Activity 1 Factor 1: problem size

|  |  |
| --- | --- |
| nSize | Time(ms) |
| 10000 | 1602 |
| 20000 | 6495 |
| 40000 | 25961 |
| 80000 | OoT |
| 16000 | OoT |
| 32000 | OoT |
| 64000 | OoT |

Activity 2. Factor 2 Measuring in a different device

Specifications of the computer: 13th Gen Inter(R) Core i5-1335U, 16 GB RAM

|  |  |  |  |
| --- | --- | --- | --- |
| nSize | Time(ms) PC P1 | Time(ms) Class comp. P2 | P2 – P1  (ms) |
| 10000 | 1427 | 1602 | 175 |
| 20000 | 5641 | 6495 | 854 |
| 40000 | 22704 | 25961 | 3257 |
| 80000 | OfT | OoT | OoT |
| 16000 | OfT | OoT | OoT |
| 32000 | OfT | OoT | OoT |
| 64000 | OfT | OoT | OoT |

Summing up, the first computer is faster than the second.

Activity 3. Factor 3 implementation evironment

|  |  |  |  |
| --- | --- | --- | --- |
| nSize | Time java(ms) | Time python(ms) | Python - Java |
| 10000 | 50 | 1427 | 1377 |
| 20000 | 161 | 5641 | 5480 |
| 40000 | 505 | 22704 | 22199 |
| 80000 | 1873 | OoT | OoT |
| 16000 | 7497 | OoT | OoT |
| 32000 | 29982 | OoT | OoT |
| 64000 | OfT | OoT | OoT |

Java is faster than Python because it is a compiled language with optimization, while Python is interpreted. It is easy to see how, with the same algorithms, Java outperforms Python by far.

Activity 4. Factor 4: algorithm that is used

A2 python

|  |  |
| --- | --- |
| nSize | Time(ms) |
| 10000 | 160 |
| 20000 | 569 |
| 40000 | 2077 |
| 80000 | 7940 |
| 16000 | OfT |
| 32000 | OfT |
| 64000 | OfT |

A3 python

|  |  |
| --- | --- |
| nSize | Time(ms) |
| 10000 | 77 |
| 20000 | 282 |
| 40000 | 1076 |
| 80000 | 3959 |
| 16000 | 15665 |
| 32000 | OfT |
| 64000 | OfT |

A2 Without Optimization

|  |  |
| --- | --- |
| nSize | Time(ms) |
| 10000 | 35 |
| 20000 | 135 |
| 40000 | 511 |
| 80000 | 1775 |
| 16000 | 6843 |
| 32000 | 27442 |
| 64000 | OfT |

A2 Java With Optimization

|  |  |
| --- | --- |
| nSize | Time(ms) |
| 10000 | 11 |
| 20000 | 31 |
| 40000 | 118 |
| 80000 | 459 |
| 16000 | 1545 |
| 32000 | 5746 |
| 64000 | 22762 |

A3 Java Without Optimization

|  |  |
| --- | --- |
| nSize | Time(ms) |
| 10000 | 21 |
| 20000 | 76 |
| 40000 | 288 |
| 80000 | 1041 |
| 16000 | 3915 |
| 32000 | 14599 |
| 64000 | 55011 |

A3 Java With Optimization

|  |  |
| --- | --- |
| nSize | Time(ms) |
| 10000 | 7 |
| 20000 | 15 |
| 40000 | 56 |
| 80000 | 226 |
| 16000 | 756 |
| 32000 | 2884 |
| 64000 | 10722 |

After all, one can see the big differences that come along with the algorithm that is being used. When the algorithm has a lower complexity, the times don’t grow as much as they would do if they had higher complexities. Also, optimizations done by the compiler in languages such as java play a really important role in improving time. Lastly, the chosen programming language is crucial when it comes to speed, e.g., Python is much slower than Java.