North South University

Department of Electrical and Computer Engineering

CSE 225L.13 (Data Structures and Algorithms Lab)

Lab 1: Introduction to C++ (Part 1)

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Objective:

- To get introduced to C++
- To ensure that the students get a proper footing in C++

Introduction to C++:

For many years, C++ has been used for teaching Data Structure and Algorithms. This could have been achieved with Python and Java as well, but C++ has been used because it is one of the fastest programming languages right now.

System I/O:

Like C, we can use basic commands to give input and display the required output to the screen.

However, we have to use the iostream header which we always include from the start. ***Iostream*** stands for standard input-output stream. This header file contains definitions of objects like cin, cout, cerr, etc.

For input, we use ***cin*** to provide input. Consider this statement: cin >> a (where ***a*** is a variable of any datatype), here we use cin coupled with the extraction operator (>>) to read input provided from the keyboard or whatever device you prefer to use.

For output, we use ***cout*** to provide output. Consider this statement: cout << a (where ***a*** is a variable of any datatype), here we use cout coupled with the insertion operation (<<) to display output.

Functions:

A function is a block of code that runs in the case where it is called. In the functions, we can pass data as parameters that could be used inside the function. The reason for using functions is that we do not want to write the same code about 100 times, thus, functions promote reusability where the code is defined ONCE.

An example of a function is given below:

```
void myFunction() {
  cout << "This is a function!\n";
}
```

Now, we call the function as many times as we need to do.

Concepts of Object-Oriented Programming:

In CSE215, we have learned that Object-Oriented Programming focuses on classes and objects. A class is a user-defined datatype that we can use in our program, and we can create objects out of it. Variables in the classes are called attributes. An example of a class is given below:

```
class TestClass {     // The class
  public:             // Access specifier
    int custNum;      // Attribute (int variable)
    double custDec;   // Attribute (double variable)

    void testMethod() {  // Method/function defined inside the class
      cout << "This is a test method!" << endl;
    }
};
```

Methods can be declared outside the class as well in this manner.

```
void MyClass::myMethod() {
  cout << "This is a test method!" << endl;
}
```

In addition, the creation of objects in classes should be done inside the main method

```
int main(){
  TestClass testObject; // Creating an object of TestClass

  // Access attributes and set the values
  testObject.custNum = 14;
  testObject.custDec = 3.7;

  // Print the associated attributes of testObject
  cout << testObject.custNum << endl;
  cout << testObject.custDec << endl;
  return 0;
}
```

Tasks (Part 1 – Back to Basics):

1. Take 3 integer inputs and print their sum
2. Take 2 float inputs and print their difference
3. Write a function called void isEven(int n) where you will check whether a number is even or not. Check the function if the value of n is 44, 19, and 0.

Tasks (Part 2 – Creation of Class Objects):

1. Create a Class called “Employee” that has name, ID, and salary. The class should have a method *printInfo()* that prints the information of the employee
2. Now, create a driver file (main file) where you will create multiple Employee objects and show their information.