Template Week 1 – Bits & Bytes

Student number: 573190

Assignment 1.1: Bits & Bytes intro

What are Bits & Bytes?

The bits are the smallest unit in the computer, they can contain the 0's and 1's.
The bytes consist of 8 bits and is the standard unit used to represent a character of data.

What is a nibble?

A nibble is a unit of data equal to 4 bits.

What relationship does a nibble have with a hexadecimal value?

each hexadecimal digit can be mapped directly to a nibble. So, 1 nibble equals 1 hexadecimal.

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

Binary data is very long and difficult to read, hexadecimal is easier to read and shorter.

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

The 8 bits in a byte are split into two nibbles, and each nibble is converted to a single hexadecimal digit.

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

An IPv4 address is written in dotted-decimal notation, that's why it has a total of 32 bits. Because 8 bits + 8 bits + 8 bits + 8 bit = 32 bits.

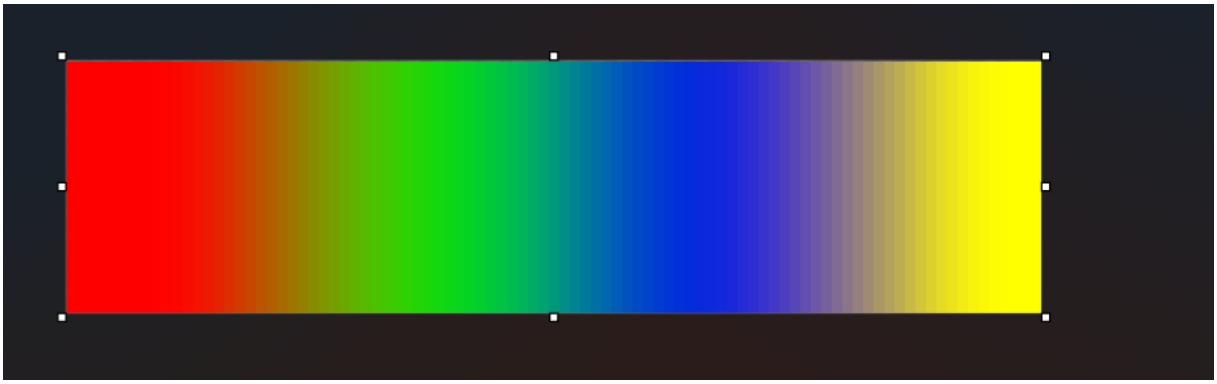
Assignment 1.2: Your favourite colour

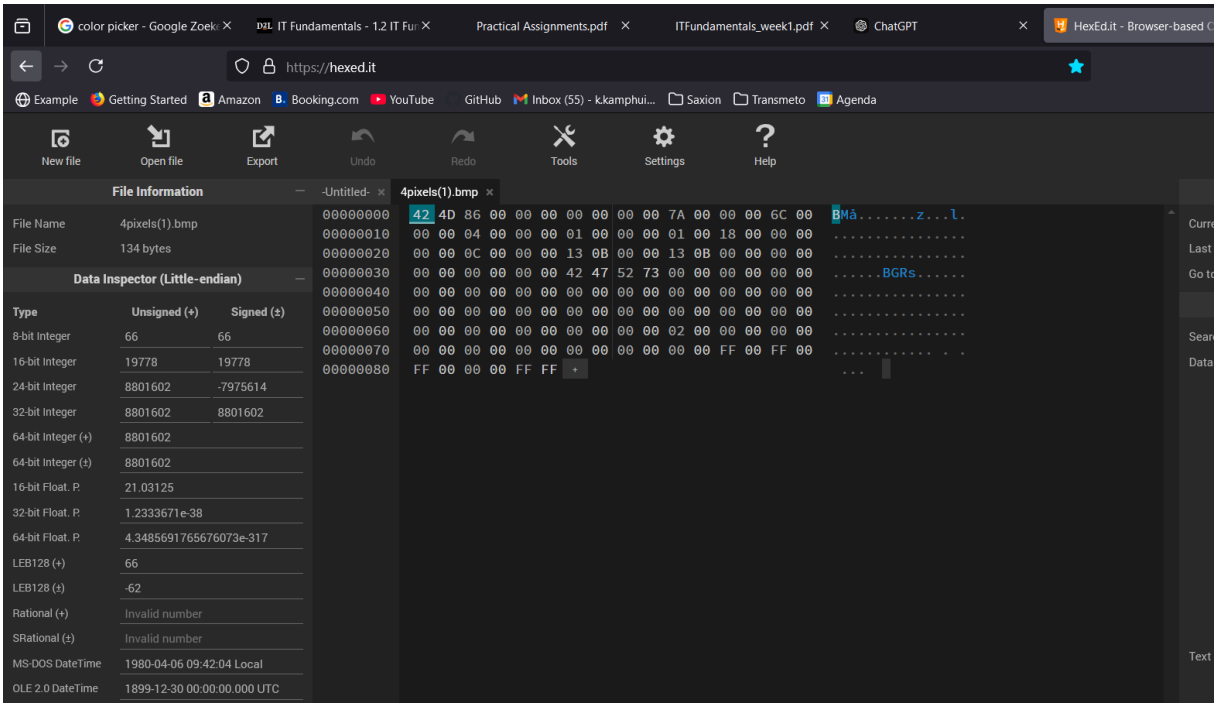
Hexadecimal colour code: #f0ff00

Assignment 1.3: Manipulating binary data

Colour	Colour code hexadecimaal (RGB)	Big Endian	Little Endian
RED	#FF0000	42 4D 86 7A 6C	6C 7A 86 4D 42
GREEN	#00FF00		
BLUE	#0000FF		
WHITE	#FFFFFF		
Favourite (previous assignment)	#f0ff00		

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: 573190

Binary number:

573190 : 2 = 286.595 = 0
286.595 : 2 = 143.297,5 = 1
143.297 : 2 = 71.648,5 = 1
71.648 : 2 = 35.824 = 0
35.824 : 2 = 17.912 = 0
17.912 : 2 = 8.956 = 0
8.956 : 2 = 4.478 = 0
4.478 : 2 = 2.239 = 0
2.239 : 2 = 1.119,5 = 1
1119 : 2 = 559,5 = 1
559 : 2 = 279,5 = 1
279 : 2 = 139,5 = 1
139 : 2 = 69,5 = 1
69 : 2 = 34,5 = 1
34 : 2 = 17 = 0
17 : 2 = 8,5 = 1
8 : 2 = 4 = 0
4 : 2 = 2 = 0
2: 2 = 1 = 0
1 : 2 = 0.5 = 1

= 10001011111100000110

Hexidecimal:

573190 : 16 = 35.824,375
573190 – (35824 x 16) = 6

35.824 : 16 = 2239
2239 – (2239 x 16) = 0

2239 : 16 = 139,9375
2239 – (139 x 16) = G (15)

139 : 16 = 8,6875
139 – (8 x 16) = 11

8 : 16 = 0.5

8 – (0 x 16) = 8

= 8BG06

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