

## 6859 Points

Peter and Bob are playing a “Points” game on a math sheet of paper. Peter places a few points on the paper — grid nodes. Bob wants to surround them with a polygon so that all marked nodes are lying strictly within (not at the border) the polygon. All sides of the polygon are along the sides or the diagonals of the grid cells and its perimeter is as small as possible. You must determine what is the perimeter of the polygon.

### Input

The input file contains several test cases, each of them as described below.

The first line contains integer  $N$  — the number of points placed by Peter ( $1 \leq N \leq 100000$ ). Each of following  $N$  lines contains two integers  $x_i, y_i$  — the point coordinates placed by Peter. The coordinates by absolute value do not exceed  $10^6$ . Some points can match.

### Output

For each test case, you need to print one number — the perimeter of the required polygon, on a line by itself. The answer should be printed with accuracy not less than 0.001.

### Sample Input

```
1
0 0
2
1 1
1 2
```

### Sample Output

```
5.656
7.656854
```