PROBLEM I.6: FIBONACCI SEQUENCE 2

ROSIE KEY

1. The Program

A program was created that generates the Fibonacci sequence at a length given by user input N. The user is then asked to give another input m. After the first for loop creates the Fibonacci sequence, a second for loop runs through the list and checks for any terms that are divisible by m and stores them in a second list. The program then outputs all terms as well as how many terms are multiples of m.

2. Answers

The first question for the assignment was to find the first 50 terms of the sequence (N=50) and pick out the terms that are divisible by 4 (m=4). The following are the outputs given by the program:

```
[0, 8, 144, 2584, 46368, 832040, 14930352, 267914296,
                    4807526976]
```

The second question asks for the percentage of even numbers (m=2) out of the first 10,000 terms of the Fibonacci sequence (N=10000). The following is the output given by the program:

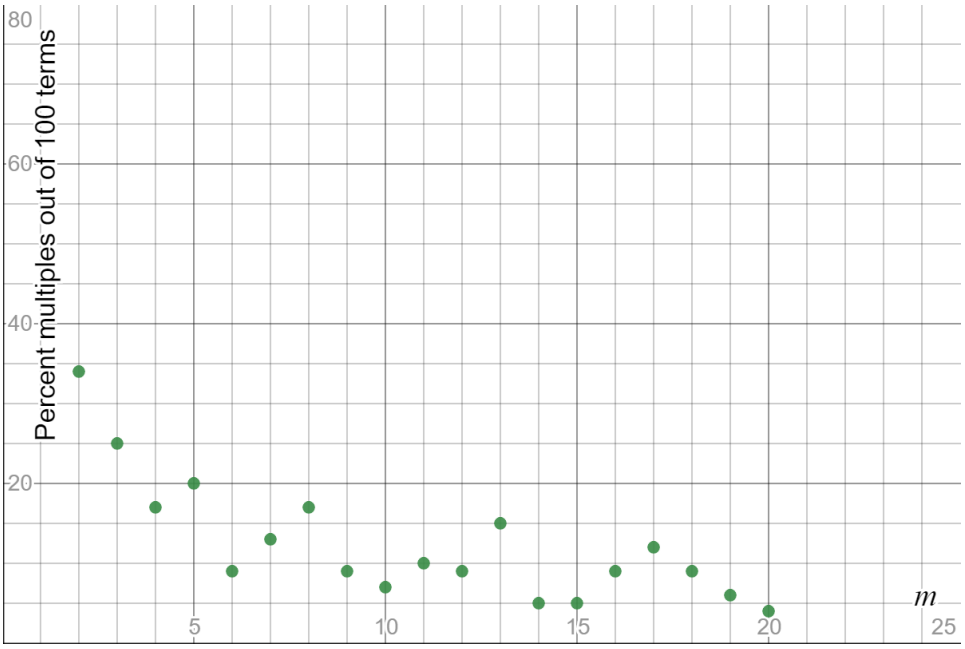
```
The number of terms that are divisible by m is 3334.
```

Using the output, the following percentage is returned:

$$\frac{3334}{10000} \times 100 = 33.34\%$$

In response to the third question, I could not conjecture a formula in time before the due date of the assignment. However, I did find an interesting pattern between the number m and the percentage of terms divisible by that integer given by the graph below:

Date: February 2019.



It seems that as the number m increases, the percentage of numbers divisible by m fluctuate, but experience exponential decay overall.