

National University of Computer and Emerging Sciences



Lab Manual # 07

Programming Fundamentals

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Instructions:

- Do your tasks individually
- Anyone indulged in the act of plagiarism would be awarded zero
- Pay attention to details, do paper work before starting your code
- Understanding of the question is also part of the lab work

Objectives:

In this lab, students will study:

- Functions

Task 1: What does the following code compile and run without error?

```
void F1()
void F2()
void F3()
void main()
{
    F1()
    F2()
    F3()
}
void F1()
{
    F3()
}
void F3()
{
    F2()
}
void F2()
{
    cout<<"Functions are interesting"<<endl;
}
```

Task 2: What is the final value of the temp?

```
int ffunction(int, int);
void main()
{
    int temp=0;
    int var1=3;
    int var2=5;
    temp= ffunction(var1, var2);

}

int ffunction(int x, int y)
{
    return x+y;
}
```

Task 3: Output of the following code?

```
int test(int n1, int n2)
{
    cout<<n2<<n1<<endl;
    return n2*n1;
}
void main()
{
    int n1=2, n2=3,n3=4;
    n2 = test(test(n1,n3),n2);
    cout<< n1<< n3<< n2<< endl;
}
```

Task 4: Output of the following code?

```
void main()
{
    void numbers(int x, int &y);
    int a, b, c;
    a=22;
    b=90;
    c=14;
    numbers(a,a);
    numbers(a,b);
    numbers(b,a);
    cout<<a<<" "<<b<<" "<<c<<endl;
}
void numbers(int x, int&y)
{
    int b;
    x += 6;
    y +=11;
    b = 55;
    cout<<b<<" "<<x <<" "<<y<< endl;
}
```

Task 5: Write a program 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 item's wholesale cost is 5.00 and its markup percentage is 100%, then the item's retail price is 10.00.

If an item's wholesale cost is 5.00 and its markup percentage is 50%, then the item's retail price is 7.50.

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

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

Task 6: Write C++ program that will ask the user to enter the width and length of a rectangle and then display the rectangle's area. The program calls the following functions, which have not been written:

- **getLength:** This function should ask the user to enter the rectangle's length and then return that value as a double .
- **getWidth:** This function should ask the user to enter the rectangle's width and then return that value as a double .
- **getArea:** This function should accept the rectangle's length and width as arguments and return the rectangle's area. The area is calculated by multiplying the length by the width.
- **displayData:** This function should accept the rectangle's length, width, and area as arguments and display them in an appropriate message on the screen.

Task 7: When an object is falling because of gravity, the following formula can be used to determine the distance the object falls in a specific time period:

$$d = 1/2 * g * t^2$$

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 the object has been falling.

Write a function named **DistanceFallen** that accepts an object's falling time (in seconds) as an argument. The function should return the 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 displays the return value.

Task 8: Write a function called **displayShape** that accepts size and shapetype as parameters and displays a square or a triangle of the required size.

So e.g. if the function is called with the following parameters:

displayShape('S', 5); a square of size 5 is displayed as given

1	2	3	4	5
2	4	6	8	10
3	6	9	12	15
4	8	12	16	20
5	10	15	20	25

displayShape('T', 6); a triangle of size 6 is displayed as given

```
  1
 1 1
1 2 1
1 3 3 1
1 4 6 4 1
1 5 10 10 5 1
```