

# CSC443 Assignment 1 Report

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## Part: Sequential Write

Medium #1: CDF Machine Hard Drive

Medium #2: Macbook Air, Flash Storage with 4GB memory

Medium #3: 2GB USB Drive

File size: 5MB = 5,000,000 bytes in decimal

Block Size	Time (ms) Medium #1	Time (ms) Medium #2	Time (ms) Medium #3	Experiment Report & Analysis
100 B	141	576	422	<p>(Please refer to Diagram 1 on 3rd page.)</p> <p>By performing the experience on the three mediums mentioned above, we can notice that the file writing rate (bytes/ms) are pretty low with very small block sizes (~100B - 500B).</p> <p>The explanation for this observation is that, since the total file size is quite large relative to the block_size, it indeed will take longer for all three mediums to perform disk writing to the file with such a small buffer size.</p> <p>However, it is observed that the writing rate increases as the block size increases for medium 1 and 2, meanwhile medium 2 shows a greater increase in the speed. This is because a increased buffer size will decrease the number of times to read/write data to disk, which results in fewer I/Os and shorter total time.</p> <p>However, the write rate for medium 3 (USB) significantly decreased for block size ranging from 1 KB - 5 KB and this occurs for every single attempt of the experiment. A possible explanation may be due to the poor physical condition of this storage (Low storage along with ~8 years of purchase history, which may cause some portion of memory to be damaged).</p> <p>By looking through the performance, the write rate do not increase linearly, but rather follows a bell curved trend. This indicates there may be some sort of optimal writing block size ranging from 2.5 KB - 1MB, by taking medium 2 as the sample, it's most optimal block size ranged from 50 KB - 1MB.</p>
500 B	104	179	369	
1 KB	98	137	5323	
2.5 KB	93	100	5858	
5 KB	94	84	3255	
7.5 KB	94	76	662	
10 KB	92	77	649	
25 KB	93	72	651	
50 KB	91	59	649	
75 KB	94	58	642	
100 KB	92	58	652	
250 KB	91	60	642	
500 KB	93	60	640	
750 KB	97	59	646	
1MB	92	58	648	
2MB	110	67	648	
3MB	110	76	633	

## Part: Sequential Read

Medium #1: CDF Machine Hard Drive

Medium #2: Macbook Air, Flash Storage with 4GB memory

Medium #3: 2GB USB Drive

File size: 5MB = 5,000,000 bytes in decimal

Block Size	Time (ms) Medium #1	Time (ms) Medium #2	Time (ms) Medium #3	<b>Experiment Report &amp; Analysis</b>  (Please refer to Diagram 2 on 3rd page)  For sequential read, medium 1 seems to have a very consistent reading rate for all block size 100 B - 3MB, this may be due to the mechanical design of the hard drive, which is superior in performing sequential read, and thus resulting in a fairly average performance among all block sizes (no significant optimal block size).  However, medium 2 and 3 started off with inconsistent reading rates ranging from 100B - 5 KB block size, this result differs from medium 1 and it may be explained by the mechanical design of a flash drive (use of circuits for storage than rotating disk of a hard drive). One notable observation is that both medium 2 and 3 hit the highest reading rate at 2.5 KB, which I also suspect may be an optimal block size for these mediums. In addition, this optimal block size seems more fixed at around 2.5 KB, in comparison to the optimal range of block sizes in the sequential write case.  Regarding to the trend of reading rates,, the read rate for all three mediums with the same file size/different block sizes are quite consistent ranging from 5 KB - 2 MB, and the rate slightly decrease for block size > 2MB. This trend is somehow similar to that of sequential writing.
100 B	42	31	34	
500 B	42	49	23	
1 KB	41	48	47	
2.5 KB	41	24	25	
5 KB	42	51	45	
7.5 KB	39	50	47	
10 KB	40	50	45	
25 KB	41	46	48	
50 KB	39	45	47	
75 KB	40	51	45	
100 KB	40	46	46	
250 KB	39	49	46	
500 KB	39	45	45	
750 KB	42	44	46	
1MB	38	44	47	
2MB	43	49	50	
3MB	43	61	49	

## Plot Diagrams

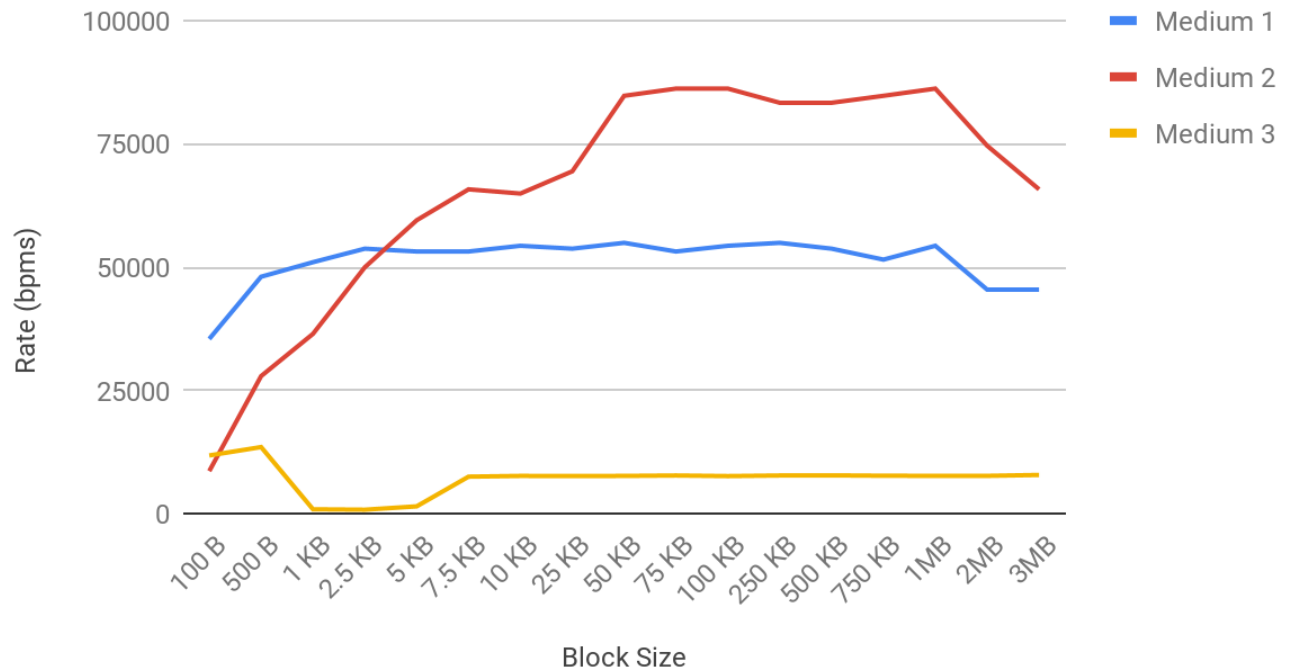
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Medium #2: Macbook Air, Flash Storage with 4GB memory

Medium #3: 2GB Storage USB Drive

File size: 5MB = 5,000,000 bytes in decimal

### Sequential Write Bytes per Time(ms)



### Sequential Read Byte Time Rate

