12744 Just Some Permutations - 2

Given N, L and K. Dexter wants to find the lexicographically K-th permutation of the numbers 1, 2, ..., N such that the length of the longest increasing subsequence (LIS) of the permutation (treat the permutation as a sequence of numbers) is exactly L (see notes for the definitions).

A permutation $A_1, A_2, \ldots, A_N$ of N numbers is lexicographically smaller than another permutation $B_1, B_2, \ldots, B_N$, if $A_i < B_i$ for some i and $A_j = B_j$ for all $j < i$.

For example when $N = 4$, $L = 2$ the first four such permutations lexicographically are: {1, 4, 3, 2}, {2, 1, 4, 3}, {2, 4, 1, 3} and {2, 4, 3, 1}. But {1, 4, 2, 3} is not valid as the length of the LIS is 3 here.

Input

First line of the input contains an integer T (≤ 30) which is the number of test cases. Each of the following T lines contain three integers N $(1 < N < 14)$, L $(1 \leq L \leq N)$ and K $(1 \leq K \leq 10^9)$. There are at most 15 cases in the input file where $N = 13$.

Output

For each case, output the case number, followed by the lexicographically K-th permutation of first N numbers, such that, the length of LIS of that permutation is exactly L. If there are less than K permutations, output '`-1`'.

Notes:

A subsequence of a sequence is a sequence formed from the given sequence by deleting some of the elements without disturbing the relative positions of the remaining elements and LIS is defined as length of longest such subsequence where the values are strictly increasing. So, if the sequence is {2, 4, 1, 3}, LIS is 2 and {2, 3}, {1, 3}, {2, 4} are some LIS of the sequence.

Sample Input

```
4
4 2 3
4 2 4
4 2 15
4 2 13
```

Sample Output

```
Case 1: 2 4 1 3
Case 2: 2 4 3 1
Case 3: -1
Case 4: 4 3 1 2
```