Subset "AND"

Input file:	`standard input`
Output file:	`standard output`
Time limit:	3 seconds
Memory limit:	512 megabytes

You are given two integers k and s. Build a set of s-bit numbers from 0 to $2^s - 1$, such that the number of different values among bitwise "AND"'s of all numbers in all non-empty subsets of your set is exactly k.

A bitwise "AND" is an operation applied to two or more numbers. Consider two integers a and b in binary: $a = \overline{a_{s-1}a_{s-2}\dots a_1a_0}$, $b = \overline{b_{s-1}b_{s-2}\dots b_1b_0}$ (we can assume that both a and b have exactly s bits, maybe with leading zeros). The result of bitwise "AND" of these two integers is a s-bit integer $c = a\&b = \overline{c_{s-1}c_{s-2}\dots c_1c_0}$, where c_i is equal to 1, if $a_i = 1$ and $b_i = 1$, and 0, if at least one of a_i or b_i is 0. For example, the bitwise "AND" of 29 (11101_2) and 11 (01011_2) is equal to 9 (01001_2).

In case of more than two numbers, the result of the bitwise "AND" is calculated by subsequently applying the bitwise "AND" to the first and the second number, then to the result of the first "AND" and the third number, and so on. If the subset only contains one number, then the result is that number.

Input

The only line in the input contains two integers k and s ($k \geq 1$) — the required number of different "AND" values and the number of bits you can use for your numbers.

Output

The first line should contains the number n ($1 \leq n \leq 125$) — the size of your set. The second line should contains the numbers in your set, separated by spaces. All numbers must be between 0 and $2^s - 1$ inclusive. It's guaranteed that an answer exists for all given input data.

Scoring

Subtask	Score	Constraints
1	7	$s = 10$, $k \leq 10$
2	10	$s = 30$, $k \leq 2^7$
3	11	$s = 60$, $k \leq 2^{10}$
4	11	$s = 60$, $k \leq 2^{15}$
5	12	$s = 60$, $k \leq 2^{18}$
6	16	$s = 60$, $k \leq 2^{19}$
7	10	$s = 60$, $k \leq 2^{20}$
8	8	$s = 50$, $k \leq 2^{20}$
9	15	$s = 40$, $k \leq 2^{20}$

Example

standard input	standard output
`6 10`	`3` `9 6 10`

Explanation

Numbers in the example output are $9 = 1001_2$, $6 = 0110_2$, $10 = 1010_2$. There are six different "AND" values for all subsets of these three numbers: 9, 6, 10, $8 = 9$ & 10, $2 = 10$ & 6, $0 = 9$ & $6 = 9$ & 6 & 10.