Analysis of Question 1

a)

The main part of computing an epsilon sample is dividing the input sample into groups of size . As we have seen in class, the naïve approach is to sort the input points based on their coordinate and then split manually. However, we implemented a better method using "K-select", which on average gives a linear runtime. (The pivot can be chosen so that it gives a linear runtime in the worst case)

We used an algorithm like Quicksort, only that we stopped after reaching the index we need. After that we could separate the points efficiently into groups, and repeat recursively.

Time Analysis:

Splitting the group into groups takes a total time of:

Since we call this method recursively d times, where each time still takes , we get that the total time is:

b)

We implemented this question using a recursive call to q1a's . We ran the epsilon sample this time with . We used k-select here as well, so that every time we remove the points closest to centers as we saw in class (finding the median here, could have been done with median of medians algorithm).

Time Analysis: