Algorithmics	Student information	Date	Number of session
	UO:300896	6/02/25	2
	Surname: De San Claudio Mesa		
	Name: Alejandro		

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Activity 1. [Calculate how many more years we can continue using this way of counting. Explain what you did to calculate it]

292.471.153 more years.

Long max value = 9.223.372.036.854.775.807 ms

9.223.372.036.854.775.807 ms = 292.471.208 years

We substract the 55 years that already happened

292.471.208 - 55 = 292.471.153

Activity 2.1 [Why does the measured time sometimes come out as 0?]

Because of the time taken for executing the program is less than 1 ms

Activity 2.2 [From what size of problem (n) do we start to get reliable times?]

200000

Activity 3.1 [What happens with time if the problem size is multiplied by 2?]

Time nearly duplicates:

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```
SIZE=10 TIME=1 milliseconds SUM=282 NTIMES=10000
SIZE=20 TIME=1 milliseconds SUM=8 NTIMES=10000
SIZE=40 TIME=2 milliseconds SUM=-238 NTIMES=10000
SIZE=80 TIME=3 milliseconds SUM=229 NTIMES=10000
SIZE=160 TIME=6 milliseconds SUM=253 NTIMES=10000
SIZE=320 TIME=12 milliseconds SUM=1872 NTIMES=10000
SIZE=640 TIME=24 milliseconds SUM=890 NTIMES=10000
SIZE=1280 TIME=47 milliseconds SUM=-1601 NTIMES=10000
SIZE=2560 TIME=94 milliseconds SUM=611 NTIMES=10000
SIZE=5120 TIME=187 milliseconds SUM=-973 NTIMES=10000
SIZE=10240 TIME=374 milliseconds SUM=13660 NTIMES=10000
SIZE=20480 TIME=763 milliseconds SUM=-12838 NTIMES=10000
```

Activity 3.2 [What happens with time if the problem size is multiplied by a value k other than 2? (try it, for example, for k=3 and k=4 and check the times obtained)

K=3

```
SIZE=10 TIME=1 milliseconds SUM=-52 NTIMES=10000
SIZE=30 TIME=2 milliseconds SUM=90 NTIMES=10000
SIZE=90 TIME=4 milliseconds SUM=481 NTIMES=10000
SIZE=270 TIME=12 milliseconds SUM=-2266 NTIMES=10000
SIZE=810 TIME=31 milliseconds SUM=2983 NTIMES=10000
SIZE=2430 TIME=91 milliseconds SUM=-1536 NTIMES=10000
SIZE=7290 TIME=275 milliseconds SUM=-1033 NTIMES=10000
SIZE=21870 TIME=815 milliseconds SUM=-3645 NTIMES=10000
SIZE=65610 TIME=2419 milliseconds SUM=4733 NTIMES=10000
SIZE=196830 TIME=7236 milliseconds SUM=5971 NTIMES=10000
```

K=5

```
SIZE=10 TIME=1 milliseconds SUM=-152 NTIMES=10000
SIZE=50 TIME=3 milliseconds SUM=-20 NTIMES=10000
SIZE=250 TIME=10 milliseconds SUM=-287 NTIMES=10000
SIZE=1250 TIME=49 milliseconds SUM=2766 NTIMES=10000
SIZE=6250 TIME=235 milliseconds SUM=9403 NTIMES=10000
SIZE=31250 TIME=1182 milliseconds SUM=5361 NTIMES=10000
SIZE=156250 TIME=5883 milliseconds SUM=-16495 NTIMES=10000
```

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Activity 3.3 [Tables MAXIMUM)

CPU1: 12th Gen Intel(R) Core(TM) i5-12400 2.50 GHz

RAM1: 16,0 GB

Size	T(max)	T(sum)
10000	0.058	0.0377
20000	0.113	0.0743
40000	0.220	0.1482
80000	0.445	0.2927
160000	0.890	0.5873
320000	1.769	1.1747
640000	3.566	2.3510
1280000	7.095	4.7113
2560000	14.125	9.4374

Activity 3.4 [Tables MATCHES)

CPU1: 12th Gen Intel(R) Core(TM) i5-12400 2.50 GHz

RAM1: 16,0 GB

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	Surname: De San Claudio Mesa		
	Name: Alejandro		

Siza	T(matches2)	T(matches1)
10000	0.06	511
20000	0.1	2026
40000	0.21	8065
80000	0.42	32244
160000	0.85	130349
320000	1.67	-
640000	3.35	-
1280000	6.7	-
2560000	13.4	-
5120000	27.05	-
10240000	54	-
20480000	110	-
40960000	218	-

T(Sum) is linear O(n)

T(Max) is linear O(n)

T(matches1) is quadratic O(n^2)

T(matches2) is linear O(n)