Execution times of PythonA1.py

|  |  |
| --- | --- |
| n | Time(s) |
| 10\_000 | 1’652 |
| 20\_000 | 6’811 |
| 40\_000 | 27’512 |
| 80\_000 | 110’921 |
| 160\_000 | 446’387 |
| 320\_000 | OT |
| 640\_000 | OT |

Factor 2: computer performance

|  |  |  |
| --- | --- | --- |
| n | CP1 Time(s) | CP2 Time(s) |
| 10\_000 | 1’652 | 3’087 |
| 20\_000 | 6’811 | 11’843 |
| 40\_000 | 27’512 | 48’527 |
| 80\_000 | 110’921 | 180’635 |
| 160\_000 | 446’387 | OT |
| 320\_000 | OT | OT |
| 640\_000 | OT | OT |

CP1 has an AMD Ryzen 7 4800H processor with 16GB of RAM installed. In the other hand the CP2 contains an Intel Core i7-4790 processor with 8GB of RAM

As evidenced by the Excel graphics, the performance of the computer shows a slight decline (more time per instruction) compared to the first one. This variance can be attributed to differences in processor performance for this specific task and the respective frequencies of each.

Factor 3: implementation environment (JavaA1)

|  |  |
| --- | --- |
| n | Time(s) |
| 10\_000 | 0’173 |
| 20\_000 | 0’679 |
| 40\_000 | 2’724 |
| 80\_000 | 10’863 |
| 160\_000 | 43’611 |
| 320\_000 | 174’703 |
| 640\_000 | OT |

Python A1 vs A2 vs A3:

|  |  |  |  |
| --- | --- | --- | --- |
| n | A1(s) | A2(s) | A3(s) |
| 10\_000 | 1’652 | 0’196 | 0’01 |
| 20\_000 | 6’811 | 0’737 | 0’04 |
| 40\_000 | 27’512 | 2’748 | 0’015 |
| 80\_000 | 110’921 | 10’257 | 0’063 |
| 160\_000 | 446’387 | 38’767 | 0’240 |
| 320\_000 | OT | 146’232 | 0’ 885 |
| 640\_000 | OT | OT | 3’332 |

Java A1 vs A2 vs A3 (without optimization)

|  |  |  |  |
| --- | --- | --- | --- |
| n | A1(s) | A2(s) | A3(s) |
| 10\_000 | 0’372 | 0’048 | 0’028 |
| 20\_000 | 1’551 | 0’167 | 0’104 |
| 40\_000 | 6’062 | 0’591 | 0’385 |
| 80\_000 | 24’806 | 2’263 | 1’455 |
| 160\_000 | 98’229 | 8’333 | 5’391 |
| 320\_000 | 387’927 | 31’394 | 20’128 |
| 640\_000 | OT | 119.194 | 76’811 |

Java A1 vs A2 vs A3 (with optimization)

|  |  |  |  |
| --- | --- | --- | --- |
| n | A1(s) | A2(s) | A3(s) |
| 10\_000 | 0’174 | 0,02 | 0,012 |
| 20\_000 | 0’679 | 0,073 | 0,038 |
| 40\_000 | 2’716 | 0,271 | 0,143 |
| 80\_000 | 10’863 | 1,008 | 0,524 |
| 160\_000 | 43’471 | 3,794 | 1,963 |
| 320\_000 | 173’844 | 14,309 | 7,399 |
| 640\_000 | OT | 54,079 | 27,965 |

The optimized form skips numerous unnecessary intermediate steps, resulting in significantly faster program execution.