

Programming Assignment 1 Report

Producer Consumer Problem using Semaphores and Spinlocks

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AIM

To solve the bounded buffer producer-consumer problem on kernel threads using spinlocks and semaphores and compare their performance.

PROCEDURE

1. Implement bounded buffer kernel threads for producer consumer problem using semaphores and then using spinlocks.
2. Store the output data of the average time consumed by producers and consumers in each of the program, change tp and tc to repeat this step many times. Take tp,tc such their ratio are 10 , 8 , .. , 2 , 1 , 0.1 ,..., 0.6 , 0.8
3. Draw graph of the results.

Graph Analysis

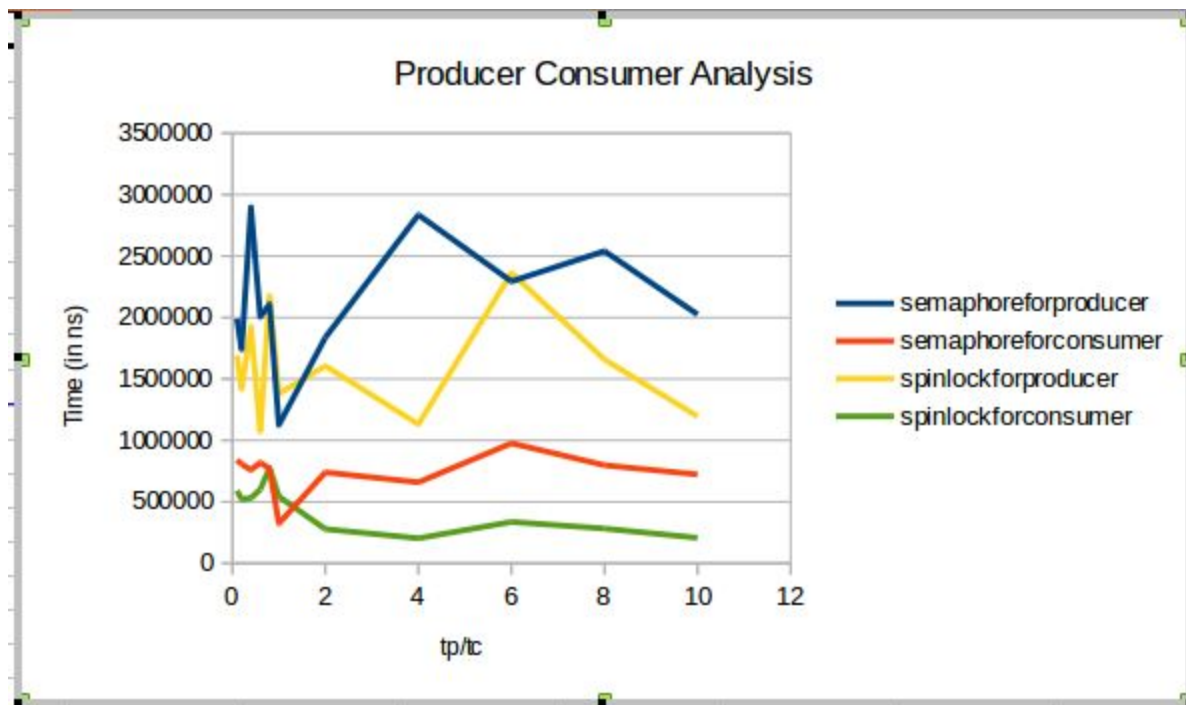


Figure 1: Producer Consumer Analysis using semaphore and spinlock.

