In-Class Exercises – Iteration Structures

1. Write Python programs to display the following patterns. The number of lines should be taken as input from the user.

   a.
   ```
   *
   **
   ***
   ****
   .
   .
   .
   ```

   b.
   ```
   1
   22
   333
   4444
   .
   .
   .
   ```

2. Write Python program to find sum of `n` natural numbers. `n` should be entered by the user.

3. Write a Python program that takes an integer from the user and prints its times table up to 10.

4. Write a Python program to take an integer from the user and prints its times table up to `x`. `x` is also given by the user.

5. Write a Python program that takes an integer from the user and prints its factors.

6. Write a Python program that takes an integer from the user and determines if it is a prime number. Print appropriate messages. Prime numbers are those which have only factors: 1 and the number itself.

7. Write a Python program to display the n terms of harmonic series and their sum.
   Harmonic series: 1 + 1/2 + 1/3 + 1/4 + 1/5 ... 1/n terms
   Test Data :
   Input the number of terms : 5
   Expected Output : 1/1 + 1/2 + 1/3 + 1/4 + 1/5
   Sum of Series up to 5 terms : 2.283334

8. Write a Python program to display the first `n` terms of Fibonacci series. In Fibonacci series, first two terms are 0 and 1 respectively, after that every term is the sum of the last two terms.
   Fibonacci series: 0 1 2 3 5 8 13 .....
   Test Data :
   Input number of terms to display : 10
   Expected Output : Here is the Fibonacci series upto to 10 terms :
   0 1 1 2 3 5 8 13 21 34

9. Write a Python program to display the sum of the series [9 + 99 + 999 + 9999 ...].
   Test Data :
   Input the number or terms :5
   Expected Output : 9 99 999 9999 99999
   The sum of the series = 111105

10. Write a Python program to input basic salary of `n` employees; calculate and print the gross and net salary according to following rules. The value `n` should also be taken from user at the start of the program.
    Gross Salary = Basic Salary (BS) + House Rent Allowance (HRA) + Dearness Allowance (DA)
    Net Salary = Gross Salary (GS) – Deductions (DD)
    BS <= 10000 : HRA = 20% of BS, DA = 80% of BS, DD = 2% of BS
    BS <= 20000 : HRA = 25% of BS, DA = 90% of BS, DD = 4% of BS
    BS > 20000 : HRA = 30% of BS, DA = 95% of BS, DD = 10% of BS

11. Repeat problem 10. Now the user should be allowed to enter data for as many users as required and should press some negative number to exit.

12. Write Python programs to count the number of vowels in a sentence input by the user.

13. Write Python programs to display the following patterns. The number of lines should be taken as input from the user.

```
1
1 2
1 2 3
1 2 3 4
.
.
.
```