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Gr 933

Lab 6 – Parallelizing techniques

1. The regular $O(n^2)$ algorithm

This algorithm has been done simply by applying the formula: sol[i+j] += a[i] * b[j]

The synchronization method used in this algorithm for the threaded version was simply by launching a thread for each element of the solution to be calculated, using a mutex, locking it before calculating the coefficient of the solution polynomial & unlocking it after it was calculated.

2. Karatsuba algorithm

This algorithm is run similarly to the divide & conquer algorithm, in the way that the polynomials are divided into smaller parts, lowering the number of multiplications to be done.

The only synchronization done in this algorithm is joining all the threads at the end, before copying the obtained results in the vector that represents the coefficients of the resulting polynomial.

On a polynomial of degree 1000, the following times were obtained:

Karatsuba: 0.124505 seconds

Karatsuba (threaded): 0.0773223 seconds

Regular: 0.0114967 seconds

Regular (threaded): 0.056574 seconds