

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: $\{1, 2, 3\} \cup \{4\}$, $\{1, 2, 4\} \cup \{3\}$, $\{1, 3, 4\} \cup \{2\}$, $\{2, 3, 4\} \cup \{1\}$, $\{1, 2\} \cup \{3, 4\}$, $\{1, 3\} \cup \{2, 4\}$, $\{1, 4\} \cup \{2, 3\}$.

There is a recurrence which allows you to compute $S(n, m)$ for all m and n .

$$S(0, 0) = 1,$$

$$S(n, 0) = 0, \text{ for } n > 0,$$

$$S(0, m) = 0, \text{ for } m > 0,$$

$$S(n, m) = m \cdot S(n-1, m) + S(n-1, m-1), \text{ for } n, m > 0.$$

Your task is much "easier". Given integers n and m satisfying $1 \leq m \leq n$, compute the parity of $S(n, m)$, i.e. $S(n, m) \bmod 2$.

For instance, $S(4, 2) \bmod 2 = 1$.

Task

Write a program that:

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

Input

The first line of the input contains exactly one positive integer d equal to the number of data sets, $1 \leq d \leq 200$. 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, $1 \leq m_i \leq n_i \leq 10^9$.

Output

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

Example

Sample input:

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1
4 2
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Sample output:

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1
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