Programming Assignment 5-3:
Grid-based Maze Router for 2-terminal Nets

Problem Descriptions:

Given (1) a gridded routing region, (2) two-terminal net information including net names and terminal locations, and (3) blockage information that indicates a line or a region where the router cannot pass through, apply Lee's algorithm to route the nets so that the total wire length and the number of wiring corners are minimized.

Input format:

The input file consists of three parts: a bounding box, a netlist, and blockage information. The first two rows specify a bounding box, i.e., a gridded routing region, as shown in the following.

.row 100
.col 100

We assume the lower-left corner of this bounding box is the origin (0,0).

The keyword '.net' signify the beginning of the definition of the netlist. Each statement consists of a net name and two positions to locate its two terminals. The following is an example of three nets.

.net
Net1 (40 56) (64 70)
Net2 (45 54) (87 66)
Net3 (20 11) (94 80)

A blockage may be a line or a rectangle. If both the x-coordinates and y-coordinates are different, this blockage is a rectangle. The order of the corners or endpoints for a rectangle or a line is arbitrary. The following example defines two line blockages and a rectangle blockage.

.blk
(10 10) (50 10)
(55 25) (55 75)
(30 50) (80 30)

Output format:

1. A text output that describes the routes of each net.
2. A GUI to display the routing result.
3. A text output that gives the total wire length and the number of wiring corners

Grading:

Your grade depends on the correctness, and runtime of your program. You may first compress all of the source code and execution file and then email your homework to TA before the deadline (please specify your student ID in the subject). The implementation details and your comments about this homework should be written in a simple report and mailed to TA together.