

Algorithmics	Student information	Date	Number of session
	UO:		
	Surname:		
	Name:		



TABLE 1 = BUBBLE ALGORITHM

n	T ordered	T reverse	T random
10000	315 ms	1437	1026
2*10000	1223	5742	4048
2**2*10000	4852	22858	16267
2**3*10000	19371	Oot	Oot
2**4*10000	Oot	Oot	Oot

The results are as expected since it is in the ordered case which is the best case the complexity of the bubble is linear, when reverse it has a quadratic complexity then the measurements are out of time since the problem grows very fast, same with random.

TABLE 2 = SELECTION ALGORITHM

n	T ordered	T reverse	T random
10000	314	295	319
2*10000	1202	1149	1226
2**2*10000	4808	4494	4850
2**3*10000	19321	17869	19354
2**4*10000	Oot	Oot	Oot

Measurements are as expected since the complexity of the selection algorithm is always quadratic the times measured grow quadratically.

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TABLE 3 = INSERTION ALGORITHM

n	T ordered	T reverse	T random
10000	1	304	155 ms
2*10000	0	1155	578 Ms
2**2*10000	1	4641	2321 Ms
2**3*10000	1	18693	9351 Ms
2**4*10000	3	Oot	Oot

Measurements seem correct since in best case which is ordered the complexity is $O(1)$ while worst case which would be reverse and also random complexity is quadratic.

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QUICKSORT ALGORITHM

n	T ordered	T reverse	T random
250000	2	17	4
2*250000	3	26	7
2**2*250000	6	51	14
2**3*250000	11	101	28
2**4*250000	22	206	58
2**5*250000	46	416	120
2**6*250000	91	848	248

As it is proven in the measurements in the ordered case (best case) complexity is $O(n \log n)$, since the case in the other measurements is almost the same times are similar because the complexity stills $O(n \log n)$

TABLE 5 = QUICKSORT + INSERTION ALGORITHM (n=16 M and random)

N	t random
Quicksort	
Quicksort+Insertion (k=5)	15272 ms
Quicksort+Insertion (k=10)	15276 ms
Quicksort+Insertion (k=20)	15557 ms

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Quicksort+Insertion (k=30)	16401 ms
Quicksort+Insertion (k=50)	18002 ms
Quicksort+Insertion (k=100)	24668 ms
Quicksort+Insertion (k=200)	39328 ms
Quicksort+Insertion (k=500)	Oot
Quicksort+Insertion (k=1000)	Oot

Results are as expected according to the complexity of both Quicksort and insertion the combination of both in the best cases has a $O(n \log n)$ complexity which can be seen in the results of the first iterations while in the final cases at their worst case they have a quadratic complexity making out of time measurements.