Problem H. Exact Subsequences

Input file:	*standard input*
Output file:	*standard output*
Time limit:	1 second
Memory limit:	512 mebibytes

Consider all binary strings that have exactly n different non-empty subsequences (different by contents). Sort the strings in lexicographic order. Find the k-th such string in this order.

Input

Each test contains multiple test cases. The first line contains an integer t ($1 \le t \le 100$) — the number of test cases. The descriptions of the t test cases follow.

The description of each test case consists of a single line with two integers n and k ($1 \le n, k \le 10^9$).

Output

For each test case, if there are less than k binary strings with exactly n different non-empty subsequences, print `-1` on a single line. Otherwise, print lexicographically k-th of them on the next two lines in the following format:

A non-empty binary string can be uniquely described by its first character and list of sizes of blocks of equal characters. You should print m and c on the first line, where m is the number of blocks and c is the first character. Then, on the second line, print the sizes of blocks $L_1, L_2, \ldots, L_m$ in order.

Example

standard input	*standard output*
8 3 1 3 2 3 3 3 4 3 5 1000000000 1 99824 4353 2129721 207087	1 0 3 2 0 1 1 2 1 1 1 1 1 3 -1 1 0 1000000000 11 0 9 2 2 1 6 2 1 2 7 1 1 9 0 9 9 8 2 4 4 3 5 3

Note

The actual strings corresponding to answers to the sample are:

```
000
01
10
111
-1
000...000 (1000000000 times)
00000000011001000000110110000000010
00000000011111111100000000110000111100011111000
```