

CS3523 : Assignment - 3 Report

CO23BTECH11006

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1 Results

1.1 1.

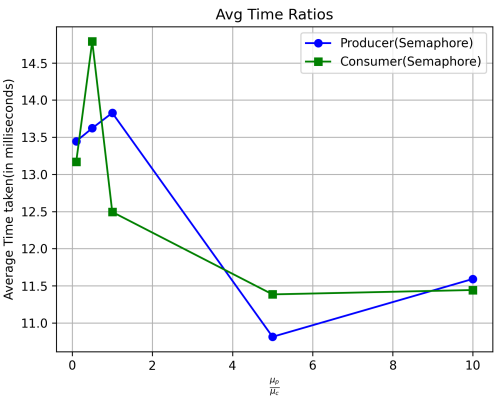


Figure 1: Delay ratio for semaphores

1.2 2.

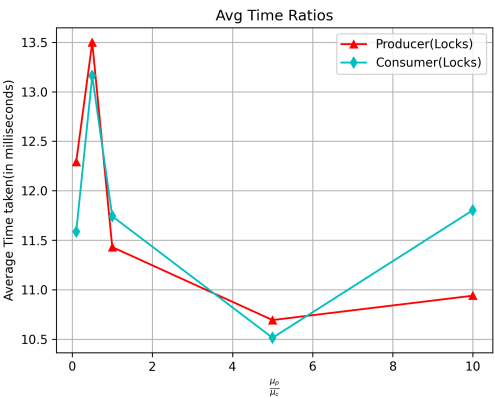


Figure 2: Delay ratio for locks and condition variable

1.3 3.

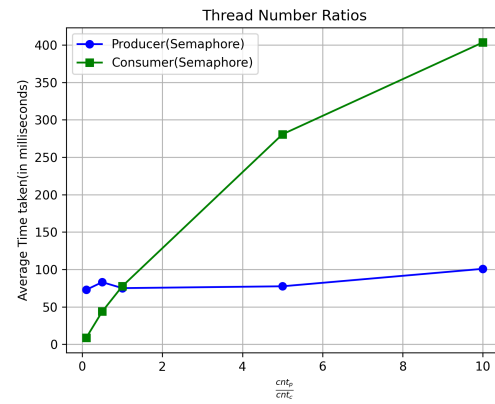


Figure 3: Thread Number ratio for semaphores

1.4 4.

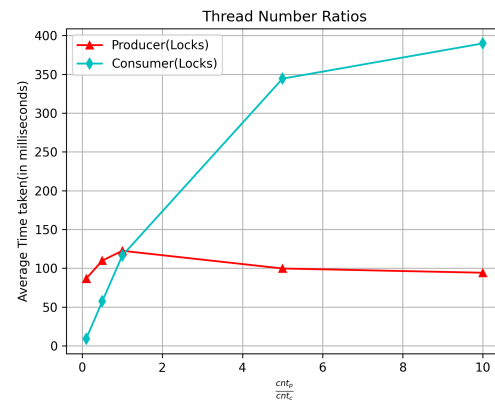


Figure 4: Thread Number ratio for locks and condition variables

2 Observation

2.1 Disclaimer

The above plots for producers are near constant since the varied values are the consumer metrics.

2.2 Delay Ratio

The reason for the curvature seen in the plot is caused by the input values taken for the ration, The μ_p value for the producers are fixed at 10ms, the μ_c using the ratio and μ_p is be $\frac{\mu_p}{ratio}$. This means that as the ratio increases, the μ_c value decreases.

- From the above explanation, the plot is decreasing exponentially as the ratio increases, or in another sense, the values are exponentially decreasing as μ_c decreases.
- This might be caused by the distribution we are taking for the ‘delay’ parameter. In this case, we are taking exponential distribution for the ‘delay’ parameter, and this is visible in the plot.
- There is another observation which can be viewed in the plot that is both producers and consumers are following the same plot even though the value is only being varied for consumers.
- This is caused by the implementation producers and consumers using both semaphores and conditional variables, since both producers and consumers have to wait for each other, i.e. the ‘Delay’ parameter chosen for producer will affect consumer and vise-versa.

2.3 Thread Number Ratio

Since the producer’s values are constant, we will see the relation of consumers to the producers.

From plot 4 and 3,

- We can observe that the plot for both the lock and semaphore implementation are increasing as the ratio $\frac{cnt_p}{cnt_c}$ increases.
- We can also observe the plot is increasing near linear for both semaphores and locks, we can predict this since as we increase the $cnt_{p/c}$ the wait time for each thread is increased.
- The difference in the type of curve between semaphore and locks can be explained through the different implementation of bounded buffer in semaphore and conditional variables.