A. Pythagorean Theorem II

time limit per test: 3 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

In mathematics, the Pythagorean theorem — is a relation in Euclidean geometry among the three sides of a right-angled triangle. In terms of areas, it states:

In any right-angled triangle, the area of the square whose side is the hypotenuse (the side opposite the right angle) is equal to the sum of the areas of the squares whose sides are the two legs (the two sides that meet at a right angle).

The theorem can be written as an equation relating the lengths of the sides a, b and c, often called the Pythagorean equation:

$$a^2 + b^2 = c^2$$

where c represents the length of the hypotenuse, and a and b represent the lengths of the other two sides.

Given n, your task is to count how many right-angled triangles with side-lengths a, b and c that satisfied an inequality $1 \le a \le b \le c \le n$.

Input

The only line contains one integer n $(1 \le n \le 10^4)$ as we mentioned above.

Output

Print a single integer — the answer to the problem.

Examples

input

```
5
```

output

```
1
```

input

```
74
```

output

```
35
```

B. Calendar

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

Calendars in widespread use today include the Gregorian calendar, which is the de facto international standard, and is used almost everywhere in the world for civil purposes. The Gregorian reform modified the Julian calendar's scheme of leap years as follows:

Every year that is exactly divisible by four is a leap year, except for years that are exactly divisible by 100; the centurial years that are exactly divisible by 400 are still leap years. For example, the year 1900 is not a leap year; the year 2000 is a leap year.

In this problem, you have been given two dates and your task is to calculate how many days are between them. Note, that leap years have unusual number of days in February.

Look at the sample to understand what borders are included in the aswer.

Input

The first two lines contain two dates, each date is in the format yyyy:mm:dd ($1900 \le yyyy \le 2038$ and yyyy:mm:dd is a legal date).

Output

Print a single integer — the answer to the problem.

Examples

input

```
1900:01:01
2038:12:31
```

output

```
50768
```

input

```
1996:03:09
1991:11:12
```

output

```
1579
```

C. Lucky Permutation Triple

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

Bike is interested in permutations. A permutation of length n is an integer sequence such that each integer from 0 to $(n - 1)$ appears exactly once in it. For example, $[0, 2, 1]$ is a permutation of length 3 while both $[0, 2, 2]$ and $[1, 2, 3]$ is not.

A permutation triple of permutations of length n (a, b, c) is called a Lucky Permutation Triple if and only if $\forall i (1 \le i \le n), a_i + b_i \equiv c_i \mod n$. The sign a_i denotes the i-th element of permutation a. The modular equality described above denotes that the remainders after dividing $a_i + b_i$ by n and dividing c_i by n are equal.

Now, he has an integer n and wants to find a Lucky Permutation Triple. Could you please help him?

Input

The first line contains a single integer n $(1 \le n \le 10^5)$.

Output

If no Lucky Permutation Triple of length n exists print -1.

Otherwise, you need to print three lines. Each line contains n space-seperated integers. The first line must contain permutation a, the second line — permutation b, the third — permutation c.

If there are multiple solutions, print any of them.

Examples

input

```
5
```

output

```
1 4 3 2 0
1 0 2 4 3
2 4 0 1 3
```

input

```
2
```

output

```
-1
```

Note

In Sample 1, the permutation triple $([1, 4, 3, 2, 0], [1, 0, 2, 4, 3], [2, 4, 0, 1, 3])$ is Lucky Permutation Triple, as following holds:

- $1 + 1 \equiv 2 \equiv 2 \mod 5$;
- $4 + 0 \equiv 4 \equiv 4 \mod 5$;
- $3 + 2 \equiv 0 \equiv 0 \mod 5$;
- $2 + 4 \equiv 6 \equiv 1 \mod 5$;
- $0 + 3 \equiv 3 \equiv 3 \mod 5$.

In Sample 2, you can easily notice that no lucky permutation triple exists.

D. Rectangle Puzzle II

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

You are given a rectangle grid. That grid's size is $n \times m$. Let's denote the coordinate system on the grid. So, each point on the grid will have coordinates — a pair of integers (x, y) $(0 \le x \le n, 0 \le y \le m)$.

Your task is to find a maximum sub-rectangle on the grid (x_1, y_1, x_2, y_2) so that it contains the given point (x, y), and its length-width ratio is exactly (a, b). In other words the following conditions must hold: $0 \le x_1 \le x \le x_2 \le n$, $0 \le y_1 \le y \le y_2 \le m$, $\frac{x_2-x_1}{y_2-y_1} = \frac{a}{b}$.

The sides of this sub-rectangle should be parallel to the axes. And values x_1, y_1, x_2, y_2 should be integers.

If there are multiple solutions, find the rectangle which is closest to (x, y). Here "closest" means the Euclid distance between (x, y) and the center of the rectangle is as small as possible. If there are still multiple solutions, find the lexicographically minimum one. Here "lexicographically minimum" means that we should consider the sub-rectangle as sequence of integers (x_1, y_1, x_2, y_2), so we can choose the lexicographically minimum one.

Input

The first line contains six integers n, m, x, y, a, b $(1 \le n, m \le 10^9, 0 \le x \le n, 0 \le y \le m, 1 \le a \le n, 1 \le b \le m)$.

Output

Print four integers x_1, y_1, x_2, y_2, which represent the founded sub-rectangle whose left-bottom point is (x_1, y_1) and right-up point is (x_2, y_2).

Examples

input
```
9 9 5 5 2 1
```
output
```
1 3 9 7
```

input
```
100 100 52 50 46 56
```
output
```
17 8 86 92
```

E. Minimum Modular

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

You have been given n distinct integers $a_1, a_2, \ldots, a_n$. You can remove at most k of them. Find the minimum modular m ($m > 0$), so that for every pair of the remaining integers (a_i, a_j), the following unequality holds: $a_i \not\equiv a_j \mod m$.

Input

The first line contains two integers n and k ($1 \le n \le 5000, 0 \le k \le 4$), which we have mentioned above.

The second line contains n distinct integers $a_1, a_2, \ldots, a_n$ ($0 \le a_i \le 10^6$).

Output

Print a single positive integer — the minimum m.

Examples

input

```
7 0
0 2 3 6 7 12 18
```

output

```
13
```

input

```
7 1
0 2 3 6 7 12 18
```

output

```
7
```