


Algorithmics	Student information	Date	Number of session
	UO:302165	6/02/2025	1.1
	Surname: Uña Garcia	 Escuela de Ingeniería Informática Universidad de Oviedo	
	Name: Lucas		



Activity 1. [Calculate years left with currentmillis]

As the method is returning a long value, it has a maximum size of **9223372036854775807** milliseconds from the January 1, 1970 so:

$9223372036854775807\text{ms} * 1\text{s}/1000\text{ms} * 1\text{h}/3600\text{s} * 1\text{day}/24\text{h} * 1\text{year}/365.25\text{days} = 292151043.2$ years from 1970.

$292151043.2 - (2025 - 1970) = 292150988.2$ years left nowadays

Activity 2. [Time reliability]

- Sometimes came out as 0 because the size of the problem is such small that the time spent is as near to zero that the measure is not accurate.

- The time starts to be most accurate from $n=13000000$ on.

Activity 3. [Small execution times]

- If the problem is multiplied by two, from one iteration to another the time spent is doubled too.
- Same behavior happens with $k=3,4,\dots$, the time is multiplied by 3, multiplied by 4, etc.
- For any value of k (being k a constant number) that multiplies the size of the problem, it will follow a linear complexity.

A different complexity will be met if for example the size of the problem (n) is multiplied by itself ($n*n$) in each iteration. In this way, the complexity will be $O(n^2)$.

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-The complexities obtained are the expected ones because the time spent grows $k*n$, being k a constant value.

	(in milliseconds)	
n	Tsum	Tmaximum
10000	0,0387	0,061
20000	0,0766	0,113
40000	0,156	0,222
80000	0,305	0,446
160000	0,611	0,88
320000	1,228	1,762
640000	2,448	3,544
1280000	4,925	7,137
2560000	9,764	14,1
5120000	19,7	28,8
10240000	39,6	57,2
20480000	79,5	114,5
40960000	157,9	229,7
81920000	315,8	457,9
	$O(n)$	$O(n)$

	(in milliseconds)	
n	Tmatches1	Tmatches2
10000	515	0,062
20000	2050	0,107
40000	8317	0,21
80000	32492	0,415
160000	129509	0,833
320000	Oot	1,703
640000	Oot	3,333
1280000	Oot	6,647
2560000	Oot	13,34
5120000	Oot	26,9
10240000	Oot	54,1
20480000	Oot	107,7
40960000	Oot	216,4
81920000	Oot	431,8
	$O(n)$	$O(n)$

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CPU: 12th Gen Intel(R) Core(TM) i5-12400 2.50 GHz

RAM: 16GB