(CL-1002) Programming Fundamentals Lab

Fall 2021

NUCES-FAST Peshawar Campus

Assignment # 02

- The due date for this homework is **December 12th, 2021**
- There is **30%** penalty for late submission.
- No Late submission would be entertained after the first week of deadline
- Copied assignments will be awarded **zero** marks without any investigation.
- All submissions should be made on Google Class Room.
- Upload only a PDF and MS word file including all tasks source code and its output (screen shot).
- You have to copy the source code in your word file. Don't take the screen shot of source code.
- Note that these assignment marks could be graded through a quiz (viva) in class.
- Proper Comments your Code otherwise marks will be deducted.

Question # 01

A box of cookies can hold 24 cookies, and a container can hold 75 boxes of cookies. Write a program that prompts the user to enter the total number of cookies, the number of cookies in a box, and the number of cookie boxes in a container. The program then outputs the number of Boxes and the number of containers to ship the cookies. Note that each box must contain the specified number of cookies, and each container must contain the specified number of boxes. If the last box of cookies contains less than the number of specified cookies, you can discard it and output the number of leftover cookies. Similarly, if the last container contains less than the number of specified boxes, you can discard it and output the number of leftover boxes.

Question # 02

Write a Program that takes ‘n’ and ‘x’ from user and computes the following series.

$$s = \sum_{k=0}^{n} x^k / k!$$

Sample Output:

```
Enter the value for n 5
Enter the value for x 3
18.4
```

Question # 03

A “Perfect” number is a positive whole number that is the sum of its proper divisors (including 1 and excluding the number itself). For example, the proper divisors of 6 are 1, 2, 3 and 1 + 2 + 3 = 6. So, 6 is a perfect number. Similarly, 28 is also a perfect number.

Write a program that displays first 4 perfect numbers.

Sample Run:

6 is a perfect number

1+2+3=6

28 is a perfect number

1+2+4+7+14=28

Question # 04

Write a Python function to construct the following pattern, using a loop.

Sample Output

```
Enter the number of rows: 7
      0
     1 1
    2 2 2
   3 3 3 3
  4 4 4 4 4
 5 5 5 5 5 5
6 6 6 6 6 6 6
 5 5 5 5 5 5
  4 4 4 4 4
   3 3 3 3
    2 2 2
     1 1
      0
```

Question # 05

Write a program that computes the product of any two matrices entered by the user. Your program should check if the two matrices are multipliable or not. In case of non-multipliable matrices, the program should display a proper message and prompt the user to reinter matrices with proper dimensions.

Note: Do not use built-in function for matrix multiplication

Sample Output

```
Enter the number of rows for matrix 1 3
Enter the number of columns for matrix 1 2

Enter the number of rows for matrix 2 3
Enter the number of columns for matrix 2 2
Error! column of first matrix not equal to row of second matrix
Enter the number of rows for matrix 1 2
Enter the number of columns for matrix 1 3

Enter the number of rows for matrix 2 3
Enter the number of columns for matrix 2 2
<------------------------------------------->
Enter Elements of Matrix 1 (0,0): 1
Enter Elements of Matrix 1 (0,1): 2
Enter Elements of Matrix 1 (0,2): 3
Enter Elements of Matrix 1 (1,0): 4
Enter Elements of Matrix 1 (1,1): 5
Enter Elements of Matrix 1 (1,2): 6
<------------------------------------------->
Enter Elements of Matrix 2 (0,0): 7
Enter Elements of Matrix 2 (0,1): 8
Enter Elements of Matrix 2 (1,0): 9
Enter Elements of Matrix 2 (1,1): 10
Enter Elements of Matrix 2 (2,0): 11
Enter Elements of Matrix 2 (2,1): 12
<------------------------------------------->
Output Matrix
58  64
139  154
```

Good Luck!