Activity 2. Some iterative models

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| N | tLoop1 (10000) | tLoop2 (1000) | tLoop3 (100) | tLoop4 (100) |
| 100 | 0,0099 | 0,332 | 1,23 | 1,22 |
| 200 | 0,0204 | 1,52 | 4,99 | 8,97 |
| 400 | 0,0435 | 6,03 | 22,26 | 70,18 |
| 800 | 0,1061 | 29,23 | 94,39 | 557,89 |
| 1600 | 0,2997 | OoT | 437,45 | OoT |
| 3200 | 0,5002 | OoT | OoT | OoT |
| 6400 | 1,0283 | OoT | OoT | OoT |
| 12800 | 2,8690 | OoT | OoT | OoT |
| 25600 | OoT | OoT | OoT | OoT |
| 51200 | OoT | OoT | OoT | OoT |

As seen in the computing, the difference between the theoretical time and the real time progressively worsens as you go to worse complexities. That is that for Loop1 they are really similar and for Loop4 they are really far apart

Imagen que contiene Tabla

Descripción generada automáticamente

Activity 3. Creation of iterative models of a given time complexity

|  |  |  |  |
| --- | --- | --- | --- |
| N | tLoop5 (1000) | tLoop6 (100) | tLoop7 (10) |
| 100 | 0,174 | 1,16 | 32,7 |
| 200 | 0,544 | 7,00 | 466,4 |
| 400 | 1,708 | 54,39 | OoT |
| 800 | 6,504 | 413,30 | OoT |
| 1600 | 25,360 | OoT | OoT |
| 3200 | OoT | OoT | OoT |
| 6400 | OoT | OoT | OoT |

As can be seen in this, that they all have worse complexities than in the previous activity, the difference in the theoretical and measured times are really obvious

Imagen que contiene Tabla

Descripción generada automáticamente

Activity 4. Comparison of two algorithms

|  |  |  |  |
| --- | --- | --- | --- |
| N | tLoop1 (10000) | tLoop2 (1000) | t1/t2 |
| 100 | 0,0099 | 0,332 | 0,0298 |
| 200 | 0,0204 | 1,520 | 0,0134 |
| 400 | 0,0435 | 6,030 | 0,0072 |
| 800 | 0,1061 | 29,230 | 0,0036 |
| 1600 | 0,2997 | OoT | OoT |
| 3200 | 0,5002 | OoT | OoT |
| 6400 | 1,0283 | OoT | OoT |
| 12800 | 2,8690 | OoT | OoT |
| 25600 | OoT | OoT | OoT |
| 51200 | OoT | OoT | OoT |

All the ratios tend to 0 which means the complexity of Loop1 is better

Imagen que contiene Tabla

Descripción generada automáticamente

|  |  |  |  |
| --- | --- | --- | --- |
| N | tLoop3 (100) | tLoop2 (1000) | t3/t2 |
| 100 | 1,23 | 0,332 | 3,7048 |
| 200 | 4,99 | 1,520 | 3,2829 |
| 400 | 22,26 | 6,030 | 3,6915 |
| 800 | 94,39 | 29,230 | 3,2292 |
| 1600 | 437,45 | OoT | OoT |
| 3200 | OoT | OoT | OoT |
| 6400 | OoT | OoT | OoT |
| 12800 | OoT | OoT | OoT |
| 25600 | OoT | OoT | OoT |
| 51200 | OoT | OoT | OoT |

As their complexity is equal we have to compute its implementation constant which is greater than 1 which means that Loop2 is better

Imagen que contiene Tabla

Descripción generada automáticamente

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| N | tloop4 python | tloop4 java no | tloop4 java yes | no/python | yes/no |
| 200 | 6,148 | 8,97 | 0,1038 | 1,459 | 0,1157 |
| 400 | 53,473 | 70,18 | 0,6453 | 1,3124 | 0,0092 |
| 800 | 458,983 | 557,89 | 4,4478 | 1,2136 | 0,0080 |
| 1600 | OoT | OoT | 26,0689 | OoT | OoT |
| 3200 | OoT | OoT | OoT | OoT | OoT |
| 6400 | OoT | OoT | OoT | OoT | OoT |

As the implementation constant of no optimizations by python is greater than 1, we know that python is better

As the implementation constant of optimizations by no optimizations is smaller than 1, we know that java with optimizations is better