Template Week 1 – Bits & Bytes

Student number: 568681

Assignment 1.1: Bits & Bytes intro

What are Bits & Bytes?

A bit is the smallest unit of a digital information it can be either 1 or 0. A byte is a collection of 8 bits, it can represent values from 0 to 255

What is a nibble?

A nibble is four consecutive binary digits or half of 8 an 8-bit byte.

What relationship does a nibble have with a hexadecimal value?

A nibble has sixteen possible values(2^4). A nibble can be represented by a single hexadecimal digit.

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

A single hexadecimal represents 4 binary bits, which means that each byte(8 bits) can be represented by just 2 hexadecimal digits. Which makes the readability easier and makes it more compact.

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

A byte has a direct relationship with hexadecimal values because each byte can be represented by exactly 2 hexadecimal digits.

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

An IPv4 subnet is composed of 4 octets (bytes). Each octet is made up of 8 bits

Therefore 4 octets x 8 bits per octet = 32 bits

Assignment 1.2: Your favourite colour

Hexadecimal colour code:

#FF0000

Assignment 1.3: Manipulating binary data

Colour	Colour code hexadecimaal (RGB)	Big Endian	Little Endian
RED	#FF0000		
GREEN	#00FF00		
BLUE	#0000FF		
WHITE	#FFFFFF		
Favourite (previous assignment)	#FF0000		

Screenshot modified BMP file in hex editor:

Bonus point assignment – week 1

Convert your student number to a hexadecimal number and a binary number.

568681 = 1000 1010 1101 0110 1001

1000 1010 1101 0110 1001 = 8AD69

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

568681 / 2 = 1

284.340 / 2 = 0

142.170 / 2 = 0

71.085 / 2 = 1

35.542 / 2 = 0

17.771 / 2 = 1

8.885 / 2 = 1

4.442 / 2 = 0

2.221 / 2 = 1

1110 / 2 = 0

555 / 2 = 1

277 / 2 = 1

138 / 2 = 0

69 / 2 = 1

34 / 2 = 0

17 / 2 = 1

8 /2 = 0

4 / 2 = 0

2 / 2 = 0

1 / 2 = 1

And for the hexadecimal I got the binary number 1000 1010 1101 0110 1001 and did the calculations

1 x 2^3 + 0 x 2^2 + 0 x 2^1 + 0x2^0 = 8

1 x 2^3 + 0 x 2^2 + 1 x 2^1 + 0 x 2^0 = 10(A)

1 x 2^3 + 1x2^2 + 0 x 2^1 + 1 x 2^0 = 13(D)

0 x 2^3 + 1 x 2^2 + 1x 2^1 + 0 x 2^0 = 6
1 x 2^3 + 0 x 2^2 + 0 x 2^1 + 1 x 2^0 = 9

568681 – 8AD69

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