Template Week 1 – Bits & Bytes

Student number: 563634

Assignment 1.1: Bits & Bytes intro

What are Bits & Bytes?

A bit is the smallest unit where data can be stored or transferred in a computer. A bit unit consists of only either 0 or 1.

A byte is a group of 8 bits. It´s a larger unit where data can be stored or transferred in a computer.

What is a nibble?

A nibble is a group of 4 bits. If we need smaller chunks of data, we use nibble.

What relationship does a nibble have with a hexadecimal value?

a single nibble can represent exactly one hexadecimal digit.

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

Because displaying binary data as hexadecimal values makes the information easier to read, write or change.

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

A byte and a hexadecimal value are connected because a byte contains exactly two hexadecimal digits.

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

Well, an IPv4 subnet has four groups of 8 bits, so that’s 8 * 4 = 32

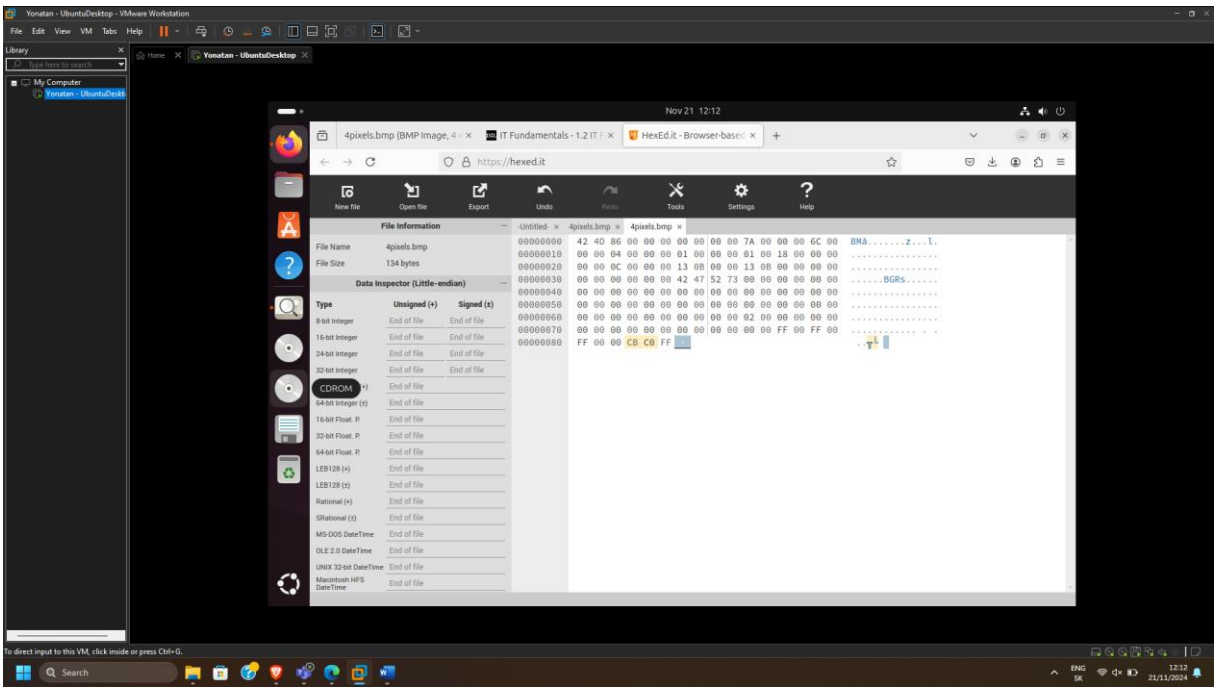
Assignment 1.2: Your favourite colour

Hexadecimal colour code: #808080

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#
GRAY	#FFC0CB	#FFC0CB	#CBC0FF

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: 563634

563634 / 2 = 281817 == remainder 0

281817 / 2 = 140908 == remainder 1

140908 / 2 = 70454 == remainder 0

70454 / 2 = 35227 == remainder 0

35227 / 2 = 17613 == remainder 1

17613 / 2 = 8806 = remainder 1

8806 / 2 = 4403 = remainder 0

4403 / 2 = 2201 = remainder 1

2201 / 2 = 1100 = remainder 1

1100 / 2 = 550 = remainder 0

550 / 2 = 275 = remainder 0

275 / 2 = 137 = remainder 1

137 / 2 = 68 = remainder 1

68 / 2 = 34 = remainder 0

34 / 2 = 17 = remainder 0

17 / 2 = 8 = remainder 1

8 / 2 = 4 = remainder 0

4 / 2 = 2 = remainder 0

2 / 2 = 1 = remainder 0

1 / 2 = 0 remainder 1

The binary answer is: 1000 1001 1001 1011 0010.

Hexadecimal calculation:

563634 ÷ 16 = 35227 remainder 2

35227 ÷ 16 = 2201 remainder 11

2201 ÷ 16 = 137 remainder 9

137 ÷ 16 = 8 remainder 9

8 ÷ 16 = 0 remainder 8

The hexadecimal answer is : 899B2

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