

CSCI/MATH 3180
Programming Assignment 1
September 7, 2007
Due Monday, September 17 at 9:10 am

Do problem 5 in Computer Problems 2.1 (page 54) with the following modifications and additional specifications:

There will be no octal output, only binary.

Most of the work will be done by the following procedure:

```
string decToBin(string decIn, int bits);  
// decIn represents a non-negative decimal number in the format  
// d[d...].d[d...], that is, with at least one digit before the  
// decimal point and at least one digit after the decimal point.  
// Returns a string representing its value in binary,  
// with bits digits after the binary point.
```

decToBin will use the integer-arithmetic algorithms given in class for conversion of a decimal integer to binary and for the conversion of a decimal fraction to binary. Note that *decToBin* returns trailing 0s up to the number of digits specified.

The main program will just do input and output. Input a non-negative decimal number. You may assume that each of the whole and fractional parts is small enough to be stored as a long integer. (Long integers are stored in 32 bits in Visual C++. See limits.h.) Also input an integer that specifies how many binary digits to put after the binary point in the output. Your program does not have to check for valid input format. Be consistent with the following sample run. Input is underlined for emphasis; it does not have to be underlined in your actual run.

Decimal number? 8341.625

Number of binary digits after the binary point? 5

The decimal number 8341.625 is 10000010010101.10100 in binary

Hints: Use C++ strings to your advantage. Input the decimal number as a string. Useful functions include *find*, *substr* and *atol*.

You can develop your program using the C++ environment of your choice, but it must be submitted as a working Visual C++.NET 2005 project.

Delete both debug folders in your project directory. (One will be at the top level, in the same folder as the .sln file. The other will be in the project folder that appears at the top level.) Navigate back to the top level (where you'll see the .sln file), select the remaining files and zip them into a file lastname.zip. Turn in this file on a CD or by e-mail to cs3180@cs.mtsu.edu by the deadline above.