### 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 variable can contain a maximum of 4,294,967,296 unique colour values

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

The minimum value is 0, the maximum value is 255 and the range is 256(0-255) values for each colour component.

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**

94 as decimal is equal to 0101 1110 in binary.

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:**  
0101 1110(R) 0000 0000(G) 0000 0000(B) 0000 0000(A)

1. **What is the decimal value of the binary number from question 4?**

Decimal value from question 4 equals 1,577,058,304.

1. **Write the bit shifting operation (in C#) that will move all bits from the ‘R’ position in the colour variable to the ‘G’ position.**char green = red >> 8;
2. **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?**00000000(R) 01011110(G) 00000000(B) 00000000(A) - binary

6,160,384 - decimal

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.**

See Unit Test project – ColourSetRed2()

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