**Programming Fundamentals**

**Lab Manual**

**Week 05 – Lab 02**

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**Function Basics**

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# Objectives

* Practice top down algorithm development methodology by dividing main problem in to sub problems and writing their respective functions.
* To be able to write user-defined functions in a program.
* To be able to identify parameter required to be passed in functions.
* To be able to divide a problem into subtasks.
* To be able to write functions for specific functionality.

# Lab Task 1

Write a menu driven program that allows the user to calculate following for 2 numbers.

1. Addition
2. Subtraction
3. Division
4. Multiplication
5. Power function
6. Square function
7. Square root function
8. Factorial function

Program should display the following menu:

1 – Calculate sum of two numbers

2 – Calculate difference of two numbers

3 – Calculate product of two numbers

4 – Calculate quotient of two numbers

5 – Calculate exponential power of a number

6 – Calculate factorial of a number

7 – Calculate square of a number

8 – Calculate square root of a number

7 – Quit

**Note**: Include myMath.h from previous Lab and make use of switch statement to create your menu.

# Lab Task 2

Write a program to measure the rate of inflation for the past year. The program asks for the price of an item (such as a food or Jewelry item) both one year ago and today. It estimates the inflation rate as the difference in price divided by the year-ago price. Your program should allow the user to repeat this calculation as often as the user wishes. Define a function to compute the rate of inflation. The inflation rate should be a value of type ***double*** giving the rate as a percentage, for example 7.5 for 7.5%.

# Lab Task 3

One way to estimate the height of a child is to use the following formula, which uses the height of the parents:

*H*male\_child = (( *H*mother 13/12) + *H*father )/2

*H*female\_child = (( *H*father 12/13) + *H*mother )/2

All heights are in inches. Write a function that takes as input parameters the gender of the child, height of the mother in inches, and height of the father in inches, and outputs the estimated height of the child in inches. Embed your function in a program that allows you to test the function over and over again until telling the program to exit. The user should be able to input the heights in feet and inches, and the program should output the estimated height of the child in feet and inches.

# Lab Task 4

You are supposed to write a program for a Hotel to make bills for the customers. To print a bill for a customer, the program takes as input the number of days the customer stayed, Category of room reserved by customer, number of meals taken by the customer. The program should then perform following tasks to make a bill.

**Calculate Basic Charges:** The room changers are calculated according to the category of the room. There are 4 categories of rooms named as category A, B, C and D. The basic charges for a room are calculated by multiplying the number of the days of stay with the charges per day of the room. The basic charges of the room per day are as follow.

Category Rate per day

A Rs.1000

B Rs.2000

C Rs.4000

D Rs.8000

**Calculate Meal Charges:** At the hotel all meals are of same cost**.** Each meal costs 80 Rupees. The Meal charges are simply calculated by multiplying the number of meals taken by customer with the cost of one meal.

**Calculate Tax:** The total charges of staying at hotel also include the tax. The tax is calculated as the total of basic tax and stay tax. The basic tax is calculated by adding the Basic charges and meal charges and calculating 10% of the total. The formula for basic tax is 10% of (Basic charges + Meal charges). The stay tax is fixed rate of Rs. 40 per day, and calculated as 40 multiplied by number of days of stay. So the total tax is equal to basic tax + stay tax.

The charges calculated as above are finally added to make total dues.

Write functions for each of the above tasks. The functions should also display the calculated charges. The main function of the program should take all inputs and should only display the total dues.