Homework #6

The following programs are due at the beginning of class on Tuesday, October 29. You can submit your programs online via NYU Classes. Please submit a separate .py file for each program, and put your name and the problem/assignment number in a comment at the top of the program.

1. The formula for converting a temperature from Celsius to Fahrenheit is

\[ F = \frac{9}{5} C + 32 \]

where \( F \) is the Fahrenheit temperature and \( C \) is the Celsius temperature. Write a program that asks the user for a minimum temperature in Celsius, a maximum temperature in Celsius, and an increment, and then creates a table of the Celsius temperatures in this range with their Fahrenheit equivalents. For example, if the user inputs a maximum of 10, a minimum of 4, and increments of 2, the program should output the following table:

<table>
<thead>
<tr>
<th>Celsius</th>
<th>Fahrenheit</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>39.2</td>
</tr>
<tr>
<td>6</td>
<td>42.8</td>
</tr>
<tr>
<td>8</td>
<td>46.4</td>
</tr>
<tr>
<td>10</td>
<td>50</td>
</tr>
</tbody>
</table>

2. The Fibonacci numbers were described by Leonardo Fibonacci in his 1202 book *Liber Abaci*, although they had already been discovered earlier in Indian mathematics. The first Fibonacci numbers are \( F_0 = 0 \) and \( F_1 = 1 \). After that, all subsequent Fibonacci numbers are defined in terms of the previous two using the formula:

\[ F_n = F_{n-2} + F_{n-1}. \]

For example,

\[ F_2 = F_0 + F_1 = 0 + 1 = 1 \quad \text{and} \quad F_3 = F_1 + F_2 = 1 + 1 = 3. \]

The first ten Fibonacci numbers are 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, \ldots Write a program that lists the first 1000 Fibonacci numbers (and then go read the Wikipedia article on them. They’re amazing!)

3. Write a program that asks the user for a number and then lists all of its factors. For example, if the user inputs 12, the program should output 1, 2, 3, 4, 6, and 12.
4. Write a program that uses nested loops to draw the following pattern:

```plaintext
  # #
  # #
  # #
  # #
  # #
  # #
  # #
  # #
```