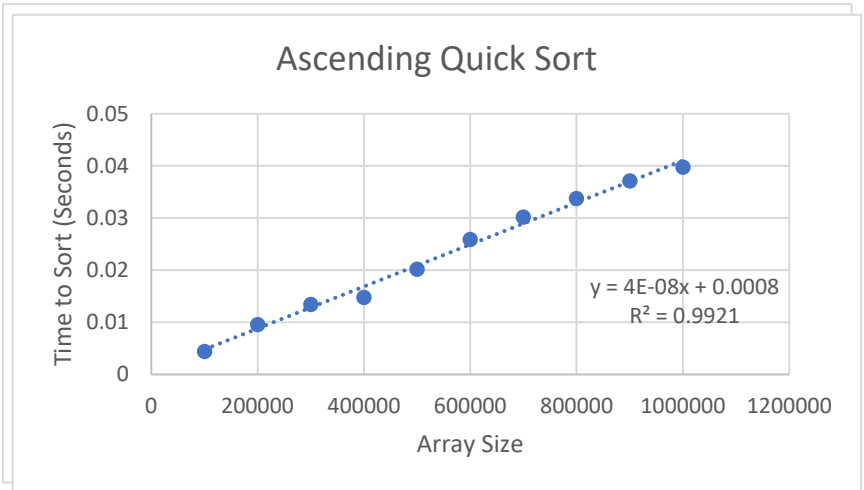
Joseph Pennington 2912079

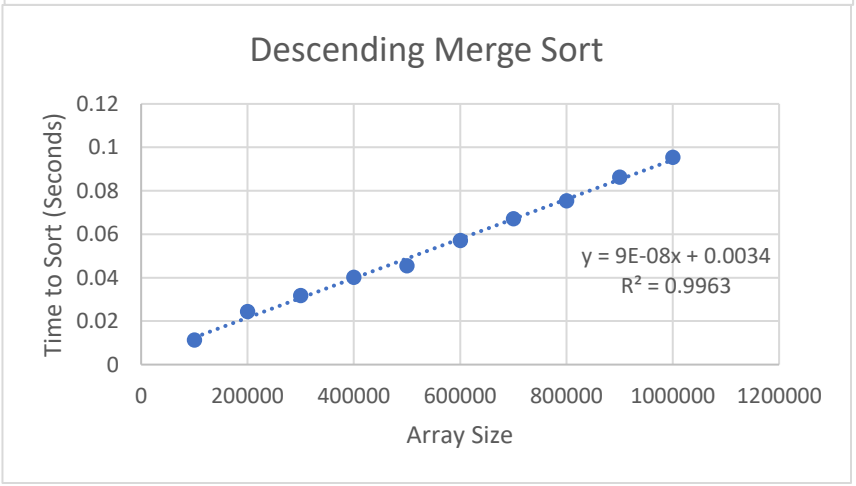
Merge

	100000	200000	300000	400000	500000	600000	700000	800000	900000	1000000
Ascending	0.011193	0.019325	0.033192	0.042689	0.049998	0.056716	0.070133	0.079291	0.088953	0.10504
Descending	0.011212	0.024314	0.031745	0.04017	0.045437	0.057068	0.067039	0.075264	0.086139	0.095302
Random	0.022826	0.045653	0.057022	0.075979	0.094795	0.120411	0.143339	0.15507	0.177086	0.214805



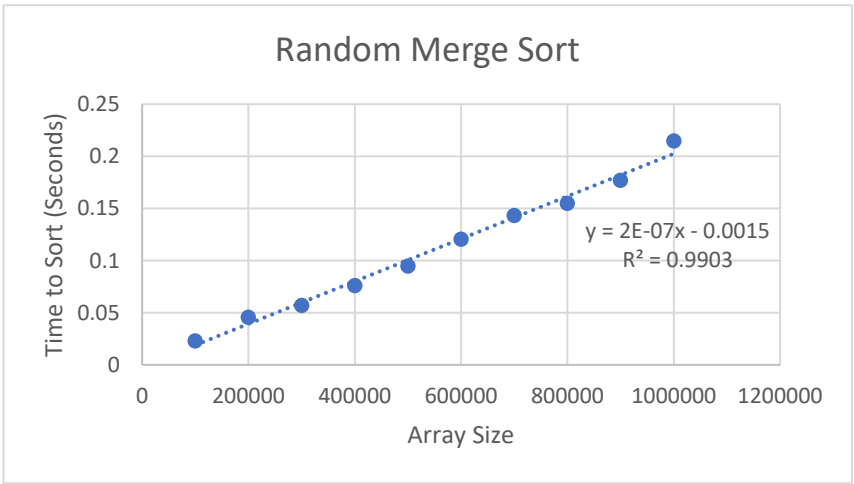
The linear trendline closely represents merge sort's O(Nlog(N)) complexity. For example, when N=800000, the value is 4722472 divided by 0.07921 is approximately 59 million, and when N=200000, the value is 1060205, divided by 0.019325, is approximately 54 million. This shows that they have similar proportions based on O(Nlog(N)).

