**Programming Fundamentals**

**Lab Manual**

**Week 06 – Lab 01**

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**Function and Arrays**

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**Faculty of Information Technology**

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# Lab Task 1

Write a C++ program to compute **Sin(x)** where

**x x3 x5 x7 x9 xn**

**sin (x) = ----- ─ ---- + ---- ─ ---- + ----- ─ …………. ------**

**1! 3! 5! 7! 9! n!**

Your program should accept two values from the user (the angle x and the value of n) and then should compute and print the value of sin(x).

To make the program, do following tasks.

* Write two functions, i.e. function to calculate factorial and function to calculate power having following prototypes.

**double Factorial (int n); //Factorial function prototype**

**double Power(double x, int y); //Power function prototype**

* Use these functions in your main function to compute the series.

Use factorial and power function defined in your myMath.h header file in previous labs.

# Lab Task 2

Write a function called deleteRepeats that has a partially filled array of characters as a formal parameter and that deletes all repeated letters from the array. Since a partially filled array requires two arguments, the function will actually have two formal parameters: an array parameter and a formal parameter of type int that gives the number of array positions used. When a letter is deleted, the remaining letters are moved forward to fill in the gap.

This will create empty positions at the end of the array so that less of the array is used. Since the formal parameter is a partially filled array, a second formal parameter of type int will tell how many array positions are filled. This second formal parameter will be a call-by-reference parameter and will be changed to show how much of the array is used after the repeated letters are deleted. For example, consider the following code:

char a[10];

a[0] = 'a';

a[1] = 'b';

a[2] = 'a';

a[3] = 'c';

int size = 4;

deleteRepeats(a, size);

After this code is executed, the value of a[0] is 'a' , the value of a[1] is 'b' , the value of a[2] is 'c' , and the value of size is 3 . (The value of a[3] is no longer of any concern, since the partially filled array no longer uses this indexed variable.) You may assume that the partially filled array contains only lowercase letters. Embed your function in a suitable test program.

# Lab Task 3

Write a program that will allow two users to play tic-tac-toe. The program should ask for moves alternately from player X and player O. The program displays the game positions as follows:

1 2 3

4 5 6

7 8 9

The players enter their moves by entering the position number they wish to mark. After each move, the program displays the changed board. A sample board configuration is as follows:

X X O

4 5 6

O 8 9

# Lab Task 4

In the sport of diving, seven judges award a score between 0 and 10, where each score may be a floating-point value. The highest and lowest scores are thrown out and the remaining scores are added together. The sum is then multiplied by the degree of difficulty for that dive. The degree of difficulty ranges from 1.2 to 3.8 points. The total is then multiplied by 0.6 to determine the diver’s score. Write a computer program that inputs a degree of difficulty and seven judges’ scores, and outputs the overall score for that dive. The program should ensure that all inputs are within the allowable data ranges.