C. Subsequence Counting

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

Pikachu had an array with him. He wrote down all the non-empty subsequences of the array on paper. Note that an array of size n has $2^n - 1$ non-empty subsequences in it.

Pikachu being mischievous as he always is, removed all the subsequences in which `Maximum_element_of_the_subsequence - Minimum_element_of_subsequence` $\geq d$

Pikachu was finally left with X subsequences.

However, he lost the initial array he had, and now is in serious trouble. He still remembers the numbers X and d. He now wants you to construct any such array which will satisfy the above conditions. All the numbers in the final array should be positive integers less than 10^{18}.

Note the number of elements in the output array should not be more than 10^4. If no answer is possible, print -1.

Input

The only line of input consists of two space separated integers X and d ($1 \leq X, d \leq 10^9$).

Output

Output should consist of two lines.

First line should contain a single integer n ($1 \leq n \leq 10\,000$)— the number of integers in the final array.

Second line should consist of n space separated integers — $a_1, a_2, \ldots, a_n$ ($1 \leq a_i < 10^{18}$).

If there is no answer, print a single integer `-1`. If there are multiple answers, print any of them.

Examples

input
10 5

output
6 5 50 7 15 6 100

input
4 2

output
4 10 100 1000 10000

Note

In the output of the first example case, the remaining subsequences after removing those with `Maximum_element_of_the_subsequence - Minimum_element_of_subsequence` ≥ 5 are $[5], [5, 7], [5, 6], [5, 7, 6], [50], [7], [7, 6], [15], [6], [100]$. There are 10 of them. Hence, the array $[5, 50, 7, 15, 6, 100]$ is valid.

Similarly, in the output of the second example case, the remaining sub-sequences after removing those with `Maximum_element_of_the_subsequence - Minimum_element_of_subsequence` ≥ 2 are $[10], [100], [1000], [10000]$. There are 4 of them. Hence, the array $[10, 100, 1000, 10000]$ is valid.