J Just Some Permutation 5

Given **N** and **K**, find the lexicographically **K-th** (1-indexed) smallest permutation $\mathbf{P_1, P_2 \dots P_N}$ of the first **N** positive integers (**1, 2 … N**), such that the adjacent numbers are relatively prime [$\mathbf{GCD(P_i, P_{i+1}) = 1}$, for $\mathbf{1 \le i < N}$] in the permutation. A permutation of **N** numbers $\mathbf{A_1, A_2 \dots A_N}$ is lexicographically smaller than another permutation $\mathbf{B_1, B_2 \dots B_N}$ if $\mathbf{A_i < B_i}$ for some **i** and $\mathbf{A_j = B_j}$ for all $\mathbf{j < i}$.

Input

First line of the input contains an integer **T (≤20)**, which is the number of test cases. Each of the next **T** lines contain two space separated integers **N (1≤N≤28)** and **K (1≤K≤10^18)**.

Output

For each test case output the case number and then **N** space separated integers which is the lexicographically **K-th** smallest permutation of the first **N** positive integer numbers, such that adjacent numbers in the permutation are relatively prime. If there are less than **K** such permutations then output '**-1**'. See sample input output for exact formatting.

Sample Input	Output for Sample Input
3 3 3 4 2 4 20	Case 1: 2 1 3 Case 2: 1 4 3 2 Case 3: -1

Problem Setter: Tasnim Imran Sunny & Md. Shiplu Hawlader
Special Thanks: Syed Shahriar Manjur