An array of size 10000000 would take approximately 1.006 seconds based on the equation given in the graph.



The linear trendline closely represents merge sort's O(Nlog(N)) complexity. For example, when N=800000, the value is 4722472 divided by 0.075264 is approximately 62 million, and when N=200000, the value is 1060205, divided by 0.024314, is approximately 43 million. This shows that they have similar proportions based on O(Nlog(N)).

An array of size 10000000 would take approximately 0.9034 seconds based on the equation given in the graph.



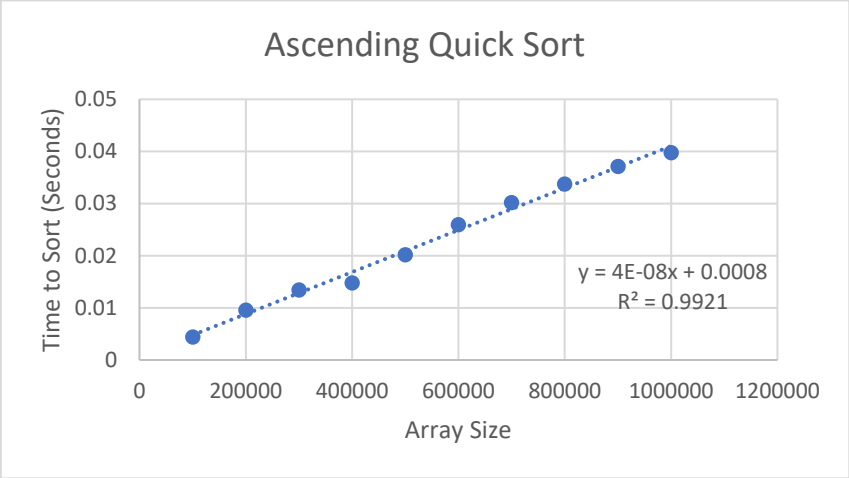
The linear trendline closely represents merge sort's O(Nlog(N)) complexity. For example, when N=800000, the value is 4722472 divided by 0.15507 is approximately 30 million, and when N=200000, the value is 1060205, divided by 0.045653, is approximately 23 million. This shows that they have similar proportions based on O(Nlog(N)).

An array of size 10000000 would take approximately 1.9985 seconds based on the equation given in the graph.

