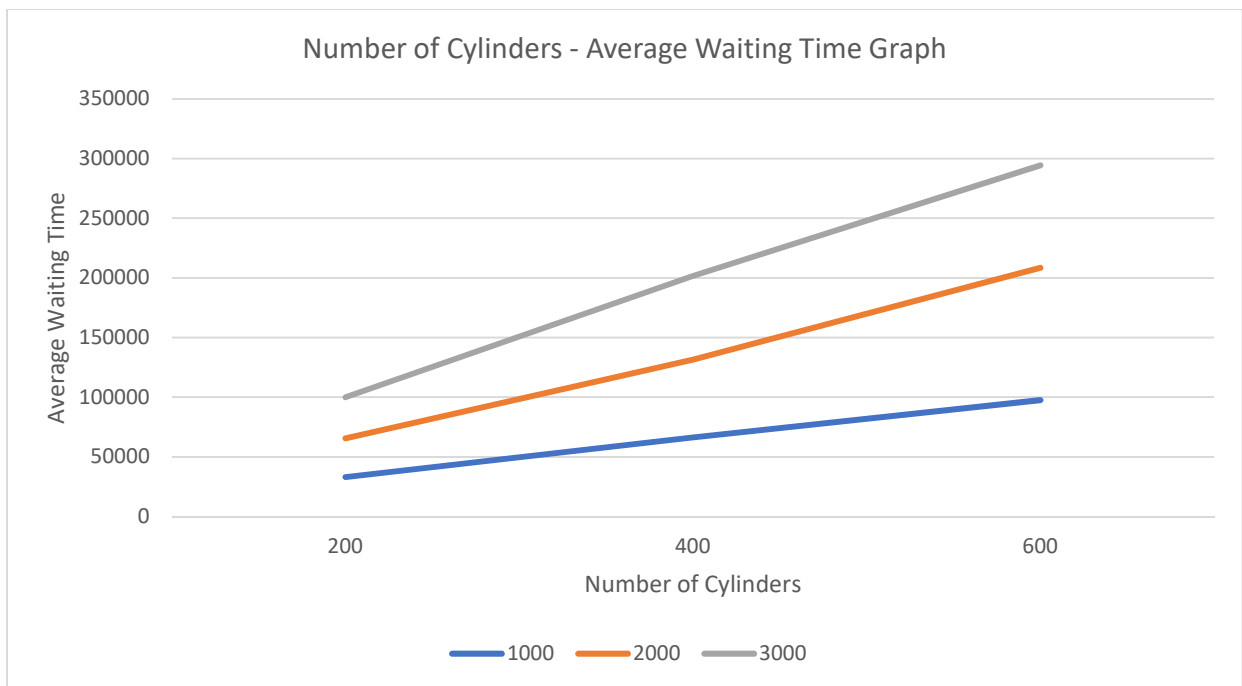
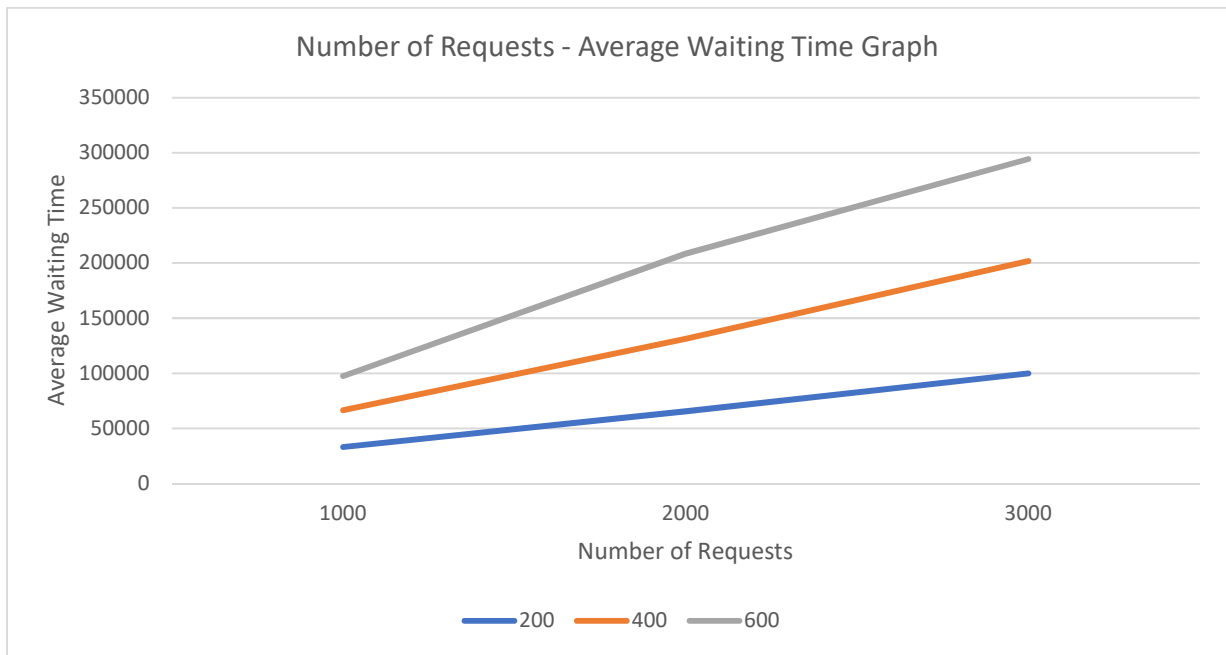
FCFS Total Head Movement

N / Number of Requests	1000	2000	3000
200	67273	134158	201605
400	134187	263168	407699
600	198338	416793	591225



