

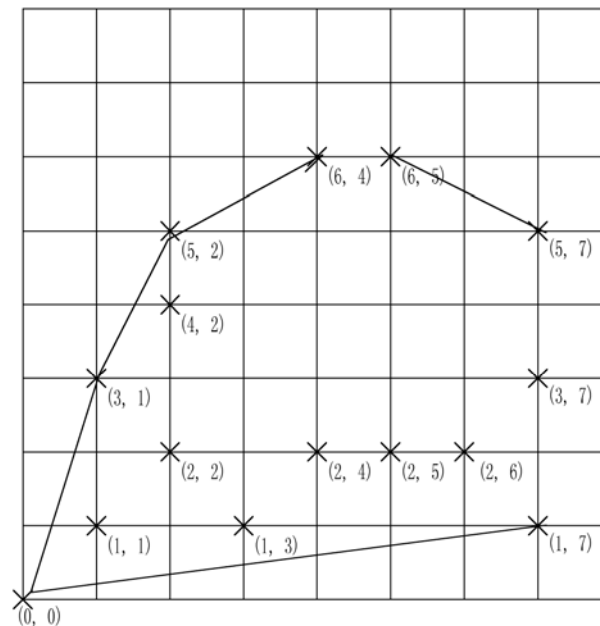
## Problem A

### Minimal Fence Length

*Input file: pa.txt*

#### Problem Statement

A landlord partitions his land into a 100 by 100 grid. He randomly plants trees on the intersection points of the grid within his land. Lately he wants to build a fence to enclose all the trees. Given those trees, your job is to calculate the minimal length of the fence to encompass them. A sample figure is as follows. The minimal fence is then formed by the tree in positions (0,0), (3,1), (5,2), (6,4), (6,5), (5,7), (3,7), and (1,7), with length 21.9412.



#### Input File Format

The first line of input file consists of a single number denoting the number of test cases in the file. There is a single line containing a '/' character separating two consecutive test cases. The end of the file is marked with a line containing a '.' character. Each test case starts with a positive integer  $n$  ( $n \leq 30$ ) representing the number of trees, followed by  $n$  ordered pairs of row and column numbers (separated by a blank space) to represent the positions of the trees. The order of trees that appears in the input data set is random.

#### Output Format

For each test case, print out all of the following on a single line separated by blanks: The test case number  $i$ , the string "The minimal length of the fence is ", and your computed minimal length of the fence to 4 decimal places. Accuracy within 0.001 of the correct answer will be accepted as correct.

**Sample Input**

```
1
15
0 0
1 3
1 1
2 2
3 1
4 2
5 2
6 4
6 5
5 7
2 5
2 4
2 6
3 7
1 7
.
```

**Sample Output**

```
Case 1: The minimal length of the fence is 21.9412
```