Problem B
Mooncake
Time Limit: 1 second

A special delicious mooncake has been prepared for Mid-Autumn Festival!

The shape of the cake is a polygon (***not*** necessarily convex). This polygon is ***not*** a degenerate one, that means no vertex lies on an edge joining two other vertices.

The mooncake is expected to serve $K + 1$ visitors.

You use a knife to cut the cake along a horizontal line $y = y_1$ to serve the first visitor. When the second visitor arrives, you cut the cake along another horizontal line $y = y_2 > y_1$ to serve him or her, and so on.

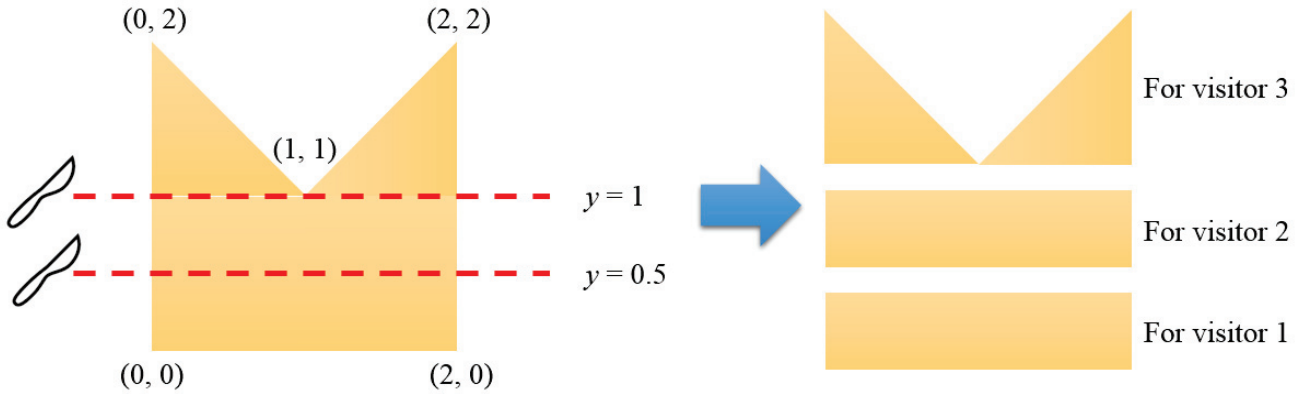
Using K cuts with K distinct horizontal lines, you can split the mooncake into $K + 1$ parts so that $K + 1$ visitors can enjoy the special mooncake. Each part may contain multiple separated pieces of the cake.

Your task is to find the set of K horizontal lines to split the mooncake into $K + 1$ parts with the same area, each of which will be served for a visitor.

Note: A horizontal line contains all points with the same Y-coordinate.

Example:

To serve three visitors, the mooncake is cut with two horizontal lines, $y = 0.5$ and $y = 1$.



Input

The first line of input contains two integers N and K, $3 \le N \le 65\,535$, $1 \le K \le 65\,535$, where N is the number of vertices of the polygon, and K is the number of lines to cut.

The next N lines contain the vertices of the polygon in clockwise order. Each vertex is defined by its coordinates X and Y, which are integers and not exceeding 10000 in absolute value.

Output

The output file should contain K lines, each of which contains the Y-coordinate of a horizontal line. Those coordinates should be in ascending order.

Your output should have an absolute or relative error of at most 10^{-4}.

Sample Input 1

```
5 2
0 0
0 2
1 1
2 2
2 0
```

Sample Output 1

```
0.5000
1.0000
```

Sample Input 2

```
4 1
0 0
0 3
3 3
3 0
```

Sample Output 2

```
1.5000
```