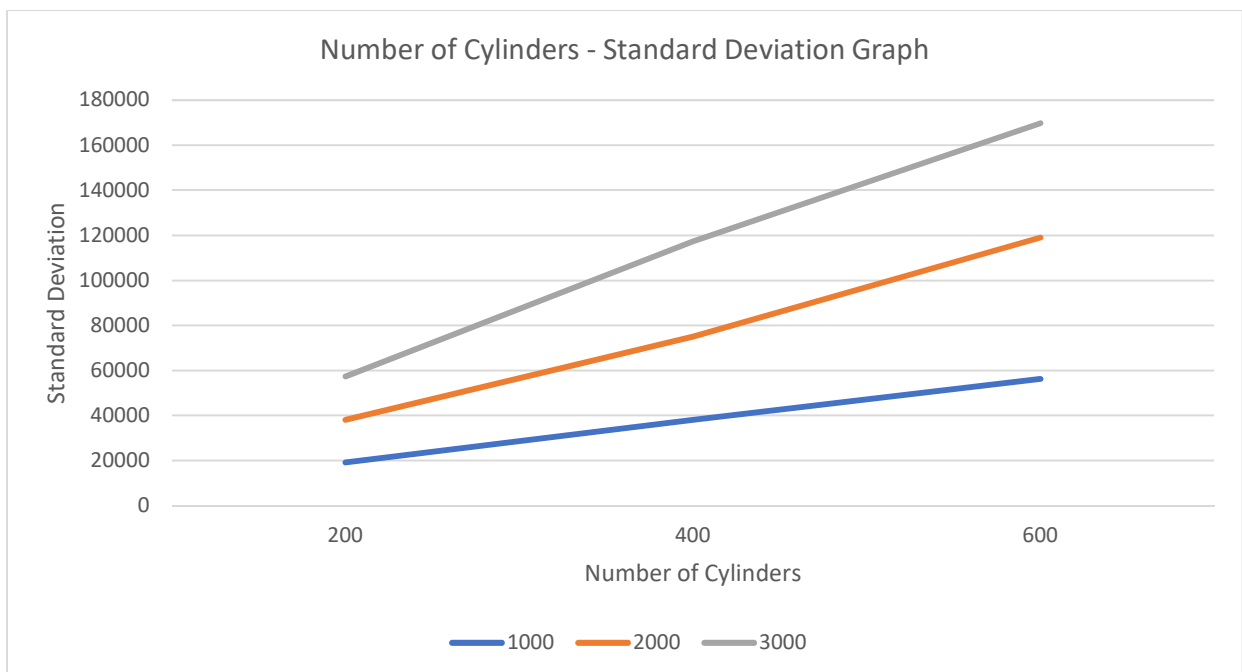
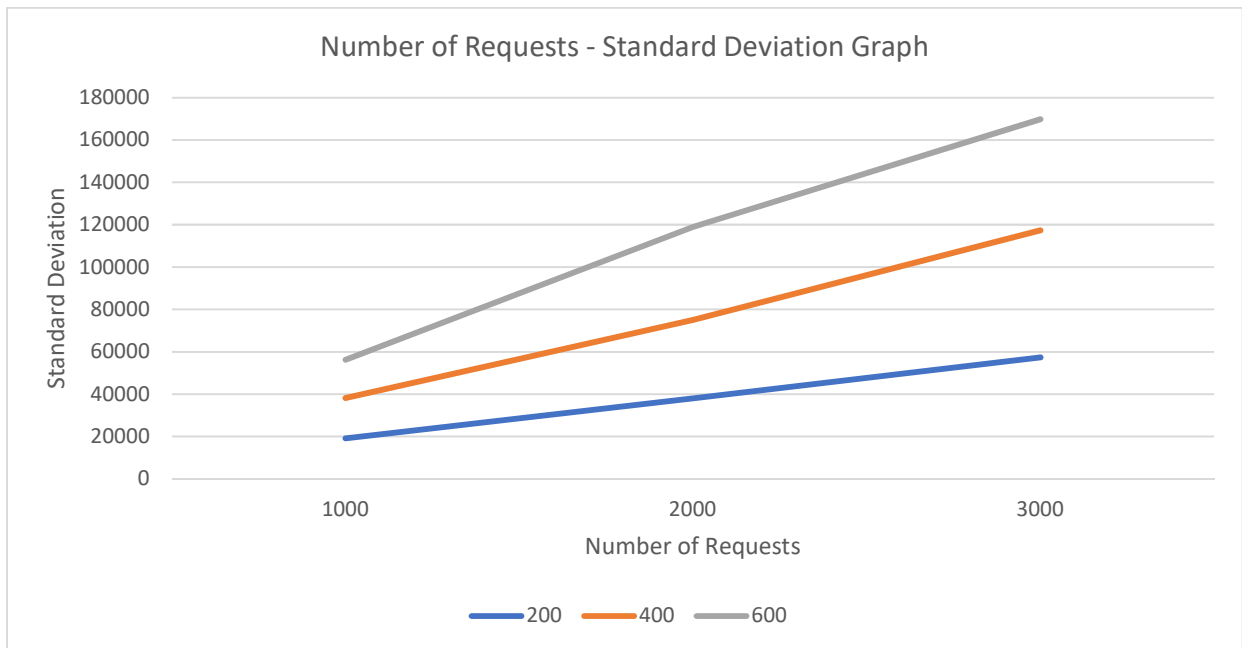
FCFS Average Waiting Time

N / Number of Requests	1000	2000	3000
200	33104.27	65486.38	99872.37
400	66456.20	131381.69	201834.51
600	97526.82	208449.85	294380.66



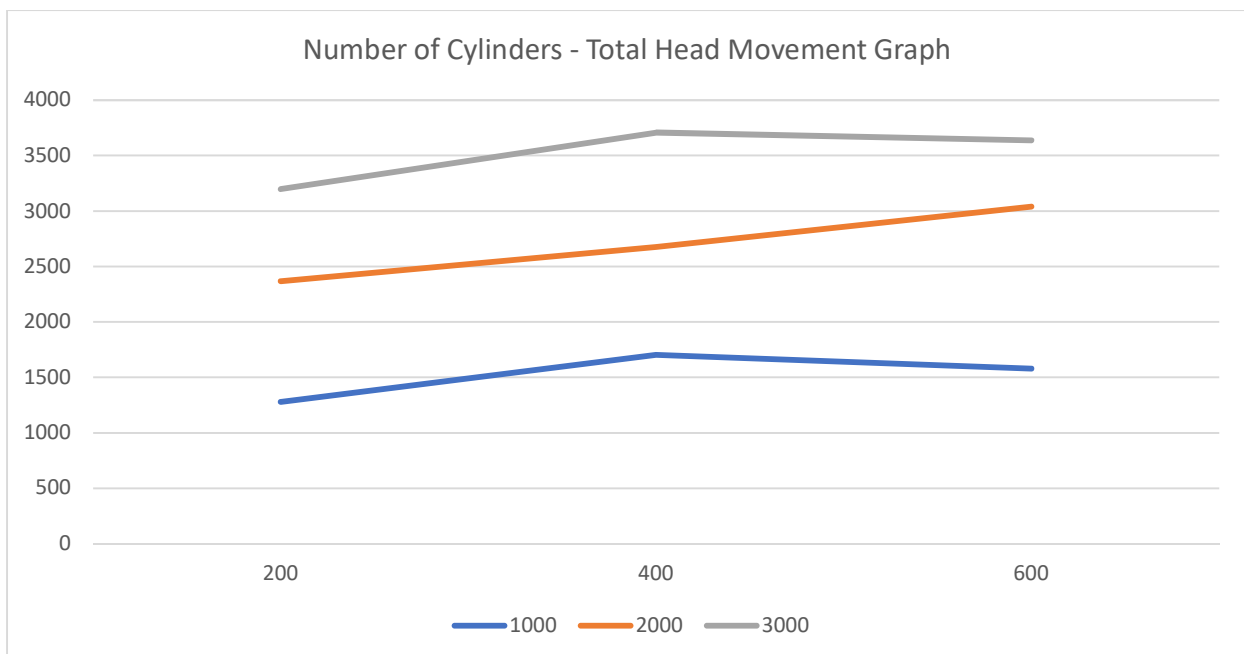
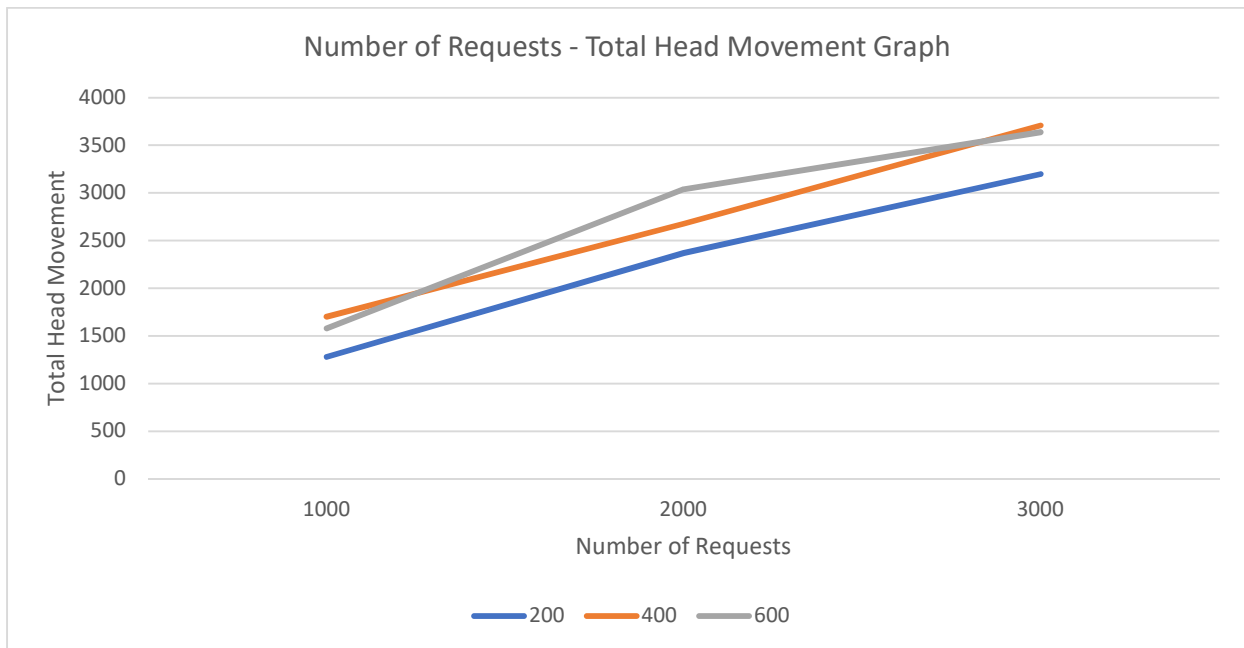
FCFS Standard Deviation

