Homework Project 1

Given 09/21/2011, Due 10/12/2011

The aim of this project is to create a program that takes a set of points and segment obstacles as input, as well as a start and target point, and shows the bottleneck shortest path between them. It provides a visual feedback by drawing the points, obstacles, and the path on the screen using the `xlib` interface.

The program takes one command-line argument, a file name. The first line describes the coordinate intervals; it is of the form

```
[-100,500]x[0,300]
```

The following lines give the set of points; the first two points are the start and target point of the path. They have the format

```
P (-19, 273)
```

After these come some lines with obstacles; they are line segments described by start and end point, with format

```
S (20,100) (55,63)
```

You can parse these files with `scanf` (e.g., format `"[%d,%d]x[%d,%d]"` for the first line). There are less than 1000 points and obstacles.

As first stage, your read the input; then you check for each pair of points and each segmenty whether the pair of points is separated by the segment; if not, you compute the distance and put it in an array of occuring distances. Then you sort this array. Finally, you perform binary search on that array to find the smallest distance d such that if you connect only point pairs of distance at most d, the start and target point are in the same connected component. Then you select a path from start to target in that component, and display the points, obstacles, and the resulting path in a window.

The programming language is C or C++; test your code before submission using the `gcc` or `g++` compiler. Please remove all dead code; try to program as clearly as possible, since I try to read it. Do not copy code from another student.

Submit your source code by e-mail to `peter@cs.ccny.cuny.edu`; include your name and the homework number in the subject line.