1318 – Strange Game

In a country named "Ajob Desh", people play a game called "Ajob Game" (or strange game). This game is actually a game of words. The rules for the game are as follows:

1. It's an **N** player game and players are numbered from **1** to **N**. And the players alternate turns in a circular way. Player 1 starts first. The next turn is for player 2, then player 3 and so on. After the turn for the $\mathbf{N}^{th}$ player, player 1 gets his turn again and the same procedure is continued.

2. In each turn a player has to propose a pair of words. Each of the words should have length **L**, and the words should differ in exactly **M** positions. As their language has **K** alphabetical symbols, a word is a collection of symbols from these **K** alphabets.

3. The pair of words proposed by a player should differ in exactly **M** positions, it means that there should be exactly **M** positions where the two words have different symbols, and in other positions they have same symbols. For example, 'ab**c**' and 'ab**d**' differ in exactly 1 position, '**a**b**c**' and '**a**c**a**' differ in exactly 2 positions, '**abc**' and '**cab**' differ in exactly 3 positions.

4. In each turn a player has to propose a new pair of words. Two pairs are different if at least one word is different. Note that here pair refers to unordered pair. Let **A, B, C** be three different words, then **(A, B)** and **(B, A)** are same, but **(A, C)** and **(A, B)** are different. For example, if a player already proposed {abc, def}, then none can propose {abc, def} or {def, abc}. But a player can propose {abc, fed} or {abc, abc} or {pqc, abc} etc.

5. If a player fails to propose a new pair of words, he is treated as the loser of the game. And the game ends.

Let **N = 2, K = 2, L = 2, M = 1** and the alphabet is **{ab}**. All the words of length 2 are: **{aa, ab, ba, bb}**. Player 1 chooses pair **{aa, ab}** (differs in 1 position as **M = 1**) then player 2 chooses pair **{ab, bb}**. After that player 1 chooses **{aa, ba}** then player 2 chooses **{bb, ba}**. And then there is no pair left for player 1, and so, player 1 will lose.

Now this game is played by **N** players who know this game very well thus they play optimally. You are given **N, K, L** and **M**; you have to find the loosing player.

Input

Input starts with an integer **T (≤ 200)**, denoting the number of test cases.

Each case starts with a line containing four integers **N (2 ≤ N ≤ 10000), K (1 ≤ K ≤ 10^9), L (1 ≤ L ≤ 10^5)** and **M (0 ≤ M ≤ L)**.

Output

For each case, print the case number and the player who loses the game.

Sample Input	Output for Sample Input
5 2 2 2 1 3 4 3 3 9 26 8 5 10 2 2 2 100 3 2 0	Case 1: 1 Case 2: 1 Case 3: 5 Case 4: 3 Case 5: 10