N / Number of Requests	1000	2000	3000
200	19150.68	38042.20	57339.68
400	38091.42	75050.48	117358.36
600	56235.71	118991.63	169806.19



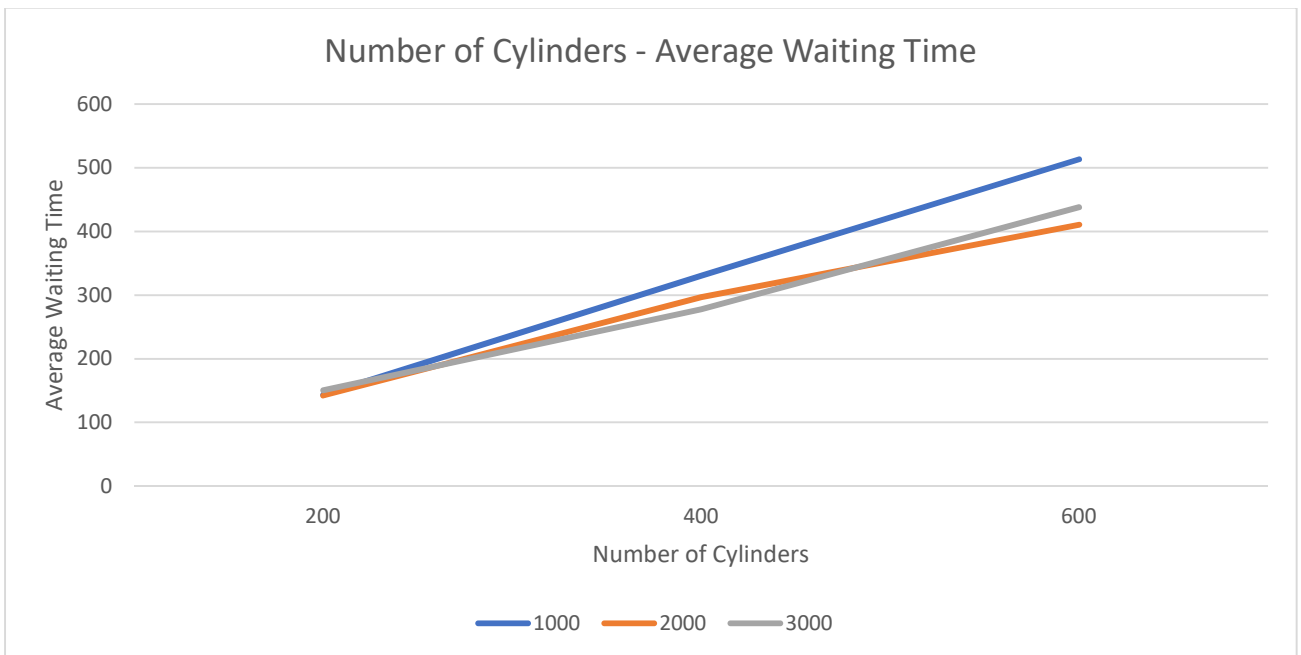
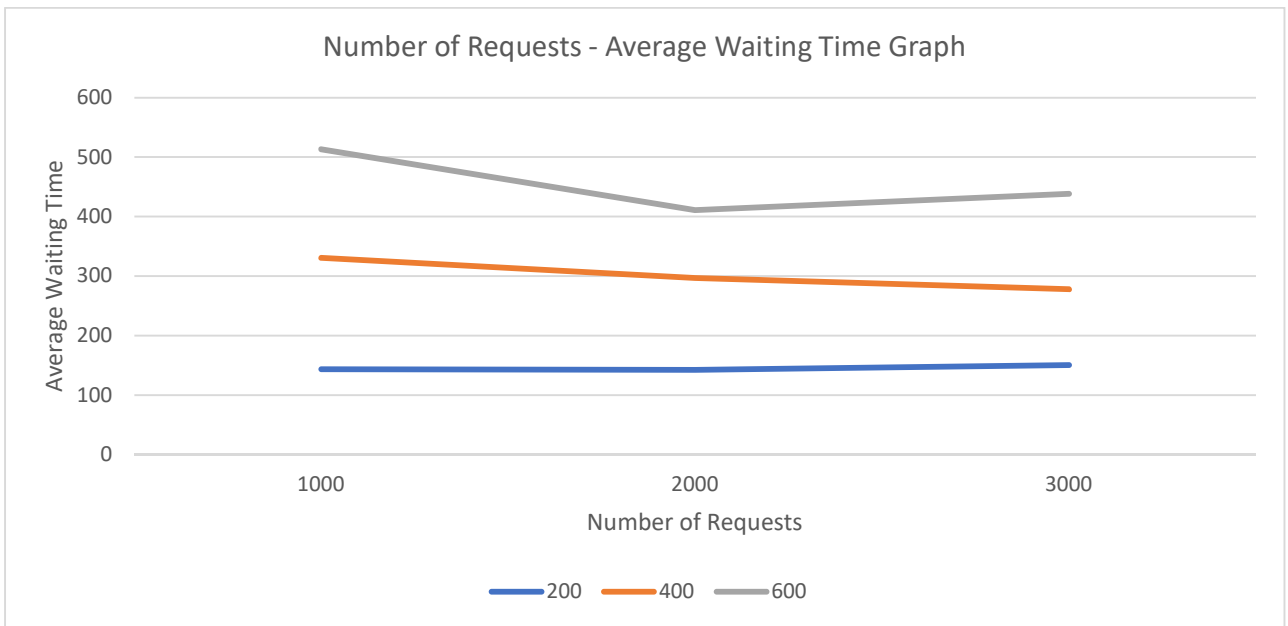
SSTF Total Head Movement

N / Number of Requests	1000	2000	3000
200	1279	2368	3198
400	1702	2678	3708
600	1579	3041	3638



