Codeforces Round #235 (Div. 2)

A. Vanya and Cards

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

Vanya loves playing. He even has a special set of cards to play with. Each card has a single integer. The number on the card can be positive, negative and can even be equal to zero. The only limit is, the number on each card doesn't exceed x in the absolute value.

Natasha doesn't like when Vanya spends a long time playing, so she hid all of his cards. Vanya became sad and started looking for the cards but he only found n of them. Vanya loves the balance, so he wants the sum of all numbers on found cards equal to zero. On the other hand, he got very tired of looking for cards. Help the boy and say what is the minimum number of cards does he need to find to make the sum equal to zero?

You can assume that initially Vanya had infinitely many cards with each integer number from $-x$ to x.

Input

The first line contains two integers: n $(1 \le n \le 1000)$ — the number of found cards and x $(1 \le x \le 1000)$ — the maximum absolute value of the number on a card. The second line contains n space-separated integers — the numbers on found cards. It is guaranteed that the numbers do not exceed x in their absolute value.

Output

Print a single number — the answer to the problem.

Sample test(s)

input
3 2 -1 1 2
output
1

input
2 3 -2 -2
output
2

Note

In the first sample, Vanya needs to find a single card with number -2.

In the second sample, Vanya needs to find two cards with number 2. He can't find a single card with the required number as the numbers on the lost cards do not exceed 3 in their absolute value.

B. Sereja and Contests

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

Sereja is a coder and he likes to take part in Codesorfes rounds. However, Uzhland doesn't have good internet connection, so Sereja sometimes skips rounds.

Codesorfes has rounds of two types: $Div1$ (for advanced coders) and $Div2$ (for beginner coders). Two rounds, $Div1$ and $Div2$, can go simultaneously, ($Div1$ round cannot be held without $Div2$) in all other cases the rounds don't overlap in time. Each round has a unique identifier — a positive integer. The rounds are sequentially (without gaps) numbered with identifiers by the starting time of the round. The identifiers of rounds that are run simultaneously are different by one, also the identifier of the $Div1$ round is always greater.

Sereja is a beginner coder, so he can take part only in rounds of $Div2$ type. At the moment he is taking part in a $Div2$ round, its identifier equals to x. Sereja remembers very well that he has taken part in exactly k rounds before this round. Also, he remembers all identifiers of the rounds he has taken part in and all identifiers of the rounds that went simultaneously with them. Sereja doesn't remember anything about the rounds he missed.

Sereja is wondering: what minimum and what maximum number of $Div2$ rounds could he have missed? Help him find these two numbers.

Input

The first line contains two integers: x $(1 \le x \le 4000)$ — the round Sereja is taking part in today, and k $(0 \le k < 4000)$ — the number of rounds he took part in.

Next k lines contain the descriptions of the rounds that Sereja took part in before. If Sereja took part in one of two simultaneous rounds, the corresponding line looks like: "1 num_2 num_1" (where num_2 is the identifier of this $Div2$ round, num_1 is the identifier of the $Div1$ round). It is guaranteed that num_1 - $num_2 = 1$. If Sereja took part in a usual $Div2$ round, then the corresponding line looks like: "2 num" (where num is the identifier of this $Div2$ round). It is guaranteed that the identifiers of all given rounds are less than x.

Output

Print in a single line two integers — the minimum and the maximum number of rounds that Sereja could have missed.

Sample test(s)

input
3 2 2 1 2 2
output
0 0

input
9 3 1 2 3 2 8 1 4 5
output
2 3

input
10 0
output
5 9

Note

In the second sample we have unused identifiers of rounds 1, 6, 7. The minimum number of rounds Sereja could have missed equals to 2. In this case, the round with the identifier 1 will be a usual $Div2$ round and the round with identifier 6 will be synchronous with the $Div1$ round.

The maximum number of rounds equals 3. In this case all unused identifiers belong to usual $Div2$ rounds.

C. Team

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

Now it's time of Olympiads. Vanya and Egor decided to make his own team to take part in a programming Olympiad. They've been best friends ever since primary school and hopefully, that can somehow help them in teamwork.

For each team Olympiad, Vanya takes his play cards with numbers. He takes only the cards containing numbers 1 and 0. The boys are very superstitious. They think that they can do well at the Olympiad if they begin with laying **all** the cards in a row so that:

- there wouldn't be a pair of any side-adjacent cards with zeroes in a row;
- there wouldn't be a group of three consecutive cards containing numbers one.

Today Vanya brought n cards with zeroes and m cards with numbers one. The number of cards was so much that the friends do not know how to put all those cards in the described way. Help them find the required arrangement of the cards or else tell the guys that it is impossible to arrange cards in such a way.

Input

The first line contains two integers: n $(1 \le n \le 10^6)$ — the number of cards containing number 0; m $(1 \le m \le 10^6)$ — the number of cards containing number 1.

Output

In a single line print the required sequence of zeroes and ones without any spaces. If such sequence is impossible to obtain, print -1.

Sample test(s)

input
1 2
output
101

input
4 8
output
110110110101

input
4 10
output
11011011011011

input
1 5
output
-1

D. Roman and Numbers

time limit per test: 4 seconds
memory limit per test: 512 megabytes
input: standard input
output: standard output

Roman is a young mathematician, very famous in Uzhland. Unfortunately, Sereja doesn't think so. To make Sereja change his mind, Roman is ready to solve any mathematical problem. After some thought, Sereja asked Roma to find, how many numbers are close to number n, modulo m.

Number x is considered close to number n modulo m, if:

- it can be obtained by rearranging the digits of number n,
- it doesn't have any leading zeroes,
- the remainder after dividing number x by m equals 0.

Roman is a good mathematician, but the number of such numbers is too huge for him. So he asks you to help him.

Input

The first line contains two integers: n $(1 \leq n < 10^{18})$ and m $(1 \leq m \leq 100)$.

Output

In a single line print a single integer — the number of numbers close to number n modulo m.

Sample test(s)

input
104 2
output
3

input
223 4
output
1

input
7067678 8
output
47

Note

In the first sample the required numbers are: 104, 140, 410.

In the second sample the required number is 232.

E. Olympic Games

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

This problem was deleted from the contest, because it was used previously at another competition.

Input

Output

Sample test(s)

input
1 1 1 2 100
output
6

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