

## CSCI 1301 – Lab 10/01/08 - 10/02/08

### Exercise

The purpose of this exercise is to apply your knowledge about repetition/loop statements discussed during the lectures.

Write a program called *DecimalToBinary* that allows the user to enter a non-negative integer, i.e. an integer greater than or equal to zero, computes its binary representation as a **string** of 0's and 1's and displays it in the screen. If the user enters a negative integer, the program displays an error message and terminates.

To obtain the binary representation of a non-negative integer divide the number by 2, the remainder is the least significant binary digit. Then, divide the quotient of this division by 2, the remainder of the division will be the second least significant digit and so on until the quotient is zero. For example, to obtain the binary representation of 123:

```
123 / 2 = 61, remainder: 1
61 / 2 = 30, remainder: 1
30 / 2 = 15, remainder: 0
15 / 2 = 7, remainder: 1
7 / 2 = 3, remainder: 1
3 / 2 = 1, remainder: 1
1 / 2 = 0, remainder: 1
```

The binary representation of 123 is 1111011.

Observe that the remainders of the divisions from top to bottom are the binary digits in the binary representation of the integer from right to left.

### Sample Runs

#### Example 1

```
Please enter an integer >=0 (<0 to terminate): 10
The binary representation of 10 is 1010.
```

#### Example 2

```
Please enter an integer >=0 (<0 to terminate): 13
The binary representation of 13 is 1101.
```

### Example 3

```
Please enter an integer >=0 ( <0 to terminate):0  
The binary representation of 0 is 0.
```

### Example 4

```
Please enter an integer >=0 ( <0 to terminate):-10  
Sorry, you have entered a negative number.
```

**Hint:** Use a string variable to store the binary representation of the non-negative integer entered by the user as a string of 0's and 1's.

Compile, run and test your program.

After you have completed this exercise, demonstrate it to your lab instructor.

### WebCT Submission

After you have completed both exercises in this lab, upload the java file *DecimalToBinary* in WebCT and submit it to receive credit.