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**COMP9101 Ass04**

**文本, 信件

描述已自动生成**

**Q2.**

According to the hint, we can sort the di, which is the time spent on each road, in an increasing order. Then we can build a bipartite graph, which the left side is the warehouse, the right part is the shops. And the super source in this problem connect to the warehouse, the capacity of each edge is 1. The super sink connects to the shop, which the capacity of each edge is also 1. Suppose there is a time limit (dt), if the track can transfer from warehouse to shops with the ith road in the dt, which means dt >= di, we can set the capacity of current edge as 1. If not, set edge as 0. Use binary search to check the number of shops that can receive from the warehouse under dt time. Calculate the maximum flow, if the result equal to the number of shops. If not, we should increase the time dt, and repeating above.

For sorting step, the time complexity is O(mlogm);

For max flow algorithm, by using the Preflow push, the time complexity is O((2n+2)^3)=O(n^3);

The binary search in the last step is O(logm)

Therefore, the total time complexity is O(mlogm)+O(n^3logm)