National University of Computer and Emerging Sciences, Lahore Campus

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	Lab No 6		
Course Name:	**Programming Fundamentals**	**Course Code:**	**CS 188**
Program:	**BS(SE)**	**Semester:**	**Fall 2020**
Duration:	**2.5 hours**	**Total Points:**	**20 + 10 + 20**
Lab Date:	**Saturday, November 14, 2020**	**Weight**	**3%**
Section:	**SE-1A and SE-1B**	**Page(s):**	

Instruction/Notes: **Cheating during the lab will result in negative marks**

Topics Covered: Loops and 1D Array

Us a text editor to create the program and use the g++ compiler to compile your program using the already installed MinGW compiler toolchain or use the MinGW copied into your network derive.

NO ONLINE TOOLS TO BE USED FROM THIS LAB ONWARDS

Problem No 1:

a) Write a function that reads **n** elements into a one dimensional integer array. Your function must have the following prototype

void cin_Array(int arr[], int n)

b) Write a function that display the first **n** elements into a one dimensional integer array. Your function must have the following form also called the function prototype

void cout_Array(const int arr[], int n)

c) Write a function that computes the frequency of each digit in all the numbers stored in an integer array of size N. The function will have the following prototype

void Digit_Frequency(const int Numbers[], int N, int F[])

This function has the following parameters
const int Numbers[]: An array of integers containing numbers (positive/negative)
int N: An integer specifying the number of values to be processed.

int F[]: An uninitialized array of size 10 that will be used to return the frequency of each digit to the caller

Finally write a main function that creates an array of size 20. The function must ask the user to specify the total numbers **n** (0< n < 21) and then input **n** number in the array using the above function.
The main function must create an integer array of size 10 to hold the frequencies of various digits.
It must then pass the array containing numbers and the array of frequencies to the Digit_Frequency function to compute the frequency.

The main function must finally display both the arrays of numbers and digit frequencies on screen using the cout_Array function.

Problem No 2:

Write a C++ program that prints the first **n** terms of the Tick-Tock series. The value of n is taken as input. The first 8 terms of the Tick-Tock series, i.e., for n=8 are as follows:

2 - 5 + 4 -10 + 6 - 15 + 8 - 20

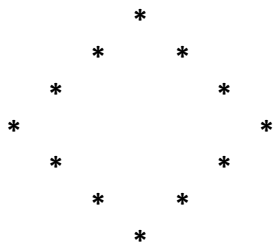
Can you guess the pattern? The odd terms are multiples of 2 and in increasing order (2, 4, 6, 8 etc.). The even terms are increasing multiples of 5 and in negative form. The terms are alternatively positive and negative. Nothing should be printed if the value of n is below 1.

Problem No3:

You are allowed to use only the following three **cout** statements along with the repetition structures (i.e. loops) to print the following two patterns

STATEMENT NO	**STATEMENT**
1	cout<< "*"
2	cout<<" "
3	cout<<endl

i. **An empty diamond of stars (the user supplies the height) of heights n. User will specify the height of the star**
For example if the user enters 4 as height of the diamond then the program must show the following pattern



ii. **An X of stars (user supplies the height) of height n**

For example if the user specifies the height to be 4 then the program must display the following pattern