The following problems should be completed using the programming language Go [2]. You should create a GitHub repository containing your solutions.

1. The natural numbers below 10 that are multiples of 3 or 5 are: 3, 5, 6 and 9. The sum of these multiples is 23. Find the sum of all the multiples of 3 or 5 below 1000 [1].

2. The first six prime numbers in order are 2, 3, 5, 7, 11, and 13. So, for instance, the 4th prime number is 7. Write a program to find the 10,001st prime number. [1].

3. Write a program that accepts a user inputted string and prints its reverse.

4. Write a program that takes as input a positive integer and applies the following operations until the sequence begins to repeat: if the number is even, divide it by 2, but if the nubmer is odd, multiply it by 3 and add 1. The program should print the generated sequence to the screen. You might want to consider whether the program always terminates, and what will happen should the program encounter a 0.

5. Write a program that accepts four characters as input, and outputs all permutations of those four characters. What should your program do if two or more of the characters are the same?

References

[1] Colin Hughes. Project euler.

[2] Google Inc. The go programming language.