Template Week 1 – Bits & Bytes

Student number: 579675

Assignment 1.1: Bits & Bytes intro

What are Bits & Bytes?

- A bit is either 0 or 1
- A byte is a sequence of 8 bits
- Bits & Bytes are values that represent data for computers

What is a nibble?

- A nibble is four bits placed in sequence

What relationship does a nibble have with a hexadecimal value?

- One nibble of binary translates to one character in Hexadecimal value

Why is it wise to display binary data as hexadecimal values?

- They are way more readable, hexadecimal FF for example would be 1111111111111111, with hundreds of these behind eachother it would become difficult to read really quick.

What kind of relationship does a byte have with a hexadecimal value?

- Whenever you display hexadecimal, you do so in pairs of two. Which in binary is equal to one byte exactly

An IPv4 subnet is 32-bit, show with a calculation why this is the case.

32 / 4 (IPv "4") = 8 bits

So there are 4 bytes in an IPv4 subnet, with each a value worth of somewhere between 0 and 255.

So with 4 bytes you could set up a subnet of, for example: 192.168.139.145

Assignment 1.2: Your favourite color

Hexadecimal color code:

- #77c145

Assignment 1.3: Manipulating binary data

Color	Color code hexadecimaal (RGB)	Big Endian	Little Endian
RED	#ff0000	#FF0000	#0000FF
GREEN	#00ff00	#00FF00	#00FF00
BLUE	#0000ff	#0000FF	#FF0000
WHITE	#ffffff	#FFFFFF	#FFFFFF
Favourite (previous assignment)	#77c145	#77C145	#45C177

Screenshot modified BMP file in hex editor:
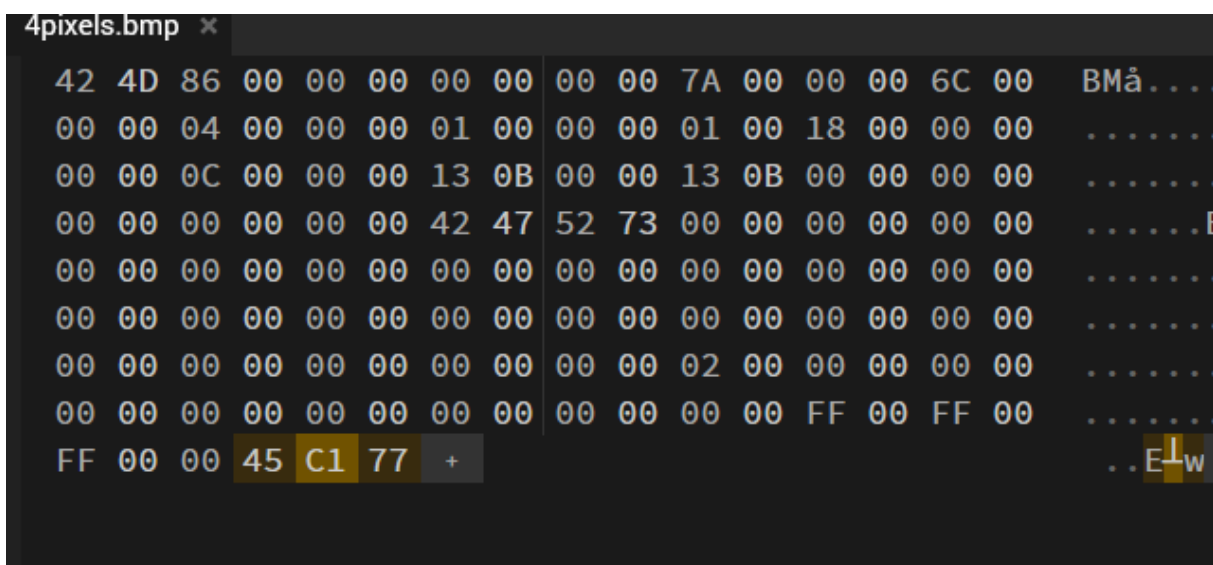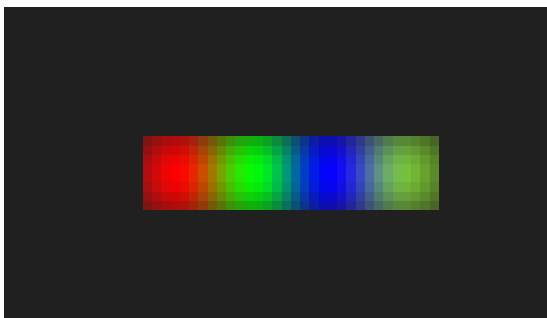
Assignment 1.4: Student number to HEX and Binary

Convert your student number to a hexadecimal number and a binary number.

Explain in detail that the calculation is correct. Use the PowerPoint slides of week 1.

Student number: 579675

579675 / 2 = 289837, R = 1

289837 / 2 = 144918, R = 1

144918 / 2 = 72459, R = 0

72459 / 2 = 36229 R = 1

36229 / 2 = 18114, R = 1

18114 / 2 = 9056, R= 0

9056 / 2 = 4529, R = 0

4529 / 2 = 2264, R = 1

2264 / 2 = 1132, R = 0

1132 / 2 = 566, R = 0

566 / 2 = 283, R = 0

283 / 2 = 141, R = 1

141 / 2 = 70, R = 1

70 / 2 = 35, R = 0

35 / 2 = 17, R = 1

17 / 2 = 8, R = 1

8 / 2 = 4, R = 0

4 / 2 = 2, R = 0

2 / 2 = 1, R = 0

1 / 2 = 0, R = 1

You are supposed to read it from bottom to top, so you would get: 1000 1101 1000 0101 1011

1000 = 8

1101 = 13 = D

1000 = 8

0101 = 5

1011 = 11 = B

So 579675 in binary is 8D85B in hexadecimal value

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