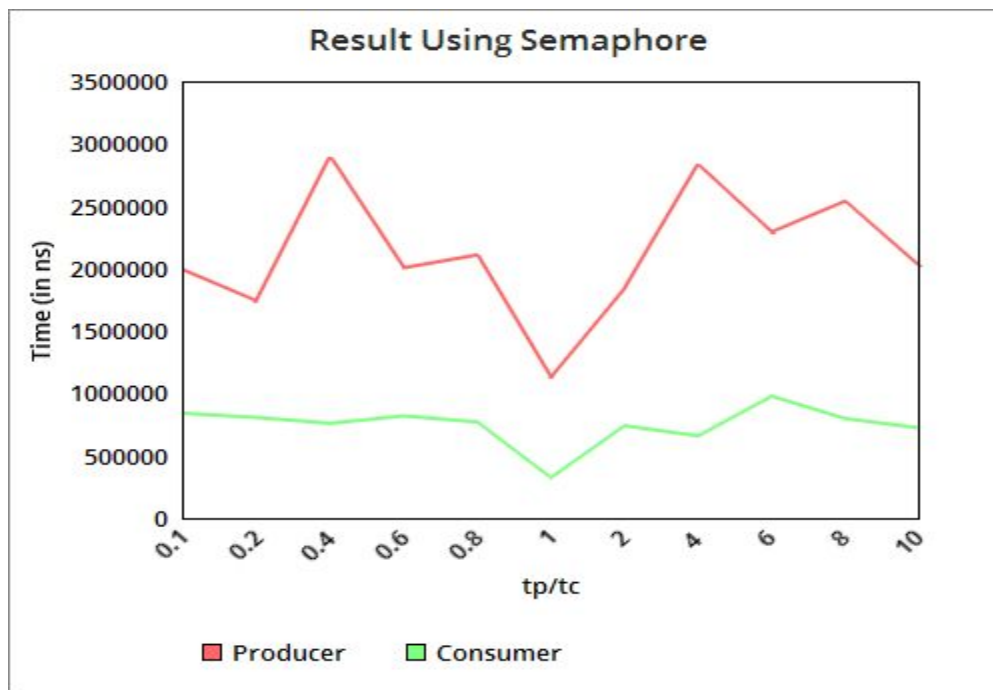


Figure 2: Average time consumed by producer and consumer using Semaphore.

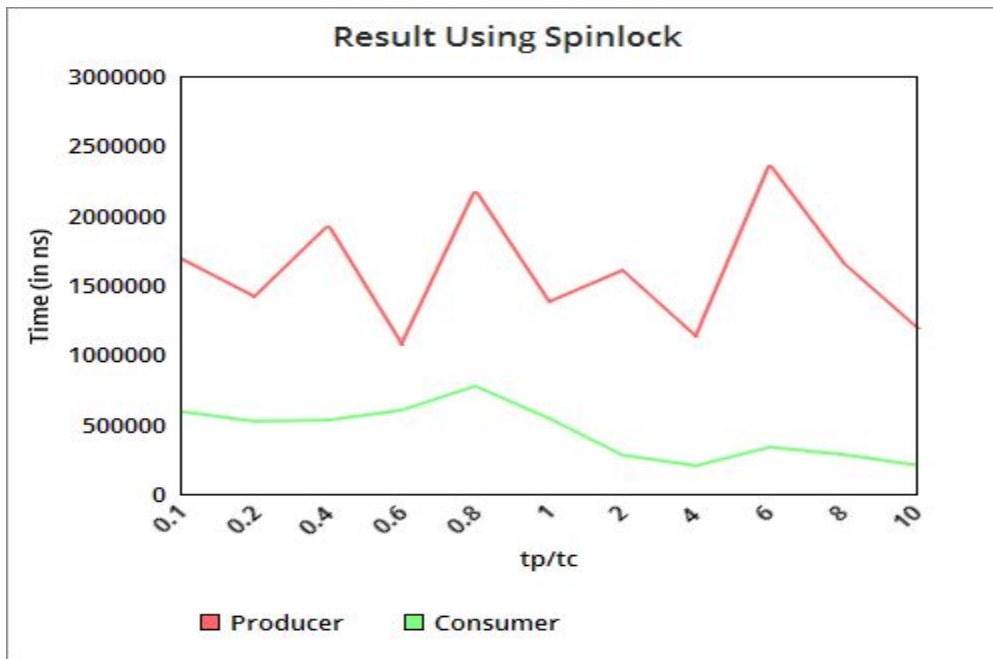


Figure 3: Average time consumed by producer and consumer using Spinlock.

