Template Week 1 – Bits & Bytes

Student number:

Assignment 1.1: Bits & Bytes intro

What are Bits & Bytes?

A bit can be either 0 or 1, is the smallest unit of data and is a single symbol in a binary number. A byte is a group of 8 bits and is mostly used to measure memory space or file size.

What is a nibble?

Nibble consists of 4 bits.

What relationship does a nibble have with a hexadecimal value?

Nibble can hold one hexadecimal digit.

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

Hexadecimal values make reading of the data easier than when it's displayed as binary value.

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

A byte can be presented as 2 hexadecimal digits since one byte is 8 bits and the hexadecimal value consists of 4.

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

An IPv4 address consists of 4 octets which are 8 bits each in binary.

8 x 4 = 32 which means that the IPv4 subnet has 32 bits.

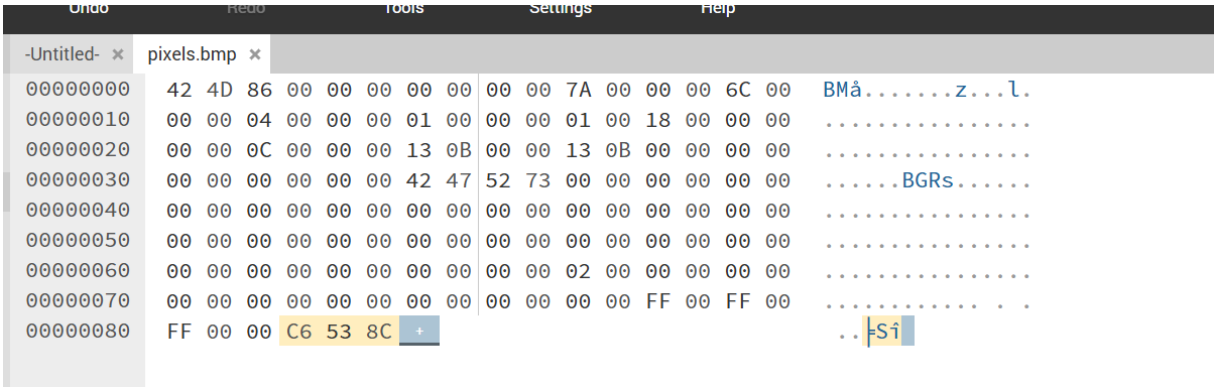
Assignment 1.2: Your favourite colour

Hexadecimal colour code: #c6538c

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)	C6538C	C6538C	8C53C6

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.

562606 / 2 = 281303 remainder 0

281303 / 2 = 140651 remainder 1

140651 / 2 = 70325 remainder 1

70325 / 2 = 35162 remainder 1

35162 / 2 = 17581 remainder 0

17581 / 2 = 8790 remainder 1

8790 / 2 = 4395 remainder 0

4395 / 2 =2197 remainder 1

2197 / 2 = 1098 remainder 1

1098 / 2 = 549 remainder 0

549 / 2 = 274 remainder 1

274 / 2 = 137 remainder 0

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

562606 (10) = 10001001010110101110 (2)

1000 (2) = 8 (16)

1001 (2) = 9 (16)

0101 (2) = 5 (16)

1010 (2) = A (16)

1110 (2) = E (16)

1000 1001 0101 1010 1110 (2) = 895AE (16)

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