

Similar statements (4)**P73574_en**

Catorzè Concurs de Programació de la UPC - Semifinal (2016-06-29)

Consider two infinite horizontal lines A and B , separated ℓ units apart. The line A has m points at the abscissae a_1, \dots, a_m . The line B has n points at the abscissae b_1, \dots, b_n . Given p different indices i_1, \dots, i_p chosen from $\{1 \dots m\}$, and p different indices j_1, \dots, j_p chosen from $\{1 \dots n\}$, define d_k as the Euclidean distance between a_{i_k} and b_{j_k} , that is,

$$d_k = \sqrt{(a_{i_k} - b_{j_k})^2 + \ell^2} .$$

You are given ℓ , p , and the points in A and in B . Pick i_1, \dots, i_p and j_1, \dots, j_p in order to

$$\text{maximize } \min_{k=1..p} d_k$$

Input

Input consists of several cases, each one with only integer numbers. Every case begins with four strictly positive numbers ℓ , p , m and n . Follow $a_1 \leq a_2 \leq \dots \leq a_{m-1} \leq a_m$. Follow $b_1 \leq b_2 \leq \dots \leq b_{n-1} \leq b_n$. Assume $\ell \leq 10^6$, $p \leq \min(m, n)$, and that the absolute value of each abscissa is at most 10^6 .

Additionally, assume that m and n are at most 1000.

Output

For every case, print the result with four digits after the decimal point. If you use the long double type, the input cases have no precision issues.

Sample input

```
1 1 2 2
5 10
9 20

1 2 2 2
5 10
9 20

1000000 4 5 4
300000 300000 300000 300000 300000
-500000 -500000 -500000 -500000

3 2 7 4
0 2 4 6 8 10 12
1 4 7 10
```

Sample output

```
15.0333
4.1231
1280624.8475
10.4403
```

Problem information

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