Problem J
The Closest Pair Problem

Input: standard input
Output: standard output
Time Limit: 8 seconds
Memory Limit: 32 MB

Given a set of points in a two dimensional space, you will have to find the distance between the closest two points.

Input

The input file contains several sets of input. Each set of input starts with an integer **N (0<=N<=10000)**, which denotes the number of points in this set. The next **N** line contains the coordinates of **N** two-dimensional points. The first of the two numbers denotes the **X-coordinate** and the latter denotes the **Y-coordinate**. The input is terminated by a set whose **N=0**. This set should not be processed. The value of the coordinates will be less than **40000** and non-negative.

Output

For each set of input produce a single line of output containing a floating point number (with four digits after the decimal point) which denotes the distance between the closest two points. If there is no such two points in the input whose distance is less than **10000**, print the line **INFINITY**.

Sample Input

```
3
0 0
10000 10000
20000 20000
5
0 2
6 67
43 71
39 107
189 140
0
```

Sample Output

```
INFINITY
36.2215
```

(World Final Warm-up Contest, Problem setter: Shahriar Manzoor)

"Generally, a brute force method has only two kinds of reply, a) Accepted b) Time Limit Exceeded."