Lab 6 – 08227 Advanced Programming

This tutorial introduces the reader to key fundamentals, namely conditionals and Boolean logic.

The content of this lab tutorial may be covered in the lecture after the scheduled lab, depending on timetabling. If this is the case, then try to complete as much as you can before the lecture, and then complete the rest of this lab next week during the next lab session.

1.0 Conditionals

In the following code there are two functions, **functionA()** and **function()** as follows:

```
void functionA(int i) {
    // range is 1, 3, 4
    if (i==1) {
        cout << "I is 1" << endl;
    }
    if ((i>2) && (i<5)) {
        cout << "I is either 3 or 4" << endl;
    }
    if ((i!=1) && ((i<=2) || (i>=5))) {
        cout << "I is outside of range" << endl;
    }
}

bool functionB(int i) {
    if (i==1) {
        return true;
    } else {
        return false;
    }
}
```

functionA() takes a parameter **i** and checks to see if it is either the value of **1**, **3** or **4** and displays the outcome. **functionB()** takes a parameter **i** and checks to see if it is **equal to 1**, and if so it returns **true**, otherwise it return **false**.

2.0 Conditionals Exercise 1

Download the **Lab6.zip** file and extract the files to **G:/08227/Lab6/**. Open the **Conditionals** solution and then view the **main.cpp** code in Visual Studio. There are two functions, namely **functionA()** and **functionB()** which are the same as above.

Rewrite **functionA()** to implement the following action (**i** and **j** are both of type **int**):

```
If i divided by j is equal to 4, then i is set to 100.
```

Rewrite **functionB()** to implement the following action (**i** and **j** are both of type **int**):

```
If i times j is 8 then i is set to 50, otherwise j is set to 60.
```

Write a **functionC()** to implement the following action (**i** and **j** are both of type **int**, HINT - if {} else ..):

```
If i is less than j, then j is doubled;
Else if i is an even number, then i is doubled;
Otherwise both i and j are incremented by 1.
```

Write a **functionD()** to implement the following action (**i** and **j** are both of type **int**, HINT - if {} else ..):

```
If both i and j are equal to 0, then i is set to 1 and j is set to 2;
Else if only i is 0, then i is set to 5 and j is set to 10;
Else if only j is 0, then i is set to 10 and j is set to 5;
Otherwise both i and j are set to 4.
```

3.0 Conditionals Exercise 2

Given that the following definitions are defined:

```
bool P = true;
bool Q = false;
bool R = false;
string s = "a";
string t = "b";
int i = 10;
int j = 0;
```

Evaluate the following expressions by **(i)** calculating the answer on paper, **(ii)** write a program to confirm your answer.

*[**NB:** You will need to add the line #include <string> to your code to use the string operators]*

1) `s != t`
2) `s < t`
3) `i * j`
4) `i > j`
5) `i < j + 2`
6) `!P == Q`
7) `R == (P&&Q)`
8) `Q && (P || R)`
9) `Q || (P && !R)`
10) `P && !Q && !R || (P == !Q)`