Activity 2. Factor 1: problem size

RAM: 16 GB

CPU: 13th Gen Intel(R) Core(TM) i7-13700H 2.40 GHz

N = 10000

|  |  |
| --- | --- |
| N | Time |
| 10000 | 5 038 |
| 20000 | 21 625 |
| 40000 | 80 944 |
| 80000 | OoT |
| 160000 | OoT |
| 320000 | OoT |
| 640000 | OoT |

Activity 3. Factor 2: computer performance

RAM: 8 GB

CPU: Intel Core i7-4790 3.6 GHz

|  |  |
| --- | --- |
| N | Time |
| 10000 | 2 427 |
| 20000 | 9 693 |
| 40000 | 39 743 |
| 80000 | OoT |
| 160000 | OoT |
| 320000 | OoT |
| 640000 | OoT |

Activity 4. Factor 3: implementation environment

|  |  |  |
| --- | --- | --- |
| N | Time Java | Time Python |
| 10000 | 236 | 5 038 |
| 20000 | 1 014 | 21 625 |
| 40000 | 3 748 | 80 944 |
| 80000 | 14 555 | OoT |
| 160000 | 59 053 | OoT |
| 320000 | OoT | OoT |
| 640000 | OoT | OoT |

The times in Java are significantly better than those in Python as Java has built-in improvements

Activity 4. Factor 4: algorithm that is used

|  |  |  |  |
| --- | --- | --- | --- |
| N | Time PythonA1 | Time PythonA2 | Time PythonA3 |
| 10000 | 5 038 | 583 | 314 |
| 20000 | 21 625 | 224 | 1 114 |
| 40000 | 80 944 | 8 332 | 4 436 |
| 80000 | OoT | 28 635 | 1 5780 |
| 160000 | OoT | 118 877 | 5 3554 |
| 320000 | OoT | OoT | OoT |
| 640000 | OoT | OoT | OoT |

With optimizations

|  |  |  |  |
| --- | --- | --- | --- |
| N | Time JavaA1 | Time JavaA2 | Time JavaA3 |
| 10000 | 236 | 34 | 19 |
| 20000 | 1 014 | 101 | 5 |
| 40000 | 3 748 | 380 | 18 |
| 80000 | 14 555 | 1 582 | 737 |
| 160000 | 59 053 | 5 314 | 284 |
| 320000 | OoT | 19 479 | 10 017 |
| 640000 | OoT | 71 953 | 36 711 |

Without optimizations

|  |  |  |  |
| --- | --- | --- | --- |
| N | Time JavaA1 | Time JavaA2 | Time JavaA3 |
| 10000 | 1 035 | 118 | 78 |
| 20000 | 4 502 | 429 | 243 |
| 40000 | 17 162 | 1 885 | 975 |
| 80000 | 68 037 | 6 664 | 3 635 |
| 160000 | OoT | 23 458 | 13 225 |
| 320000 | OoT | 85 645 | 46 958 |
| 640000 | OoT | OoT | OoT |

The optimizations can be seen perfectly, as for example for an N of 80000 times without optimizations are more or less 6 times slower than times with optimizations