Distance between polygons P27519_en

That's all: Compute the distance between the sides of two given polygons.

Input

Input consists of several cases. Each case begins with two numbers n and m. Follow the n points that define the first polygon, and the m points that define the second polygon. Assume $1 \leq n, m \leq 10^3$. All the given coordinates are integer numbers with absolute value at most 10^4.

Output

For every case, print its number followed by the minimum distance between the sides of the two polygons, rounded to four digits after the decimal point. If handled correctly, the input cases have no precision issues.

Sample input 1

```
3 3
0 0  0 1  1 0
2 2  1 2  2 1

4 2
0 0  6 6  0 6  6 0
3 4  3 5

1 3
8 8
8 7  8 9  8 9

2 2
-1 -1  1 1
-1 1  1 -1

1 1
0 0
0 0

2 2
0 0  0 2
0 1  0 3

1 1
1 1
1 0
```

Sample output 1

```
Case #1: 1.4142
Case #2: 0.7071
Case #3: 0.0000
Case #4: 0.0000
Case #5: 0.0000
Case #6: 0.0000
Case #7: 1.0000
```

Problem information

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