Codeforces Round #125 (Div. 2)

A. Hexadecimal's theorem

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

Recently, a chaotic virus Hexadecimal advanced a new theorem which will shake the Universe. She thinks that each Fibonacci number can be represented as sum of three not necessary different Fibonacci numbers.

Let's remember how Fibonacci numbers can be calculated. $F_0 = 0$, $F_1 = 1$, and all the next numbers are $F_i = F_{i-2} + F_{i-1}$.

So, Fibonacci numbers make a sequence of numbers: $0, 1, 1, 2, 3, 5, 8, 13, \ldots$

If you haven't run away from the PC in fear, you have to help the virus. Your task is to divide given Fibonacci number n by three not necessary different Fibonacci numbers or say that it is impossible.

Input

The input contains of a single integer n $(0 \le n < 10^9)$ — the number that should be represented by the rules described above. It is guaranteed that n is a Fibonacci number.

Output

Output three required numbers: a, b and c. If there is no answer for the test you have to print "`I'm too stupid to solve this problem`" without the quotes.

If there are multiple answers, print any of them.

Sample test(s)

input
3
output
1 1 1

input
13
output
2 3 8

B. Special Olympics

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

A renowned abstract artist Sasha, drawing inspiration from nowhere, decided to paint a picture entitled "Special Olympics". He justly thought that, if the regular Olympic games have five rings, then the Special ones will do with exactly two rings just fine.

Let us remind you that a ring is a region located between two concentric circles with radii r and R $(r < R)$. These radii are called internal and external, respectively. Concentric circles are circles with centers located at the same point.

Soon a white canvas, which can be considered as an infinite Cartesian plane, had two perfect rings, painted with solid black paint. As Sasha is very impulsive, the rings could have different radii and sizes, they intersect and overlap with each other in any way. We know only one thing for sure: the centers of the pair of rings are not the same.

When Sasha got tired and fell into a deep sleep, a girl called Ilona came into the room and wanted to cut a circle for the sake of good memories. To make the circle beautiful, she decided to cut along the contour.

We'll consider a contour to be a continuous closed line through which there is transition from one color to another (see notes for clarification). If the contour takes the form of a circle, then the result will be cutting out a circle, which Iona wants.

But the girl's inquisitive mathematical mind does not rest: how many ways are there to cut a circle out of the canvas?

Input

The input contains two lines.

Each line has four space-separated integers x_i, y_i, r_i, R_i, that describe the i-th ring; x_i and y_i are coordinates of the ring's center, r_i and R_i are the internal and external radii of the ring correspondingly $(-100 \le x_i, y_i \le 100;\ 1 \le r_i < R_i \le 100)$.

It is guaranteed that the centers of the rings do not coinside.

Output

A single integer — the number of ways to cut out a circle from the canvas.

Sample test(s)

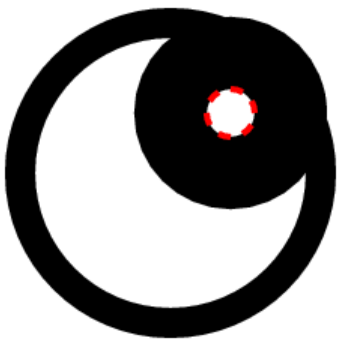
input
60 60 45 55 80 80 8 32
output
1

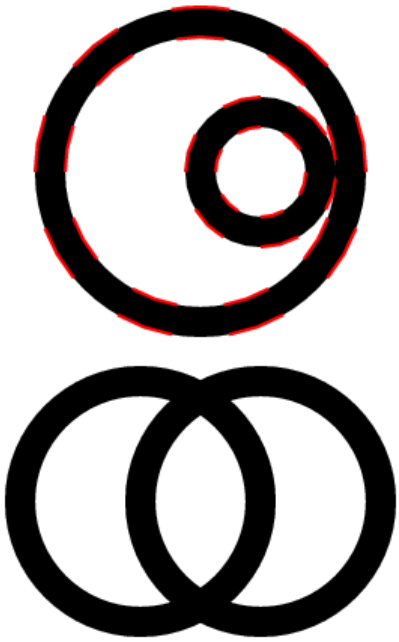
input
60 60 45 55 80 60 15 25
output
4

input
50 50 35 45 90 50 35 45
output
0

Note

Figures for test samples are given below. The possible cuts are marked with red dotted line.





C. About Bacteria

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

Qwerty the Ranger took up a government job and arrived on planet Mars. He should stay in the secret lab and conduct some experiments on bacteria that have funny and abnormal properties. The job isn't difficult, but the salary is high.

At the beginning of the first experiment there is a single bacterium in the test tube. Every second each bacterium in the test tube divides itself into k bacteria. After that some abnormal effects create b more bacteria in the test tube. Thus, if at the beginning of some second the test tube had x bacteria, then at the end of the second it will have $kx + b$ bacteria.

The experiment showed that after n seconds there were exactly z bacteria and the experiment ended at this point.

