Problem C. What a sequence!

Input file:	*standard input*
Output file:	*standard output*
Time limit:	2 seconds
Memory limit:	512 mebibytes

Let a_n be a sequence defined by the recursive formula:

$$a_{n+2} = k \cdot a_{n+1} + a_n$$
$$a_0 = 0$$
$$a_1 = 1$$

Given a certain $k \in \{1, 3, 5, 7\}$ and an odd prime number p, your task is to find the value of $a_p \bmod p$.

Input

In the first line one integer $Z \leq 10^6$ is given, denoting number of testcases described in following lines.

For each test case, first and the only input line contains two natural numbers p and k, p being an odd prime number.

$k \in \{1, 3, 5, 7\}$. The total length of the numbers p in the all testcases doesn't exceed 10^6.

Output

For each test case you should print exactly one line containing the value of $a_p \bmod p$.

Example

standard input	standard output
3 3 5 11 1 13 3	2 1 0