Joseph Pennington 2912079

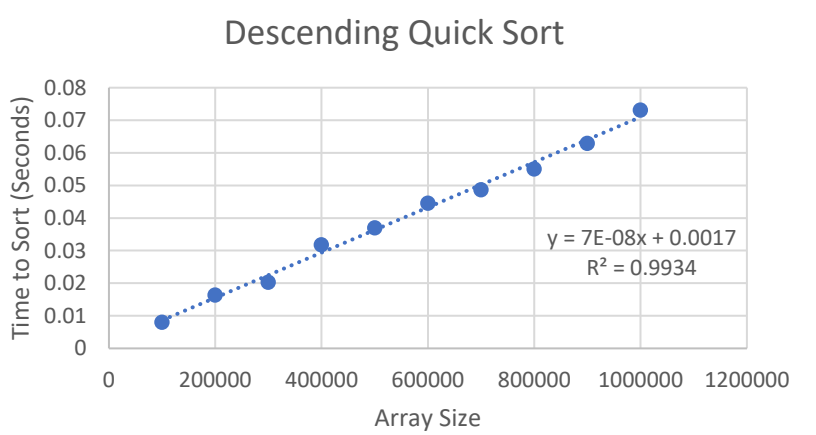
Quick

	100000	200000	300000	400000	500000	600000	700000	800000	900000	1000000
Ascending	0.00441	0.009553	0.01342	0.014805	0.020173	0.025932	0.03021	0.033742	0.037108	0.039749
Descending	0.008004	0.016402	0.02032	0.03182	0.037063	0.044621	0.048663	0.055089	0.06291	0.073138
Random	0.018531	0.03108	0.050277	0.064138	0.079673	0.096489	0.113419	0.130973	0.148198	0.166811



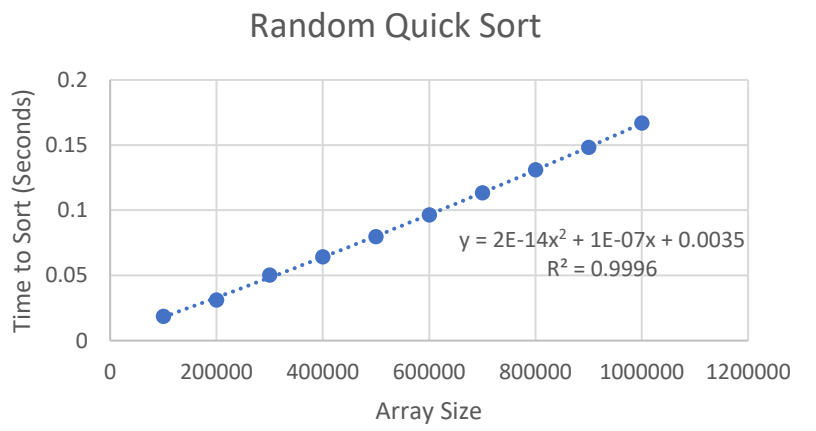
The linear trendline closely represents quick sort's O(Nlog(N)) complexity. For example, when N=800000, the value is 4722472 divided by 0.033742 is approximately 139 million, and when N=200000, the value is 1060205, divided by 0.045653, is approximately 110 million. This shows that they have similar proportions based on O(Nlog(N)). This is the best case.

An array of size 10000000 would take approximately 0.408 seconds based on the equation given in the graph.



The linear trendline closely represents quick sort's O(Nlog(N)) complexity. For example, when N=800000, the value is 4722472 divided by 0.055089 is approximately 85 million, and when N=200000, the value is 1060205, divided by 0.016402, is approximately 64 million. This shows that they have similar proportions based on O(Nlog(N)). This is the average case.

An array of size 10000000 would take approximately 0.7017 seconds based on the equation given in the graph.



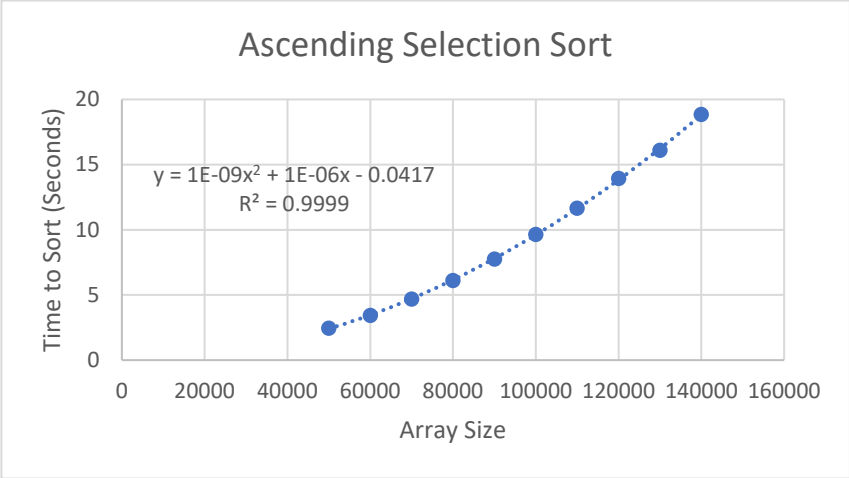
The trendline closely represents quick sort's $O(N^2)$ complexity. For example, when N=800000, the value is 6.4E11 divided by 0.130973 is approximately 4.8E12, and when N=200000, the value is 4E10, divided by 0.0318, is approximately 1.2E12. This shows that they have similar proportions based on $O(N^2)$. This is the worst case.

