Codeforces Round #262 (Div. 2)

A. Vasya and Socks

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

Vasya has n pairs of socks. In the morning of each day Vasya has to put on a pair of socks before he goes to school. When he comes home in the evening, Vasya takes off the used socks and throws them away. Every m-th day (at days with numbers $m, 2m, 3m, ...$) mom buys a pair of socks to Vasya. She does it late in the evening, so that Vasya cannot put on a new pair of socks before the next day. How many consecutive days pass until Vasya runs out of socks?

Input
The single line contains two integers n and m $(1 \le n \le 100; 2 \le m \le 100)$, separated by a space.

Output
Print a single integer — the answer to the problem.

Sample test(s)

input
2 2
output
3

input
9 3
output
13

Note
In the first sample Vasya spends the first two days wearing the socks that he had initially. Then on day three he puts on the socks that were bought on day two.

In the second sample Vasya spends the first nine days wearing the socks that he had initially. Then he spends three days wearing the socks that were bought on the third, sixth and ninth days. Than he spends another day wearing the socks that were bought on the twelfth day.

B. Little Dima and Equation

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

Little Dima misbehaved during a math lesson a lot and the nasty teacher Mr. Pickles gave him the following problem as a punishment.

Find all integer solutions x $(0 < x < 10^9)$ of the equation:

$$x = b \cdot s(x)^a + c,$$

where a, b, c are some predetermined constant values and function $s(x)$ determines the sum of all digits in the decimal representation of number x.

The teacher gives this problem to Dima for each lesson. He changes only the parameters of the equation: a, b, c. Dima got sick of getting bad marks and he asks you to help him solve this challenging problem.

Input

The first line contains three space-separated integers: a, b, c $(1 \le a \le 5;\ 1 \le b \le 10000;\ -10000 \le c \le 10000)$.

Output

Print integer n — the number of the solutions that you've found. Next print n integers in the increasing order — the solutions of the given equation. Print only integer solutions that are larger than zero and strictly less than 10^9.

Sample test(s)

input
3 2 8
output
3 10 2008 13726

input
1 2 -18
output
0

input
2 2 -1
output
4 1 31 337 967

C. Present

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

Little beaver is a beginner programmer, so informatics is his favorite subject. Soon his informatics teacher is going to have a birthday and the beaver has decided to prepare a present for her. He planted n flowers in a row on his windowsill and started waiting for them to grow. However, after some time the beaver noticed that the flowers stopped growing. The beaver thinks it is bad manners to present little flowers. So he decided to come up with some solutions.

There are m days left to the birthday. The height of the i-th flower (assume that the flowers in the row are numbered from 1 to n from left to right) is equal to a_i at the moment. At each of the remaining m days the beaver can take a special watering and water w contiguous flowers (he can do that only once at a day). At that each watered flower grows by one height unit on that day. The beaver wants the height of the smallest flower be as large as possible in the end. What maximum height of the smallest flower can he get?

Input

The first line contains space-separated integers n, m and w ($1 \le w \le n \le 10^5$; $1 \le m \le 10^5$). The second line contains space-separated integers $a_1, a_2, ..., a_n$ ($1 \le a_i \le 10^9$).

Output

Print a single integer — the maximum final height of the smallest flower.

Sample test(s)

input
6 2 3 2 2 2 2 1 1
output
2

input
2 5 1 5 8
output
9

Note

In the first sample beaver can water the last 3 flowers at the first day. On the next day he may not to water flowers at all. In the end he will get the following heights: [2, 2, 2, 3, 2, 2]. The smallest flower has height equal to 2. It's impossible to get height 3 in this test.

D. Little Victor and Set

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

Little Victor adores the sets theory. Let us remind you that a set is a group of numbers where all numbers are pairwise distinct. Today Victor wants to find a set of integers S that has the following properties:

- for all x $(x \in S)$ the following inequality holds $l \le x \le r$;
- $1 \le |S| \le k$;
- lets denote the i-th element of the set S as s_i; value $f(S) = s_1 \oplus s_2 \oplus \cdots \oplus s_{|S|}$ must be as small as possible.

Help Victor find the described set.

Input

The first line contains three space-separated integers l, r, k $(1 \le l \le r \le 10^{12};\ 1 \le k \le min(10^6, r - l + 1))$.

Output

Print the minimum possible value of $f(S)$. Then print the cardinality of set $|S|$. Then print the elements of the set in any order.

If there are multiple optimal sets, you can print any of them.

Sample test(s)

input
8 15 3
output
1 2 10 11

input
8 30 7
output
0 5 14 9 28 11 16

Note

Operation $x \oplus y$ represents the operation of bitwise exclusive OR. In other words, it is the XOR operation.

E. Roland and Rose

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

Roland loves growing flowers. He has recently grown a beautiful rose at point $(0, 0)$ of the Cartesian coordinate system. The rose is so beautiful that Roland is afraid that the evil forces can try and steal it.

To protect the rose, Roland wants to build n watch towers. Let's assume that a tower is a point on the plane at the distance of at most r from the rose. Besides, Roland assumes that the towers should be built at points with integer coordinates and the sum of squares of distances between all pairs of towers must be as large as possible. Note, that Roland may build several towers at the same point, also he may build some of them at point $(0, 0)$.

Help Roland build the towers at the integer points so that the sum of squares of distances between all towers is maximum possible. Note that the distance in this problem is defined as the Euclidian distance between points.

Input

The first line contains two integers, n and r $(2 \le n \le 8;\ 1 \le r \le 30)$.

Output

In the first line print an integer — the maximum possible sum of squared distances. In the i-th of the following n lines print two integers, x_i, y_i — the coordinates of the i-th tower. Each tower must be inside or on the border of the circle with radius r. Note that there may be several towers located at the same point of the plane, also some towers can be located at point $(0, 0)$.

If there are multiple valid optimal arrangements, choose any of them.

Sample test(s)

input
4 1

output
16 0 1 0 1 0 -1 0 -1

input
3 6

output
312 0 6 5 -3 -5 -3