Activity 1. [Some iterative models]

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **N** | **tLoop1** | **tLoop2** | **tLoop3** | **tLoop4** |
| 100 | 0,052 | 0,051 | 0,053 | 0,050 |
| 200 | 0,104 | 0,192 | 0,213 | 0,36 |
| 400 | 0,218 | 0,905 | 0,914 | 2,782 |
| 800 | 0,518 | 4,112 | 5,170 | 22,021 |
| 1600 | 1,127 | 18,195 | 17,0 | Oot |
| 3200 | 2,376 | Oot | Oot | Oot |
| 6400 | 5,011 | Oot | Oot | Oot |
| 12800 | 12,584 | Oot | Oot | Oot |
| 25600 | 23,760 | Oot | Oot | Oot |
| 51200 | 51,520 | Oot | Oot | Oot |

Complexity:

Loop 1 (n^2 \* log^3(n))

Loop 2(log3(n) \* n^2)

Loop 3(n^2 \* log2(n))

Loop 4(n^3)

Activity 2. [Creation of iterative models]

|  |  |  |  |
| --- | --- | --- | --- |
| **N** | **tLoop5** | **tLoop6** | **tLoop7** |
| 100 | 0,054 | 0,049 | 0,066 |
| 200 | 0,261 | 0,398 | 0,974 |
| 400 | 1,323 | 4,306 | 14,026 |
| 800 | 6,525 | 37,874 | Oot |
| 1600 | 32,238 | Oot | Oot |
| 3200 | Oot | Oot | Oot |
| 6400 | Oot | Oot | Oot |

Complexity:

Loop 5 (O(n^2 \* log2n))

Loop 6 (O(n^3 \* log(n)))

Loop 7 (O(n^4))

Activity 3. [Comparison of two algorithms]

Loop1:

n time repetions counter

100 98 10000 603

200 204 10000 1340

400 435 10000 2937

800 1023 10000 6942

1600 2195 10000 14938

3200 4699 10000 32010

6400 10006 10000 68272

12800 22604 10000 153612

25600 47503 10000 324273

Loop2:

n time repetions counter

100 70 200 25500

200 254 200 101000

400 1306 200 482400

800 7801 200 2245600

1600 30609 200 8971200

The time of both loops is expressed in time(ms) per repetition

|  |  |  |  |
| --- | --- | --- | --- |
| **n** | **tLoop1** | **tLoolp2** | **t1/t2** |
| 100 | 0,0098 | 0,35 | 0,028 |
| 200 | 0,0204 | 1,27 | 0,016 |
| 400 | 0,0435 | 6,53 | 0,007 |
| 800 | 0,1023 | 39,005 | 0,003 |
| 1600 | 0,2195 | 153,045 | 0,0014 |
| 3200 | 0,4699 | Oot | Oot |
| 6400 | 1,0006 | Oot | Oot |
| 12800 | 2,2604 | Oot | Oot |
| 25600 | 4,7503 | Oot | Oot |

Activity 4. [Two algorithms with the same complexity]

Loop3:

n time repetions counter

100 126 100 71400

200 522 100 323200

400 2260 100 1447200

800 9799 100 6416000

1600 42127 100 28195200

3200 18088 100 122956800

Loop2:

n time repetions counter

100 70 200 25500

200 254 200 101000

400 1306 200 482400

800 7801 200 2245600

1600 30609 200 8971200

3200 4991 10 40985600

The time of both loops is expressed in time(ms) per repetition

|  |  |  |  |
| --- | --- | --- | --- |
| **n** | **L3** | **L2** | **t1/t2** |
| 100 | 1,26 | 0,35 | 3,6 |
| 200 | 5,22 | 1,27 | 4,11 |
| 400 | 22,6 | 6,53 | 3,46 |
| 800 | 97,99 | 39,005 | 2,51 |
| 1600 | 421,27 | 153,045 | 2,75 |
| 3200 | 1808,8 | 499,1 | 3,62 |

Activity 5. [Same algorithm in different development environments]

**Loop4 without optimizacion:**

n time repetions counter

100 50 40 171700

200 361 40 1353400

400 2775 40 10746800

800 21840 40 85653600

**Loop4 with optimizacion:**

n time repetions counter

100 227 10000 171700

200 1038 10000 1353400

400 6365 10000 10746800

800 44187 10000 85653600

**Loop4 python:**

TIME (milliseconds)

n= 100 \*\*time= 7 \*\*counter= 171700

n= 200 \*\*time= 107 \*\*counter= 1353400

n= 400 \*\*time= 413 \*\*counter= 10746800

n= 800 \*\*time= 3889 \*\*counter= 85653600

n= 1600 \*\*time= 28840 \*\*counter= 683947200

The time of all the loops is expressed in time(ms) per repetition

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **N** | **tLoop4 (Python)-t41** | **tLoop4(Java without optimization)–t42** | **tLoop4 Java with optimization) – t43** | **t42/t41** | **t43/t42** |
| 100 | 7 | 1,25 | 0,0227 | 0,178 | 0,018 |
| 200 | 107 | 9,025 | 0,1038 | 0,043 | 0.012 |
| 400 | 413 | 69,375 | 0,6365 | 0,168 | 0.009 |
| 800 | 3889 | 546 | 4,4187 | 0,140 | 0.008 |
| 1600 | 28840 | Oot | Oot | Oot | Oot |
| 3200 | Oot | Oot | Oot | Oot | Oot |
| 6400 | Oot | Oot | Oot | Oot | Oot |