Binary Stirling Numbers

The Stirling number of the second kind S(n, m) stands for the number of ways to partition a set of n things into m nonempty subsets. For example, there are seven ways to split a four-element set into two parts: {1, 2, 3} u {4}, {1, 2, 4} u {3}, {1, 3, 4} u {2}, {2, 3, 4} u {1}, {1, 2} u {3, 4}, {1, 3} u {2, 4}, {1, 4} u {2, 3}.

There is a recurrence which allows you to compute S(n, m) for all m and n.
S(0, 0) = 1,
S(n, 0) = 0, for n > 0,
S(0, m) = 0, for m > 0,
S(n, m) = m*S(n-1, m) + S(n-1, m-1), for n, m > 0.

Your task is much "easier". Given integers n and m satisfying 1 <= m <= n, compute the parity of S(n, m), i.e. S(n, m) mod 2.

For instance, S(4, 2) mod 2 = 1.

Task

Write a program that:

- reads two positive integers n and m,
- computes S(n, m) mod 2,
- writes the result.

Input

The first line of the input contains exactly one positive integer d equal to the number of data sets, 1 <= d <= 200. The data sets follow.

Line i + 1 contains the i-th data set - exactly two integers n_i and m_i separated by a single space, 1 < = m_i < = n_i <= 10^9.

Output

The output should consist of exactly d lines, one line for each data set. Line i, 1 <= i < = d, should contain 0 or 1, the value of S(n_i, m_i) mod 2.

Example

Sample input:
1
4 2

Sample output:
1