**PDP Lab. 5**

**-documentation-**

**Algorithms:**

* All algorithms use divide and conquer for computing the result of multiplication of two polynomials of same size s=2^n, for every n ϵ N\* .
* The sequential ones call a recursive function for multiplying one of the 4 products using the regular algorithm or one of the 3 products using the Karatsuba algorithm.
* The parallel ones launch a new thread responsible of multiplying one of the 4 products using the regular algorithm or one of the 3 products using the Karatsuba algorithm.

**Synchronization:**

* In order to synchronize the parallel algorithms, the thread starting the other threads responsible for computing the products will join them.

**Performance:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| First Pol. | Second Pol. | Result Pol. | Sequential | Parallel | Karatsuba Seq. | Karatsuba Par. |
| 1\*x^0 | 2\*x^0 | 2\*x^0 | 1222099 | 2563000 | 813999 | 1559900 |
| 1\*x^1+2\*x^0 | 3\*x^1+4\*x^0 | 3\*x^2+10\*x^1+8\*x^0 | 1548300 | 2890500 | 218599 | 1937700 |
| 1\*x^3+2\*x^2+3\*x^1+4\*x^0 | 5\*x^3+6\*x^2+7\*x^1+8\*x^0 | 5\*x^6+16\*x^5+34\*x^4+60\*x^3+61\*x^2+52\*x^1+32\*x^0 | 344499 | 5326799 | 446200 | 3033600 |
| 1\*x^7+2\*x^6+3\*x^5+4\*x^4+5\*x^3+6\*x^2+7\*x^1+8\*x^0 | 9\*x^7+10\*x^6+11\*x^5+12\*x^4+13\*x^3+14\*x^2+15\*x^1+16\*x^0 | 9\*x^14+28\*x^13+58\*x^12+100\*x^11+155\*x^10+224\*x^9+308\*x^8+408\*x^7+427\*x^6+428\*x^5+410\*x^4+372\*x^3+313\*x^2+232\*x^1+128\*x^0 | 828401 | 19563800 | 840399 | 6849400 |