

**Similar statements (5)**

**P12471\_en**

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

Consider two infinite horizontal lines  $A$  and  $B$ , separated  $\ell$  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  $\ell, p$ , and the points in  $A$  and in  $B$ . Pick  $i_1, \dots, i_p$  and  $j_1, \dots, j_p$  in order to

$$\text{minimize } \max_{k=1..p} d_k$$

**Input**

Input consists of several cases, each one with only integer numbers. Every case begins with four strictly positive numbers  $\ell, p, m$  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  $10^4$ .**

**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**

```
1.4142
10.0499
1280624.8475
3.0000
```

## **Problem information**

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