Activity 1. Factor 1: problem size

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | 10000 | 20000 | 40000 | 80000 | 160000 | 320000 | 640000 |
| PC1 | 1556 ms | 6393 ms | 25789 ms | OoT | OoT | OoT | OoT |

Activity 2. Factor 2: computer performance

PC1: RAM (16,0 GB), CPU (12th Gen Intel(R) Core (TM) i5-12400 2.50 GHz)

PC2: RAM (16,0 GB), CPU (AMD Ryzen 5 3600 6-Core Processor 3.59 GHz)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | 10000 | 20000 | 40000 | 80000 | 160000 | 320000 | 640000 |
| PC1 | 1556 ms | 6393 ms | 25789 ms | OoT | OoT | OoT | OoT |
| PC2 | 2397 ms | 9743 ms | 39325 ms | OoT | OoT | OoT | OoT |

Activity 3. Factor 3: implementation enviroment

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | 10000 | 20000 | 40000 | 80000 | 160000 | 320000 | 640000 |
| PY | 1556 ms | 6393 ms | 25789 ms | OoT | OoT | OoT | OoT |
| Java | 452 ms | 1668 ms | 6210 ms | 26723 ms | OoT | OoT | OoT |

Activity 4. Factor 4: algorithm that is used

Python:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | 10000 | 20000 | 40000 | 80000 | 160000 | 320000 | 640000 |
| PYA1 | 1556 ms | 6393 ms | 25789 ms | OoT | OoT | OoT | OoT |
| PYA2 | 319 ms | 1208 ms | 4461 ms | 16483 ms | 59909 ms | OoT | OoT |
| PYA3 | 138 ms | 529 ms | 2070 ms | 7618 ms | 28219 ms | OoT | OoT |

Java without optimization (DJava.compilation=NONE):

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | 10000 | 20000 | 40000 | 80000 | 160000 | 320000 | 640000 |
| JA1 | 452 ms | 1668 ms | 6210 ms | 26723 ms | OoT | OoT | OoT |
| JA2 | 191 ms | 795 ms | 3155ms | 12921 ms | 50757 ms | OoT | OoT |
| JA3 | 121 ms | 483 ms | 1984 ms | 8279 ms | 33899 ms | OoT | OoT |

Java with optimization:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | 10000 | 20000 | 40000 | 80000 | 160000 | 320000 | 640000 |
| JA1 | 175 ms | 693 ms | 2776 ms | 11128 ms | 44538 ms | OoT | OoT |
| JA2 | 4 ms | 1 ms | 2 ms | 1 ms | 2 ms | 2 ms | 9 ms |
| JA3 | 3 ms | 1 ms | 2 ms | 1 ms | 2 ms | 3 ms | 10 ms |

Conclusion :

What we can see with the results obtained is that when we run the algorithms in python is slower than java, even if we set the compiler to none in java. The main time difference is when we use java with the compiler. This is due to some functions of the compiler that when you are not storing results as we are doing here, that code is not run so we get the absurd times lower than 10ms.