Project Euler #74: Digit factorial chains



This problem is a programming version of Problem 74 from projecteuler.net

The number 145 is well known for the property that the sum of the factorial of its digits is equal to 145:

$$1! + 4! + 5! = 1 + 24 + 120 = 145$$

Perhaps less well known is 169, in that it produces the longest chain of numbers that link back to 169; it turns out that there are only three such loops that exist:

$$169 \rightarrow 363601 \rightarrow 1454 \rightarrow 169$$

 $871 \rightarrow 45361 \rightarrow 871$
 $872 \rightarrow 45362 \rightarrow 872$

It is not difficult to prove that EVERY starting number will eventually get stuck in a loop. For example,

$$69
ightarrow 363600
ightarrow 1454
ightarrow 169
ightarrow 363601 (
ightarrow 1454) \ 78
ightarrow 45360
ightarrow 871
ightarrow 45361 (
ightarrow 871) \ 540
ightarrow 145 (
ightarrow 145)$$

Starting with **69** produces a chain of five non-repeating terms, but the longest non-repeating chain with a starting number below one million is sixty terms.

For a given length L and limit N print all the integers $\leq N$ which have chain length L

Input Format

First line contains T, followed by T lines. Each line contains N and L separated by space.

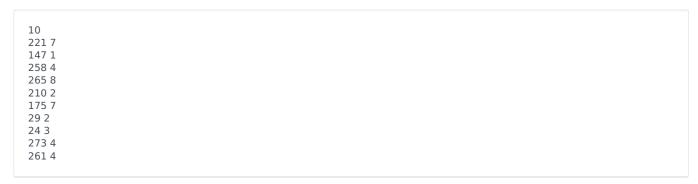
Constraints

$$\begin{aligned} &1 \le T \le 10 \\ &10 \le N \le 1000000 \\ &1 \le L \le 60 \end{aligned}$$

Output Format

Print the integers separated by space for each testcase. Where there are no such number for a given L, print -1.

Sample Input



Sample Output

4 27 39 72 93 107 117 170 171 0 10 11 154 24 42 104 114 140 141 0 10 11 -1 78 87 196 236 263 78 87 196 236