6_配對遊戲 (Matching Game)

(20 分)

時間限制: 1 second
記憶體限制: 256 MB

題目敘述

座標平面上有 $2n$ 個點，其中有 n 個紅點和 n 個藍點，第 i 個紅點的座標是 $(0, a_i)$，第 i 個藍點的座標則是 (L, b_i)。所有的紅點都在 $x = 0$ 的垂直線上，所有的藍點則都在 $x = L$ 的垂直線上。注意，點的座標有可能會重複，但他們不算同一個點。

一開始，所有點都沒有被配對過，而你的起始分數為 0。

在一次配對操作中，你可以選擇尚未被配對過的紅點和藍點各一個並將它們配對，假設兩個點之間的歐幾里得距離為 d，配對後你獲得的分數就是 d。兩個點 $(x_1, y_1), (x_2, y_2)$ 之間的歐幾里得距離為 $\sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$。

你的目標是利用 n 次配對操作獲得最多的分數。請寫一支程式，算出你能獲得的最大分數。

輸入格式

第一行輸入兩個正整數 n, L。

第二行輸入 n 個整數 $a_1, a_2, \ldots, a_n$，代表 n 個紅點的座標為 $(0, a_1), (0, a_2), \ldots, (0, a_n)$。

第三行輸入 n 個整數 $b_1, b_2, \ldots, b_n$，代表 n 個藍點的座標為 $(L, b_1), (L, b_2), \ldots, (L, b_n)$。

輸出格式

輸出一個實數代表你能獲得的最大分數。

你的回答只要絕對誤差或相對誤差不超過 10^{-6} 就會視為正確，也就是說假設你的回答為 A 而正確答案為 B，則你的答案會視為正確若 $\frac{|A-B|}{\max(1,|B|)} \le 10^{-6}$。

資料範圍

- $1 \le n \le 10^5$
- $1 \le L \le 10^9$
- $-10^9 \le a_i, b_i \le 10^9$

測試範例

輸入範例 1

```
3 1
4 5 1
2 6 3
```

輸出範例 1

```
9.675510736134259
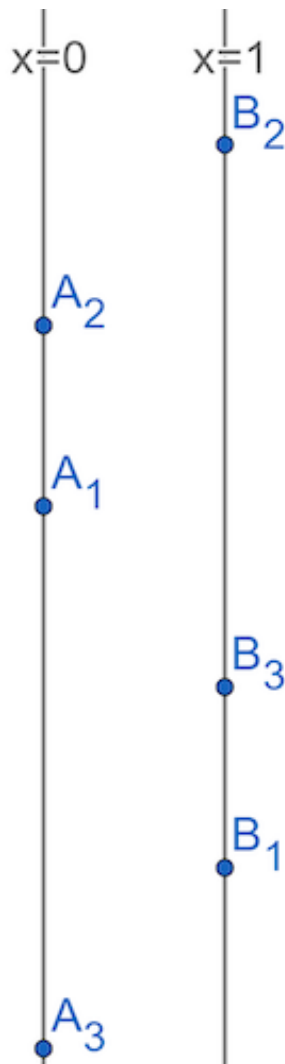```

## 輸入範例 2

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

輸出範例 2

```
10.000
```

範例說明

範例一中，令 A_i 為點 $(0, a_i)$，B_i 為點 $(1, b_i)$，則最好的配對方法是將紅點 A_1, A_2, A_3 依序和藍點 B_3, B_1, B_2 配對。下圖為這六個點和兩條垂直線的相對位置。

範例二中，不管怎麼配對，最後的分數一定是 10。

6_Matching Game

(20 points)

Time Limit: 1 second
Memory Limit: 256MB

Statement

There are $2n$ points on a coordinate plane, consisting of n red points and n blue points. The coordinates of the i-th red point are $(0, a_i)$, and the coordinates of the i-th blue point are (L, b_i). All red points lie on the vertical line $x = 0$, and all blue points lie on the vertical line $x = L$. Note that the coordinates of the points may be repeated, but they are still considered distinct points.

Initially, none of the points are paired, and your starting score is 0.

In one pairing operation, you can choose one unpaired red point and one unpaired blue point and pair them together. If the Euclidean distance between the two points is d, then you earn a score of d after pairing them. The Euclidean distance between two points $(x_1, y_1), (x_2, y_2)$ is $\sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$.

Your goal is to achieve the highest possible score after performing n pairing operations. Write a program to calculate the maximum score you can obtain.

Input Format

The first line contains two positive integers n and L.

The second line contains n integers $a_1, a_2, \ldots, a_n$, representing the coordinates of the n red points $(0, a_1), (0, a_2), \ldots, (0, a_n)$.

The third line contains n integers $b_1, b_2, \ldots, b_n$, representing the coordinates of the n blue points $(L, b_1), (L, b_2), \ldots, (L, b_n)$.

Output Format

Output a real number representing the maximum score you can achieve.

Your answer will be considered correct if the absolute or relative error does not exceed 10^{-6}, meaning that if your answer is A and the correct answer is B, your answer will be considered correct if $\frac{|A-B|}{\max(1,|B|)} \leq 10^{-6}$
.

Constraints

- $1 \leq n \leq 10^5$
- $1 \leq L \leq 10^9$
- $-10^9 \leq a_i, b_i \leq 10^9$

Test Cases

Input 1

```
3 1
4 5 1
2 6 3
```

Output 1

```
9.675510736134259
```

Input 2
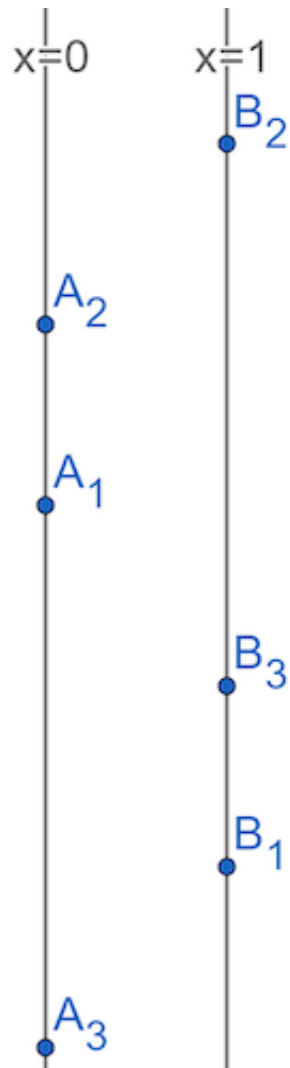
```
5 2
1 1 1 1 1
1 1 1 1 1
```

Output 2

```
10.000
```

Illustrations

In the first example, let A_i be the point $(0, a_i)$ and B_i be the point $(1, b_i)$.

The best pairing method is to pair the red points A_1, A_2, A_3 with the blue points B_3, B_1, B_2, respectively.

The following picture shows the relative positions of the six points and two vertical lines.

In the second example, no matter how you pair the points, the final score will always be 10.