CS 210 Homework 1

1. primes.py: Write a program to find all prime numbers less than an integer n, where n is given as a command-line argument (assume $n > 2$).

   ```
   $ python3 primes.py 40
   2 3 5 7 11 13 17 19 23 29 31 37
   ```

2. factor.py: Factor an integer n given as a command-line argument (assume $n \geq 2$).

   ```
   $ python3 factor.py 40
   2 2 2 5

   $ python3 factor.py 23
   23
   ```

3. increasingDigits.py: Write a program to count all integers from 1 to n (inclusive) that have all digits in increasing order, where n is given as a command-line argument. For example,

   - 5 is in increasing order (single digit)
   - 237 is in increasing order ($2 < 3 < 7$)
   - 227 is not ($2 \not< 2$)
   - 427 is not ($4 \not< 2$)

   ```
   $ python3 increasingDigits.py 30
   24
   ```

4. stats.py: Write a program that reads a list of integers from the user, until they enter -12345 (the -12345 should not be considered part of the list). Then print the mean, median, and standard deviation of the list.

   Suppose the numbers input are $x_1, x_2, \ldots, x_n$. Then the mean is

   $$\mu = \frac{1}{n} \sum_{i=1}^{n} x_i.$$

   The median is the "middle" value if n is odd, or the average of the two "middle" values if n is even (assuming the x_i values are rearranged in increasing order).

   The standard deviation is

   $$\sigma = \sqrt{\frac{1}{n-1} \sum_{i=1}^{n} (x_i - \mu)^2}.$$

```
$ python3 stats.py
15
4
10
2
-12345
mean: 7.75
median: 7.0
standard deviation: 5.909032633745278
```

5. zeroTriples.py: Write a program that reads a list of integers from the user, until they enter -12345 (the -12345 should not be considered part of the list). Then find all triples in the list that sum to zero. You can assume the list won't contain any duplicates, and a triple should not use the same number more than once.

```
$ python3 zeroTriples.py
1
2
4
-12345
0 triples found

$ python3 zeroTriples.py
-3
1
4
2
-12345
1 triple found:
1, 2, -3

$ python zeroTriples.py
-9
1
-3
2
4
5
-4
-1
-12345
4 triples found:
-9, 4, 5
1, -3, 2
-3, 4, -1
5, -4, -1
```

Submission

Please zip these python files into a file called `hw1.zip` and submit the zip file on Canvas.