1) Several major delivery firms have eliminated left turns from their routes for various reasons [see, e.g., https://www.cnn.com/2017/02/16/world/ups-trucks-no-left-turns/index.html]. Your delivery firm wants to go a step further by having its trucks take as few turns as possible. Suppose that:
   - The city your firm is in has \( n \) roads
   - Each road is a straight line segment
   - The set of all roads is topologically connected
   - Each road allows traffic in both directions
   - There are no forbidden turns at any intersection
   - Let \( d_{i,j} \) be 1 if roads \( i \) and \( j \) intersect and 0 otherwise
   - If \( x \) and \( y \) are two points on the same road, \( d_{x,y} \) is the distance between \( x \) and \( y \) along that road

Design an algorithm which finds the shortest path between two points in the road network of your city such that this path requires the smallest possible number of turns (see figure below for an example). Prove the correctness of your algorithm and determine its runtime complexity.

Streets are pictured as blue segments. Among the paths between the marked points that require the fewest possible turns, the shortest such path is found (pictured in red).

2) You go to a party where some guests aren't friends, but for any partition of the guests into two nonempty groups, there is a person in the first group who is friends with someone in the second group.
   a) Suppose that each pair of guests at the party has exactly one mutual friend. Can there be an even number of people at the party?
   b) Suppose that each pair of guests at the party has exactly two mutual friends. Can there be an even number of people at the party?

Justify your answers.