An array of size 10000000 would take approximately 2.0035 seconds based on the equation given in the graph.

Joseph Pennington 2912079

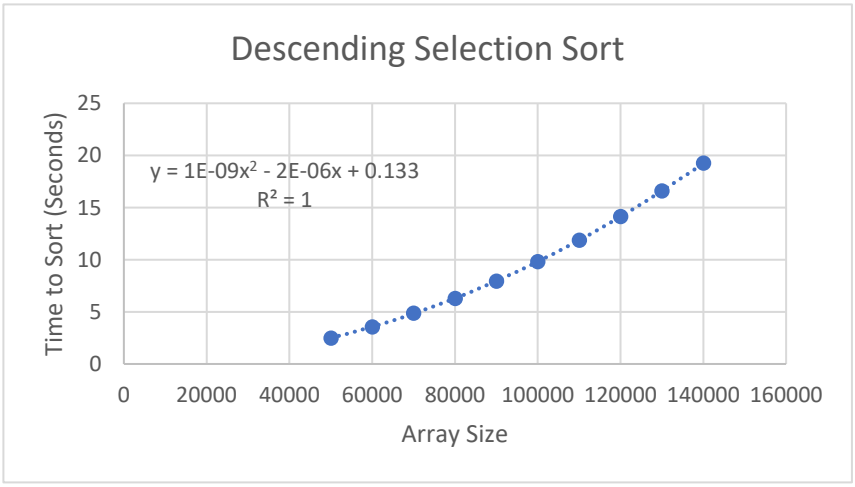
Selection

	50000	60000	70000	80000	90000	100000	110000	120000	130000	140000
Ascending	2.4402	3.44533	4.68511	6.11892	7.76375	9.64912	11.6528	13.9406	16.1012	18.8404
Descending	2.47856	3.56014	4.87955	6.29224	7.94277	9.81679	11.8539	14.1464	16.5952	19.2503
Random	2.52835	3.64412	4.93937	6.44129	8.14348	10.0419	12.1673	14.4252	16.98	19.6237



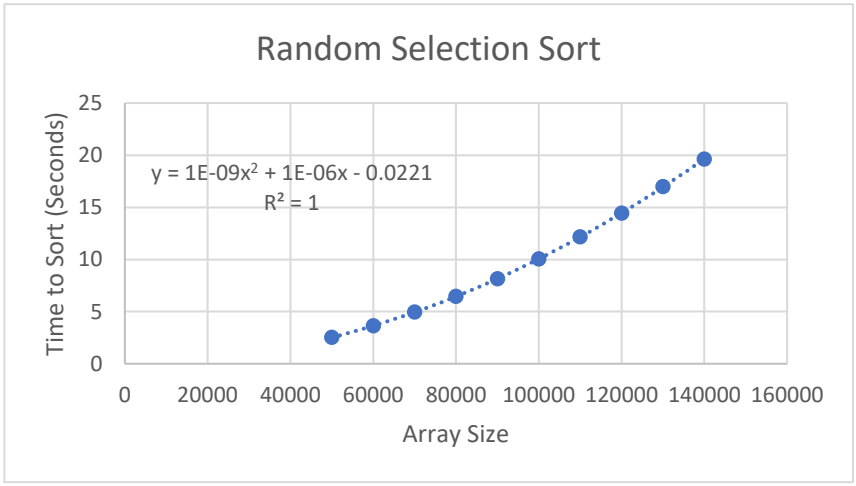
The trendline closely represents selection sort's $O(N^2)$ complexity. For example, when N=120000, the value is 1.44E10 divided by 13.9406 is approximately 1E9, and when N=60000, the value is 3.6E9, divided by 3.44533, is approximately 1E9. This shows that they have similar proportions based on $O(N^2)$.

An array of size 10000000 would take approximately 100009 seconds based on the equation given in the graph.



The trendline closely represents selection sort's $O(N^2)$ complexity. For example, when N=120000, the value is 1.44E10 divided by 14.1464 is approximately 1E9, and when N=60000, the value is 3.6E9, divided by 3.56014, is approximately 1E9. This shows that they have similar proportions based on $O(N^2)$.

