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

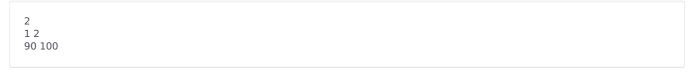
$$1 \le T \le 10^4$$

 $1 \le n < m \le 10^{18}$

Output Format

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

Sample Input



Sample Output

