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5 MB Test file Generation:

```
(base) tunabeluga@ANDREWTUNA:~/ECE357/ece357/pset01$ dd if=/dev/urandom bs=5M count=1 | tr -c '\t\n' ' \t' > fat_random_tabs.txt
1+0 records in
1+0 records out
5242880 bytes (5.2 MB, 5.0 MiB) copied, 0.025881 s, 203 MB/s
```

Data Collection:

```
(base) tunabeluga@ANDREWTUNA:~/ECE357/ece357/pset01$ time ./tabstop -b 1 -o output.txt fat_random_tabs.txt

real    0m14.231s
user    0m1.804s
sys     0m11.621s
(base) tunabeluga@ANDREWTUNA:~/ECE357/ece357/pset01$ time ./tabstop -b 2 -o output.txt fat_random_tabs.txt

real    0m6.704s
user    0m1.210s
sys     0m5.766s
(base) tunabeluga@ANDREWTUNA:~/ECE357/ece357/pset01$ time ./tabstop -b 4 -o output.txt fat_random_tabs.txt

real    0m3.798s
user    0m0.705s
sys     0m3.249s
(base) tunabeluga@ANDREWTUNA:~/ECE357/ece357/pset01$ time ./tabstop -b 8 -o output.txt fat_random_tabs.txt

real    0m1.500s
user    0m0.351s
sys     0m1.211s
(base) tunabeluga@ANDREWTUNA:~/ECE357/ece357/pset01$ time ./tabstop -b 16 -o output.txt fat_random_tabs.txt

real    0m0.804s
user    0m0.207s
sys     0m0.628s
(base) tunabeluga@ANDREWTUNA:~/ECE357/ece357/pset01$ time ./tabstop -b 32 -o output.txt fat_random_tabs.txt

real    0m0.521s
user    0m0.146s
sys     0m0.392s
(base) tunabeluga@ANDREWTUNA:~/ECE357/ece357/pset01$ time ./tabstop -b 64 -o output.txt fat_random_tabs.txt

real    0m0.292s
user    0m0.101s
sys     0m0.199s
(base) tunabeluga@ANDREWTUNA:~/ECE357/ece357/pset01$ time ./tabstop -b 128 -o output.txt fat_random_tabs.txt

real    0m0.203s
user    0m0.106s
sys     0m0.104s
(base) tunabeluga@ANDREWTUNA:~/ECE357/ece357/pset01$ time ./tabstop -b 256 -o output.txt fat_random_tabs.txt

real    0m0.180s
user    0m0.098s
sys     0m0.086s
(base) tunabeluga@ANDREWTUNA:~/ECE357/ece357/pset01$ time ./tabstop -b 512 -o output.txt fat_random_tabs.txt

real    0m0.147s
user    0m0.122s
sys     0m0.031s
(base) tunabeluga@ANDREWTUNA:~/ECE357/ece357/pset01$ time ./tabstop -b 1024 -o output.txt fat_random_tabs.txt

real    0m0.137s
user    0m0.116s
sys     0m0.025s
```

