Template Week 1 – Bits & Bytes

Student number:580693

Assignment 1.1: Bits & Bytes intro

What are Bits & Bytes?
They are a unit of digital information, where bit is the smallest that can be 0 or 1 and a byte is just 8 bits.

What is a nibble?
A nibble is a unit of digital information that is four bits, so half a byte.

What relationship does a nibble have with a hexadecimal value?
A nibble is exactly one hexadecimal digit.

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

Because we can represent bigger numbers easier.

What kind of relationship does a byte have with a hexadecimal value?
A byte has a direct relationship with hexadecimal because an 8-bit byte can be perfectly represented by exactly two hexadecimal digits. This is because each hexadecimal digit corresponds to 4 bits

An IPv4 subnet is 32-bit, show with a calculation why this is the case.
An IPv4 address is 32 bits long because it is structured as four 8-bit octects, which can be written as an 8 + 8 + 8 + 8 = 32 bit calculation
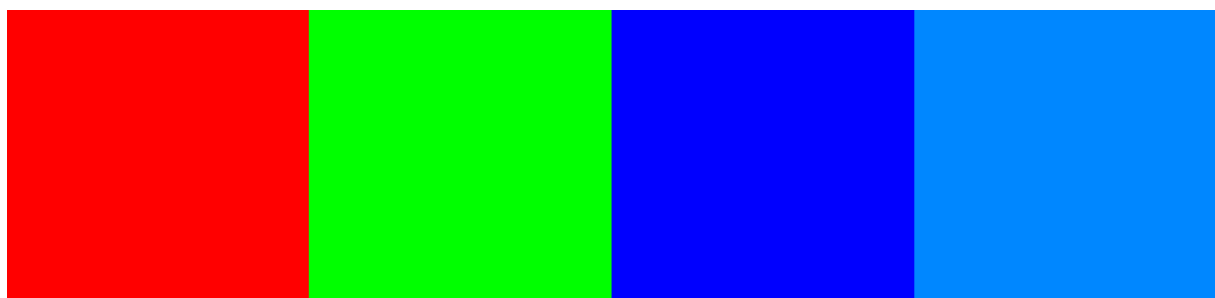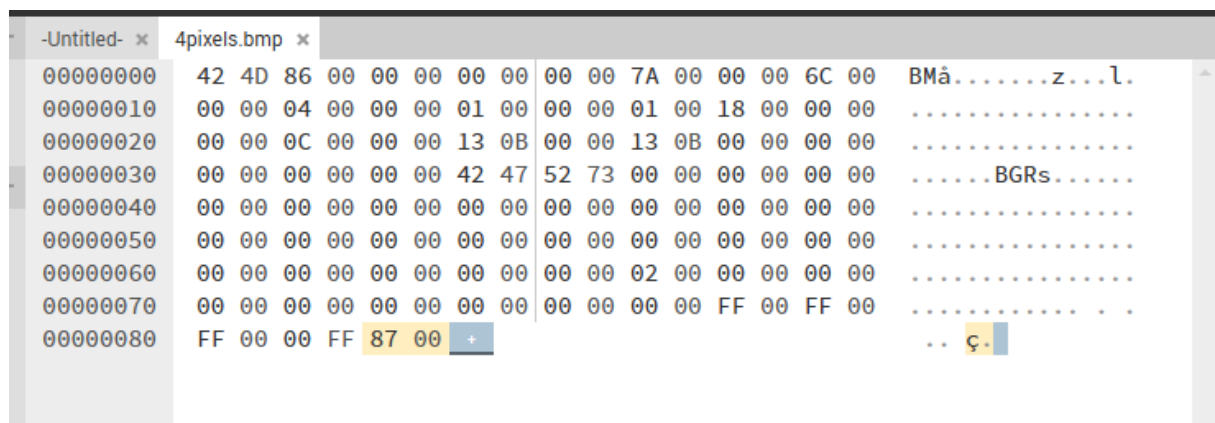
Assignment 1.2: Your favourite color

Hexadecimal color code:
FF8700

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)	FF8700	FF8700	0087FF

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.
08DCF5
580,693 ÷ 16 = 36,293 remainder 5

36,293 ÷ 16 = 2,268 remainder 5

2,268 ÷ 16 = 141 remainder 12 → hex digit C

141 ÷ 16 = 8 remainder 13 → hex digit D

8 ÷ 16 = 0 remainder 8 → hex digit 8

1000110111001111101

8 = 1000

D (13) = 1101

C (12) = 1100

5 = 0101

5 = 0101

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

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