Real Time Embedded Systems-1st assignment

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Objective

The objective of this assignment is to count the time between the insertion of an object in the FIFO queue by the "producer" thread and its extraction by the "consumer" thread without executing the function pointer.For a big number of loops,the optimal number of consumer-threads, that minimizes the average waiting time, needs to be found as well.

Experiments

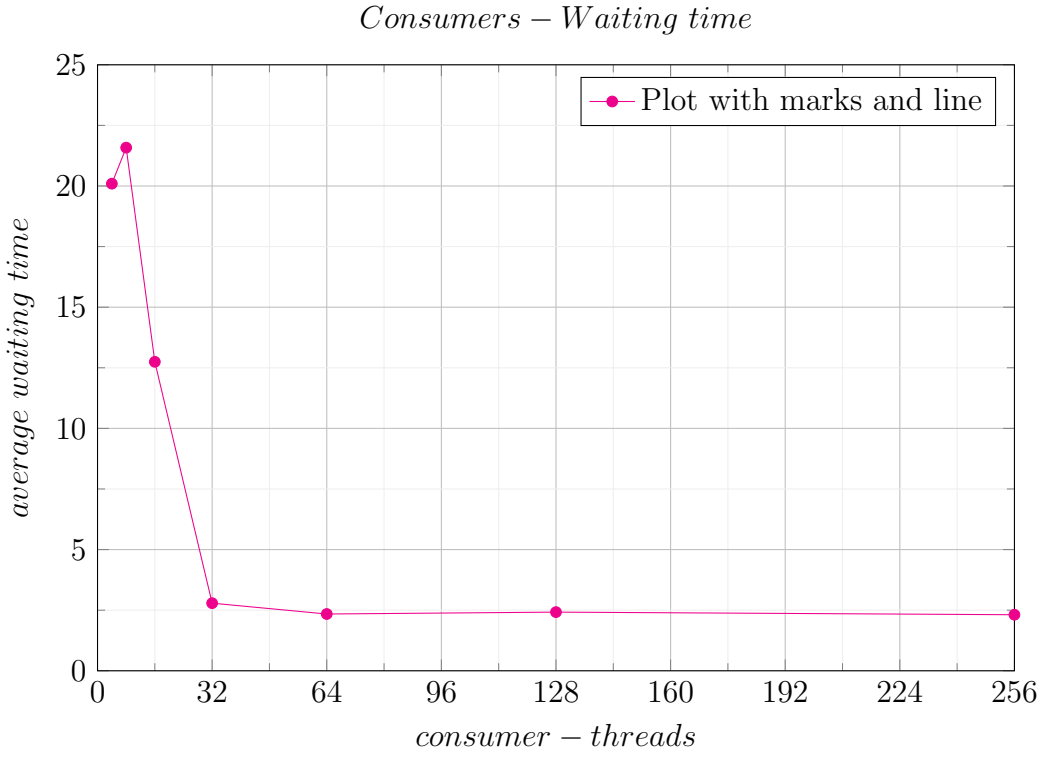
The experiments were executed in an AMD Ryzen 7 5800H, 3200.000 MHz. In order to stabilize the measurements, the number of loops was set at 100000.

Observations

In the beginning the number of consumer-threads was kept stable and the number of producer-threads was given different values. While the number of consumer-threads was bigger than the number of producer-threads the average waiting time was very big. Keeping the producer-threads stable and giving bigger numbers to the consumer-threads an optimization of the average waiting time was observed. What needs to be underlined is that the best average waiting time is notified for a number of consumer-threads that is 16 times bigger than the number of producer-threads.

Plots

Producer-Threads = 16(stable).



Conclusion

To sum up, by increasing the number of producer-threads the FIFO queue, most of the times, is full and as a result the average waiting increases. On the contrast, by keeping the number of consumer-threads 16 times bigger than the number of producer-threads makes the FIFO queue, most of the times, empty and so the waiting time decreases.