Dexter considers a permutation of first N positive numbers $(1, 2, \ldots, N)$ **beautiful** if all the absolute differences between **adjacent numbers** in the permutation are distinct.

So for $N = 4$: $\{3, 2, 4, 1\}$ is a **beautiful** permutation because the absolute differences are $\{1, 2, 3\}$. But $\{3, 1, 4, 2\}$ is not **beautiful** since the absolute differences $\{2, 3, 2\}$ are not distinct.

Given N and K find the lexicographically K-th smallest beautiful permutation of the first N positive numbers. A permutation of N numbers $A_1, A_2, \ldots, A_n$ 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 $j < i$.

Input

First line of the input contains an integer T (≤ 1000) which is the number of test cases. Each of the next T lines contain two space separated integers N ($1 < N < 20$) and K ($1 \leq K \leq 10^9$).

Output

For each test case output the case number and then N space separated integers which is the lexicographically K-th smallest beautiful permutation of first N positive numbers. If there are less than K beautiful permutations then output '`-1`'. See sample output for exact formatting.

Sample Input

```
4
5 1
5 2
5 4
5 10
```

Sample Output

```
Case 1: 1 5 2 4 3
Case 2: 2 3 5 1 4
Case 3: 3 2 4 1 5
Case 4: -1
```