An array of size 10000000 would take approximately 99980 seconds based on the equation given in the graph.



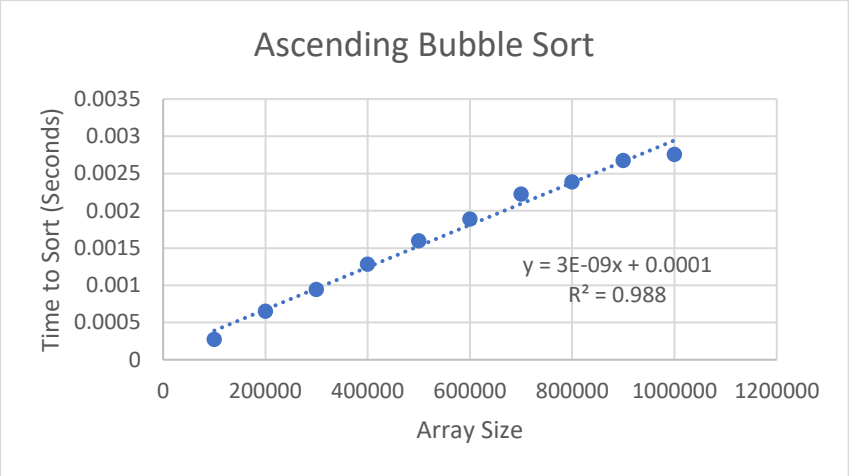
The trendline closely represents selection sort's $O(N^2)$ complexity. For example, when N=120000, the value is 1.44E10 divided by 14.4252 is approximately 1E9, and when N=60000, the value is 3.6E9, divided by 3.64412, is approximately 1E8. This shows that they have similar proportions based on $O(N^2)$.

An array of size 10000000 would take approximately 100009 seconds based on the equation given in the graph.

Joseph Pennington 2912079

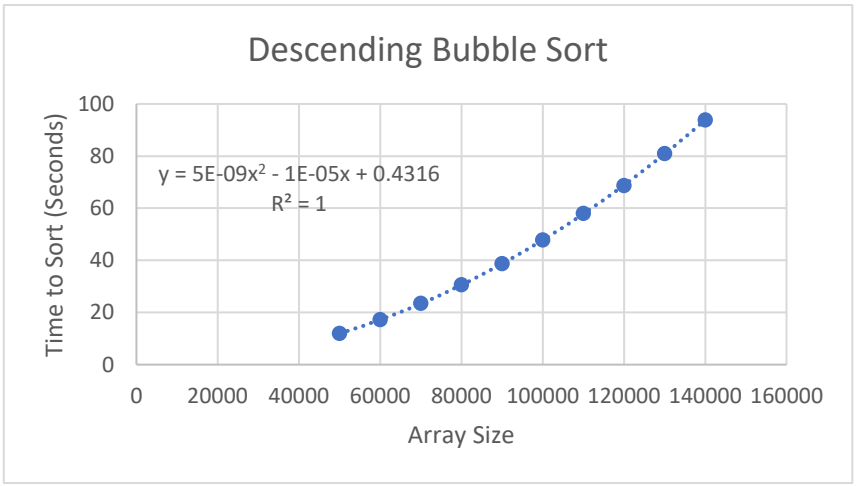
Bubble

	100,000	200,000	300,000	400,000	500,000	600,000	700,000	800,000	900,000	1,000,000
Ascending	0.000273	0.000653	0.000944	0.001283	0.001597	0.001889	0.002225	0.002389	0.002674	0.002757
	50,000	**60,000**	**70,000**	**80,000**	**90,000**	**100,000**	**110,000**	**120,000**	**130,000**	**140,000**
Descending	11.9675	17.2285	23.4197	30.5897	38.6458	47.7805	57.9219	68.6547	80.8972	93.8411
Random	11.8955	17.3832	23.6653	30.8879	39.0706	48.2276	58.2506	69.4081	81.3189	94.4078