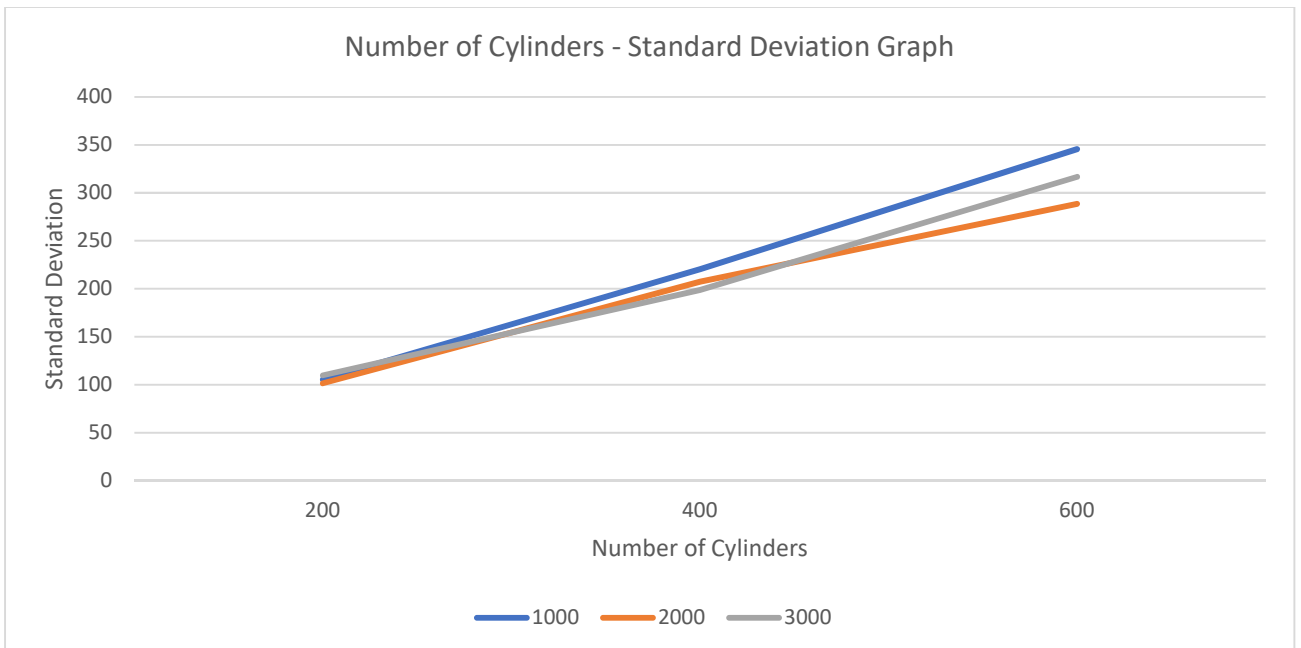
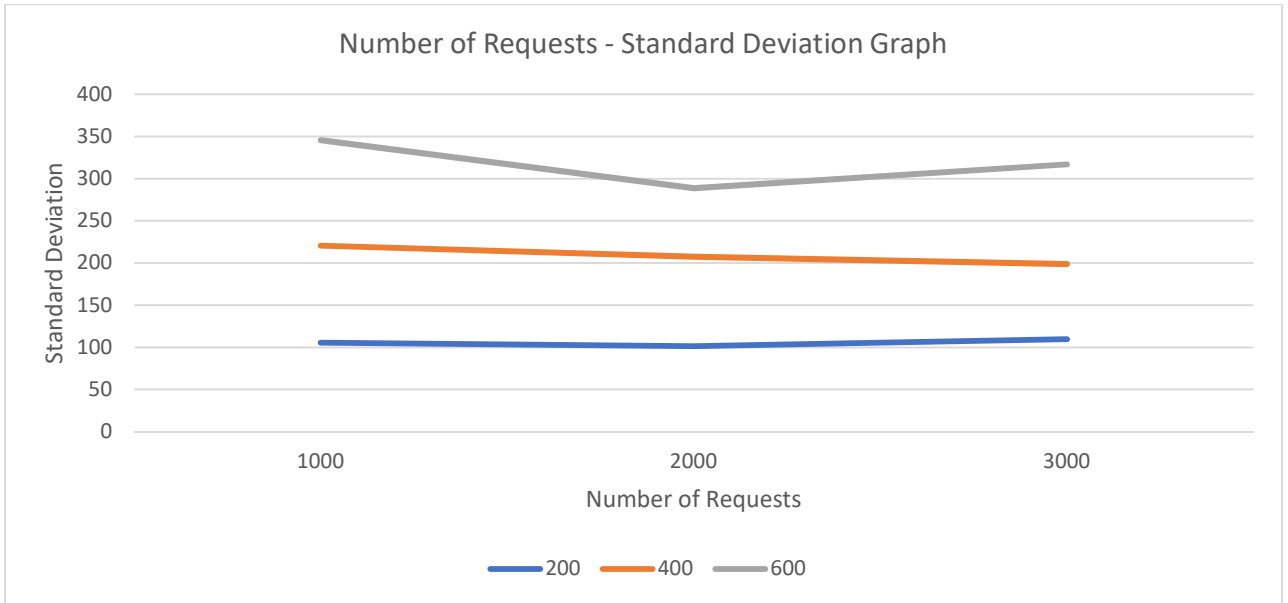
SSTF Average Waiting Time

N / Number of Requests	1000	2000	3000
200	143.59	142.40	150.53
400	330.61	297.07	277.81
600	513.36	410.81	438.24



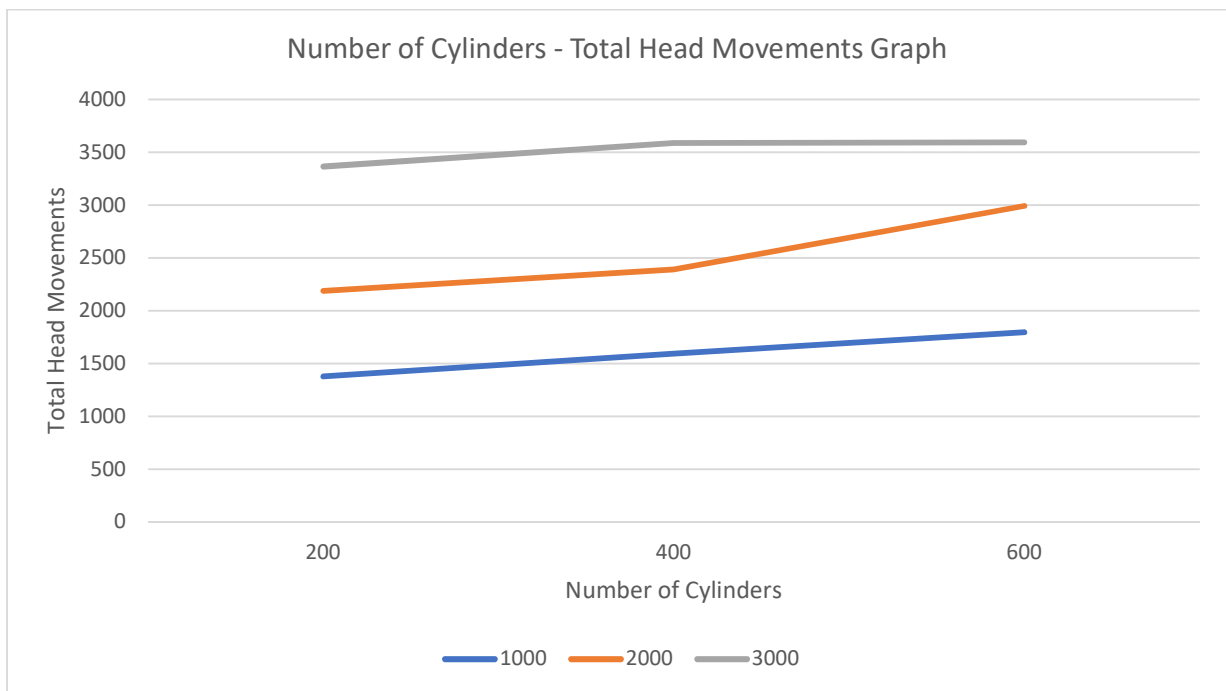
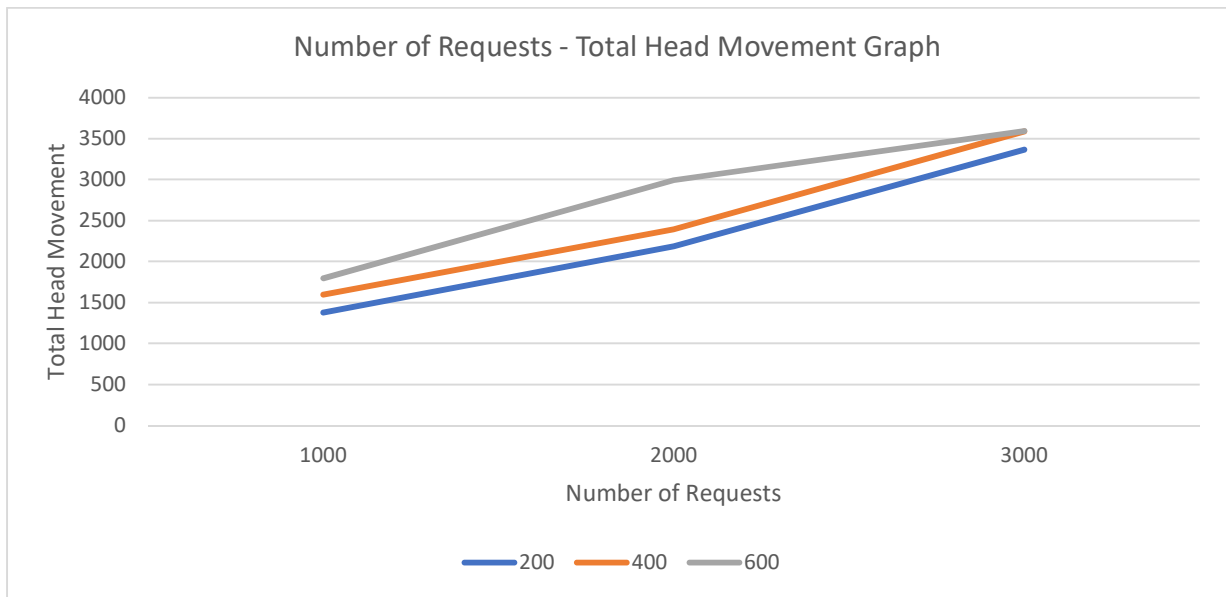
SSTF Standard Deviation

