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>

# SOLUTIONS: Homework 6 – Problem 1

```python
def convert_to_fahrenheit(celsius_temp):
    return 9*celsius_temp/5 + 32

print("This program displays a table of Celsius and Fahrenheit temperatures.")
min_temp = int(input("What is the minimum Celsius temperature that you would like the table to display? "))
max_temp = int(input("What is the maximum Celsius temperature that you would like the table to display? "))
increment = int(input("What increment should the table use? "))
print()
print("Celsius Fahrenheit")
for temp in range(min_temp, max_temp + 1, increment):
    print(temp, convert_to_fahrenheit(temp))
```
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, . . . Write a program that lists the first 1000 Fibonacci numbers (and then go read the Wikipedia article on them. They’re amazing!)

# SOLUTIONS: Homework 6 – Problem 2

```python
# prints the first 1000 Fibonacci numbers
fib1 = 0
fib2 = 1
print(fib1)
print(fib2)
for n in range(0, 998):
    temp_fib = fib1 + fib2  # temporarily stores the next Fibonacci number
    print(temp_fib)
    fib1 = fib2
    fib2 = temp_fib
```

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.

# SOLUTIONS: Homework 6 – Problem 3

```python
print("This program finds all factors of a number.")
number = int(input("Please enter a number: "))
print()
print("The factors of", number, "are:")
for potential_factor in range(1, number + 1):
    remainder = number % potential_factor
    if remainder == 0:
        print(potential_factor)
```
4. Write a program that uses nested loops to draw the following pattern:

```
##
# #
# #
# #
# #
# #
# #
```

```
# SOLUTIONS: Homework 6 – Problem 4

for r in range(7):
    print('#', end=' ')
    for c in range(r):
        print(' ', end=' ')
    print('#
    print('#
```