Activity 1. Factor 1 (Problem size)

|  |  |
| --- | --- |
| Python A1 | |
| **n** | **Ex. Time (ms)** |
| 10000 | 1936 |
| 20000 | 7757 |
| 40000 | 30641 |
| 80000 | OoT |
| 160000 | OoT |
| 320000 | OoT |
| 640000 | OoT |

|  |  |  |
| --- | --- | --- |
|  | Python A1 Computer 1 | Python A1 Computer 2 |
| **n** | **Ex. Time C1 (ms)** | **Ex. Time C2 (ms)** |
| 10000 | 1936 | 1223 |
| 20000 | 7757 | 4926 |
| 40000 | 30641 | 19633 |
| 80000 | OoT | OoT |
| 160000 | OoT | OoT |
| 320000 | OoT | OoT |
| 640000 | OoT | OoT |

Activity 2. Factor 2 (Computer power)

* **Computer 1 specs:** 
  + 13th Gen Intel(R) Core(TM) i7-1360P 2.20 GHz
  + 16GB Ram
* **Computer 2 specs:**
  + 12th Gen Intel(R) Core(TM) i7-12700KF 3.61GHz
  + 32GB Ram

Activity 3. Factor 3 (Implementation environment)

|  |  |
| --- | --- |
| Java A1 with JIT disabled | |
| **n** | **Ex. Time (ms)** |
| 10000 | 483 |
| 20000 | 1935 |
| 40000 | 7130 |
| 80000 | 29037 |
| 160000 | OoT |
| 320000 | OoT |
| 640000 | OoT |

The times achieved with Java implementation are faster than with Python, this is mainly due to Java’s compiled nature against Python’s interpreted execution.

Activity 4. Factor 4 (Algorithm that is used)

|  |  |  |  |
| --- | --- | --- | --- |
| Python Algorithms in Computer 1 | | | |
| **n** | **Ex. Time A1 (ms)** | **Ex. Time A2 (ms)** | **Ex. Time A3 (ms)** |
| 10000 | 1936 | 217 | 125 |
| 20000 | 7757 | 871 | 463 |
| 40000 | 30641 | 3208 | 1577 |
| 80000 | OoT | 11557 | 5989 |
| 160000 | OoT | 44389 | 22302 |
| 320000 | OoT | OoT | OoT |
| 640000 | OoT | OoT | OoT |

|  |  |  |  |
| --- | --- | --- | --- |
| Java Algorithms in Computer 1 with JIT disabled | | | |
| **n** | **Ex. Time A1 (ms)** | **Ex. Time A2 (ms)** | **Ex. Time A3 (ms)** |
| 10000 | 483 | 50 | 25 |
| 20000 | 1935 | 207 | 92 |
| 40000 | 7130 | 771 | 400 |
| 80000 | 29037 | 2757 | 1412 |
| 160000 | OoT | 10049 | 5119 |
| 320000 | OoT | 38454 | 20100 |
| 640000 | OoT | OoT | OoT |

|  |  |  |  |
| --- | --- | --- | --- |
| Java Algorithms in Computer 1 with JIT enabled | | | |
| **n** | **Ex. Time A1 (ms)** | **Ex. Time A2 (ms)** | **Ex. Time A3 (ms)** |
| 10000 | 98 | 12 | 6 |
| 20000 | 407 | 48 | 20 |
| 40000 | 1581 | 175 | 94 |
| 80000 | 6447 | 605 | 309 |
| 160000 | 25269 | 2261 | 1145 |
| 320000 | OoT | 8404 | 4268 |
| 640000 | OoT | 31719 | 15981 |

As said before Java executions times are always shorter than Python’s, even without JIT optimization, mainly because of their compiled vs interpreted natures but also because of memory management issues or Python’s higher level of abstraction.

It is important to remark the difference Java’s optimization implies, being even 4 times faster when JIT is enabled.