N / Number of Requests	1000	2000	3000
200	105.44	101.47	109.81
400	220.54	207.42	198.83
600	345.67	288.73	316.84



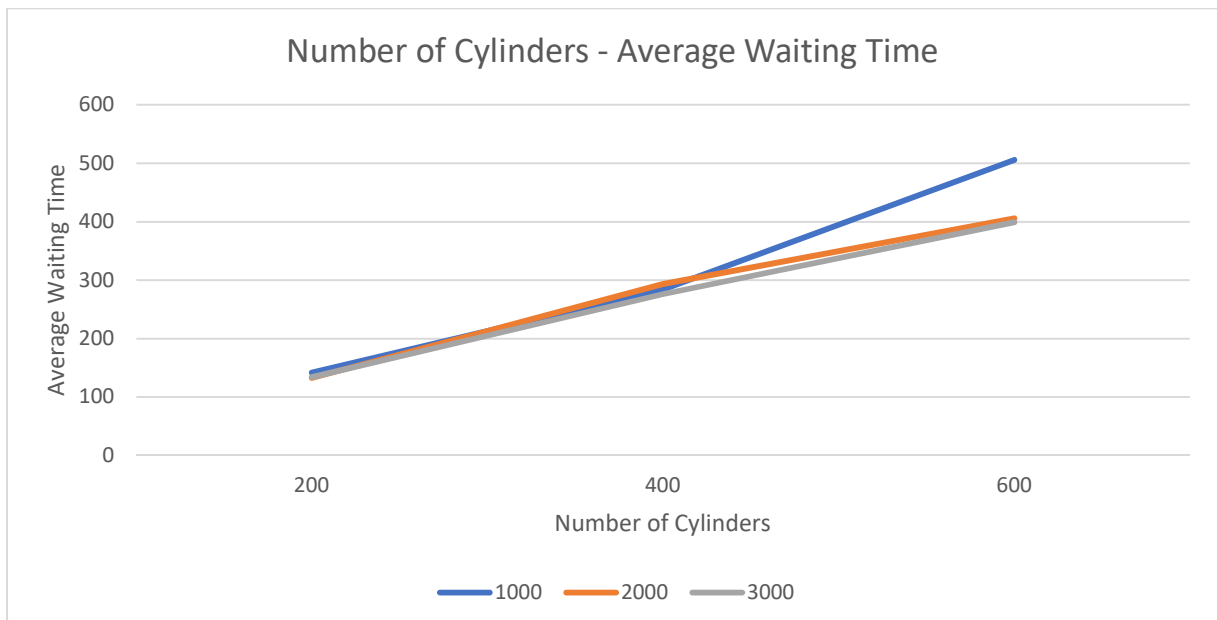
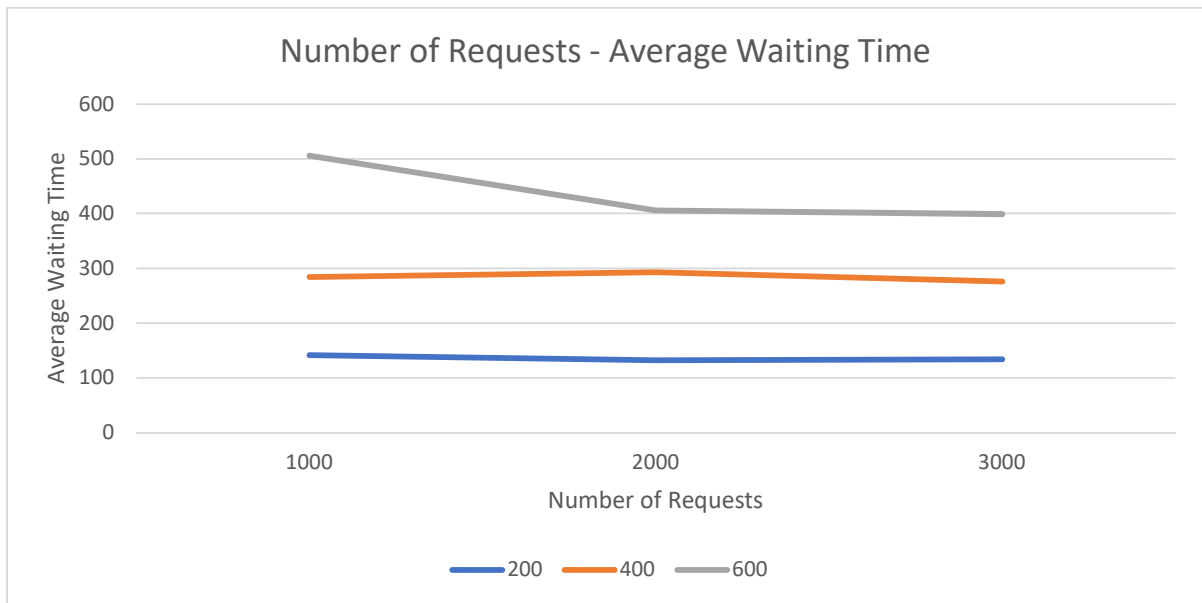
LOOK Total Head Movement

N / Number of Requests	1000	2000	3000
200	1378	2189	3366
400	1596	2392	3589
600	1796	2993	3594



