Activity 1. [Calculate the years that we can continue using System.currentTimeMillis()]

First, in one year there are 100x60x60x24x365=3,153,600,000 milliseconds. This has been going on since 1st January, 1970, so 55 years =173,448,000,000.

Long uses 64 bits, so it can represents till the number 18,446,744,073,709,551,615, buts as it is signed = 9,223,372,036,854,775,807.

We subtract both values and the pass the milliseconds to years to check how many years left. 9,223,371,863,406,775,807/ 3,153,600,000 = 2,924,712 years.

Activity 2. [Time is 0]

The return could be zero when the compiler ignores the routine or if the time is faster than milliseconds.

From 781250, the time is different than 0.

Activity 3. [Repetitions]

If the size is multiplied by 2, then the time is approximately the double of the time of the first size. This happens for any k, the time is almost k*times of first size.

Those are the times expected for a linear complexity of O(n), As they increase in a linear way.

Algorithmics	Student information	Date	Number of session
	UO: 297383	10/02/2025	1.1
	Surname: Herrero Sánchez		
	Name: Iván		

n	Tsum (ms)	Tmaximum
10000	$257*10^{-5}$	$157*10^{-5}$
20000	$503*10^{-5}$	$345*10^{-5}$
40000	$1006*10^{-5}$	$693*10^{-5}$
80000	$2017*10^{-5}$	$1457*10^{-5}$
160000	$4062*10^{-5}$	$3236*10^{-5}$
320000	$7831*10^{-5}$	$5594*10^{-5}$
640000	$163*10^{-3}$	$99*10^{-3}$
1280000	$331*10^{-3}$	$194*10^{-3}$
2560000	$1774*10^{-3}$	$400*10^{-3}$
5120000	$3785*10^{-3}$	$1005*10^{-3}$
10240000	7.84	$2385*10^{-3}$
20480000	15.41	5.15
40960000	30.9	10.5
81920000	60	21

n	Tmatches1	Tmatches2
10000	18.7	$245*10^{-5}$
20000	67.7	$464*10^{-5}$
40000	245.5	$931*10^{-5}$
80000	967.7	$1930*10^{-5}$
160000	4535	$3765*10^{-5}$
320000	18110	$7875*10^{-5}$
640000	72543	$164*10^{-3}$
1280000	OoT	$332*10^{-3}$
2560000	OoT	$816*10^{-3}$
5120000	OoT	$1994*10^{-3}$

	Student information	Date	Number of session
Algorithmics	UO: 297383	10/02/2025	1.1
	Surname: Herrero Sánchez		
	Name: Iván		

10240000	OoT	4357*10^-3
20480000	OoT	9.2
40960000	OoT	18.4
81920000	OoT	35.7

Using memory of 16GB and Processor of 2.5GHz.

Tsum and Tmax both increase the time by 2 each time, following the given computational complexity of O(n). Also, Tmatches2 also increase by 2. Tmatches1 increase by 4 each time, but also follows a O(n).