**Siena College’s 35th Annual High School Programming Contest**

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##### March 31, 2023

###### Green Problem #5: Fingers and Toes

Background Information:

To multiply a 3-digit number by another 3-digit number using the standard grade school algorithm requires at least 16 digits. Sometimes there will be 20 or more digits. In the following general example each D is a placeholder for a digit between 0 and 9.

General Specific

Example: DDD Example: 179

x DDD x 224

DDD 716

DDD 358

DDD 358

DDDDD 40096

In the specific example above notice that each digit from 0 to 9 is used exactly two times.

Write a program that outputs every pair of 3-digit positive integers M and N where each digit from 0 to 9 is used exactly two times with the standard multiplication algorithm or nine of the digits are used exactly 2 times with one of the digits used a different number of times. You might think about using your fingers and toes to count the 20 digits but there may be examples with more than 20 digits. Also, there may be a better way than using fingers and toes. 😁

Programming Problem:

Input:  None

Output: Use the following format for each pair. The list must be in ascending order based on M.

###### Example format for each output line:

179 x 224: each digit appears exactly 2 times

324 x 845: each digit appears exactly 2 times except 2 which appears 6 times

Green Problem #5 ADDENDUM

* The first sentence of the "Background Information" should read:

To multiply a 3-digit number by another 3-digit number using the standard grade school algorithm requires at least **16** digits. Sometimes there will be **20** or more digits.

* When counting the number of 0 digits, leading zeros should not be counted.

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