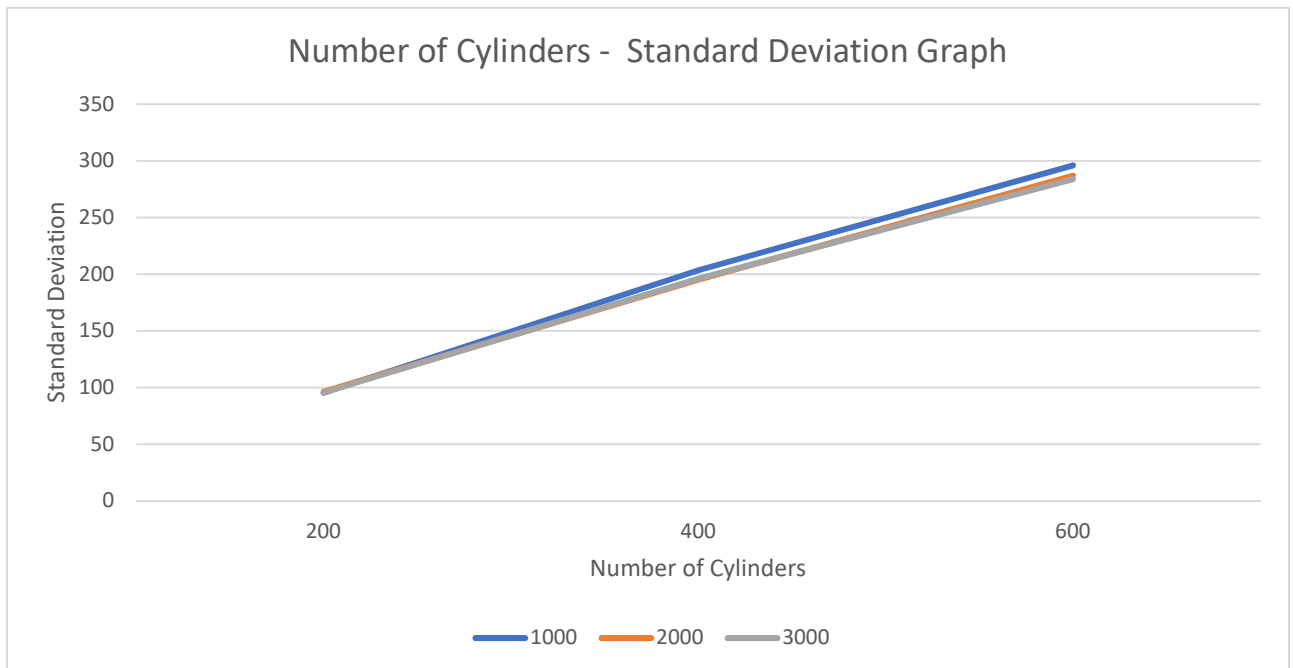
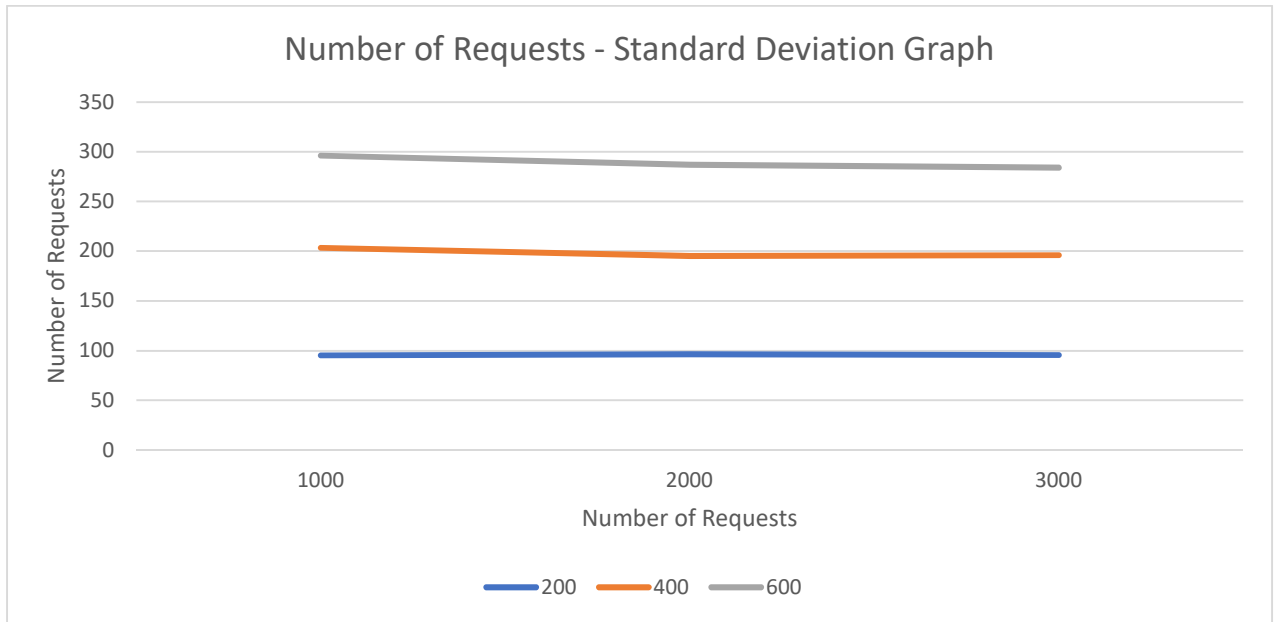
LOOK Average Waiting Time

N / Number of Requests	1000	2000	3000
200	141.67	132.41	133.85
400	284.19	293.16	276.09
600	505.83	405.84	399.01



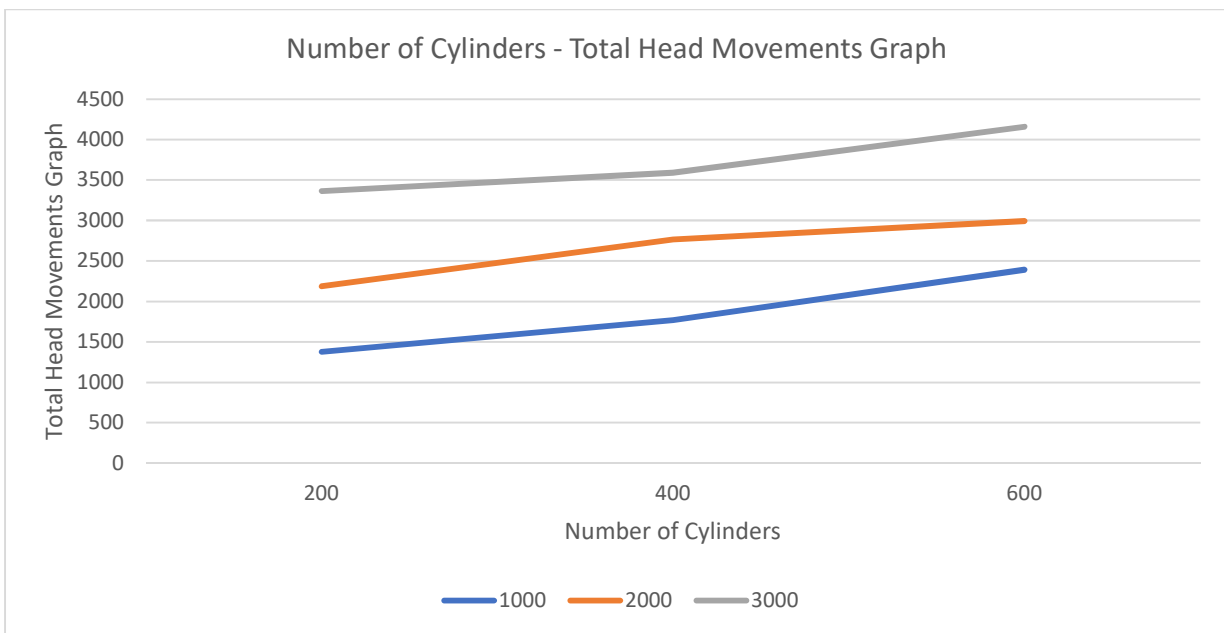
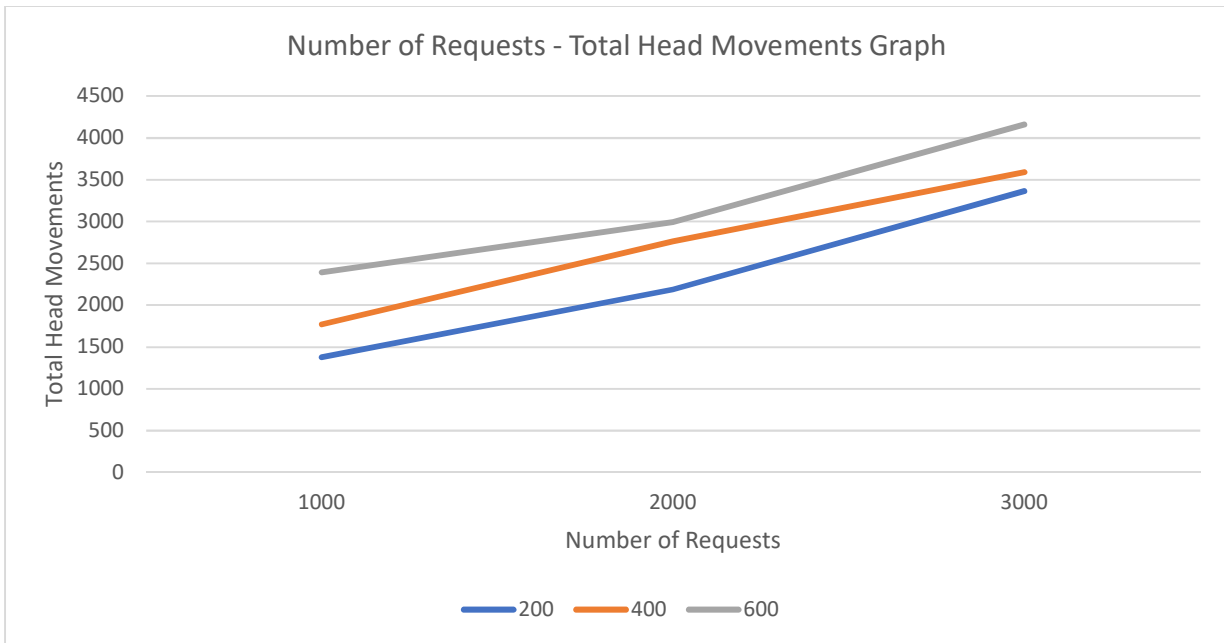
LOOK Standard Deviation

