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In order to test our program thoroughly, we first took a large text file (10,000,000 bytes) containing 10,000,000 random characters and compressed it. Click **here** for the link to the file.

We achieved the following results using threads and processes:

Number of Parts	Initial Size	Final Size
1	10,000,000 bytes	• 9,873,464 bytes
2	10,000,000 bytes	• 4,936,827 bytes • 4,936,637 bytes
4	10,000,000 bytes	• 2,468,217 bytes • 2,468,610 bytes • 2,468,318 bytes • 2,468,319 bytes

In the same way, we split the output into 8, 16, 32, and 64 files. The program behaved as expected and the output files and their sizes consistently added up to 9,873,464 bytes.

The following is the comparison for the time it took to execute the same task with threads:

Note: The tests were performed on the machine **grep.cs.rutgers.edu**

Thread:

Number of Parts	Test #1 Time (Seconds)	Test #2 Time (Seconds)	Test #3 Time (Seconds)	Test #4 Time (Seconds)	Test #5 Time (Seconds)	Average Time (Seconds)
1	1.79	2.1	1.78	1.77	1.76	1.84
2	1.77	2.4	1.85	1.79	1.79	1.92
4	2.76	2.52	2.67	2.43	2.38	2.552
8	2.68	2.61	2.71	2.72	2.6	2.664
16	2.72	2.73	2.91	2.73	2.73	2.764
32	2.74	2.73	2.74	2.74	2.74	2.738
64	2.76	2.79	2.76	2.74	2.76	2.762

The following is the comparison for the time it took to execute the same task with threads vs processes:

Note: The tests were performed on the machine **grep.cs.rutgers.edu**

Process:

Number of Parts	Test #1 Time (Seconds)	Test #2 Time (Seconds)	Test #3 Time (Seconds)	Test #4 Time (Seconds)	Test #5 Time (Seconds)	Average Time (Seconds)
1	1.12	1.14	1.11	1.13	1.11	1.122
2	1.24	1.12	1.15	1.61	1.12	1.248
4	1.6	1.8	1.63	1.75	1.71	1.698
8	1.95	1.96	1.88	1.98	1.94	1.942
16	1.91	1.93	1.94	1.9	1.92	1.92
32	1.74	1.8	1.73	1.74	1.79	1.76
64	1.38	1.46	1.41	1.48	1.42	1.43

The following is the comparison for the time it took to execute the same task with threads vs processes:

Note: The tests were performed on the machine **grep.cs.rutgers.edu**

Thread vs Process

Number of Parts	Time it took using Thread	Time it took using Process
1	1.84 seconds	1.122 seconds
2	1.92 seconds	1.248 seconds
4	2.552 seconds	1.698 seconds
8	2.664 seconds	1.942 seconds
16	2.764 seconds	1.92 seconds
32	2.738 seconds	1.76 seconds
64	2.762 seconds	1.43 seconds

Conclusions: We notice that spawning processes to accomplish the task is generally faster than using threads.