Algorithmics	Student information	Date	Number of session
	UO:300084	10-02-25	1
	Surname: Seijo Martínez		
	Name: Sergio		

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Activity 1. Measuring execution times

CurrentTimesMillis ()

Since the currentTimeMillis () method, uses as type long the amount of milliseconds we can use it would be the MAX_LONG value in java that is: 9,223,372,036,854,775,807. If we convert that number to years it would be approximately: 2924594114 years. So the answer is we do not have to worry about this method functionality at all.

Vector2 class

The time is 0 sometimes because the currentTimeMillis() method is run both times in the less than a millisecond. The number n where we start getting times above 50ms is approximately 13000000(13 million).

Activity 2. Taking small execution times(<50ms)

Vector4 class

When we multiply the problem size by 2 the times above 50ms double its time.

When multiplying the times by 3 and 4 the result is the expected, the times increase accordingly. So taking this into account we got the results expected for a program with complexity O(n).

Table 1: T sum and T maximum WITHOUT OPTIMIZATION

The specs of the pc for this table are: RAM (16, 0 GB (15, 8 GB usable) and CPU (12th Gen Intel(R) Core(TM) i5-12400 2.50 GHz)

N	Tsum	Tmaximum
10000	42 / 1000 = 0,042 ms	59 / 1000 = 0,059 ms
20000	82 / 1000 = 0,082 ms	115 / 1000 = 0,115 ms
40000	1270 / 1000 = 0,127 ms	229 / 1000 = 0,229 ms

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80000	2535 / 1000 = 0,235 ms	459 / 1000 = 0,459 ms
160000	5073 / 1000 = 5,5073ms	917 / 1000 = 0,917 ms
320000	10171 / 1000 = 1,0171 ms	1853 / 1000 = 1,853 ms
640000	20609 / 1000 = 2,0609 ms	3691 / 1000 = 3,691 ms
1280000	41056 / 1000 = 4,1056 ms	7411 / 1000 = 7,411 ms
2560000	8175 / 100 = 8,175 ms	14885 / 1000 = 14,885 ms
5120000	15435 / 100 = 15,35 ms	29284 / 1000 = 29,284 ms

Table 2: Tmatches1 and 2 WITHOUT OPTIMIZATION

The specs of the pc for this table are RAM (16,0 GB) and CPU (AMD Ryzen 5 3600 6-Core Processor 3.59 GHz).

N	Tmatch1	Tmatch2
10000	744 ms	95 / 1000 = 0,095 ms
20000	2963 ms	188 / 1000 = 0,188 ms
40000	11845 ms	373 / 1000 = 0,373 ms
80000	47552 ms	747 / 1000 = 0,747 ms
160000	OoT	1493 / 1000 = 1,493 ms
320000	OoT	2998 / 1000 = 2,998 ms
640000	OoT	6009 / 1000 = 6,009 ms
1280000	OoT	12017 / 1000 = 12,017 ms
2560000	OoT	24032 / 1000 = 24,032 ms
5120000	OoT	48087 / 1000 = 48,087 ms
10240000	OoT	962 / 10 = 96,2 ms