We suspect that for every positive integer N there exists an integer of the form $11\ldots10\ldots0$ (a sequence of 1's followed by 0 or more 0's) that is divisible by N. For example, with $N = 3$, 111 is divisible by 3, with $N = 4$, 100 is divisible by 4, with $N = 7$, 11111 is divisible by 7. We want to verify this for some integers. The solution to this problem is to find two different numbers P and Q in the form of $11\ldots1$ (a sequence of 1's) that have the same remainder when dividing by N. The difference D between P and Q will be in the form of $11\ldots10\ldots0$ and divisible by N.

In order to solve this problem, we have to start with finding the remainder when dividing a number in the form of $11\ldots1$ by N. Your task is to write a program to do this.

Input

The input file consists of several data sets. The first line of the input file contains the number of data sets which is a positive integer and is not bigger than 20. The following lines describe the data sets.

Each data set is described by two lines. The first line contains the integer N ($1 < N < 10^9$). The second line contains the integer number P (P contains at least one digit and at most 2000 digits).

Output

For each test case, write in one line the remainder when dividing P by N.

Sample Input

```
2
4
11
5
111
```

Sample Output

```
3
1
```