Exercise: Fibonacci

The Fibonacci numbers is a special sequence of numbers. They are defined so that the first two numbers are 1, and all following numbers are the sum of the two preceding numbers, i.e.
The 0th Fibonacci number is 1.
The 1st Fibonacci number is also 1.
The 2nd Fibonacci number is 1 + 1 = 2.
The 3rd Fibonacci number is 1 + 2 = 3.
The 4th Fibonacci number is 2 + 3 = 5.
Etc.

Write a program that prints out the first 20 Fibonacci numbers, in the following format: Output:

```
Fibonacci(0) = 1
Fibonacci(1) = 1
Fibonacci(2) = 2
Fibonacci(3) = 3
Fibonacci(4) = 5
Fibonacci(5) = 8
Fibonacci(6) = 13
...
```

Note: You should have (at least) two variables representing the last number and the number before that. The new number (in a third variable) is calculated as the sum of these two variables. A loop cycle then ends updating the two variables to their new values.

Exercise: Reverse strings

Write a program that prompts the user for a string, and prints its reverse. Example: the string `"Hello"` typed on the keyboard will be printed out as `"olleH"`.
Keep doing this repeatedly (in a loop), until the user enters the string `"quit"`.

Note: The method `charAt(index)` in the `String` class can be used to get the character at a specific index in the string, and the method `length()` can be used to get the number of characters in the string. When comparing strings, the method `equals` might be useful.

(Optional and challenging Exercise: Series)

Look at the following series

$$S(n) = 1 + \frac{1}{2} + \left(\frac{1}{2}\right)^2 + \left(\frac{1}{2}\right)^3 + \left(\frac{1}{2}\right)^4 + \left(\frac{1}{2}\right)^5 + \cdots + \left(\frac{1}{2}\right)^{n+1}$$

Calculate S(5), S(25) and S(100) and check if the series convergences towards 2.

(Optional and challenging Exercise: PI approximation)

An approximation for π can be calculated using a finite number of terms by the following series

$$\pi = 4 - \frac{4}{3} + \frac{4}{5} - \frac{4}{7} + \frac{4}{9} - \frac{4}{11} + \cdots$$

Calculate an approximation to π with 500 terms. Note the change in sign between the terms