



**21CSCI01P**

## **Introduction to Computing**

### **Lab (1)**

#### **This tutorial covers**

- **Tutorial:**
  1. **Functions**
  2. **General Revision**
- **Problems from 1 to 5 in the lecture slides.**
- **Chapter 6 in the textbook, 8<sup>th</sup> edition.**

**Problem (1): Write and compile the following programs and answer the questions**

**Program 1:**

```
#include <iostream>
using namespace std;
int main(){
    cout << "Hello from the main function.\n";
    dispMsg();
    cout << "Back again to the main function.\n";
    return 0;
}
void dispMsg(){
    cout << "Hello from the function dispMsg.\n";
}
```

- i. Write down the compile time error of this program from the visual studio compiler?

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- ii. What is meant by this error, and how to fix it?

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**Program 2**

```
#include <iostream>
#include <string>
using namespace std;
void dispMsg(int x) {
    cout << x;
}
int main(){
    string x = "Hello from the main function.\n";
    dispMsg(x);
    cout << "Back again to the main function.\n";
    return 0;
}
```

- i. Write down the compile time error of this program from the visual studio compiler?

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- ii. What is the reason of this error, and how to fix it?

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### Program 3

```
#include <iostream>
using namespace std;
void dispMsg(int x, int y) {
    int z = x + y;
}
int main(){
    int result = dispMsg(2, 3);
    cout << "The sum of 2 and 3 is " << result;
    return 0;
}
```

- i. Write down the compile time error of this program from the visual studio compiler?

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- ii. What is meant by this error, and how to fix it?

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### Program 4

```
#include <iostream>
#include <string>
using namespace std;
int dispMsg(int x, int y) {
    int k = x + y;
    return k;
}
int main(){
    int result = dispMsg(2, 3, 4);
    cout << "The sum of 2 and 3 and 4 is " << result;
    return 0;
}
```

- i. What is the compile time error of this program?

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- ii. What is the reason of this error, and how to fix it?

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.....

## Program 5

```
#include <iostream>
#include <string>
using namespace std;
int dispMsg(int x, int y, int z) {
    int k = x + y + z;
    return k;
}
int main(){
    int result = dispMsg(2, 3);
    cout << "The sum of 2 and 3 is " << result;
    return 0;
}
```

- i. What is the compile time error of this program?

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- ii. What is the reason of this error, and how to fix it?

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**Problem (2): Complete the following program:**

```
#include <iostream>
#include <string>
using namespace std;
int x = 3;
string y = "change";

//The function findCharacter(x) returns the character in string y
//at the location x sent in the function input parameter.
char findCharacter(int x);

int main(){
    int x = 1;
    cout << findCharacter(x);
    return 0;
}

//write down the definition of the function findCharacter
```

[illegible]

### **Problem (3):**

**The following program should do the following:**

1. It accepts 3 numbers from the user.
2. The program check whether these numbers are all integers or not by defining **isInt ()** function.

**isInt ():** this function takes each of these numbers and returns true if the input number is integer and false otherwise.

3. Depending on the return from the previous function, do the following:

- a. If **all** the three numbers are integers, the program should print a message stating that and print the sum of these numbers by defining **intSum()** function.

**intSum():** takes 3 integer numbers as input and returns the sum of those numbers.

- b. If **any** of these three numbers is float, the program prints a message stating that numbers contain floats and print their sum by calling **floatSum()** function.

**floatSum():** takes 3 float numbers as input and returns the sum of those numbers.

### **The program:**

```
#include <iostream>
#include <string>
using namespace std;
float floatSum(float x, float y, float z) {
    float sum = x + y + z;
    return sum;
}
int intSum(int x, int y, int z) {
    int sum = x + y + z;
    return sum;
}
bool isInt(float a) {
    bool integerNumber = true;
    if ((a - (int)a) != 0)
        integerNumber = false;
    return integerNumber;
}
int main(){
    float input1, input2, input3;
    cout << "Please Enter 3 numbers (float or integer) = ";
    cin >> input1 >> input2 >> input3;
    if (isInt(input1) && isInt(input2) && isInt(input3))
        cout << "Sum of integers = " << intSum(input1, input2, input3);
    else
        cout << "Sum of floats = " << floatSum(input1, input2, input3);
    return 0;
}
```

**Update the above program to do the following:**

Add two functions **OddOrEven()** and **isEven()**, then call these functions from the main as follows:

**OddOrEven():**

- The function doesn't return anything.
- The function receives only one parameter of type integer, check whether this number is even or odd and accordingly print out that a statement.

**isEven():**

- The function should return a boolean.
- The function receives only one parameter of type integer and checks whether this number is even or not and accordingly returns true or false.

**The program:**



**Problem (4):**

1. What is the output of the following Program?

```
#include<iostream>
using namespace std;
double functy(double d) {
    d = d + 1;
    return d;
}
int main() {
    double j = 0;
    for (int i = 0; i < 3; i++);
    j = functy(j);
    cout << j;
    return 0;
}
```

Select the correct answer:

- a) Compile time error in line 7
- b) 1
- c) 2
- d) 0
- e) 3

2. What is the output of the following Program?

```
#include <iostream>
#include <string>
using namespace std;
int fun1(int x, int y) { return x + y; }
int fun2(string s) { return s.length(); }
int fun3(bool a, char c) { return (int)a + (int)c; }
void main() {
    cout << fun1(1, 2) + fun2("Computing") + fun3(true, 'A');
}
```

Select the correct answer:

- a) 98
- b) 88
- c) 78
- d) 68
- e) 58

**Problem (5) [Take-home ungraded assignment]:**

- Write a C++ program that includes three user defined functions: **multiply()**, **divide()** and **power()**. Each of the these functions accept two integer parameters and returns an integer value.
- In the **main** function, ask the user to enter two integer values. Then ask the user to select which type of calculation is needed to apply on these two integers; multiplication, division, or power. Based on the user selection, apply the calculation by calling the corresponding function and print the result.