N / Number of Requests	1000	2000	3000
200	95.28	96.31	95.62
400	203.43	195.13	196.02
600	296.13	287.09	284.00



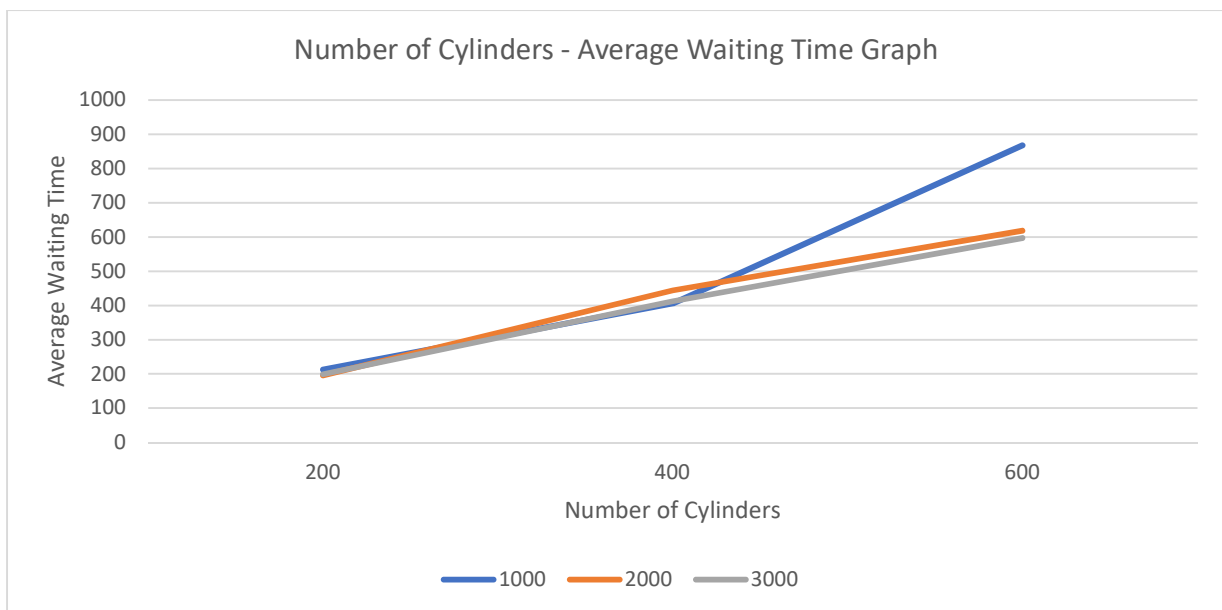
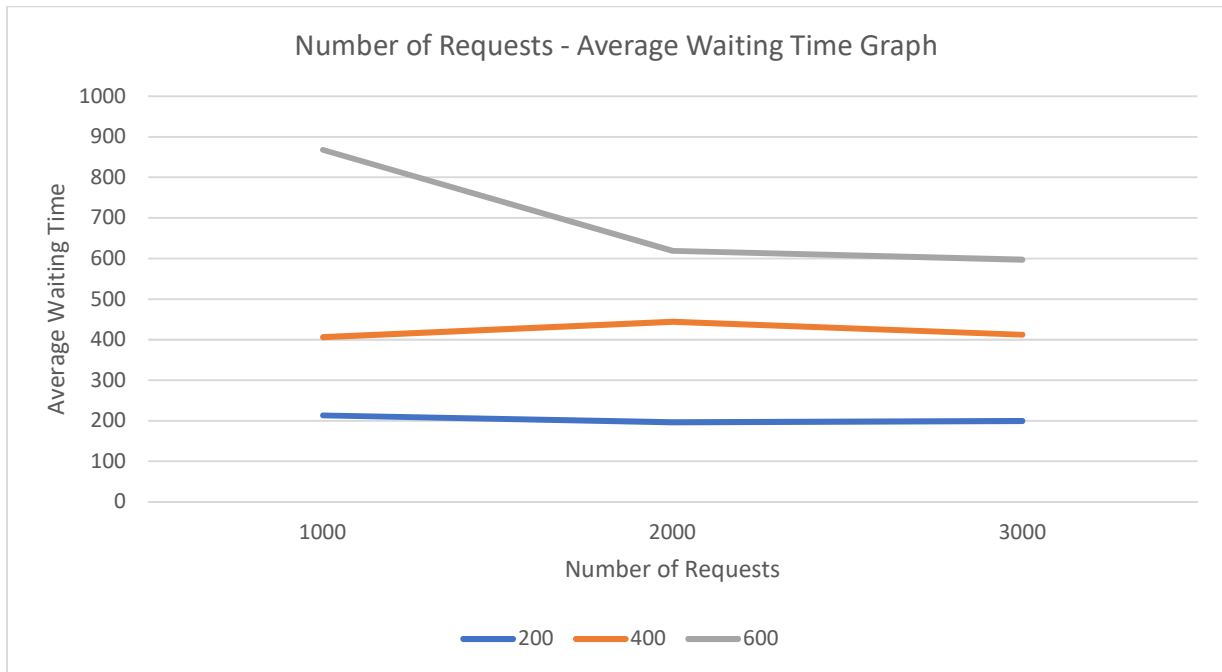
CLOOK Total Head Movement

N / Number of Requests	1000	2000	3000
200	1378	2187	3364
400	1770	2765	3589
600	2392	2993	4160



