Problems

1. Rohit has ‘2n’ older sisters. He brought ‘$4n^{2}$’ marble bags. One bag has one marble, one has two and so on. For each integer ‘k’ from 1 to ‘$4n^{2}$’ he has one bag with ‘k’ marbles.

   Help him give the ‘2n’ bags to each sister so that everyone has same number of marbles.

   ## Input

   The line contains single integer ‘2n’ ($1 \le n \le 50$).

   ## Output

   Let's assume that Rohit indexes his sisters with numbers from 1 to *2n*. You need to print 2*n* lines, on the *i*-th line print 2*n* integers — the numbers of marbles in the bags for the *i*-th sister. Naturally, all these numbers should be distinct and be within limits from 1 to $4n^{2}$. You can print the numbers in the lines in any order.

   Examples

   Input
   2
   Output
   1 4
   2 3

2. One day the agents of MHawk secret agency intercepted an integer sequence from enemy territory a_1, a_2, ..., a_n of length 'n'. The agents immediately decided to analyze the sequence. For that, they need to find all values of x, for which these conditions hold:

    a. x occurs in sequence a.
    b. Consider all positions of numbers x in the sequence a (such i, that a_i= x). These numbers, sorted in the increasing order, must form an arithmetic progression.

    Help the agents, find all x that meet the problem conditions.

Input

The first line contains integer 'n' ($1 \le n \le 10^5$). The next line contains integers a_1, a_2, ..., a_n ($1 \le a_i \le 10^5$). The numbers are separated by spaces.

Output

In the first line print integer *t* — the number of valid *x*. On each of the next *t* lines print two integers *x* and p_x, where *x* is current suitable value, p_x is the common difference between numbers in the progression (if *x* occurs exactly once in the sequence, p_x must equal 0). Print the pairs in the order of increasing *x*.

Examples

Input
1
2
Output
1
2 0

Note

In the first test 2 occurs exactly once in the sequence, ergo $p_2 = 0$.

Input
8
1 2 1 3 1 2 1 5
Output
4
1 2
2 4
3 0
5 0

3. Vivek has a ribbon, its length is *n*. He wants to cut the ribbon in a way that fulfils the following two conditions:

   - After the cutting each ribbon piece should have length *a*, *b* or *c*.
   - After the cutting the number of ribbon pieces should be maximum.

   Help Vivek and find the number of ribbon pieces after the required cutting.

Input

The first line contains four space-separated integers *n*, *a*, *b* and *c* ($1 \le n, a, b, c \le 4000$) — the length of the original ribbon and the acceptable lengths of the ribbon pieces after the cutting, correspondingly. The numbers *a*, *b* and *c* can coincide.

Output

Print a single number — the maximum possible number of ribbon pieces. It is guaranteed that at least one correct ribbon cutting exists.

Examples

Input
5 5 3 2
Output
2

Input
7 5 5 2
Output
2

Note:

In the first example Vivek can cut the ribbon in such way: the first piece has length 2, the second piece has length 3.

In the second example Vivek can cut the ribbon in such way: the first piece has length 5, the second piece has length 2.

4. Vasya has got two number: a and b. However, Vasya finds number a too short. So he decided to repeat the operation of lengthening number a n times.

   One operation of lengthening a number means adding exactly one digit to the number (in the decimal notation) to the right provided that the resulting number is divisible by Vasya's number b. If it is impossible to obtain the number which is divisible by b, then the lengthening operation cannot be performed.

   Your task is to help Vasya and print the number he can get after applying the lengthening operation to number a n times.

Input

The first line contains three integers: a, b, n ($1 \le a, b, n \le 10^5$).

Output

In a single line print the integer without leading zeros, which Vasya can get when he applies the lengthening operations to number a n times. If no such number exists, then print number -1. If there are multiple possible answers, print any of them.

Examples

Input
5 4 5
Output
524848

Input
12 11 1
Output
121

Input
260 150 10
Output
-1