(CSCI 365) Project One: A Binary Number Calculator

**Objectives:**

1. Demonstrate basic programming logic
2. Demonstrate how to convert between positive integers and their binary representation
3. Demonstrate how to add two binary numbers

**Problem Description:**

Write a C/C++ program that simulate a menu based binary number calculator. This calculate shall have the following three functionalities:

1. Covert a binary string to corresponding positive integers
2. Convert a positive integer to its binary representation
3. Add two binary numbers, both numbers are represented as a string of 0s and 1s

To reduce student work load, a start file CSCIProjOneHandout.cpp is given. In this file, the structure of the program has been established. The students only need to implement the following three functions:

1. int binary\_to\_decimal(string b);

// precondition: b is a string that consists of only 0s and 1s

// postcondition: the positive decimal integer that is represented by b

1. string decimal\_to\_binary(int n);

// precondition: n is a positive integer

// postcondition: n’s binary representation is returned as a string of 0s and 1s

1. string add\_binaries(string b1, string b2);

// precondition: b1 and b2 are strings that consists of 0s and 1s, i.e. b1 and b2 are binary

// representations of two positive integers

// postcondition: the sum of b1 and b2 is returned. For instance, if b1 = “11”, b2 = “01”, // then the return value is “100”

The following functionality has been provided:

1. main function which presents the execution logic of the whole program
2. void menu(); which display the menu of this binary calculator
3. bool isBinary(string s); which returns true if the given string s consists of only 0s and 1s; false otherwise
4. int grade(); which returns an integer that represents the student’s grade of this projects.
5. bool test\_binary\_to\_decimal() which returns true if the student’s implementation of binary\_to\_decimal function is correct; false otherwise
6. bool test\_decimal\_to\_binary() which returns true if the student’s implementation of decimal\_to\_binary function is correct; false otherwise
7. bool test\_add\_binaries which returns true if the student’s implementation of add\_binaries function is correct; false otherwise

**Work Process:**

Student shall download the CSCI365ProjOneHandout.cpp file, saved as YourNameCSCI365ProjOne.cpp, and add it to his/her C++ project. Please notice, at this point, your project shall be able to run. However, your project will not pass any test. i.e. if you choose option 4 from menu, it will shows that you get 0 out of 10.

Student shall NOT change any name of the declared functions or the given implemented functions. Student shall only implement the bodies of three functions that need to be implemented.

Please see sample run at the end of this file.

**Due Date:**

It is specified in syllabus and is announced on Blackboard

**Sample Run:** The highlighted ones are user’s input

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\* Menu \*

\* 1. Binary to Decimal \*

\* 2. Decinal to Binary \*

\* 3. Add two Binaries \*

\* 4. Grade \*

\* 5. Quit \*

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Enter you choice: 1

Enter a binary string: 101101

Its decimal value is: 45

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\* Menu \*

\* 1. Binary to Decimal \*

\* 2. Decinal to Binary \*

\* 3. Add two Binaries \*

\* 4. Grade \*

\* 5. Quit \*

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Enter you choice: 2

Enter a positive integer: 45

Its binary representation is: 101101

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\* Menu \*

\* 1. Binary to Decimal \*

\* 2. Decinal to Binary \*

\* 3. Add two Binaries \*

\* 4. Grade \*

\* 5. Quit \*

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Enter you choice: 3

Enter two binary numbers, separated by white space: 11 101

The sum is: 1000

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\* Menu \*

\* 1. Binary to Decimal \*

\* 2. Decinal to Binary \*

\* 3. Add two Binaries \*

\* 4. Grade \*

\* 5. Quit \*

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Enter you choice: 4

binary\_to\_decimal function passed the test

decimal\_to\_binary function passed the test

add\_binaries function passed the test

If you turn in your project on blackboard now, you will get 8 out of 10

Your instructor will decide if one-two more points will be added or not based on your program style, such as good comments (1 points) and good efficiency (1 point)

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\* Menu \*

\* 1. Binary to Decimal \*

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\* 4. Grade \*

\* 5. Quit \*

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Enter you choice: 5

Thanks for using binary calculator program. Good-bye

Program ended with exit code: 0