Zijian Yue

Z5188675

Q2.

First sort the array of d(i) for increasing order. We can build a bipartite graph based for this question, let Set A be the set of warehouses(with the trucks), let Set B be the set of shops, the edges between Set A and Set B is a directed edge with the cost of time d(i). According to the hint, first we consider all the roads takes less than d(i = 0){middle point} hours. In the case of d(i) has no match(each warehouse is connected to each shop at d(i) -----> obtained by performing maximum bipartite-matching algorithm) we simply increase the i by 1. Now assume we found a initiate d(i), if we have this d(i) we can simply remove all the edges with greater cost compare to d(i) because we've already had a relatively smaller available d(i). Then we will repeat the following procedure, every time we use binary search to decrease previous i value. And then if there is a match of the new i value, we remove all edges in the graph which has a cost greater than d(i), and use binary search to decrease the value of i again. If there is no match, then we increase the value of i until we've found a match. And if the previous value of i equals to the new i value(min == max) obtained from the binary search, the value i will be our answer which indicates we can minimize the time taken by follow the roads takes d(i) time.