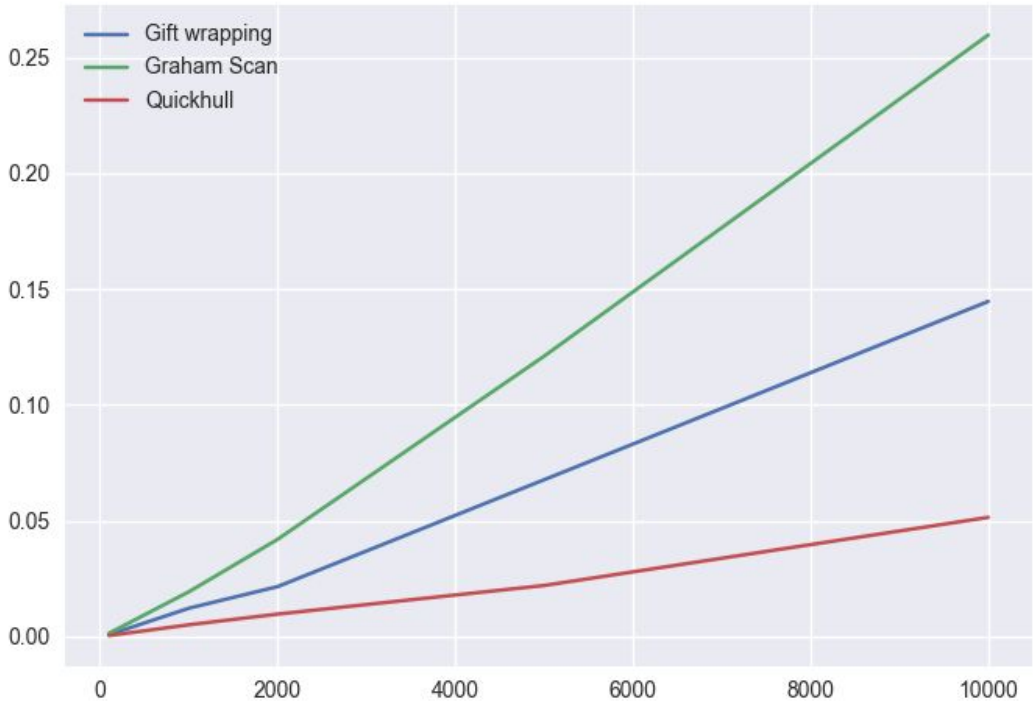
Assignment 4

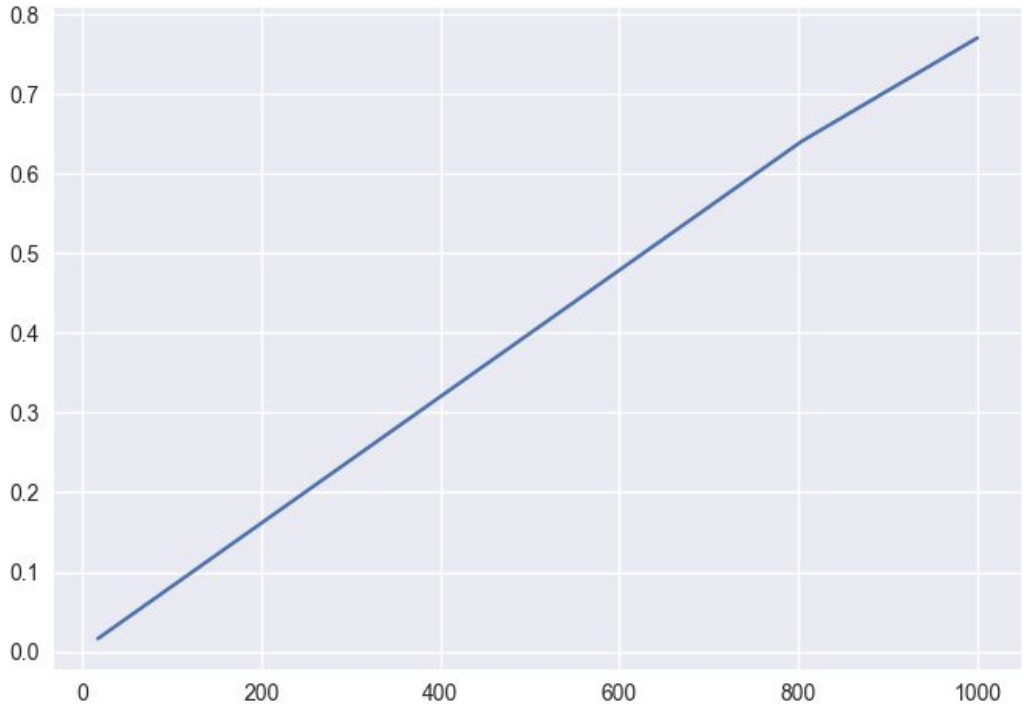
Comparison graph between various convex hull algorithms. Number of points is as given in the assignment and points are generated randomly. Number of points on x axis and Time on y axis.



Below are graphs of all 3 algorithms with various number of points on the hull. Number of points on the hull on x axis and Time on y axis.. To get a certain number of points, I generated the points in a circle. For example, to get 1000 points on hull, I generate 1000 points on circle of radius 1000.

