Algorithmics	Student information	Date	Number of session
	UO:300809	20/02/2025	2
	Surname: González Bajo		
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Activity 1. Some iterative models

N	tLoop1	tLoop2	tLoop3	tLoop4
100	0,00435	0,1645	0,834	0,737
200	0,00915	0,601	3,5085	4,874
400	0,019	2,7775	14,8915	36,454
800	0,04475	12,7225	63,2	282,92
1600	0,0952	50,3	267,75	2242
3200	0,20705	230,5	1130	17824
6400	0,4397	912,5	4687	341221
12800	0,9904	4089,6	19914	OoT
25600	2,1059	OoT	OoT	OoT
51200	4,57	OoT	OoT	OoT

- tLoop1: n*log(n)
- tLoop2: n^2*log(n)
- tLoop3: n^2*log(n)
- tLoop4: n^3
- As we can see from the table, the times obtained are tLoop4>>>tLoop3>tLoop2>>tLoop1
- In theory, tLoop2 and tLoop3 should have similar times. The reason of the different times is that when calculating the complexity, we don't have into account the base of the logarithms.

Activity 2. Creation of iterative models of a given time complexity

N	tLoop5	tLoop6	tLoop7
100	1,07	31,95	395
200	6,91	317	6079
400	27,59	2511,65	OoT
800	166,93	26026	OoT
1600	654,2	OoT	OoT
3200	3549,4	OoT	OoT
6400	14434	OoT	OoT
12800	58021	OoT	OoT
25600	OoT	OoT	OoT
51200	OoT	OoT	OoT

- tLoop5: n^2*$\log^2$(n)
- tLoop6: n^3*log(n)

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- tLoop7: n^4
- As we can see from the table, the times obtained are tLoop7>>>tLoop6>>tLoop5

Activity 3. Two Algorithms with different complexity

N	tLoop1	tLoop2	t1/t2
100	0,00435	0,1645	0,02644377
200	0,00915	0,601	0,01522463
400	0,019	2,7775	0,00684068
800	0,04475	12,7225	0,00351739
1600	0,0952	50,3	0,00189264
3200	0,20705	230,5	0,00089826
6400	0,4397	912,5	0,00048186
12800	0,9904	4089,6	0,00024218
25600	2,1059	OoT	
51200	4,57	OoT	

- As we can see in the column t1/t2 the implementation constant is lower than 1 so tLoop1 is better than tLoop2.

Activity 4. Two Algorithms with same complexity

N	tLoop3	tLoop2	t3/t2
100	0,834	0,1645	5,069908815
200	3,5085	0,601	5,837770383
400	14,8915	2,7775	5,361476148
800	63,2	12,7225	4,967577127
1600	267,75	50,3	5,32306163
3200	1130	230,5	4,902386117
6400	4687	912,5	5,136438356
12800	19914	4089,6	4,869424883
25600	OoT	OoT	
51200	OoT	OoT	

- As we can see in the column t3/t2 the implementation constant is lower than 1 so tLoop2 is better than tLoop3.

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Activity 5. Same Algorithms in different enviroments

N	tLoop4	tLoop4(OPTIMIZED)	tLoop4(Python)	t42/t41	t43/t42
200	4,874	0,089	26	54,7804678	292,134831
400	36,454	0,447333333	202	36,8135184	451,564829
800	282,92	2,609666667	1743	27,6721335	667,901392
1600	2242	18,671	14261	24,9834969	763,804831
3200	17824	1363	OoT		
6400	341221	10721	OoT		
12800	OoT	OoT	OoT		
25600	OoT	OoT	OoT		
51200	OoT	OoT	OoT		

- As we can see in the column t42/t41 and t43/t42 the efficient of the algorithms are t41>>t42 and t42>>t43.