**Table 1: Time vs. number of buffers where sem S is off, shared bufsize is 128b and filesize is 800kb**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **# of buffers** | **Trial 1 (us)** | **Trial 2 (us)** | **Trial 3 (us)** | **Average (us)** |
| **10** | 69921 | 70078 | 70193 | 70064 |
| **20** | 70192 | 70186 | 70139 | 70172 |
| **40** | 70043 | 70113 | 70183 | 70113 |
| **100** | 69900 | 69854 | 70420 | 70058 |
| **150** | 70136 | 70085 | 70033 | 70085 |

Figure 1: Time vs. number of buffers where sem S is off

In the tests above, the number of buffers was varied and the resulting completion time was recorded. Three trials were performed in order to reduce the impact of outliers. Trial 3 when buffer size is 100, is probably an outlier because it doesn’t correspond with the rest of the values. Since the variation in times around 600us, it is hard to tell whether 100 buffers is truly an optimal number of buffers.

**Table 2: Time vs. shared buffer size where sem S is off, # of buffers is 100, filesize is 800kb**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **bufsize (b)** | **Trial 1 (us)** | **Trial 2 (us)** | **Trial 3 (us)** | **Average (us)** |
| **128** | 70042 | 70031 | 70036 | 70036 |
| **256** | 69881 | 69868 | 69738 | 69829 |
| **512** | 69654 | 69647 | 69476 | 69592 |

Figure 2: Time vs. shared buffer size where sem S is off

In the tests above, the shared buffer size is being changed from 128b, to 256b, to 512b. The resulting completion time is being measured. Figure 2 shows that as the shared memory buffer size increases, the time decreases. This makes sense, since a larger buffer size means less # of writes and reads to shared memory. Since the shared memory operations are in the CS, this also means a lower number of CS entries and thus, less synchronization.

**Table 3: Time vs. number of buffers where sem S is on, shared bufsize is 128b and filesize is 800kb**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **# of buffers** | **Trial 1 (us)** | **Trial 2 (us)** | **Trial 3 (us)** | **Average (us)** |
| **10** | 70760 | 72198 | 71479 | 71479 |
| **20** | 70681 | 70580 | 70610 | 70624 |
| **50** | 71446 | 71297 | 70751 | 71165 |
| **100** | 71335 | 70962 | 70410 | 70902 |
| **150** | 71096 | 70534 | 71658 | 71096 |

Figure 3: Time vs. number of buffers where sem S is on

The test above is for changing the number of buffers when semaphore S is being used. Once again, there is no strong correlation between number of buffers and the execution speed. In comparison to Figure 1, where the same test is being performed except sem S is off, the execution times are slower when sem S is being used. The range for without sem S is 69800us to 70400us whereas with sem S, the range is 70400us to 72200us. Throughout the tests, using the extra semaphore S is always slower, by an average of 955us.

**Table 4: Time vs. shared buffer size where sem S is on, # of buffers is 100, filesize is 800kb**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **bufsize (b)** | **Trial 1 (us)** | **Trial 2 (us)** | **Trial 3 (us)** | **Average (us)** |
| **128** | 70527 | 71036 | 71396 | 70986 |
| **256** | 69813 | 69967 | 69659 | 69813 |
| **512** | 69617 | 69838 | 69598 | 69684 |

Figure 4: Time vs. shared buffer size where sem S is on

The test above monitors the change in completion time as the shared buffer size changes. Once again, an increase in buffer size is correlated to a faster completion time, although the effect is less pronounced once the buffer is around 300b. In comparison to Figure 2, where semaphore S is off, both tests have minimums which are similar, however their maximums are very different. The average when semaphore S is being used is 70161us, whereas the average when semaphore S is not being used is 69819us. Clearly the semaphore slows down the processing time slightly, however, not as much as the comparison between Figure 1 and Figure 3.

**Table 5: Time vs. file size where number of buffers is 100, shared buffer size is 128b and sem S is on**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **file size (kb)** | **Trial 1 (us)** | **Trial 2 (us)** | **Trial 3 (us)** | **Average (us)** |
| **10** | 2320 | 2644 | 2191 | 2385 |
| **100** | 12693 | 12522 | 12308 | 12508 |
| **500** | 48021 | 48171 | 47647 | 47946 |
| **1000** | 92468 | 92267 | 93081 | 92605 |
| **2000** | 181525 | 181443 | 181798 | 181589 |

Figure 5: Time vs file size where sem S is on

For the fifth test, the file size was varied and the completion time was observed. Figure 5 shows an extremely strong positive correlation between file size and completion time. This is because longer files simply take longer to copy over. This also explains why the correlation appears linear; because every extra bit increases the completion time by a constant amount.