NUST CHIP DESIGN CENTRE

C / C++ Programming

Lab # 05
Functions

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Date	*15th July 2025*

1. In-Lab Tasks: (*Write your lab task & screenshots here*)

i. Task 1:

```
[cc@ncdc-0053 codes]$ gcc lab5_task1.c -o task1
[cc@ncdc-0053 codes]$ ./task1
Type any sentence.
the Owl IS GREen.

The length of the sentence is: 18

The sentence in Upper case is:      THE OWL IS GREEN.

The sentence in Lower case is:      the owl is green.

The words in the sentence :     4
The vowels in the sentence:     5
Ocurrence of a:     0
Ocurrence of e:     3
Ocurrence of i:     0
Ocurrence of o:     1
Ocurrence of u:     0
[cc@ncdc-0053 codes]$
```

ii. Task 2:

```
PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL    PORTS

[cc@ncdc-0053 codes]$ gcc lab5_task3.c -o task3
[cc@ncdc-0053 codes]$ ./task3
Enter the scalar values.

Enter the value of a:    2

Enter the value of b:    3


Enter the Vector X values.
Enter the value of x[1]:    1
Enter the value of x[2]:    2
Enter the value of x[3]:    3


Enter the Vector Y values.
Enter the value of y[1]:    1
Enter the value of y[2]:    2
Enter the value of y[3]:    3


The dot product is given below.
5, 10, 15,

[cc@ncdc-0053 codes]$
```

iii. Task 3:

C / C++ Programming

```
[cc@ncdc-0053 codes]$ gcc lab5_task3.c -o task3
[cc@ncdc-0053 codes]$ ./task3
 Enter the Rows and Column for matrix A.

 Enter the Rows (M):   2
 Enter the Column (N):   3

 Enter the values of matrix A.
 Enter the Row # (1) and Cloumn # (1):   1
 Enter the Row # (1) and Cloumn # (2):   2
 Enter the Row # (1) and Cloumn # (3):   3
 Enter the Row # (2) and Cloumn # (1):   4
 Enter the Row # (2) and Cloumn # (2):   5
 Enter the Row # (2) and Cloumn # (3):   6

 Enter the values of matrix B.
 Enter the Row # (1) and Cloumn # (1):   1
 Enter the Row # (2) and Cloumn # (1):   0
 Enter the Row # (3) and Cloumn # (1):   -1


 The Resultant vector is.

 -2

 -2
```

iv. **Task 4:**

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```
PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL    PORTS    TER

● [cc@ncdc-0053 codes]$ gcc lab5_task4.c -o task4
● [cc@ncdc-0053 codes]$ ./task4
  Enter the Rows and Column for matrix A.

  Enter the Rows (M):   3
  Enter the Column (N):    3

  Enter only the Column for matrix B.

  Enter the Column (K):    3

  Enter the values of matrix A.
  Enter the Row # (1) and Cloumn # (1):    1
  Enter the Row # (1) and Cloumn # (2):    2
  Enter the Row # (1) and Cloumn # (3):    3
  Enter the Row # (2) and Cloumn # (1):    4
  Enter the Row # (2) and Cloumn # (2):    5
  Enter the Row # (2) and Cloumn # (3):    6
  Enter the Row # (3) and Cloumn # (1):    7
  Enter the Row # (3) and Cloumn # (2):    8
  Enter the Row # (3) and Cloumn # (3):    9

  Enter the values of matrix B.
  Enter the Row # (1) and Cloumn # (1):    1
  Enter the Row # (1) and Cloumn # (2):    2
  Enter the Row # (1) and Cloumn # (3):    3
  Enter the Row # (2) and Cloumn # (1):    4
  Enter the Row # (2) and Cloumn # (2):    5
  Enter the Row # (2) and Cloumn # (3):    6
  Enter the Row # (3) and Cloumn # (1):    7
  Enter the Row # (3) and Cloumn # (2):    8
  Enter the Row # (3) and Cloumn # (3):    9


  The Resultant vector is.

  30   36   42

  66   81   96

  102  126  150
```

v. **Task 5:**

```
PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL    PORTS    TEROSHDL: LOG REPORT

● [cc@ncdc-0053 codes]$ gcc lab5_task5.c -o task5
● [cc@ncdc-0053 codes]$ ./task5


  The Average is:  -0.05

  The signal crosses the x-axis 1 times.

  There is a glitch at t = (2).
  There is a glitch at t = (7).

  There are 2 number of glitches.

  Filtered signal:
  0.06 0.25 0.34 0.43 0.71 0.75 0.31 -0.18 -0.41 -0.68 -0.88 -0.75

○ [cc@ncdc-0053 codes]$ []
```

vi. **Task 6:**

```
PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL    PORTS    TEROSH

● [cc@ncdc-0053 codes]$ gcc lab5_task6.c -o task6
● [cc@ncdc-0053 codes]$ ./task6

 Occurrence of Black pixels = 1
 Occurrence of White pixels = 1
 Occurrence of Yellow pixels = 1


 *****Gray Scale Image*****

    76  149   29  225  178
   105  127  151  104   67
    63  192   31  152   97
     0  255  117  146  190
    90  109  200   65   75


 *********After zero padding*********

     0    0    0    0    0    0    0
     0   76  149   29  225  178    0
     0  105  127  151  104   67    0
     0   63  192   31  152   97    0
     0    0  255  117  146  190    0
     0   90  109  200   65   75    0
     0    0    0    0    0    0    0


 *************Filtered Image*************

    50.78    70.78    87.22    83.78    63.78
    79.11   102.56   128.89   114.89    91.44
    82.44   115.67   141.67   117.22    84.00
    78.78   117.44   140.78   119.22    80.56
    50.44    85.67    99.11    88.11    52.89

○ [cc@ncdc-0053 codes]$ |
```

2. Critical Analysis: (*Write you critical analysis / conclusion here*)

In this lab we learn how to use functions to implement. As it is the best approach to code a program because when we use that functionality just simply call the function in main. There is no need to write multiple times that section of code.

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