Template Week 1 – Bits & Bytes

Student number: 573512

Assignment 1.1: Bits & Bytes intro

What are Bits & Bytes?

A bit is the smallest unit of data in a computer, representing a value of either 0 or 1. A byte is a unit of data that consists of 8 bits.

What is a nibble?

A nibble is a unit of data that consists of 4 bits.

What relationship does a nibble have with a hexadecimal value?

One nibble can hold one hexadecimal digit.

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

Because for humans hexadecimal values are more easier to read than binary data. Also it is easier to make mistakes if you don't display binary data as hexadecimal values.

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

Each hexadecimal digit represents a 4-bit pattern. So two hexadecimal digits represent an 8-bit pattern. And an 8-bit pattern is also one byte.

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

Every octet in a IPv4 subnet is 8 bits. An IPv4 subnet has 4 octets. Because there are 4 octets and each of them represents 8 bits, that means with this calculation you can calculate that 8 x 4 = 32 bits.

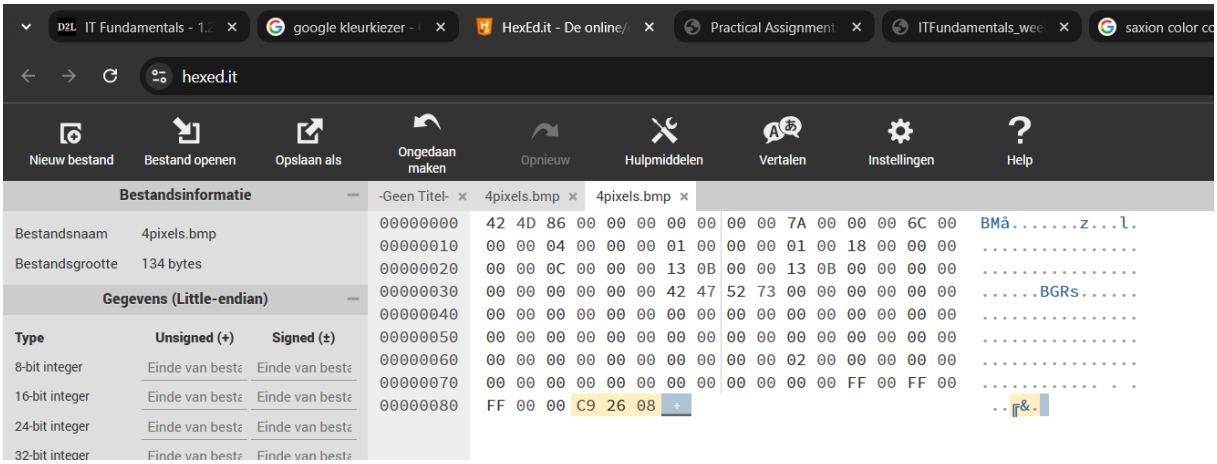
Assignment 1.2: Your favourite colour

Hexadecimal colour code: #0826c9

Assignment 1.3: Manipulating binary data

Colour	Colour 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)	#0826c9	0826c9	c92608

Screenshot modified BMP file in hex editor:



Bonus point assignment – week 1

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 -> binary number -> hexadecimal number

Student number = 573512

573512 / 2 = 286756 – Remainder 0
286756 / 2 = 143378 – Remainder 0
143378 / 2 = 71689 – Remainder 0
71689 / 2 = 35844,5 – Remainder 1
35844 / 2 = 17922 – Remainder 0
17922 / 2 = 8961 – Remainder 0
8961 / 2 = 4480,5 – Remainder 1
4480 / 2 = 2240 – Remainder 0
2240 / 2 = 1120 – Remainder 0
1120 / 2 = 560 – Remainder 0
560 / 2 = 280 – Remainder 0
280 / 2 = 140 – Remainder 0
140 / 2 = 70 – Remainder 0
70 / 2 = 35 – Remainder 0
35 / 2 = 17,5 – Remainder 1
17 / 2 = 8,5 – Remainder 1
8 / 2 = 4 – Remainder 0
4 / 2 = 2 – Remainder 0
2 / 2 = 1 – Remainder 0
1 / 2 = 0,5 – Remainder 1

0001 0001 1000 0000 0100 1000

0001 = 1
0001 = 1
1000 = 8
0000 = 0
0100 = 4
1000 = 8

#118048

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