

Project Euler #112: Bouncy numbers

This problem is a programming version of [Problem 112](#) from [projecteuler.net](#)

Working from left-to-right if no digit is exceeded by the digit to its left it is called an increasing number; for example, **134468**.

Similarly if no digit is exceeded by the digit to its right it is called a decreasing number; for example, **66420**.

We shall call a positive integer that is neither increasing nor decreasing a "bouncy" number; for example, **155349**.

Clearly there cannot be any bouncy numbers below one-hundred, but just over half of the numbers below one-thousand (**525**) are bouncy. In fact, the least number for which the proportion of bouncy numbers first reaches **50%** is **538**.

Surprisingly, bouncy numbers become more and more common and by the time we reach **21780** the proportion of bouncy numbers is equal to **90%**.

Find the least number for which the proportion of bouncy numbers is at least $\frac{n}{m}$.

Input Format

First line contains an integer T denoting the number of test cases.
Each of the following T lines contain two integers n and m .

Constraints

$$1 \leq T \leq 10^4$$
$$1 \leq n < m \leq 10^{18}$$

Output Format

For each of T test cases print one line containing a single integer - the answer to a problem.

Sample Input

```
2
1 2
90 100
```

Sample Output

```
538
21780
```