

## Educational Codeforces Round 26

### A. Text Volume

time limit per test: 1 second  
memory limit per test: 256 megabytes  
input: standard input  
output: standard output

You are given a text of single-space separated words, consisting of small and capital Latin letters.

*Volume* of the word is number of capital letters in the word. *Volume* of the text is maximum *volume* of all words in the text.

Calculate the *volume* of the given text.

#### Input

The first line contains one integer number  $n$  ( $1 \leq n \leq 200$ ) — length of the text.

The second line contains text of single-space separated words  $s_1, s_2, \dots, s_i$ , consisting only of small and capital Latin letters.

#### Output

Print one integer number — *volume* of text.

#### Examples

<b>input</b>
7 NonZERO
<b>output</b>
5
<b>input</b>
24 this is zero answer text
<b>output</b>
0
<b>input</b>
24 Harbour Space University
<b>output</b>
1

#### Note

In the first example there is only one word, there are 5 capital letters in it.

In the second example all of the words contain 0 capital letters.

## B. Flag of Berland

time limit per test: 1 second

memory limit per test: 256 megabytes

input: standard input

output: standard output

The flag of Berland is such rectangular field  $n \times m$  that satisfies following conditions:

- Flag consists of three colors which correspond to letters 'R', 'G' and 'B'.
- Flag consists of three equal in width and height stripes, parralel to each other and to sides of the flag. Each stripe has **exactly one color**.
- Each color should be used in **exactly one stripe**.

You are given a field  $n \times m$ , consisting of characters 'R', 'G' and 'B'. Output "YES" (without quotes) if this field corresponds to correct flag of Berland. Otherwise, print "NO" (without quotes).

### Input

The first line contains two integer numbers  $n$  and  $m$  ( $1 \leq n, m \leq 100$ ) — the sizes of the field.

Each of the following  $n$  lines consisting of  $m$  characters 'R', 'G' and 'B' — the description of the field.

### Output

Print "YES" (without quotes) if the given field corresponds to correct flag of Berland . Otherwise, print "NO" (without quotes).

### Examples

<b>input</b>
6 5 RRRRR RRRRR BBBBB BBBBB GGGGG GGGGG
<b>output</b>
YES
<b>input</b>
4 3 BRG BRG BRG BRG
<b>output</b>
YES
<b>input</b>
6 7 RRRGGGG RRRGGGG RRRGGGG RRRBBBB RRRBBBB RRRBBBB
<b>output</b>
NO
<b>input</b>
4 4 RRRR RRRR BBBB GGGG
<b>output</b>
NO

### Note

The field in the third example doesn't have three parralel stripes.

Rows of the field in the fourth example are parralel to each other and to borders. But they have different heights — 2, 1 and 1.

## C. Two Seals

time limit per test: 1 second  
memory limit per test: 256 megabytes  
input: standard input  
output: standard output

One very important person has a piece of paper in the form of a rectangle  $a \times b$ .

Also, he has  $n$  seals. Each seal leaves an impression on the paper in the form of a rectangle of the size  $x_i \times y_i$ . Each impression must be parallel to the sides of the piece of paper (but seal can be rotated by 90 degrees).

A very important person wants to choose two different seals and put them two impressions. Each of the selected seals puts exactly one impression. Impressions should not overlap (but they can touch sides), and the total area occupied by them should be the largest possible. What is the largest area that can be occupied by two seals?

### Input

The first line contains three integer numbers  $n$ ,  $a$  and  $b$  ( $1 \leq n, a, b \leq 100$ ).

Each of the next  $n$  lines contain two numbers  $x_i, y_i$  ( $1 \leq x_i, y_i \leq 100$ ).

### Output

Print the largest total area that can be occupied by two seals. If you can not select two seals, print 0.

### Examples

<b>input</b>
2 2 2 1 2 2 1
<b>output</b>
4
<b>input</b>
4 10 9 2 3 1 1 5 10 9 11
<b>output</b>
56
<b>input</b>
3 10 10 6 6 7 7 20 5
<b>output</b>
0

### Note

In the first example you can rotate the second seal by 90 degrees. Then put impression of it right under the impression of the first seal. This will occupy all the piece of paper.

In the second example you can't choose the last seal because it doesn't fit. By choosing the first and the third seals you occupy the largest area.

In the third example there is no such pair of seals that they both can fit on a piece of paper.

## D. Round Subset

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

Let's call the *roundness* of the number the number of zeros to which it ends.

You have an array of  $n$  numbers. You need to choose a subset of exactly  $k$  numbers so that the *roundness* of the product of the selected numbers will be maximum possible.

### Input

The first line contains two integer numbers  $n$  and  $k$  ( $1 \leq n \leq 200$ ,  $1 \leq k \leq n$ ).

The second line contains  $n$  space-separated integer numbers  $a_1, a_2, \dots, a_n$  ( $1 \leq a_i \leq 10^{18}$ ).

### Output

Print maximal roundness of product of the chosen subset of length  $k$ .