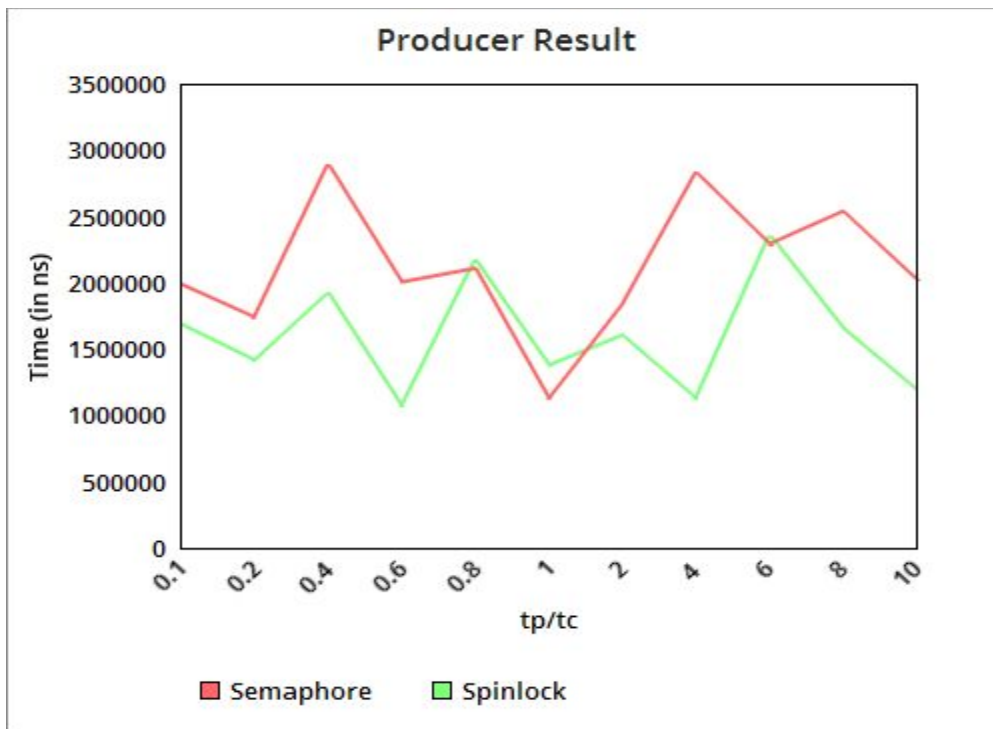


Figure 4: Average time consumed by producer.

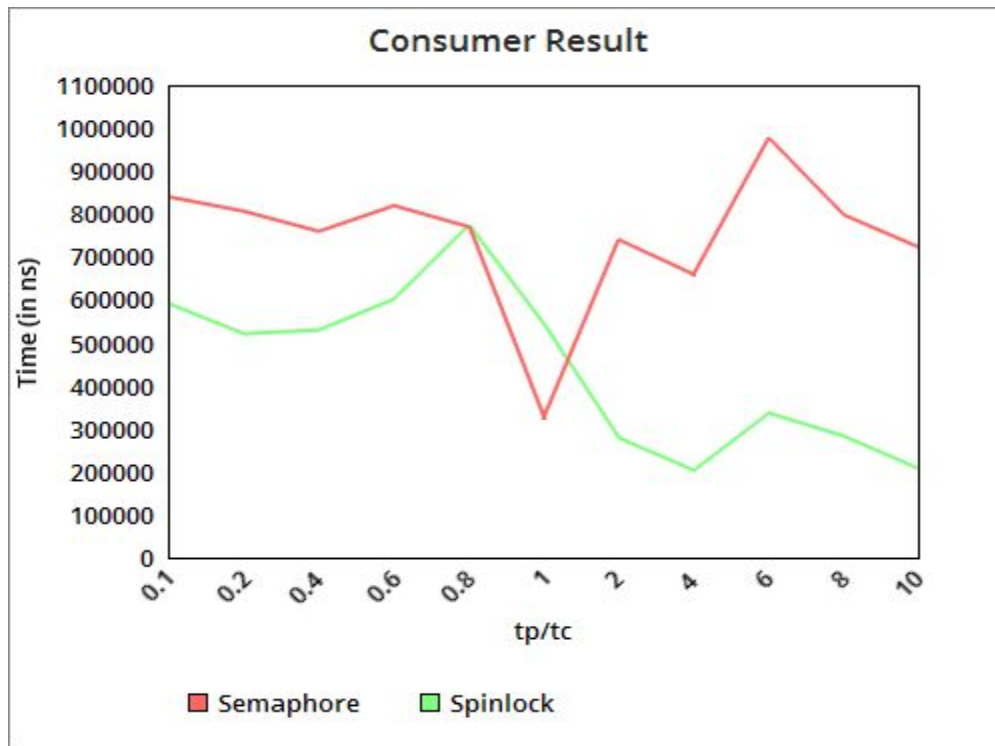


Figure 5: Average time consumed by consumer.

Findings/ Results

1. From figure 4 and 5, we can safely say that in the above data, Spinlock is performing better than Semaphore in implementing bounded buffer producer consumer problem for both producer and consumer.
2. There is only one anomaly in figure 4 and 5 where tp/tc equals 1, in this scenario Semaphore is better performing than Spinlock in implementing bounded buffer producer consumer problem.
3. From figure 2 and 3, we can safely say that average time for consumer to consume is less than the average time for producer to produce in both cases.

CONCLUSION

So we can say for low overhead locking and for short lock hold time Spinlocks are more preferred than Semaphores in kernel design. Spinlocks take less time to execute than Semaphores.