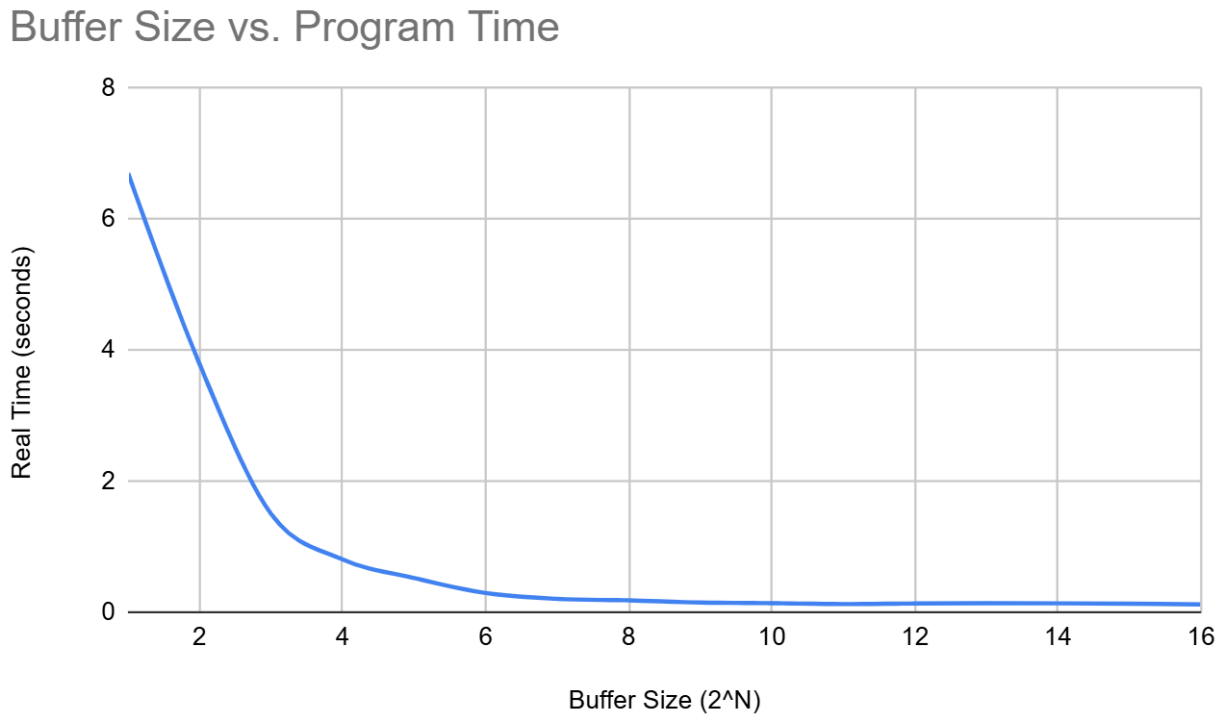
```
(base) tunabeluga@ANDREWTUNA:~/ECE357/ece357/pset01$ time ./tabstop -b 2048 -o output.txt fat_random_tabs.txt

real    0m0.124s
user    0m0.101s
sys     0m0.025s
(base) tunabeluga@ANDREWTUNA:~/ECE357/ece357/pset01$ time ./tabstop -b 4096 -o output.txt fat_random_tabs.txt

real    0m0.132s
user    0m0.085s
sys     0m0.046s
(base) tunabeluga@ANDREWTUNA:~/ECE357/ece357/pset01$ time ./tabstop -b 8192 -o output.txt fat_random_tabs.txt

real    0m0.136s
user    0m0.107s
sys     0m0.035s
(base) tunabeluga@ANDREWTUNA:~/ECE357/ece357/pset01$ time ./tabstop -b 16384 -o output.txt fat_random_tabs.txt

real    0m0.135s
user    0m0.099s
sys     0m0.042s
(base) tunabeluga@ANDREWTUNA:~/ECE357/ece357/pset01$ time ./tabstop -b 32768 -o output.txt fat_random_tabs.txt

real    0m0.129s
user    0m0.109s
sys     0m0.024s
(base) tunabeluga@ANDREWTUNA:~/ECE357/ece357/pset01$ time ./tabstop -b 65536 -o output.txt fat_random_tabs.txt

real    0m0.119s
user    0m0.088s
sys     0m0.035s
```

Data Table:

Buffer Size (Bytes)	Real Time (Seconds)
1	14.231
2	6.704
4	3.789
8	1.5
16	0.804
32	0.521
64	0.292
128	0.203
256	0.180
512	0.147

1024	0.137
2048	0.124
4096	0.132
8912	0.136
16384	0.135
32760	0.129
65536	0.119

Graph Representation:



Explanation: The table and graph exhibits a decrease in running time as buffer size increases. More specifically, initial buffer size increases halved the running time of the program until buffer size reached 64 bytes where the drop off time began to taper off. When the buffer had size of 2048, the decreasing behavior paused and further runtimes fluctuated within 0.01s. This suggests that the running times roughly converged depending on the buffer size. At this point, the bottleneck becomes the I/O throughput compared to the overhead from system calls in the runtime of this program.