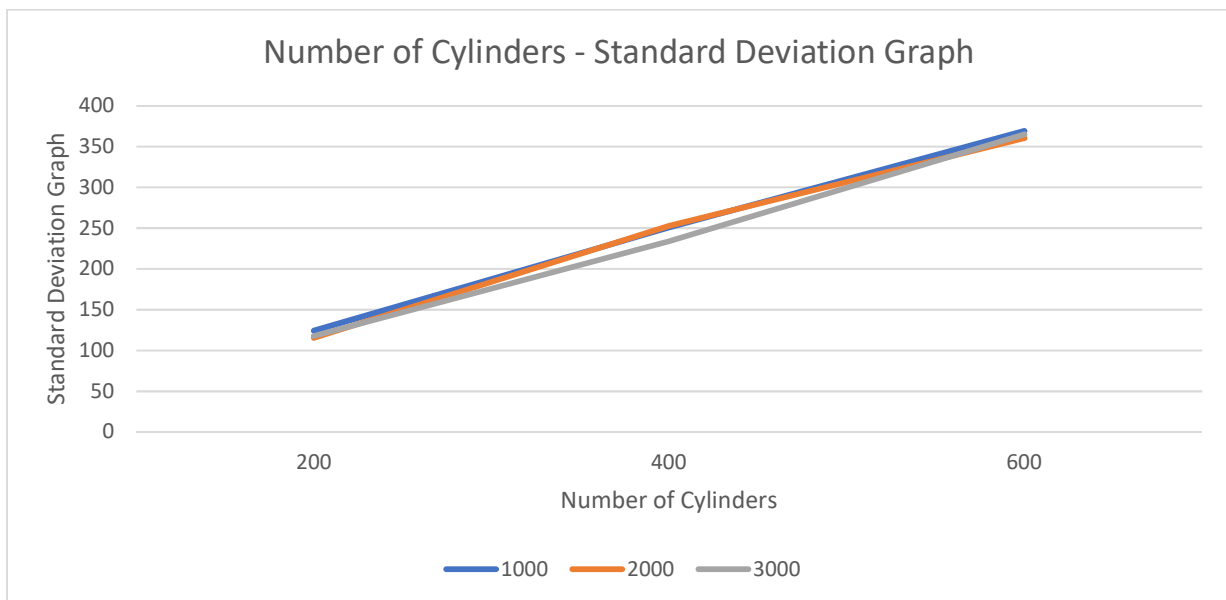
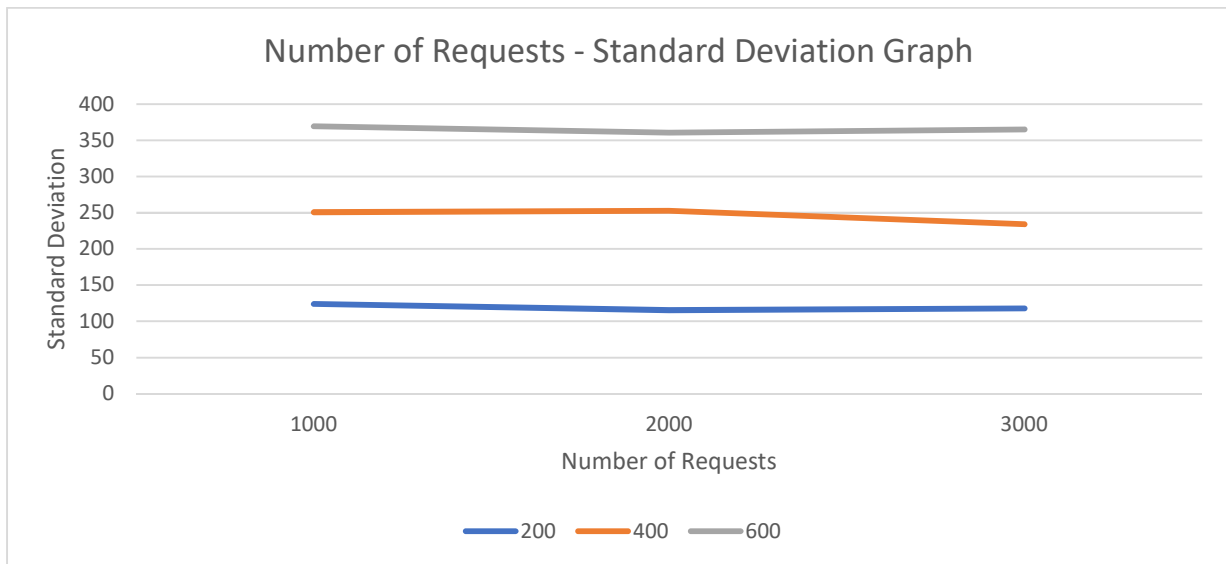
CLOOK Average Waiting Time

N / Number of Requests	1000	2000	3000
200	212.94	195.94	199.26
400	406.14	443.94	412.41
600	867.91	618.65	597.18



CLOOK Standard Deviation

N / Number of Requests	1000	2000	3000
200	124.25	115.52	117.80
400	250.82	252.68	234.02
600	369.26	360.40	365.05



2. Experiment Analysis

In this project we have worked on different algorithms that are used for scheduling the mass storage disk access requests. The algorithms we worked on were First Come First Served (FCFS), Shortest Seek Time First (SSTF), LOOK and Circular LOOK. After implementing the algorithms in a C program, we tried to give inputs that we can trace by hand to the program and checked if it works correctly for each algorithm or not. After making sure that our algorithms are able to handle both simple and corner cases, we have designed an experiment to see how these algorithms react against the changes parameters. In order to do the experiment, we wrote another program that creates large and random inputs depending on given parameters. We chose the parameters to be the maximum number of disk cylinders and number of requests and chose 3 values for each. As a result, we have obtained 9 different experiments and collected the total head movements, average wait time and standard deviation of wait time data for all of our algorithms.

After collecting the data, we were able to analyze it by comparing the results with the changes of parameters. According to these results, we found out that;

- FCFS
 - Total Head Movements in FCFS algorithm increases linearly when both number of disk cylinders and number of requests are increased.
 - Average Waiting Time in FCFS algorithm increases linearly when both number of disk cylinders and number of requests are increased.
 - Standard Deviation of waiting time in FCFS algorithm increases linearly when both number of disk cylinders and number of requests are increased. Which means
- SSTF
 - Total Head Movements in SSTF algorithm increases when the number of requests is increased, it also increases when number of cylinders are increased but the increase rate is smaller when compared to FCFS
 - Average Waiting Time in SSTF algorithm is almost constant when the number of requests is increased, which means it is not affected by the number of requests. However, it is highly affected by the number of disk numbers and linearly increases depending on it.
 - Standard in SSTF algorithm is almost constant when the number of requests is increased, which means it is not affected by the number of requests. However, it is highly affected by the number of disk numbers and linearly increases depending on it.

- LOOK
 - Total Head Movements in LOOK algorithm increases when the number of requests is increased, it also increases when number of cylinders are increased but the increase rate is smaller when compared to FCFS
 - Average Wait Time in LOOK algorithm does not change a lot when number of requests are increased, it is almost constant. Therefore, it is possible to say that it does not depend on number of requests. However, it linearly increases when number of cylinders are increased.
 - Standard Deviation of wait time in LOOK algorithm changes very small when number of requests are changed, therefore it can be said that number of requests does not cause variance. On the other hand, the average waiting time varies depending on number of cylinders since standard deviation is linearly increased.
- CLOOK
 - Total Head Movements in CLOOK increases depending on both number of requests and number of cylinders.
 - Average wait time seems to have a constant value for small number of requests but it starts to change when number of requests are increased.
 - Standard deviation is constant with respect to number of requests and it linearly increases with respect to number of cylinders.

Another comparison can be done between the algorithms by looking at the collected data;

- FCFS
 - It has very high total number of head movements, average waiting time and standard deviation. Therefore, it is not efficient to use this algorithm for such a random and large input.
- SSTF
 - It has low total number of head movements when compared to FCFS and its average waiting time and standard deviation is also similar to LOOK and CLOOK algorithms, therefore it can be used in such a random and large input.
- LOOK
 - It has low total number of head movements when compared to FCFS and its average waiting time and standard deviation is also similar to SSTF and CLOOK algorithms, therefore it can be used in such a random and large input.
- CLOOK
 - It has low total number of head movements when compared to FCFS and its average waiting time and standard deviation is also similar to SSTF and LOOK algorithms, therefore it can be used in such a random and large input.