Challenge Question 2 (Deadline: Sunday 24 September)

Constructing a Sparse Graph Quickly

Given a set of n points in the plane where each point has no other points within a distance $d/2$ to it, we would like to construct a graph where vertices correspond to the points and every two vertices are connected with an edge if the corresponding points are within a distance d of each other [1].

Give a divide and conquer algorithm that runs in time $O(n \log n)$ for constructing the graph.

[1] Such graphs may appear, with variations on the constraints, in situations where resources are naturally far from each other, e.g. petrol stations, and we are constrained in how far we can travel in a single trip without going to a resource point, e.g. by the capacity of the petrol tank.