Problem B
Power of 2 Sum

The number 2 holds a special role in computer science. For example, our conventional computers use a binary system (base-2 number system) as it is much easier for machines to operate on. It can be proven (whilst being obvious as $2^0 = 1$) that any positive integer can be constructed as a summation of powers of two, e.g., $23 = 2^4 + 2^2 + 2^1 + 2^0 = 16 + 4 + 2 + 1$; or alternatively, $23 = 2^0 + 2^0 + \cdots + 2^0$, i.e. 23 terms of 2^0. Of course, we can go further, for example, $23 = 2^{-1} + 2^{-1} + \cdots + 2^{-1}$, i.e. 46 terms of 2^{-1}; recall that $2^{-1} = {}^1\!/_2$.

In this problem, you are given two positive integers, N and K. Your task is to find a sequence of **exactly** K integers $(a_1, a_2, \ldots, a_K)$ such that:

- $2^{a_1} + 2^{a_2} + \cdots + 2^{a_K} = N$,
- $-32 \le a_i \le 32$, and
- $a_1 \ge a_2 \ge \cdots \ge a_K$.

Among all possible sequences, you should print the lexicographically smallest sequence. A sequence $b_1, b_2, \ldots, b_K$ is lexicographically smaller than a sequence $c_1, c_2, \ldots, c_K$ if and only if there exists j $(1 \le j \le K)$ such that $b_j < c_j$ while $b_i = c_i$ for all $i < j$.

For example, let $N = 23$ and $K = 5$. The possible sequences:

- $(4, 2, 1, -1, -1) \rightarrow 2^4 + 2^2 + 2^1 + 2^{-1} + 2^{-1} = 16 + 4 + 2 + {}^1\!/_2 + {}^1\!/_2 = 23$
- $(4, 2, 0, 0, 0) \rightarrow 2^4 + 2^2 + 2^0 + 2^0 + 2^0 = 16 + 4 + 1 + 1 + 1 = 23$
- $(4, 1, 1, 1, 0) \rightarrow 2^4 + 2^1 + 2^1 + 2^1 + 2^0 = 16 + 2 + 2 + 2 + 1 = 23$
- $(3, 3, 2, 1, 0) \rightarrow 2^3 + 2^3 + 2^2 + 2^1 + 2^0 = 8 + 8 + 4 + 2 + 1 = 23$

Among all possible sequences, $(3, 3, 2, 1, 0)$ is the lexicographically smallest.

Sometimes it might not be possible to have such a sequence. In such a case, you should output "`No`" (without quotes).

Input

Input begins with an integer T $(1 \leq T \leq 20)$ representing the number of cases.

Each case contains two integers N K $(1 \leq N, K \leq 100\,000)$ representing the positive integer you should construct and the number of terms, respectively.

Output

For each case, output in a line "`Case #X: Y`" (without quotes) where `X` is the case number (starts from 1) and `Y` is the output for the respective case. If there is a valid sequence for the input, then `Y` contains exactly `K` integers ranging from -32 to 32 in nonincreasing order and each separated by a single space. Otherwise, `Y` is "`No`" (without quotes).

Sample Input #1

```
3
23 5
5 1
1 4
```

Sample Output #1

```
Case #1: 3 3 2 1 0
Case #2: No
Case #3: -2 -2 -2 -2
```

Explanation for the sample input/output #1

For the 2^{nd} case, 5 is not a power of 2, thus, it cannot be represented with a sequence of only a single term.

For the 3^{rd} case, $1 = {}^1/_4 + {}^1/_4 + {}^1/_4 + {}^1/_4$.