Programming Problem Set #1

1) Write a program called `factor.py` that uses at least one loop to print out

   "Multiple of x!"

   for each element `x` that is a multiple of the factors: 5, 7, or 13 between zero and 100.

   If a number is a multiple of more than one factor, for example 35 is a multiple of both 5 and 7, print out "Multiple of 5 and 7!". If all three are factors, then print out "Multiple of 5 and 7 and 13!".

2) Write a program called `fib.py` that calculates any Fibonacci number (without using recursion). The Fibonacci sequence is defined as:

   $F_0 = 0$, $F_1 = 1$
   $F_n = F_{n-1} + F_{n-2}$

   For example, for an index of n = 4, the Fibonacci sequence is:

   0, 1, 1, 2, 3, 5, 8, …

   Therefore $F_4 = 3$.

   The index number n will be provided via the command line as the only argument to the function.

3) Write a program called `temperature.py` to output the conversion from F to C, with F ranging from 0 to 300 degrees in steps of 20 degrees. Output C to 2 decimal places. The conversion from Fahrenheit to Celsius is:

$$Temp_C = (Temp_F - 32) \times \frac{5}{9}$$

4) Write a program called `palindrome.py` to output 7-digit palindromes that are square numbers. A palindrome is a number that is the same when read forwards and backwards, for example 12321.

   An example of a 3-digit palindrome that is a square number is: 121 = 11 x 11.

5) Write a program called `perfect.py` that calculates all three-digit perfect numbers. A number is perfect if it is equal to the sum of its divisors, excluding itself.

   For example, the divisors of 28 (excluding 28) are: 1 + 2 + 4 + 7 + 14 = 28. Therefore, 28 is a perfect number.

Grading:

The problem set will be graded using the rubric provided below

	Task	Evaluation Score: Missing = 0; Inadequate = .25; Average = .5; Proficient = .75; Excellent = 1	Weight	Score
factor.py	Prints out message for a single factor		0.05	5%
	Prints all combination messages		0.05	5%
	Correct output for numbers between 0 to 100		0.05	5%
	Commented		0.05	5%
fib.py	Checks input argument validity before use		0.05	5%
	Output is correct		0.05	5%
	Uses command line argument in calculation		0.05	5%
	Commented		0.05	5%
temperature.py	Prints out entire conversion range from 0 to 300		0.05	5%
	Conversion is correct		0.05	5%
	Two decimal places for all Celsius data		0.05	5%
	Commented		0.05	5%
palindrome.py	Prints only palindromes		0.05	5%
	Prints only 7-digit numbers		0.05	5%
	Correct output		0.05	5%
	Commented		0.05	5%
perfect.py	Calculates all factors for each number		0.05	5%
	Correctly tests perfectness		0.05	5%
	Prints all correct output		0.05	5%
	Commented		0.05	5%
Grade				100%