

Government College University, Lahore

Department of Computer Science

Programming Fundamentals

Lab – 08

Startup (02) (Understand Functions)

Type the following program in your editor and observe the results

```
#include <iostream>

using namespace std;

void displayMessage(){
    cout<<"Hello from the diplayMessage() Function.\n";
}

main(){

    cout<<"Hello from the Main.\n";

    diplayMessage();

    cout<<"Good Bye from main.";

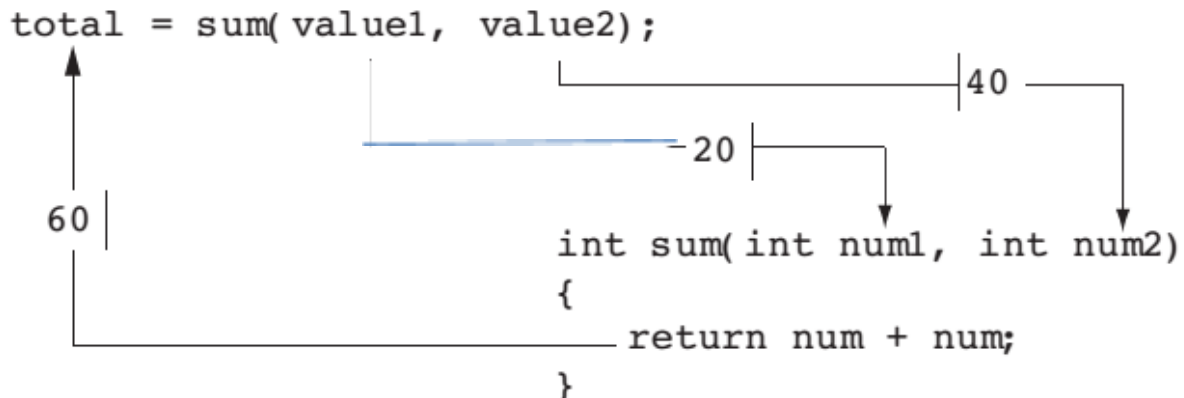
}
```

Understanding how function call works

This will allow you to understand how a function call works to get results from functions.

Total = sum (value1, value2);

Function Call



Task-1 (Markup)

Write a function that asks the user to enter an item's wholesale cost and its markup percentage. It should then display the item's retail price. For example

- If an items' wholesale cost is 5.00 and its markup percentage is 100%, then the items' retail price is 10.00.
- If an items' wholesale cost is 5.00 and its markup percentage is 50%, then the items' retail price is 7.50.

The program should have a function named **calculateRetail** that receives the wholesale cost and markup percentage as an argument and returns the retail price of the item.

Input validation : Do not accept negative values for either wholesale cost of item or percentage.

Task-2 (Falling Distance)

When an object is falling because of gravity, the following formula can be used to determine the distance of the object falls in a specific time period.

$$d = \frac{1}{2} g t^2$$

The variables in the formula are as follows:

d is the distance in meters,

g is 9.8, and

t is the amount of time, in seconds, that object has been falling.

Write a function named **fallingDistance** that accepts an object's falling time (in seconds) as an argument. The function should return distance, in meters, that the object has fallen during that

time interval. Write a program that demonstrates the function by calling it in a loop that passes the values 1 through 10 as arguments, and display the return value.

Task-3 (Kinetic Energy)

In Physics, an object that is in motion is said to have kinetic energy. The following formula can be used to determine a moving object's kinetic energy:

$$KE = \frac{1}{2}mv^2$$

The variables in the formula are as follows:

KE is the kinetic energy,

m is the object's mass in kilogram, and

v is the object velocity, in meters per second.

Write a function named ***kineticEnergy*** that accepts an object's mass (in kilogram) and velocity (in meter per seconds) as arguments. The function should return the amount of kinetic energy that the object has. Demonstrate the function by calling it in a program that asks the user to enter values for mass and velocity.

Task-4 (Present Value)

Suppose you want to deposit a certain amount of money into a savings account, and then leave it alone to draw interest for the next 10 years. At the end of 10 years you would like to have Rs. 1,000,000 in the account. How much do you need to deposit today to make that happen? You can use the following formula, which is known as the present value formula, to find out:

$$P = \frac{F}{(1+r)^n}$$

The term in the formula are as follows:

- P is the present value or the amount that you need to deposit today
- F is the future value that you want in the account. (in this case , F is Rs. 1,000,000)
- r is the annual interest rate
- n is the number of years that you plan to let the money sit in the account

Write a program that has a function named `presentValue` that performs these calculations. The function should accept the future value, annual interest rate, and the number of years as arguments. It should return the present value, which is the amount that you need to deposit today. Demonstrate the function in a program that lets the user experiment with different values for the formula's term.

Task-5 (Star Search)

A particular talent competition has five judges, each of whom awards a score between 0 and 10 to each performer, Fractional scores, such as 8.3, are allowed. A performers final score is determined by dropping the highest and lowest score received, then averaging the three remaining scores. Write a program that uses this method to calculate a contestant's score. It should include the following functions:

- `void getJudgeData ()` should ask the user for a judge's score, store it in a reference parameter variable and validate it. This function should be called by the main one for each five judges.
- `void calcScore ()` should calculate and display the average of the three scores that remain after dropping the highest and lowest score the performer received. This function should be called just once by main, and should be passed the five scores.

The last two functions, described below, should be called by `calcScore`, which uses the returned information to determine which of the scores to drop.

- `int findLowest ()` should find the lowest of the five scores passed to it.
- `int findHighest ()` should find the highest of the five score passed to it

Input validation: do not accept just score below 0 and above 10.