CS3201
Algorithm Design

Project Report

Problem: 1014
Product of Digits

Submitted to
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1. Introduction

- Problem detail
  
  Problem number: 1014
  Problem name: Product of digits
  Difficulty: 104
  Problem Source: Ural State University Internal Contest '99 #2
  Problem conditions:
  - Time limit: 1.0 second
  - Memory limit: 64 MB
  Problem description: Your task is to find the minimal positive integer number \( Q \) so that the product of digits of \( Q \) is exactly equal to \( N \).


- Input & Output

  Input: The input contains the single integer number \( N \) (0 ≤ \( N \) ≤ 109).

  Output: Your program should print to the output the only number \( Q \). If such a number does not exist print −1.

Sample

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>25</td>
</tr>
</tbody>
</table>
2. Code Overview

2.1 Solution

```python
number = int(input())
result = ""
if number == 0:
    print(10)
elif number == 1:
    print(number)
else:
    i = 9
    while i >= 2:
        while number % i == 0:
            result += str(i)
            number /= i
        i -= 1
    if number == 1:
        print(result[::-1])
    else:
        print(-1)
```
2.2 Implementation steps

Line 1: We first declared a variable that is called 'number' and set it to receive the input from the user as well as convert itself to integer.

Line 2: Declared a variable 'result' to collect the result data output that will show after the program has been terminated.

Line 3 & 4: Setting the default value to determine that if the users enter the number of 0, the program will return 10 immediately.

Line 5 & 6: Setting a further condition from line 3 & 4 that if the number that the user enters is 1, the program will return 1 right away.

Line 7 - 17 is the condition apart from the number of 0 and 1 from Line 3 - 6 (Looping)

Line 8: Declaring a temporary variable that have the value of 9 (More on that in the later coding process)

Line 9: Setting up a loop with the condition while I is more than or equal to 2

Line 10 - 12: Inside the first while loop, we set another while loop with the condition, while the number that can mod with 'i' equal to 0. We will add the number to the value of the result as well as casting it to a string. (Caution: The result number that we have declare is the empty
of string which is similar to String() in Java). After that, We will divide
the number with 'i' and assign that value back to integer 'number'

Line 13 : Whenever that stage goes out from the second loop, we will
decrement 'i' by 1, and start it again until 'i' becomes less than 2

Line 14 -15 : After we break out from both loop, we will check whether
the number is equal to 1 or not. If it is, we will print the result
backwards.

Line 16-17 : If the number is not equal to 1, the program will then
return -1. So it means that there is no such value that can multiply up
to get the input value.

2.3 Outputs

```
10
25
>>> 

0
10
>>> 

1
1
>>> 

22
-1
>>> 

36
49
```
3. Submission

3.1 Submission result from Timus

3.2 Submission detail

Language : Python 3.6
Execution time : 0.093
Memory used : 232 KB