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

The colour variable can hold up to 16,777,215 or 4,294,967,295 with alpha included.

0xFFFFFF = 16,777,215

0xFFFFFFFF = 4,294,967,295 (2^32bits)

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

Each colour component has a minimum value of 0 and a maximum value of 255 (0x00 and 0xFF)

1. Suppose the red component of the RGBA colour is to be stored in an 8-bit integer (byte) variable, and is set to the decimal value

Byte red = 94

Write this value as a binary number

94 % 2 = 0

47 % 2 = 1

23 % 2 = 1

11 % 2 = 1

5 % 2 = 1

2 % 2 = 0

1 % 2 = 1

Binary = 01011110

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

Assuming all other colour bytes are init to 0, write the 4 byte colour variable in binary.

(Found these values in question 5)

1577058304 % 2  = 0  
788529152 % 2  = 0  
394264576 % 2  = 0  
197132288 % 2  = 0  
98566144 % 2  = 0  
49283072 % 2  = 0  
24641536 % 2  = 0  
12320768 % 2  = 0  
6160384 % 2  = 0  
3080192 % 2  = 0  
1540096 % 2  = 0  
770048 % 2  = 0  
385024 % 2  = 0  
192512 % 2  = 0  
96256 % 2  = 0  
48128 % 2  = 0  
24064 % 2  = 0  
12032 % 2  = 0  
6016 % 2  = 0  
3008 % 2  = 0  
1504 % 2  = 0  
752 % 2  = 0  
376 % 2  = 0  
188 % 2  = 0  
94 % 2  = 0  
47 % 2  = 1  
23 % 2  = 1  
11 % 2  = 1  
5 % 2  = 1  
2 % 2  = 0  
1 % 2  = 1

Binary Value : 101 1110 0000 0000 0000 0000 0000 0000

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

In Color

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 268435456 | 16777216 | 1048576 | 65536 | 4096 | 256 | 16 | 1 |
| 5 | E | 0 | 0 | 0 | 0 | 0 | 0 |

(5\*16^7) + (14\*16^6) + (0 \* 16^5) + (0\*16^4) + (0\*16^3) + (0\*16^2) + (0\*16^1) + (0\*16^0)

= 1,577,058,304 The Decimal Value

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.

colorVar >>= 8; or colorVar = colorVar >> 8;

1. 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 colourvariable now?

Hex:0x005E0000 (5e has been shifted 8 bits to right)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 268435456 | 16777216 | 1048576 | 65536 | 4096 | 256 | 16 | 1 |
| 0 | 0 | 5 | E | 0 | 0 | 0 | 0 |

(0\*16^7) + (0\*16^6) + (5 \* 16^5) + (14\*16^4) + (0\*16^3) + (0\*16^2) + (0\*16^1) + (0\*16^0)

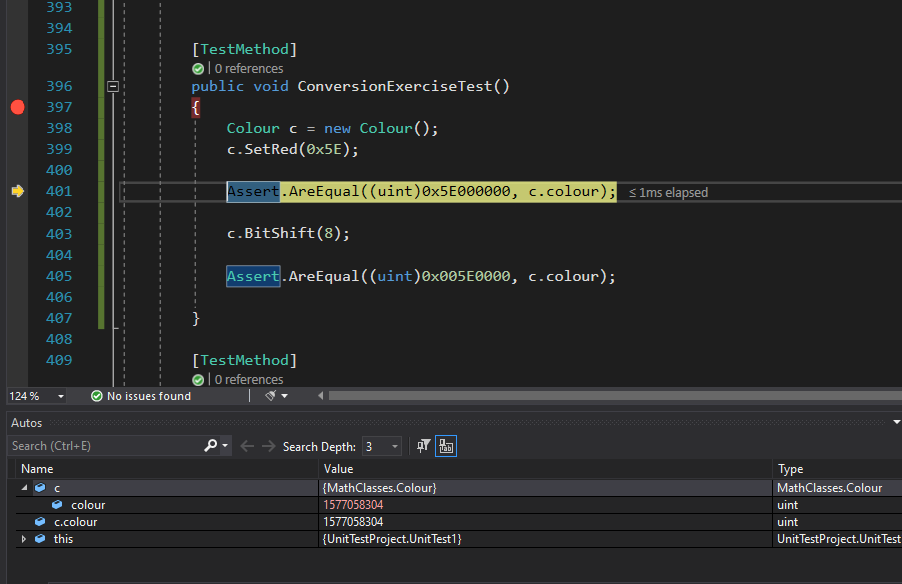
= 5,242,880 + 917,504

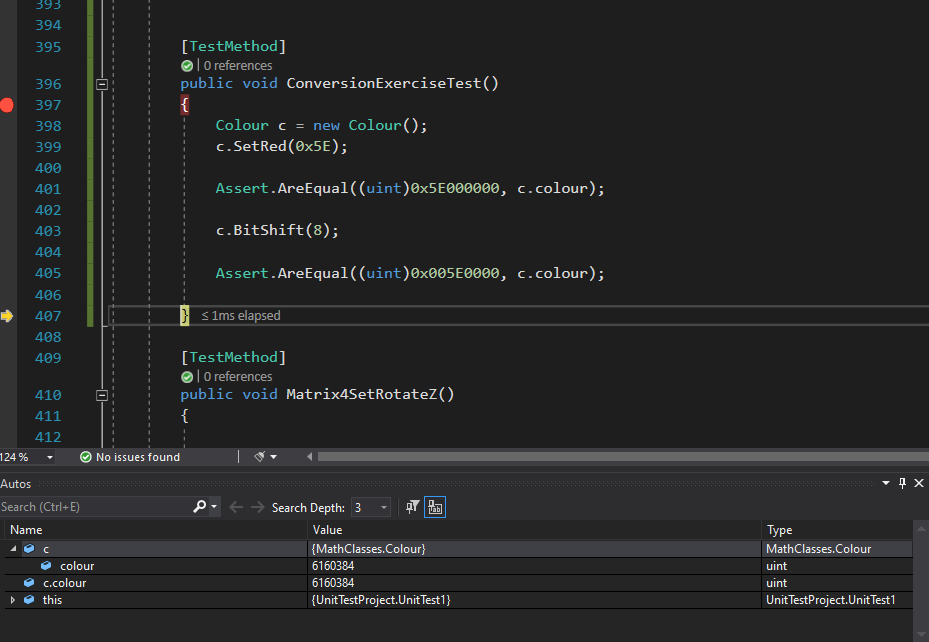
= 6,160,384

6160384 % 2  = 0  
3080192 % 2  = 0  
1540096 % 2  = 0  
770048 % 2  = 0  
385024 % 2  = 0  
192512 % 2  = 0  
96256 % 2  = 0  
48128 % 2  = 0  
24064 % 2  = 0  
12032 % 2  = 0  
6016 % 2  = 0  
3008 % 2  = 0  
1504 % 2  = 0  
752 % 2  = 0  
376 % 2  = 0  
188 % 2  = 0  
94 % 2  = 0  
47 % 2  = 1  
23 % 2  = 1  
11 % 2  = 1  
5 % 2  = 1  
2 % 2  = 0  
1 % 2  = 1

Binary : 0000000010111100000000000000000

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.





Was correct