


| Algorithmics | Student information | Date | Number of session |
|--------------|-----------------------|---|-------------------|
| | UO:UO294515 | 17/02/2025 | 3 |
| | Surname: López García |  Escuela de Ingeniería Informática Universidad de Oviedo | |
| | Name: Óscar | | |



Activity 1. [Some iterative models]

| N | tLoop1(ms) | tLoop2(ms) | tLoop3(ms) | tLoop4(ms) |
|-------|------------|------------|------------|------------|
| 100 | 0,0079 | 0,1647 | 0,87 | 0,656 |
| 200 | 0,0145 | 0,63 | 3,54 | 4,673 |
| 400 | 0,0347 | 2,89 | 14,83 | 34,37 |
| 800 | 0,0762 | 13,18 | 61,7 | 282 |
| 1600 | 0,1681 | 51,99 | 263,08 | 2127 |
| 3200 | 0,3434 | 234,62 | 1124 | 16729 |
| 6400 | 0,732 | 925 | 4634 | OoT |
| 12800 | 1,5905 | 4080 | 19921 | OoT |
| 25600 | 3,228 | 17878 | OoT | OoT |
| 51200 | 6,3315 | OoT | OoT | OoT |

| | tLoop1 | tLoop2 | tLoop3 | tLoop4 |
|--------------|------------------|-----------------|-----------------|----------|
| Complexities | $O(n \log(n^2))$ | $O(n^2 \log n)$ | $O(n^2 \log n)$ | $O(n^3)$ |

Activity 2. [Creation of iterative models of a given time complexity]

| N | tLoop5(ms) | tLoop6(ms) | tLoop7(ms) |
|------|------------|------------|------------|
| 100 | 0,411 | 4,67 | 17,9 |
| 200 | 1,722 | 36,80 | 246 |
| 400 | 7,532 | 312,01 | 3572 |
| 800 | 33,1 | 2718 | 54762 |
| 1600 | 143,3 | 23155 | OoT |

| Algorithmics | Student information | Date | Number of session |
|--------------|-----------------------|------------|-------------------|
| | UO:UO294515 | 17/02/2025 | 3 |
| | Surname: López García | | |
| | Name: Óscar | | |

| | | | |
|------|--------|-----|-----|
| 3200 | 631,9 | OoT | OoT |
| 6400 | 2728,5 | OoT | OoT |

Activity 3A. [Two algorithms with different complexity]

| N | tLoop1(ms) | tLoop2(ms) | t3/t2 |
|-------|------------|------------|------------|
| 100 | 0,0079 | 0,87 | 0,047966 |
| 200 | 0,0145 | 3,54 | 0,02301587 |
| 400 | 0,0347 | 14,83 | 0,01200692 |
| 800 | 0,0762 | 61,7 | 0,00578149 |
| 1600 | 0,1681 | 263,08 | 0,00323331 |
| 3200 | 0,3434 | 1124 | 0,00146364 |
| 6400 | 0,732 | 4634 | 0,00079135 |
| 12800 | 1,5905 | 19921 | 0,00038983 |
| 25600 | 3,228 | OoT | 0,00018056 |
| 51200 | 6,3315 | OoT | OoT |

They make sense as we know that the complexity of tLoop2 is greater than the one from tLoop1.

| Algorithmics | Student information | Date | Number of session |
|--------------|-----------------------|------------|-------------------|
| | UO:UO294515 | 17/02/2025 | 3 |
| | Surname: López García | | |
| | Name: Óscar | | |

Activity 3B. [Two algorithms with same complexity]

| N | tLoop2(ms) | tLoop3(ms) | T3/t2 |
|-------|------------|------------|------------|
| 100 | 0,1647 | 0,87 | 5,28233151 |
| 200 | 0,63 | 3,54 | 5,61904762 |
| 400 | 2,89 | 14,83 | 5,13148789 |
| 800 | 13,18 | 61,7 | 4,68133536 |
| 1600 | 51,99 | 263,08 | 5,06020389 |
| 3200 | 234,62 | 1124 | 4,79072543 |
| 6400 | 925 | 4634 | 5,00972973 |
| 12800 | 4080 | 19921 | 4,88259804 |
| 25600 | 17878 | OoT | OoT |
| 51200 | OoT | OoT | OoT |

They make sense as we know that the complexity of tLoop3 is greater than the one from tLoop2 because of the base of the logarithm.

Activity 3C. [Same algorithm in different development environments]

As I'm measuring times from a different computer, times will change.

| Algorithmics | Student information | Date | Number of session |
|--------------|-----------------------|------------|-------------------|
| | UO:UO294515 | 17/02/2025 | 3 |
| | Surname: López García | | |
| | Name: Óscar | | |

| n | tLoop4 (Python) – t41 | tLoop4 (Java without optimization) – t42 | tLoop4 (Java with optimization) – t43 | t42/t41 | t43/t42 |
|------|-----------------------|--|---------------------------------------|----------|------------|
| 200 | 50 | 10,2 | 0,98 | 0,204 | 0,09607843 |
| 400 | 425 | 74,6 | 6,75 | 0,175529 | 0,09048257 |
| 800 | 3222 | 589,6 | 49,52 | 0,182991 | 0,08398914 |
| 1600 | 29761 | 4714,9 | 375,6 | 0,158425 | 0,07966234 |
| 3200 | OoT | 37667,9 | 2940,3 | x | 0,07805850 |
| 6400 | OoT | OoT | 23113,6 | x | x |

They agree with what was expected, as the comparisons tend to zero because the time complexity of t42 is lower than t41, and t43 is lower than t42.