Section 14

PDS Lab **Lab - 4** **29.12.2021**

Instructions:

- Give sufficient comment against each statement in your program.
- You should save each program with the file name (e.g., Lab4_1.c for the program of Problem 1 in this assignment).
- There is a partial credit even if your program does not run successfully for all the test cases as mentioned.
- There are FIVE problems and you have to solve in 150 minutes. A tentative time against each problem is given and can be considered for your guidance.
- You should upload each program (only .c file) against the problem. There is no need to submit any .zip file at the end of your lab.

1. Read an integer number from the keyboard. Write a program to display all the factors of the number. For example, if the input number is 10, then it will print 1, 2, 5 and 10. Run your program with the following test cases:

```
Test case#1
Input: 12
Output: 1 2 3 4 6 12

Test case#2
Input: -13
Output: 1 13

Test case#3
Input: 0
Output: 0

Test case#4
Input: abc
Output: Not a valid input!
```

[Time: 20 minutes] [(3+2)+4×2.5]

2. Read a sequence of integer numbers (terminated by 0). Find the maximum, minimum and average value (rounded up to 2 decimal places) of the numbers you have entered.

```
Test case#1
Input: 7 15 6 -20 5 11 -2 0
Output:
Maximum is 15
Minimum is -20
Average is 3.14

Test case# 2
Input: 100 0
Output:
Maximum is 100
Minimum is 100
Average is 100.00
```

```
Test case# 3
Input: 0
Output:
Maximum is "No sufficient data"
Minimum is "No sufficient data"
Average is "No sufficient data"

Test case# 4
Input: 1.1  2.2  3.3  4.4  5.5  0
Output:
Maximum is 5
Minimum is 1
Average is 3.00
```

[Time: 25 minutes] [(3+2)+4×2.5]

3. Read any 4 digit number from the keyboard and then print the sum of its digits. For example, if the number entered is 1234, then it will print the result 10 .

```
Test case# 1
Input: 5641
Output: 16

Test case# 2
Input: -5641
Output: 16

Test case# 3
Input: 5
Output: "Sorry! You should give 4 digit data only"

Test case# 4
Input: 54321
Output: "Sorry! You should give 4 digit data only"
```

[Time: 30 minutes] [(3+2)+4×2.5]

4. Write a program to find the sum of the following series for a given value of n.

$$S = 1 - \frac{1}{3} + \frac{1}{3^2} - \frac{1}{3^3} + \cdots (-1)^n \frac{1}{3^n}$$

Use a loop to calculate the sum (Calculation 1). In addition, obtain the formula for the series and get the result then (Calculation 2).

```
Test case# 1
Input: 5
Output:     Calculation 1: 0.75
            Calculation 2: 0.75

Test case# 2
```

```
Input: 0
Output:     Calculation 1: 1.0
            Calculation 2: 1.0


Test case# 3
Input: -100
Output:     0
```

[Time: 30 minutes] [(4+4)+(4+4+4)]

5. A number is called a perfect number, if the number is equal to the sum of all its positive divisors except the number itself. For example, (6 = 1 + 2 + 3, 28 = 1 + 2 + 4 + 7 + 14). Read an integer number, say N from the keyboard and print all the perfect numbers less than or equal to N.

```
Test case# 1
Input: 1
Output:     Invalid input

Test case# 2
Input: 300
Output:     6    28   .    .    .    .

Test case# 3
Input: -100
Output:     Invalid input
```

[Time: 30 minutes] [(15+5)+(3+10+2)]

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