Homework 3 of CSC I0600 Fundamental Algorithms, Fall 2020

given November 4, 2020, due November 30

The aim of this homework is to implement the balance strategy for a k-server problem. You have a city map, which is subgraph of a grid graph (some streets are blocked). You have four servers (e.g., repairmen), which are requested at a sequence of grid points; and you dispatch for each request one server. The server stays there until you move him to his next assignment. Your goal is to keep the total travel distance small. Since this is an on-line problem, where the next request comes in only after we served the current request, we cannot expect to get the optimum for the request sequence. Instead we need to implement a local strategy that makes the decision which server to send next. In this project we will use the balance strategy: we choose the server such that the difference in travel distance between the server who traveled least and the server who traveled most is minimized.

You are provided the SIZE by SIZE grid graph as a SIZE by SIZE by four array: for each vertex (i,j) there are four possible edges which we number clockwise starting with the edge going right. So G[i][j][2] refers to the edge going left from vertex (i,j); its state can be FREE or BLOCKED. The graph is displayed on the screen. Your four servers are initially located in the four corners; they are colored pink, yellow, cyan, green. The input comes as sequence of mouseclicks near the target positions. After each mouseclick you choose one server, and move it to the new position, and display the path it moved on the screen in its color.

Your code needs to be C or C++, I need to be able to compile it on my laptop, and test it. Do not share code, and do not use code you found on the web. It is essential that what you submit is your code, anything else is cheating.