

Travelling Salesperson 2D

Input

Your program should take as input a single TSP instance. It will be run several times, once for every test case. The time limit is per test case.

The first line of standard input contains an integer $1 \leq N \leq 1000$, the number of points. The following N lines each contain a pair of real numbers x, y giving the coordinates of the N points. All numbers in the input have absolute value bounded by 10^6 .

The distance between two points is computed as the Euclidean distance between the two points, *rounded to the nearest integer*.

Output

Standard output should consist of N lines, the i 'th of which should contain the (0-based) index of the i 'th point visited.

Score

Let **Opt** be the length of an optimal tour, **Val** be the length of the tour found by your solution, and **Naive** be the length of the tour found by the algorithm below. Define $x = (\text{Val} - \text{Opt}) / (\text{Naive} - \text{Opt})$. (In the special case that $\text{Naive} = \text{Opt}$, define $x = 0$ if $\text{Val} = \text{Opt}$, and $x = \infty$ if $\text{Val} > \text{Opt}$.)

The score on a test case is $0.02x$. Thus, if your tour is optimal, you will get 1 point on this test case. If your score is halfway between **Naive** and **Opt**, you get roughly 0.14 points. The total score of your submission is the sum of your score over all test cases. There will be a total of 50 test cases. Thus, an implementation of the algorithm below should give a score of at least 1 (it will get 0.02 points on most test cases, and 1.0 points on some easy cases where it manages to find an optimal solution).

The algorithm giving the value **Naive** is as follows:

GreedyTour

```
tour[0] = 0
used[0] = true
for i = 1 to n-1
    best = -1
    for j = 0 to n-1
```

```
        if not used[j] and (best = -1 or dist(tour[i-1],j) < dist(tour[i-1],best))
            best = j
        tour[i] = best
        used[best] = true
    return tour
```

The sample output gives the tour found by GreedyTour on the sample input. The length of the tour is 323.

Sample Input 1

```
10
95.0129 61.5432
23.1139 79.1937
60.6843 92.1813
48.5982 73.8207
89.1299 17.6266
76.2097 40.5706
45.6468 93.5470
1.8504 91.6904
82.1407 41.0270
44.4703 89.3650
```

Sample Output 1

```
0
8
5
4
3
9
6
2
1
7
```