### Examples

<b>input</b>
3 2 50 4 20
<b>output</b>
3
<b>input</b>
5 3 15 16 3 25 9
<b>output</b>
3
<b>input</b>
3 3 9 77 13
<b>output</b>
0

### Note

In the first example there are 3 subsets of 2 numbers.  $[50, 4]$  has product 200 with *roundness* 2,  $[4, 20]$  — product 80, *roundness* 1,  $[50, 20]$  — product 1000, *roundness* 3.

In the second example subset  $[15, 16, 25]$  has product 6000, *roundness* 3.

In the third example all subsets has product with *roundness* 0.

## E. Vasya's Function

time limit per test: 1 second

memory limit per test: 256 megabytes

input: standard input

output: standard output

Vasya is studying number theory. He has denoted a function  $f(a, b)$  such that:

- $f(a, 0) = 0$ ;
- $f(a, b) = 1 + f(a, b - \gcd(a, b))$ , where  $\gcd(a, b)$  is the greatest common divisor of  $a$  and  $b$ .

Vasya has two numbers  $x$  and  $y$ , and he wants to calculate  $f(x, y)$ . He tried to do it by himself, but found out that calculating this function the way he wants to do that might take very long time. So he decided to ask you to implement a program that will calculate this function swiftly.

### Input

The first line contains two integer numbers  $x$  and  $y$  ( $1 \leq x, y \leq 10^{12}$ ).

### Output

Print  $f(x, y)$ .

### Examples

input
3 5
output
3
input
6 3
output
1

## F. Prefix Sums

time limit per test: 1 second

memory limit per test: 256 megabytes

input: standard input

output: standard output

Consider the function  $p(x)$ , where  $x$  is an array of  $m$  integers, which returns an array  $y$  consisting of  $m + 1$  integers such that  $y_i$  is equal to the sum of first  $i$  elements of array  $x$  ( $0 \leq i \leq m$ ).

You have an infinite sequence of arrays  $A^0, A^1, A^2, \dots$ , where  $A^0$  is given in the input, and for each  $i \geq 1$   $A^i = p(A^{i-1})$ . Also you have a positive integer  $k$ . You have to find minimum possible  $i$  such that  $A^i$  contains a number which is larger or equal than  $k$ .

### Input

The first line contains two integers  $n$  and  $k$  ( $2 \leq n \leq 200000$ ,  $1 \leq k \leq 10^{18}$ ).  $n$  is the size of array  $A^0$ .

The second line contains  $n$  integers  $A^0_0, A^0_1, \dots, A^0_{n-1}$  — the elements of  $A^0$  ( $0 \leq A^0_i \leq 10^9$ ). At least two elements of  $A^0$  are positive.

### Output

Print the minimum  $i$  such that  $A^i$  contains a number which is larger or equal than  $k$ .

### Examples

<b>input</b>
2 2 1 1
<b>output</b>
1
<b>input</b>
3 6 1 1 1
<b>output</b>
2
<b>input</b>
3 1 1 0 1
<b>output</b>
0

## G. Functions On The Segments

time limit per test: 5 seconds

memory limit per test: 1024 megabytes

input: standard input

output: standard output

You have an array  $f$  of  $n$  functions. The function  $f_i(x)$  ( $1 \leq i \leq n$ ) is characterized by parameters:  $x_1, x_2, y_1, a, b, y_2$  and take values:

- $y_1$ , if  $x \leq x_1$ .
- $a \cdot x + b$ , if  $x_1 < x \leq x_2$ .
- $y_2$ , if  $x > x_2$ .

There are  $m$  queries. Each query is determined by numbers  $l, r$  and  $x$ . For a query with number  $i$  ( $1 \leq i \leq m$ ), you need to calculate the sum of all  $f_j(x_i)$  where  $l \leq j \leq r$ . The value of  $x_i$  is calculated as follows:  $x_i = (x + last) \bmod 10^9$ , where  $last$  is the answer to the query with number  $i - 1$ . The value of  $last$  equals 0 if  $i = 1$ .

### Input

First line contains one integer number  $n$  ( $1 \leq n \leq 75000$ ).

Each of the next  $n$  lines contains six integer numbers:  $x_1, x_2, y_1, a, b, y_2$  ( $0 \leq x_1 < x_2 \leq 2 \cdot 10^5, 0 \leq y_1, y_2 \leq 10^9, 0 \leq a, b \leq 10^4$ ).

Next line contains one integer number  $m$  ( $1 \leq m \leq 500000$ ).

Each of the next  $m$  lines contains three integer numbers:  $l, r$  and  $x$  ( $1 \leq l \leq r \leq n, 0 \leq x \leq 10^9$ ).

### Examples

input
1 1 2 1 4 5 10 1 1 1 2
output
13

  

input
3 2 5 1 1 1 4 3 6 8 2 5 7 1 3 5 1 4 10 3 1 3 3 2 3 2 1 2 5
output
19 17 11