### Number Conversion Exercises

Along with the Vector and Matrix classes, your math library will contain a class that encapsulates an RGBA (red, green, blue, alpha) colour, stored as a 4 byte integer where each colour component is stored in a single byte.

The Colour class defines the following variables and functions:

public class Colour

{

public UInt32 colour;

public Colour() {}

public Colour(byte red, byte green, byte blue, byte alpha) {}

public byte GetRed() {}

public void SetRed(byte red) {}

public byte GetGreen() {}

public void SetGreen(byte green) {}

public byte GetBlue() {}

public void SetBlue(byte blue) {}

public byte GetAlpha(){}

public void SetAlpha(byte alpha) {}

}

To guide you through the development and testing of this class, answer the following questions:

1. How many unique colour values can the *colour* variable contain?

**The colour value contains 256 unique value.**

1. What is the minimum value, maximum value, and range for each colour component?

**Min value of Red = 0, Max value of Red = 255.**

**Min value of Green = 0, Max value of Green = 255.**

**Min value of Bule = 0, Max value of Blue = 255.**

**Min value of Alpha = 0, Max value of Alpha = 255.**

1. Suppose the *red* component of the RGBA colour is to be stored in an 8-bit integer (char) variable, and is set to the decimal value   
     
   　 char red = 94  
     
   Write this value as a binary number

**Binary code for Red = 101 1110.**

1. The byte containing the red value (94) from question 3 is now to be stored in the RGBA colour value (in the left-most byte).

Assuming all other colour bytes are initialized to 0, write the value of the 4-byte colour variable in binary:

1. What is the decimal value of the binary number from question 4?
2. Write the bit shifting operation (in C#) that will move all bits from the ‘R’ position in the colour variable to the ‘G’ position.
3. Our colour value now has the green colour component set, and no red, blue, or alpha colour component values.  
   What are the decimal and binary value of the *colour* variable now?

1. After you have created your Colour class and implemented all the functions listed in the class definition above, add at lease 1 new unit test to the unit test program using your answers in this exercise to verify your code.

**NOTE: submit your answers to these exercises with your assessment**