Problem 5

Five Digit Divisibility

Using each of the digits 1, 2, 3, 4 and 5 exactly once to form 5 digit numbers, how many are divisible by 12.

First we note that $12 = 3 \times 4$; in other words, if a number is divisible by 12 it will be divisible by 3 and 4.

For a number to be divisible by 3, the sum of its digits must be divisible by 3: $1 + 2 + 3 + 4 + 5 = 15$. As 15 is divisible by 3, ALL 5-digit numbers made up of the digits 1, 2, 3, 4, and 5 will be divisible by 3.

For a number to be divisible by 4, the last two digits must divide by 4. In our case, the number must end in: 12, 24, 32, or 52.

If the number ends in 12, the first three digits will be 3, 4, and 5, and there are exactly six ways of arranging these numbers: 345, 354, 435, 453, 534, 543. Similarly, if the number ends in 24, 32, or 52, the first three digits will be 135, 145, and 134 respectively.

As there are six ways of arranging three digits digits: abc, acd, bac, bca, cab, cba, there are $4 \times 6 = 24$ different 5-digit numbers that are divisible by 12.

The input file (**DATA51.txt** for the first submission and **DATA52.txt** for the second submission) will contain five lines of data. Each line will contain two whole numbers, D1 and D2. D1 will represent the number of unique digits (starting at 1), that will form the number. $3 <= D1 <= 9$. D2 represents the divisor. $2 <= D2 <= 50$.

The output file (**OUT51.txt** for the first submission and **OUT52.txt** for the second submission) will output for each input line the number of different D1-digit numbers that are divisible by D2.

Sample Input (Only three sets given)	**Sample Output**
5 12 4 6 6 8	24 0 84

http://mathschallenge.net/index.php?section=problems&show=true&titleid=five-digit_divisibility