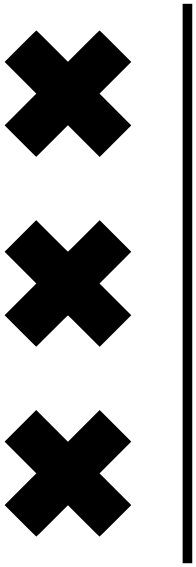
Preliminaries Testsession

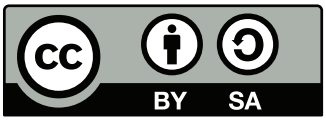
for the Benelux Algorithm Programming Contest



Benelux
Algorithm
Programming
Contest **2017**

Problems

X CAPS
Y Frog Leaps
Z Soccer Skills



X CAPS

Earth is under attack! Messages need to be sent to the Earth Defense Force (EDF) that makes clear that the situation is dire. The EDF's strongest forces consist of mechs (huge bipedal robots) that are piloted by Japanese teenagers. To make sure that the messages come across as urgent, they must be displayed on the monitors of the pilots in uppercase letters. Unfortunately, the tachyon communication system that is used by the EDF is only able to send strings in lower-case alphabetic characters.

Picture by Wackystuff via Flickr

The set of lower-case alphabetic characters is made up of the following characters: 'a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'j', 'k', 'l', 'm', 'n', 'o', 'p', 'q', 'r', 's', 't', 'u', 'v', 'w', 'x', 'y', 'z'.

Your job is to write a program that converts the given messages to upper-case.

Input

- A single line containing a string of length n ($10^0 \leq n \leq 10^6$), consisting of lower-case alphabetic characters.

Output

- A single line containing the input string where all letters are converted to upper-case letters.

Sample Input 1	**Sample Output 1**
`alert`	`ALERT`

Sample Input 2	**Sample Output 2**
`earthisunderattack`	`EARTHISUNDERATTACK`

Sample Input 3	**Sample Output 3**
`canyoupickupsomegroceries`	`CANYOUPICKUPSOMEGROCERIES`

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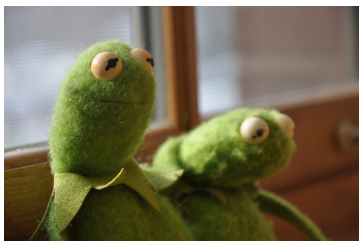
Y Frog Leaps

It is a little known secret that frogs also like to participate in the BAPC. However, to reach Amsterdam they will need to cross lots of rivers. Fortunately, the frog is in good condition and can jump as far as he wants to go. However, jumping a distance of i meters costs the frog i^2 units of energy. The only way the frog can reach Amsterdam is by jumping from stop to stop.



Picture by John Blyberg via Flickr

The frog, who is of course lazy, would like to minimize the amount of energy he needs to spend. Can you calculate the minimum amount of energy he needs to spend to reach Amsterdam?

Input

- On the first line one integer $2 \leq n \leq 10^6$, the total number of stops.
- Then follow n lines with one integer x_i, the position of the ith stop in meters, with $x_i < x_{i+1}$. Here $0 \leq x_i \leq 10^6$. The frog's start location is at the first stop x_0. Amsterdam is located at the last stop x_{n-1}.

Output

- Print a single integer indicating the minimum number of units of energy the frogs needs to travel to Amsterdam.

Sample Input 1	Sample Output 1
2 0 10	100

Sample Input 2	Sample Output 2
3 2 4 6	8

Sample Input 3	Sample Output 3
4 10 20 25 26	126

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Z Soccer Skills

At the company soccer tournament, you want to impress your boss, who is watching the game you are participating in. Fortunately, you are a pretty good soccer player, who can make some sharp passes. You look around you to your team mates to see if there are any around who are close enough that you can reliably pass, but far away enough that your boss will be impressed.

Picture by Maggio7 via Flickr

Input

- A line with an integer $1 \leq N \leq 10^6$, the number of team mates on the field.
- A line with two floating point numbers $0 \leq a, b \leq 1000$. The number a gives the least distance at which your boss will be impressed, and the number b gives the largest distance at which you can reliably pass.
- A line with two integers $-1000 \leq p_x, p_y \leq 1000$, your position on the playing field.
- N lines, each with two integers $-1000 \leq q_x, q_y \leq 1000$, the positions of your team mates on the field.

Output

- If there is no team mate on the field you can pass to in such a way that you will impress your boss, output a single line with the word "`impossible`".
- Otherwise, output a single line with two integers q_x, q_y, the location of a team mate you can pass to, and two floating point numbers: the distance from you to that team mate, and the angle at which you have to shoot, given as an angle in $[-\pi, \pi)$ measured counter-clockwise from the positive x-axis.

The distance and angle will be accepted if the absolute or relative difference is at most 10^{-6} from the actual value.

Sample Input 1	Sample Output 1
2 1.0 2.0 0 0 1 1 2 2	1 1 1.41421356 0.78539816

Sample Input 2	**Sample Output 2**
2 1.0 2.0 0 0 2 2 4 4	impossible