

GE211 Programming in C++

Lab (5)

Objectives of this lab:

- Learn about Functions that return a value.
- Learn about the importance of argument ordering.
- Learn about functions which return more than one value (call_by_reference).

Exercise 1:

This program computes the total cost of purchases made, including 5% sales tax, on number items at a cost of price each.

```
#include <iostream>
using namespace std;

double total_cost (int number, double price); // (1) Function declaration

int main( )
{
    double p, bill;
    int k;

    cout << "Enter the number of items purchased: ";
    cin >> k;
    cout << "Enter the price per item $";
    cin >> p;

    bill = total_cost(k, p); // (2) Function call
    cout.setf (ios::fixed);
    cout.setf (ios::showpoint);
    cout.precision(2);
    cout << k << " items at " << "$" << p << " each.\n"
        << "Final bill, including tax, is $" << bill << endl;

    return 0;
}

// (3) Function definition
double total_cost (int number, double price) // Function heading
{
    const double TAX_RATE = 0.05;
    double subtotal;
    subtotal = price * number;
    subtotal = subtotal + subtotal*TAX_RATE;
    return (subtotal);
}
```

Exercise 2:

Use function to compute the side area and the cross section area of a cylinder

```
#include<iostream>
#include<cmath>
using namespace std;
const double PI = 3.14159;

double area(double r); // Function that computes cross section area

double area(double r, double h); // Function that computes side area
int main()
{
    double h, r, c_area, s_area; //variables local to the main function

    cout << "Enter the radius and the height of a cylinder ";
    cin >> r >> h;
    cout << endl;
    c_area = area(r);
    cout << "The cross section area of the cylinder is " << c_area << endl;
    s_area = area(r, h);
    cout << "The side area of the cylinder is " << s_area <<" \n\n";

    return 0;
}

double area (double r)
{
    double a;
    a = (2*PI*pow(r,2));
    return a;
}
double area (double r, double h)
{
    double area;
    area = 2*PI*r*h;
    return area;
}
```

Exercise 3:

The function *Process* (*int a, int b, int c, int& s, double& g*) computes the sum and average of 3 integer numbers. Write a C++ program that calls the function *Process*

Solution:

```
#include <iostream>
using namespace std;
void Process (int a, int b, int c, int& s, double& g);    // (1) Function
declaration
int main( )
{
    double avg;
    int x1,x2,x3,sum ;
    cout << " please enter 3 integer numbers \n";
    cin >> x1 >> x2 >> x3 ;

    avg=process (x1,x2,x3,sum);                          // (2) Function call

    cout >> . . .
    return 0;
}
// (3) Function definition
void Process (int a, int b, int c, int& s, double& g)    // Function heading
{
    s = a + b + c;
    g = s/3.0;
}
```

Post-Lab:

Q1. Write a separate function to calculate the tax called:

```
double taxed_price (double price, double TAX_RATE)
```

And then modify the code of Ex.1.

Q2. Modify the function of exercise 3 to be of the form:

```
double Process (int a, int b, int c, int& s)
```