Algorithmics	Student information	Date	Number of session
	UO: 275725		1.2
	Surname: Gómez Menéndez		
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Activity 1. [Two algorithms with the same complexity]

We are going to compare loop2 and loop3 algorithms and obtain the value for the division loop2/loop3. To that, you should fill in the following table (remember to include always in all columns the units of time and the CPU and RAM of the machine where the measurement was made). In addition, briefly explain if the results make sense from the point of view of the complexities of the algorithms

Intel(R) Core(TM) i3-5005U CPU @ 2.00GHz 2.00 GHz

Ram 4GB

With an argument of 100

N	Loop2(t)	Loop3 (t)	Loop2(t)/loop3(t)
8	1	2	0.5
16	2	2	1
32	3	2	1.5
64	15	15	1
128	33	32	1.031
256	127	129	0.98
512	739	551	1.34
1024	2290	2355	0.97
2048	9790	9542	1.03
4096	38350	38836	0.98
…			

The results make sense because from n=64(the ones on which we can trust),the division is always rounding 1, so loop2 and loop3 have the same complexity.

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Activity 2. [Two algorithms with different complexity]

We are going to compare loop1 and loop2 algorithms and obtain the value for the division loop1/loop2. To that, you should fill in the following table (remember to include always in all columns the units of time and the CPU and RAM of the machine where the measurement was made). In addition, briefly explain if the results make sense from the point of view of the complexities of the algorithms.

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Ram 4GB

With an argument of 100

N	Loop1(t)	Loop2 (t)	Loop1(t)/loop2(t)
8	1	1	1
16	2	2	1
32	2	3	0.67
64	12	15	0.8
128	32	33	0.97
256	129	127	1.02
512	559	739	0.76
1024	2711	2290	1.18
2048	9121	9790	0.93
4096	38609	38350	1.006
…			

The results make sense because from n=128(the ones on which we can trutst),the division is always rounding 1, but usually it is less that zero, son maybe the complexity of the loop2 is a bit greater.

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Activity 3. [Complexity of other algorithms]

We are going to create and compare two new algorithms, loop4 (it should have a O(n4) complexity) and loop5 (it should have a O(n3 logn) complexity) algorithms and obtain the value for the division loop4/loop5. To that, you should fill in the following table (remember to include always in all columns the units of time and the CPU and RAM of the machine where the measurement was made). In addition, briefly explain if the results make sense from the point of view of the complexities of the algorithms

The argument that I used is 1000, so it is measured in milliseconds.

N	Loop4(t)	Loop5 (t)	Loop4(t)/loop5(t)
8			
16			
32			
64	36	38	0.95
128	252	332	0.76
256	2135	1890	1.13
512	15744	14905	1.05
1024	122577	120599	1.02

As the complexity of the loop4 is bigger than the other, the results of the division will be always increasing.

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Activity 4. [Study of Unknown.java]

You should create another table with execution times for different sizes of the problem for the method contained in Unknown.java together with a brief explanation of its complexity. Does it make sense according to the theoretical complexity? Use the formula explained in class to calculate the expected execution time when the size of the problem changes and compare it with the time you took empirically. Do it twice.

n	Time(ms)	SecondTime(ms)	Time/SecondTime
64	46	63	0.73
128	310	342	0.9
256	2014	2209	0.91
512	15610	16997	0.91
1024	122204	119102	1.02

As both have the same complexity because they are the same, so when we divide both, the result is always 1 more or less.