For the second experiment Qwerty is going to sterilize the test tube and put there t bacteria. He hasn't started the experiment yet but he already wonders, how many seconds he will need to grow at least z bacteria. The ranger thinks that the bacteria will divide by the same rule as in the first experiment.

Help Qwerty and find the minimum number of seconds needed to get a tube with at least z bacteria in the second experiment.

Input

The first line contains four space-separated integers k, b, n and t ($1 \le k, b, n, t \le 10^6$) — the parameters of bacterial growth, the time Qwerty needed to grow z bacteria in the first experiment and the initial number of bacteria in the second experiment, correspondingly.

Output

Print a single number — the minimum number of seconds Qwerty needs to grow at least z bacteria in the tube.

Sample test(s)

input
3 1 3 5
output
2

input
1 4 4 7
output
3

input
2 2 4 100
output
0

D. Jumping on Walls

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

Vasya plays a computer game with ninjas. At this stage Vasya's ninja should get out of a deep canyon.

The canyon consists of two vertical parallel walls, their height is n meters. Let's imagine that we split these walls into 1 meter-long areas and number them with positive integers from 1 to n from bottom to top. Some areas are safe and the ninja can climb them. Others are spiky and ninja can't be there. Let's call such areas *dangerous*.

Initially the ninja is on the lower area of the left wall. He can use each second to perform one of the following actions:

- climb one area up;
- climb one area down;
- jump to the opposite wall. That gets the ninja to the area that is exactly k meters higher than the area he jumped from. More formally, if before the jump the ninja is located at area x of one wall, then after the jump he is located at area $x + k$ of the other wall.

If at some point of time the ninja tries to get to an area with a number larger than n, then we can assume that the ninja got out of the canyon.

The canyon gets flooded and each second the water level raises one meter. Initially the water level is at the lower border of the first area. Ninja cannot be on the area covered by water. We can assume that the ninja and the water "move in turns" — first the ninja performs some action, then the water raises for one meter, then the ninja performs one more action and so on.

The level is considered completed if the ninja manages to get out of the canyon.

After several failed attempts Vasya started to doubt whether it is possible to complete the level at all. Help him answer the question.

Input

The first line contains two integers n and k ($1 \le n, k \le 10^5$) — the height of the canyon and the height of ninja's jump, correspondingly.

The second line contains the description of the left wall — a string with the length of n characters. The i-th character represents the state of the i-th wall area: character "X" represents a dangerous area and character "-" represents a safe area.

The third line describes the right wall in the same format.

It is guaranteed that the first area of the left wall is not dangerous.

Output

Print "YES" (without the quotes) if the ninja can get out from the canyon, otherwise, print "NO" (without the quotes).

Sample test(s)

input
7 3 ---X--X -X--XX-
output
YES

input
6 2 --X-X- X--XX-
output
NO

Note

In the first sample the ninja should first jump to the right wall, then go one meter down along the right wall, then jump to the left wall. The next jump can get the ninja from the canyon.

In the second sample there's no way the ninja can get out of the canyon.

E. Delivering Carcinogen

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

Qwerty the Ranger arrived to the Diatar system with a very important task. He should deliver a special carcinogen for scientific research to planet Persephone. This is urgent, so Qwerty has to get to the planet as soon as possible. A lost day may fail negotiations as nobody is going to pay for an overdue carcinogen.

You can consider Qwerty's ship, the planet Persephone and the star Diatar points on a plane. Diatar is located in the origin of coordinate axes — at point $(0, 0)$. Persephone goes round Diatar along a circular orbit with radius R in the counter-clockwise direction at constant linear speed v_p (thus, for instance, a full circle around the star takes $\frac{2\pi R}{v_p}$ of time). At the initial moment of time Persephone is located at point (x_p, y_p).

At the initial moment of time Qwerty's ship is at point (x, y). Qwerty can move in any direction at speed of at most v ($v > v_p$). The star Diatar is hot (as all stars), so Qwerty can't get too close to it. The ship's metal sheathing melts at distance r ($r < R$) from the star.

Find the minimum time Qwerty needs to get the carcinogen to planet Persephone.

Input

The first line contains space-separated integers x_p, y_p and v_p ($-10^4 \le x_p, y_p \le 10^4$, $1 \le v_p < 10^4$) — Persephone's initial position and the speed at which it goes round Diatar.

The second line contains space-separated integers x, y, v and r ($-10^4 \le x, y \le 10^4$, $1 < v \le 10^4$, $1 \le r \le 10^4$) — The intial position of Qwerty's ship, its maximum speed and the minimum safe distance to star Diatar.

It is guaranteed that $r^2 < x^2 + y^2$, $r^2 < {x_p}^2 + {y_p}^2$ and $v_p < v$.

Output

Print a single real number — the minimum possible delivery time. The answer will be considered valid if its absolute or relative error does not exceed 10^{-6}.

Sample test(s)

input
10 0 1 -10 0 2 8
output
9.584544103

input
50 60 10 50 60 20 40
output
0.000000000