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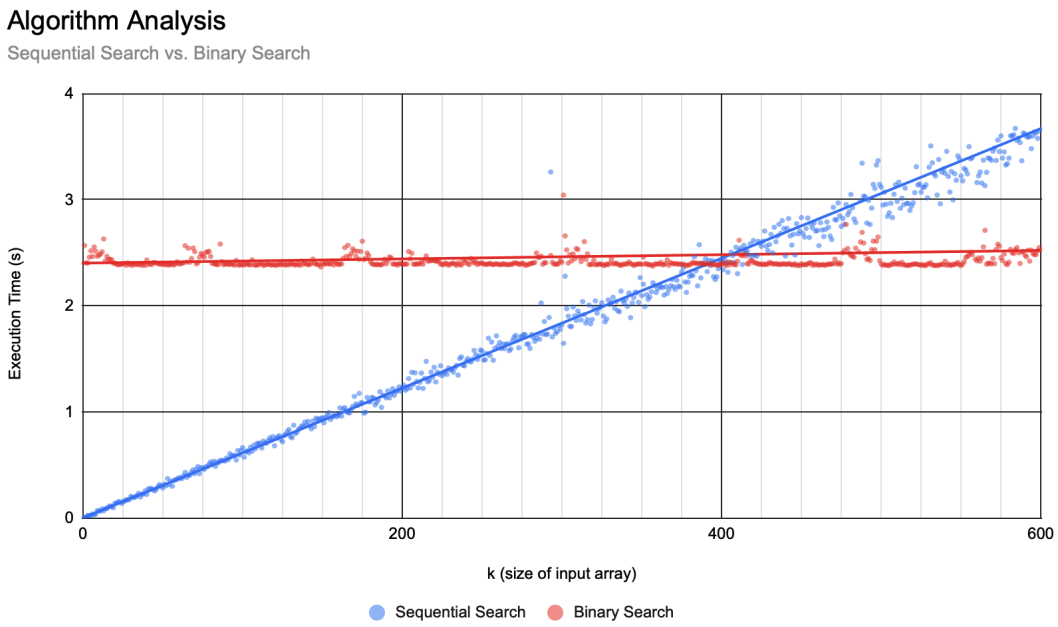
COP3530 - Data Structures

Prof. Hernandez

Fall 2022 - Assignment 3

Algorithm Analysis: Sequential Search vs. Binary Search



A. Empirical value of k: 415

B. When looking at the graph, there is a clear intersection “region” around k = 400 and t = 2.5 seconds. Evidently, when the array input size exceeds 400, binary search is the more efficient algorithm (taking around 2.5 seconds for values where k > 400). Even though sequential search was faster for “low” input sizes (k < 400), when k gets “large enough”, binary search is more efficient.

C. Graph above.

D. Initially, I didn’t understand why the execution time for binary search was so high for low values of k; however, I soon realized that quicksort adds quite a bit of “overhead” to our program. As a result, even if you’re looking for 3 elements (using binary search), you have to first sort the list which takes some time; from there one, finding all the numbers is quite efficient.