Homework Project 1

Given 09/04/2018, Due 09/25/2018

The aim of the project is to create a program that performs motion planning for a triangular vehicle in an environment with triangular obstacles. in each step, the vehicle can move by rotation or translation. You are given the vehicle shape, its start and target position and orientation, and the list of all obstacles. You discretize the free space, and find by BFS a path with minimum number of steps from the start to the target position. You show the path you found, as well as the obstacles, in a window using the xlib interface. Choose colors and linewidths to make your graphic output easy to understand. All coordinates are integers.

The name of the input file is a command line argument of your program. The file contains first a line with the description of the vehicle, of the form:

```
V (-6,-3) (-6,3) (10,0)
```

The center of the vehicle is always assumed to be the point (0,0), and any rotation is performed around that point. The next two lines give the start and target positions, as the translation and rotation of the center:

```
S (50,50) 20
T (70,400) 90
```

This is followed by the list of triangular obstacles:

```
O (100,100) (100,130) (150,110)
```

All the motion and obstacles happen inside a bounding box of 500 by 500.

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 or from a web site.

Submit your source code by e-mail to `phjmbrass@gmail.com`; include the course (I06) and homework number in the subject line, and your name as a comment in the homework file. If you submit multiple files, you can pack them with the `tar` archiver.