Forever Young

Time limit: 1 second

My birthday is coming up. Alas, I am getting old and would like to feel young again. Fortunately, I have come up with an excellent way of feeling younger: if I write my age as a number in an appropriately chosen base b, then it appears to be smaller. For instance, suppose my age in base 10 is 32. Written in base 16 it is only 20!

However, I cannot choose an arbitrary base when doing this. If my age written in base b contains digits other than 0 to 9, then it will be obvious that I am cheating, which defeats the purpose. In addition, if my age written in base b is too small then it would again be obvious that I am cheating.

Given my age y and a lower bound l on how small I want my age to appear, find the largest base b such that y written in base b contains only decimal digits, and is at least l when interpreted as a number in base 10.

Input

The input consists of a single line containing two base 10 integers y ($10 \leq y \leq 10^{18}$– yes, I am very old) and l ($10 \leq l \leq y$).

Output

Display the largest base b as described above.

Sample Input 1	**Sample Output 1**
32 20	16

Sample Input 2	**Sample Output 2**
2016 100	42

Submission guidelines: You need to upload two files in the FeedbackFruits System.

(1) Write one page document (upload pdf version of the doc) describing your algorithm or pseudocode. You should describe ***why and how*** your algorithm design should be ***efficient*** (the corresponding program should run fast).
(2) One program file (**you can upload the zip file for it**) – actual C/C++, Java, or Python code file. Make sure your code finishes its execution within 2 seconds for the largest possible input.

Hints: The problem is an application of **Binary Search technique.**