National University of Computer & Emerging Sciences, Karachi
Fall-2020 (CS-Department)

Programming Fundamentals (PF)

Assignment # 2

Max Points: 50 **Due Date:** Monday, Nov 16, 2020, 09 p.m.

Carefully read the following instructions!

- It should be clear that your assignment would not get any credit if the assignment is submitted after the due date. No assignment will be accepted after the due date.
- Strict action will be taken if submitted solution is copied from any other student.
- If you people find any mistake or confusion in assignment (Question statement), please consult before the deadline. After the deadline no queries will be entertained in this regard.
- For any query, feel free to email at: **basit.jasani@nu.edu.pk**
- **Submission:** Submission will only be accepted through **GOOGLE CLASSROOM**. Submit all your codes in a single folder name it as your Student ID **"KXX-XXXX"**. The folder will contain five C program files as Q1.c, Q2.c, Q3.c, Q4.c and Q5.c with proper commenting of the code.

Q1. Write a C program that reads a positive integer ‘n’ and then prints the following pattern

```
*********
 ********
  *******
   ******
    *****
     ****
      ***
       **
        *
```

Where ‘n’ is the number of lines.

Sample Input:

6

Sample Output:

```
******
 *****
  ****
   ***
    **
     *
```

Q2. Write a C program to input nine numbers in an array, calculate the sum of all even numbers and all odd numbers in the array and print the larger sum.

Example:

If the array contains the following elements: 2, 3, 3, 5, 4, 8, 7, 11, 2
The sum of all even elements is 2+4+8+2=16
Sum of all odd elements is 3+3+5+7+11=29

Therefore, the output should be 29.

Q3. Write a C program that calculates the scalar product of two 2D arrays A and B, assuming they have the same length.

The example of scalar product is given below;

$$AB = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \cdot \begin{bmatrix} 5 & 6 \\ 7 & 8 \end{bmatrix}$$

$$= \begin{bmatrix} 1(5) + 2(7) & 1(6) + 2(8) \\ 3(5) + 4(7) & 3(6) + 4(8) \end{bmatrix}$$

$$= \begin{bmatrix} 19 & 22 \\ 43 & 50 \end{bmatrix}$$

Q4. Write a C program that removes the duplicate values from a 1D array. The duplicates should be removed by keeping only the first occurrence of each distinct element, and shifting remaining elements backwards when a duplicate is removed. Assign the number '0' on unfilled indexes.

Sample Input:

1 | 3 | 3 | 2 | 1 | 5 | 2 | 6 | 5 | 3

Sample Output:

1 | 3 | 2 | 5 | 6 | 0 | 0 | 0 | 0 | 0

Q5. Write a C program that takes input in a 6x6 2D Array and check which row has maximum consecutive 1s.

Sample Input:

1 1 1 0 0 0
0 1 0 0 0 0
1 1 1 0 1 1
0 0 1 1 1 1
1 1 0 1 1 1
0 0 1 0 0 0

Sample Output:

Row Number 4