Algorithmics	Student information	Date	Number of session
	UO:300809	6/02/2025	1
	Surname: González Bajo		
	Name: Javier		

Escuela de Ingeniería Informática Universidad de Oviedo

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Activity 1. Measuring execution times. A

- The maximum number you can use with a long integer is 2^{63} - 1= 9.223.372.036.854.775.807.

$$\frac{9.223.372.036.854.775.807}{10^3 * 3600 * 24 * 365} = 292.471.208{,}68$$

We can use it 292.471.158 years more.

Activity 2. Measuring execution times. B

- If the times are very low, the computer will approximate it to 0.
- With SIZE=19531250 we get TIME=76 that is greater than 50 mil.

Activity 3. Taking small execution times.

- Each time the problem size is multiplied by 2, it takes approximately double the time.
- It happens the same because the time is proportional to the size of the problem that is that this program has O(n) complexity.

n	Tsum	Tmaximum
10000	0,06	0,071
20000	0,1785	0,141
40000	0,536	0,282
80000	1,6075	0,562
160000	4,834	1,126
320000	14,56	2,268
640000	3,82	4,5
1280000	11,47	9
2560000	34,6	18,14
5120000	103,76	36,26
10240000	311,24	72,53
20480000	123	144
40960000	367	295
81920000	1105	588

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n	Tmatches1	Tmatches2
10000	530	0,07692308
20000	2117	0,14769231
40000	8455	0,29538462
80000	33786	0,59230769
160000	OoT	1,18461538
320000	OoT	2,36923077
640000	OoT	4,74307692
1280000	OoT	9,53692308
2560000	OoT	19,1153846
5120000	OoT	38,28
10240000	OoT	76,4276923
20480000	OoT	153
40960000	OoT	305
81920000	OoT	610

- As we can see in both tables, the time is proportional to n(O(n)) except matches1 that has $O(n^2)$.

CPU i9-10900KF
RAM 3600MHz