### **SIENA COLLEGE**

**28th Annual** High School Programming Contest

##### **March 27, 2015**

###### Problem #5: Longhand Multiplication

Background Information: An educational, software company, Maths-R-Us, is in need of a program that will show students the details of the traditional multiplication of positive integers algorithm. Specifically, they want a program that will show the multiplicand, the multiplier, each line obtained from the application of the distributive property, and the final product.

For example, if the multiplicand is 39 and the multiplier is 846 then the output must be **EXACTLY** as shown at right. The multiplication operator (a lowercase ‘x’ in the leftmost column), the dashed lines (use a number of hyphens equal to the width of the problem), the place value zeros (take careful note of the last example), and the word “Done.” at the bottom are all required.

 39

x 846

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 234

 1460

31200

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32894

Done.

###### Programming Problem:

Input: On separate lines, two integers from 1 to 9999, inclusive.

Output: The longhand multiplication problem, as described above.

The width of the problem will be either the number of digits in the answer or one (for the ‘x’) plus the number of digits in the multiplier, whichever is greater. All numbers must be right-justified.

***NOTE:*** *The formatting is an essential part of this problem; if the output does not look just like the examples, it will be judged incorrect. The boxes are used to show where the left edge of the screen is.*

 512

x 8

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4096

Done.

###### Example 1:  Input: 512 Output:

###### 8

 2

X3

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 6

Done.

######

###### Example 2:  Input: 2 Output:

###### 3

 999

x 1001

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 999

 0000

 00000

999000

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999999

Done.

###### Example 3:  Input: 999 Output:

 1001