1118 Binary Stirling Numbers

modified from 1118

The Stirling number of the second kind $S(n, m)$ represents 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:

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

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

We can compute $S(n, m)$ using the recurrence,

$$S(n, m) = mS(n - 1, m) + S(n - 1, m - 1), \quad \text{for integers } 1 < m < n.$$

but your task is slightly different: given integers n and m, compute the parity of $S(n, m)$, i.e. $S(n, m)$ mod 2.

Example

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

Write a program that reads two positive integers n and m, computes $S(n, m)$ mod 2, and writes the result.

Input

The input begins with a single positive integer on a line by itself indicating the number of the cases following, each of them as described below. This line is followed by a blank line, and there is also a blank line between two consecutive inputs.

The input consists two integers n and m separated by a space, with $1 \leq m \leq n \leq 1000$.

Output

For each test case, the output must follow the description below. The outputs of two consecutive cases will be separated by a blank line.

The output should be the integer $S(n, m)$ mod 2.

Sample Input

```
1

4 2
```

Sample Output

```
1
```