## Problem 3: The Postman Always Rings Twice

You have recently started working at SpedEx, a company which specializes in package pickups from specially-marked boxes at various street intersections in the downtown city grid of Metropolis. Streets are laid out in a regular integer grid with both positive and negative x- and y-coordinates,  $-100 \le x, y \le 100$ , and the SpedEx depot is located at grid-position (0,0). Every Friday at 5pm, the company provides a free champagne and caviar buffet. Unfortunately, at 4:59pm each Friday, a number of pickup orders arrive, and the company has ruled that each driver must pick up two of these orders and return them to the depot before they can chow down at the buffet. The one good thing is that the company allows each driver to specify which two packages they will pick up.

Write a program which, given a list L of package pickup orders, computes and outputs all pairs of orders that require the minimum total travel distance to pick them up and return them to the depot. Recall that the minimum distance between two points  $(x_1, y_1)$  and  $(x_2, y_2)$ on an integer grid is  $|x_1 - x_2| + |y_1 - y_2|$ . Your input will be a (1 + |L|)-line textfile, in which the first line is the number of pickup orders and the remaining |L| lines are the pickup orders (one per line), specified by a pickup box name and the x- and y-coordinates of that box's street intersection. You may assume that all input files are formatted correctly.

**Sample input #1** (available as file "test3a.dat"):

Sample output #1:

depot => StaA => StaC => depot [ 6 ]

**Sample input #2** (available as file "test3b.dat"):

4 StaA -1 1 StaB 2 2 StaC 1 -2 StaD -1 -1

Sample output #2:

depot => StaA => StaD => depot [ 6 ]

Sample input #3 (available as file "test3c.dat"):

4 StaB 2 2 StaD -1 -1 StaA -1 1 StaC 1 -2

Sample output #3:

depot => StaD => StaA => depot [ 6 ]