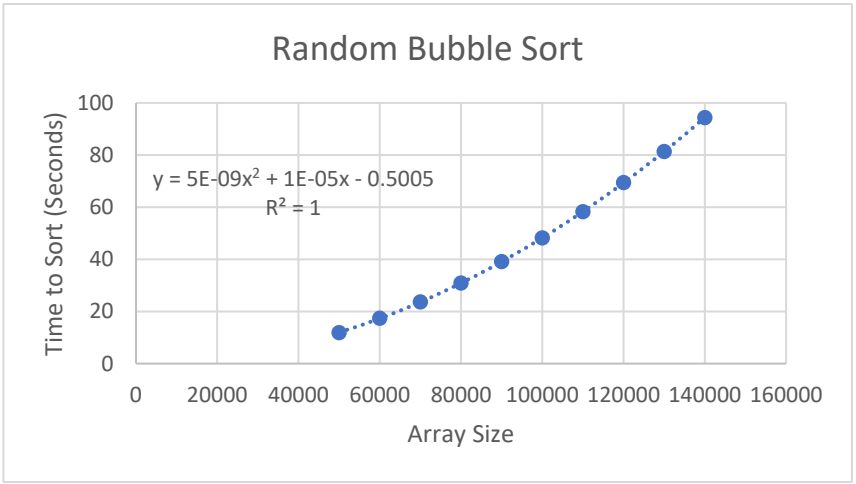
The trendline closely represents bubble sort's O(N) complexity. For example, when N=800000, the value is 800000 divided by 0.002389 is approximately 3.3E8, and when N=200000, the value is 200000, divided by 0.000653, is approximately 3.0E8. This shows that they have similar proportions based on O(N). This is the best case.

An array of size 10000000 would take approximately 0.0301 seconds based on the equation given in the graph.



The trendline closely represents bubble sort's O(N^2) complexity. For example, when N=120000, the value is 1.44E10 divided by 68.6547 is approximately 2E8, and when N=60000, the value is 3.6E9, divided by 17.2285, is approximately 2E8. This shows that they have similar proportions based on O(N^2). This is the average case.

An array of size 10000000 would take approximately 499900 seconds based on the equation given in the graph.



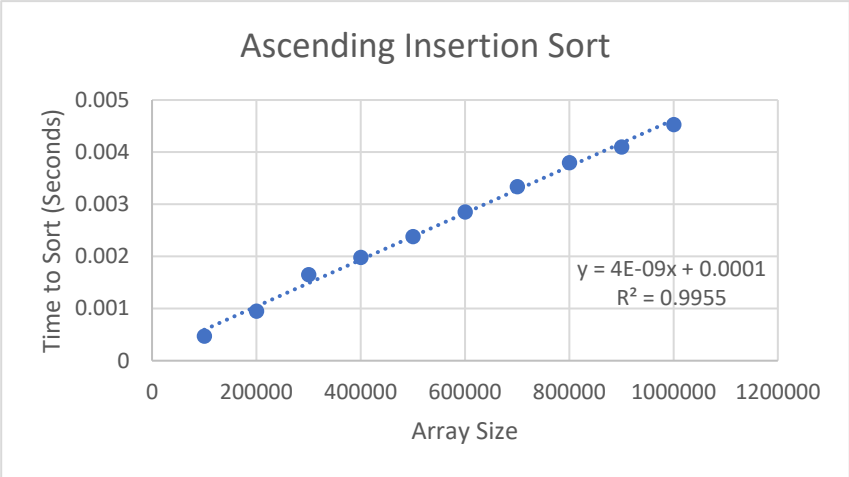
The trendline closely represents bubble sort's O(N^2) complexity. For example, when N=120000, the value is 1.44E10 divided by 69.4081 is approximately 2E8, and when N=60000, the value is 3.6E9, divided by 17.3832, is approximately 2E8. This shows that they have similar proportions based on O(N^2). This is the average case.

An array of size 10000000 would take approximately 500099 seconds based on the equation given in the graph.

