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## Choose three points

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Desè Concurs de Programació de la UPC - Final (2012-09-15)

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You are given  $n$  points on the plane, no three of which are colinear. Therefore, there is always exactly one circle that passes through any three of the given points. Please choose any three points such that its corresponding circle encloses the  $n$  points.

### Input

Input consists of several cases. Every case begins with  $n$ , followed by  $n$  different points, no three of which are colinear. The coordinates are integer numbers less than  $10^5$  in absolute value. Assume  $3 \leq n \leq 5000$ .

### Output

Print one line for every case, with three points such that their corresponding circle includes all the given points. Print, in any order and separated by one space, the index of the points (numbered from 1 to  $n$ ). If there are several solutions, print any of them. If there is no solution, print "I hate geometric problems".

### Observations

- If you use C++ floating-point numbers, in order to avoid precision issues use the **long double** type to perform calculations.
- The problemsetter's solution has cost  $\Theta(n)$ .

### Sample input

```
3 0 70000 70000 0 70000 70000
5 0 3 3 0 1 1 0 -3 -3 0
5 0 3 3 0 1 1 0 -3 -3 0
4 -1 2 0 4 2 0 0 0
```

### Sample output

```
3 1 2
1 2 4
5 4 2
2 3 4
```

### Problem information

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