Exercise of Programming Language, Homework E8

Make 5 flowcharts, each with a Python program composed according to the flowchart, to solve the following questions. Please name your flowchart files as *Q1.xml*, *Q2.xml, etc*, and program files as *Q1.py*, *Q2.py*, etc, *i.e.*, according to the serial number of questions.

1. Write a user-defined function named **my_round()**, which takes two arguments and acts similarly with the Python inborn function round() but automatically adds "0"s to the end of the result when needed. **The output of this function shall be a string.** For instance,

```
assert my_round(10, 3) == "10.000"
assert my_round(0.2345, 3) == "0.234"
assert my_round(12.32, 5) == "12.32000"
```

2. Given a list,

```
numbers = [50.9, 50.3, 48.7, 89.2, 60.0, 74.0, 54.2, 101.6, 84.9, 82.1, 79.4,
93.8]
```

   please write a function that takes a list to calculate and return its medium. Use the following assertions to test your function:

```
assert my_medium(numbers) == 76.7
assert my_medium([1, 3, 5, 10, 20]) == 5
```

3. Write a program that accept a sequence and calculate the number of upper case letters and lower case letters.
   Suppose the following input is supplied to the program:
   `Hello world!`
   Then, the output should be:
   `UPPER CASE: 1`
   `LOWER CASE: 9`

4. **Bubble Sort**, one of the most basic and simple algorithms. It may not be the most efficient, but is very easy to implement. A bubble sort takes in an unsorted list and keeps comparing each element with its right side neighbor in order to sort the data. If any element is smaller, it is shifted to the left. After completion of one round, the largest number ends up in its correct position. And then, the process is repeated again and again until all of the data is sorted.

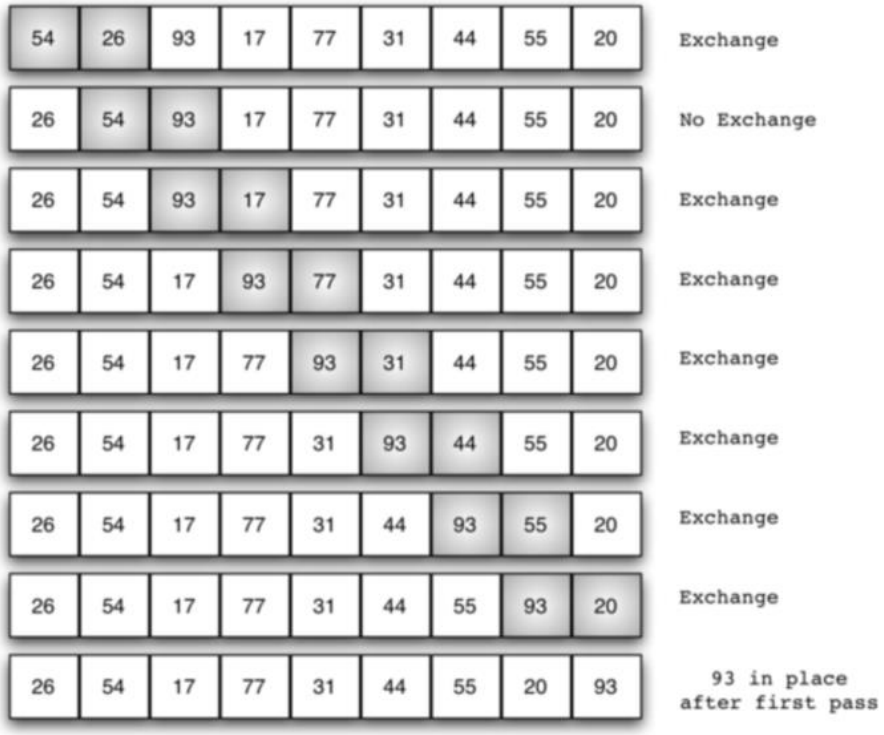
   Given a list,

```
[54, 26, 93, 17, 77, 31, 44, 55, 20]
```

Please write a function that takes a list and return its sorted version by Bubble Sort. The sorted list should look like this:

```
[17, 20, 26, 31, 44, 54, 55, 77, 93]
```

Hint: this figure shows the first round of the bubble sort



5. Write a function using a **while** loop that takes one argument *n*, and then calculates and returns the n^{th} number in the Fibonacci sequence, the rule of which is shown below,

$$F_0 = 0,\ F_1 = 1$$
$$F_n = F_{n-1} + F_{n-2} \quad (n \geq 2)$$

Use the following assertions to test your function:

```
assert my_fibonacci(5) == 5
assert my_fibonacci(10) == 55
```