Joseph Pennington 2912079

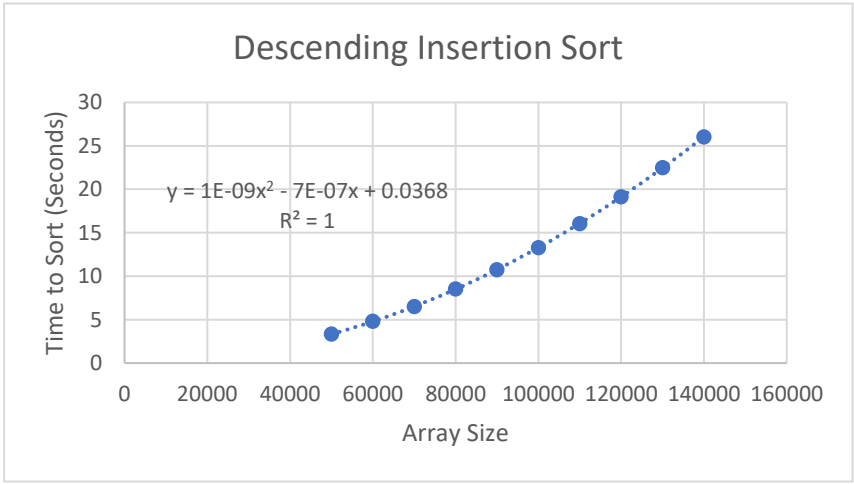
Insertion

	100,000	200,000	300,000	400,000	500,000	600,000	700,000	800,000	900,000	1,000,000
Ascending	0.000475	0.00095	0.001649	0.001983	0.00238	0.002852	0.00334	0.003801	0.004098	0.004531
	50,000	**60,000**	**70,000**	**80,000**	**90,000**	**100,000**	**110,000**	**120,000**	**130,000**	**140,000**
Descending	3.31811	4.80809	6.49739	8.54249	10.7546	13.2752	16.0518	19.1361	22.4988	26.0313
Random	1.66076	2.38367	3.23677	4.22597	5.40957	6.65924	8.04602	9.56298	11.1538	13.0841



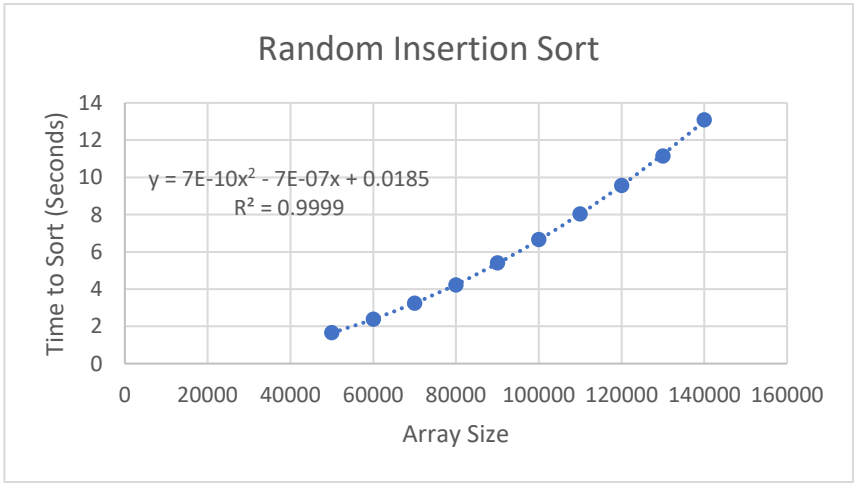
The trendline closely represents insertion sort's O(N) complexity. For example, when N=800000, the value is 800000 divided by 0.003801 is approximately 2.1E8, and when N=200000, the value is 200000, divided by 0.00095, is approximately 2.1E8. This shows that they have similar proportions based on O(N). This is the best case.

An array of size 10000000 would take approximately 0.0401 seconds based on the equation given in the graph.



The trendline closely represents insertion sort's O(N^2) complexity. For example, when N=120000, the value is 1.44E10 divided by 19.1361 is approximately 7.5E8, and when N=60000, the value is 3.6E9, divided by 4.80809, is approximately 7E8. This shows that they have similar proportions based on O(N^2). This is the worst case.

An array of size 10000000 would take approximately 99993 seconds based on the equation given in the graph.



The trendline closely represents insertion sort's O(N^2) complexity. For example, when N=120000, the value is 1.44E10 divided by 9.56298 is approximately 1.5E9, and when N=60000, the value is 3.6E9, divided by 2.38367, is approximately 1.5E9. This shows that they have similar proportions based on O(N^2). This is the average case.

An array of size 10000000 would take approximately 69993 seconds based on the equation given in the graph.