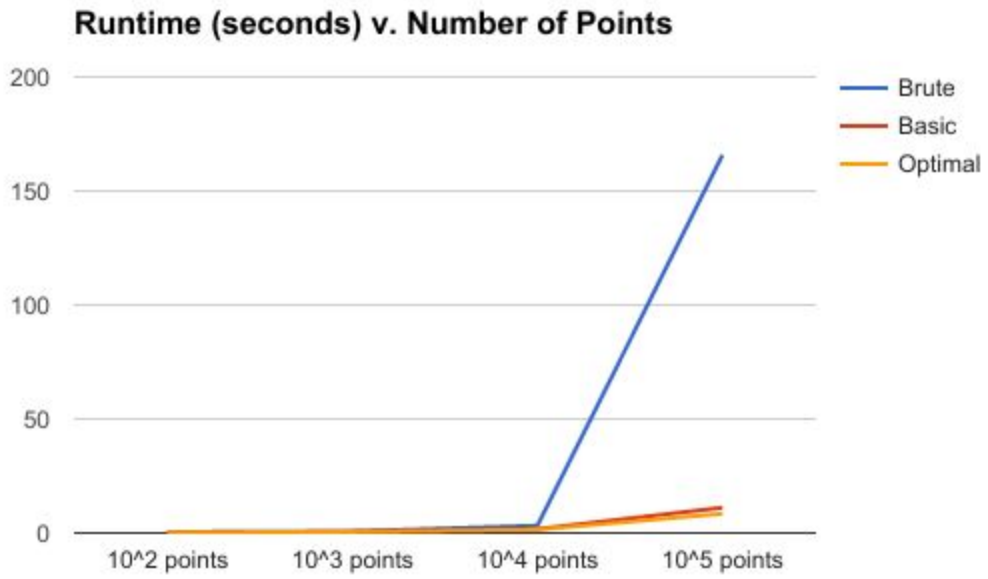
Programming Assignment 1 : Scalability Simon Wong

Looking at the growth curves for each of our different algorithms, we can see that each one fits a unique curve. We can note that the runtime of the brute force method slows down dramatically, arguably exponentially, as we increase the number of points. However, looking at the basic and optimal divide and conquer algorithm runtimes, we see that the runtime of those algorithms do not increase exponentially. Our optimal algorithm has the best run time, closely followed by the basic divide and conquer. The brute force method can keep up with the divide and conquer algorithms with smaller point sets, but drastically falls off after 10^4 points. From the data gathered from the runtime analysis, we can see that the trends of runtime vs. number of points can suggest that our algorithms match their theoretical bounds.



Runtime (seconds) for each algorithm

	Brute: (expected O(n^2))	Basic: (expected O(n(log(n))^2)	Optimal: (expected O(n(log(n)))
100 points	0.482	0.261	0.188
1000 points	0.754	0.641	0.524
10000 points	3.235	1.705	1.478
100000 points	165.84	11.11	8.459