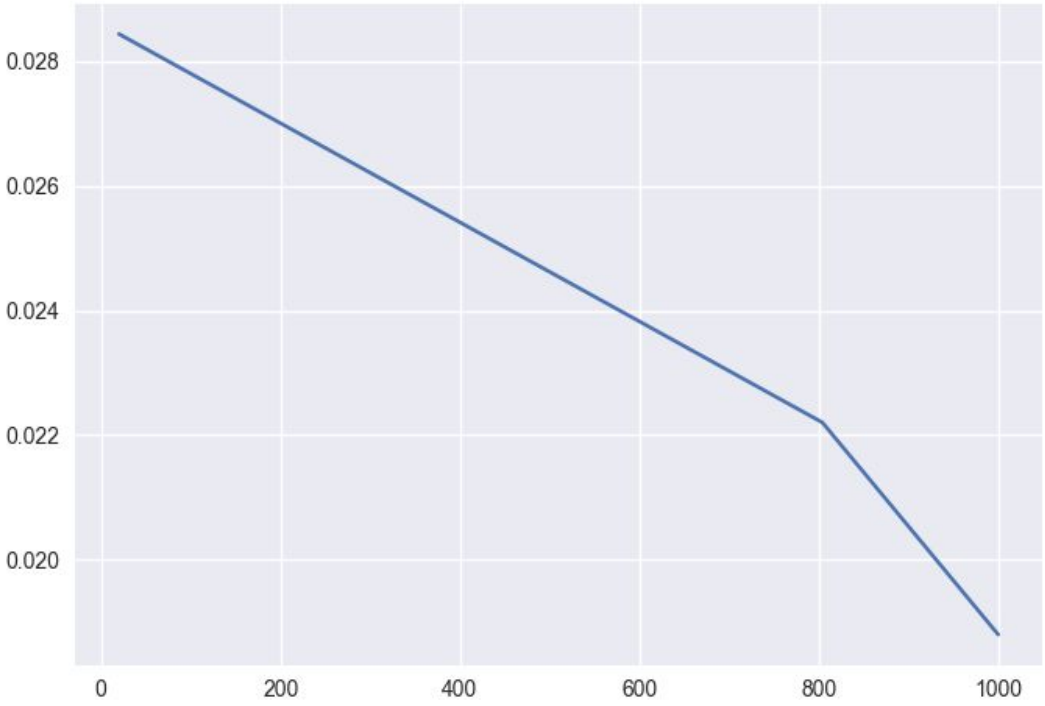
Here, the total number of points is 1000. There are 3 cases where the number of points on the hull are ~10, ~800 and 1000.

Gift Wrapping



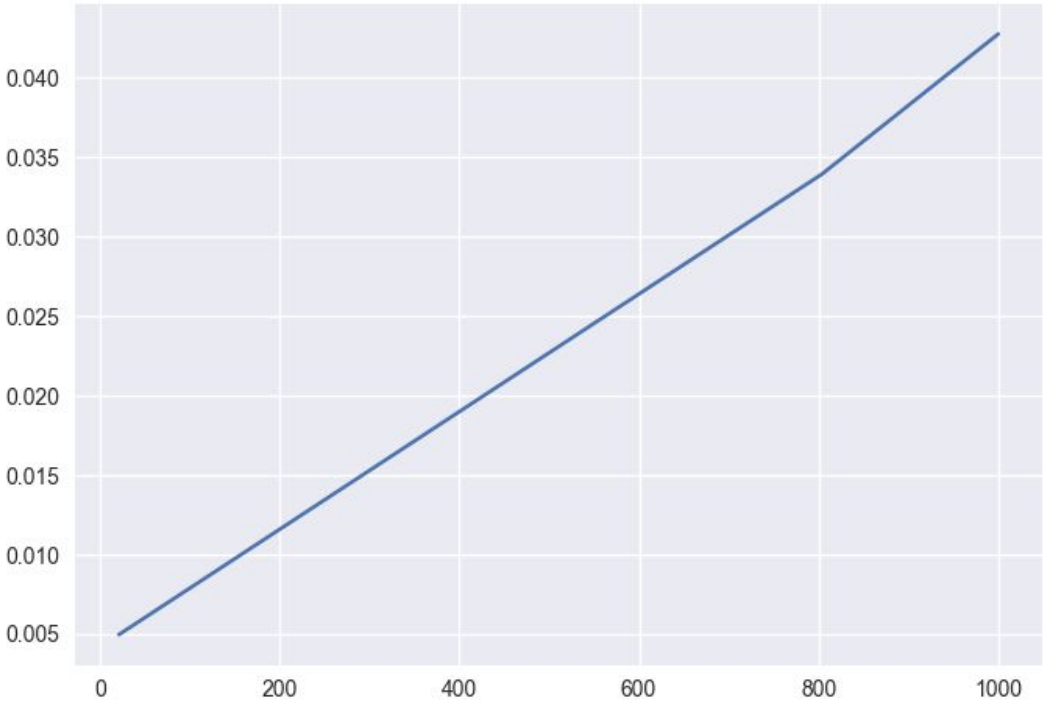
We see that this varies linearly with the number of points on the hull. Complexity: O(n*h)

Graham Scan



We see that this varies from 0.028 to 0.020, which is almost the same, because it doesn't depend on the number of points on the hull. Complexity: O(n*lg(n))

Quickhull



We see that as the points on the hull increase, the algorithm approaches its worst case and hence time increases. Worst case complexity: O(n*n)