

Template Week 1 – Bits & Bytes

Student number: 486707

Assignment 1.1: Bits & Bytes intro

What are Bits & Bytes?

A bit is the smallest electronic data unit of either a 0 or 1. A Byte is 8 of these bits.

What is a nibble?

A nibble is 4 bits.

What relationship does a nibble have with a hexadecimal value?

4 bits are needed to store a hexadecimal number. 2^4 is 16.

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

To make the binary data shorter and more readable for humans.

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

A byte can be represented by two hexadecimal values.

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

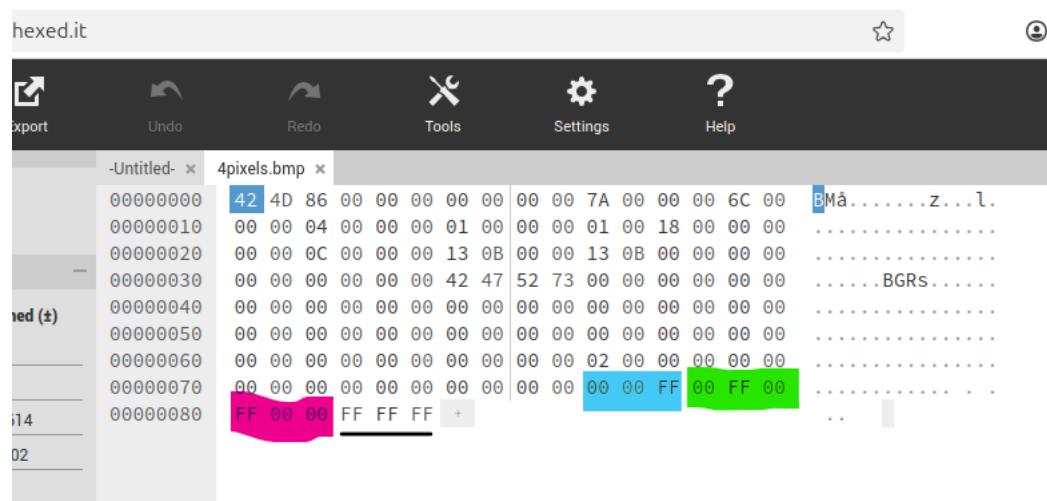
2^{32} is 4.3billion bits which is the amount of IP addresses the creator of the protocol thought would be sufficient at the time.

Assignment 1.2: Your favourite color

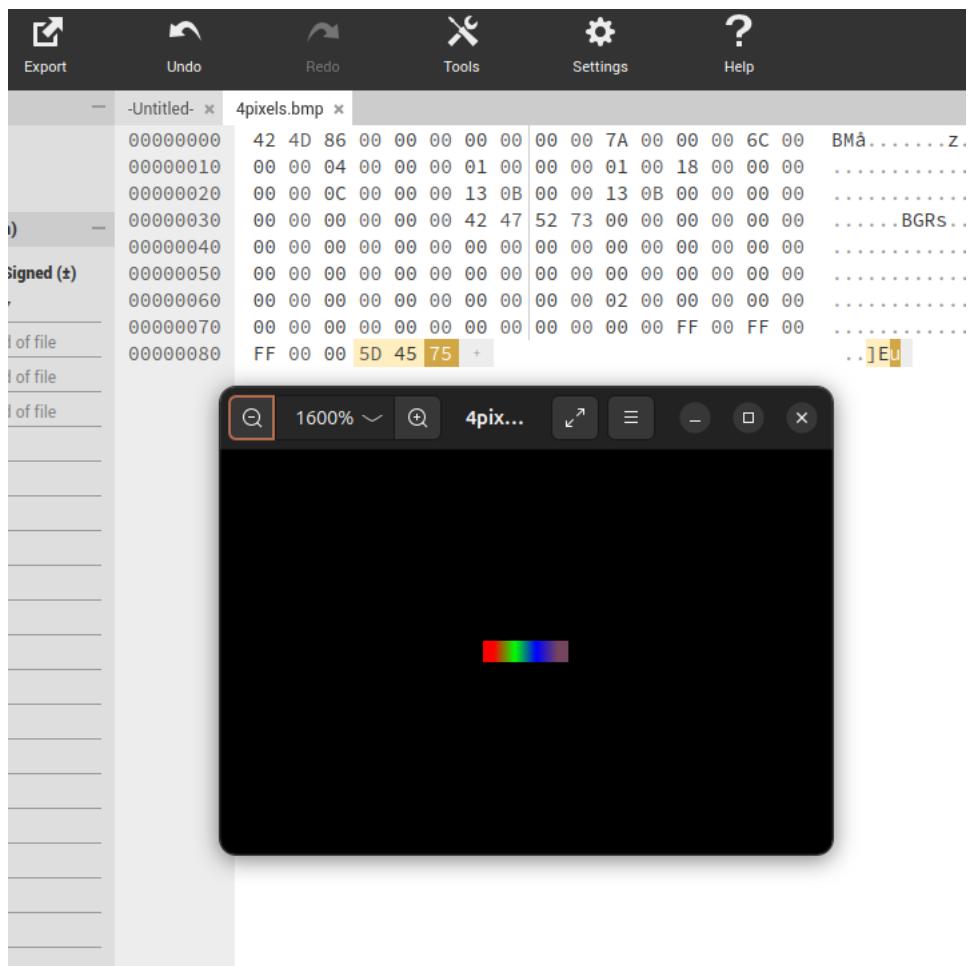
Hexadecimal color code: #5d4575

Assignment 1.3: Manipulating binary data

Color	Color 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)	5D4575 93,69,117RGB	5D4575	5754D5



Screenshot modified BMP file in hex editor:

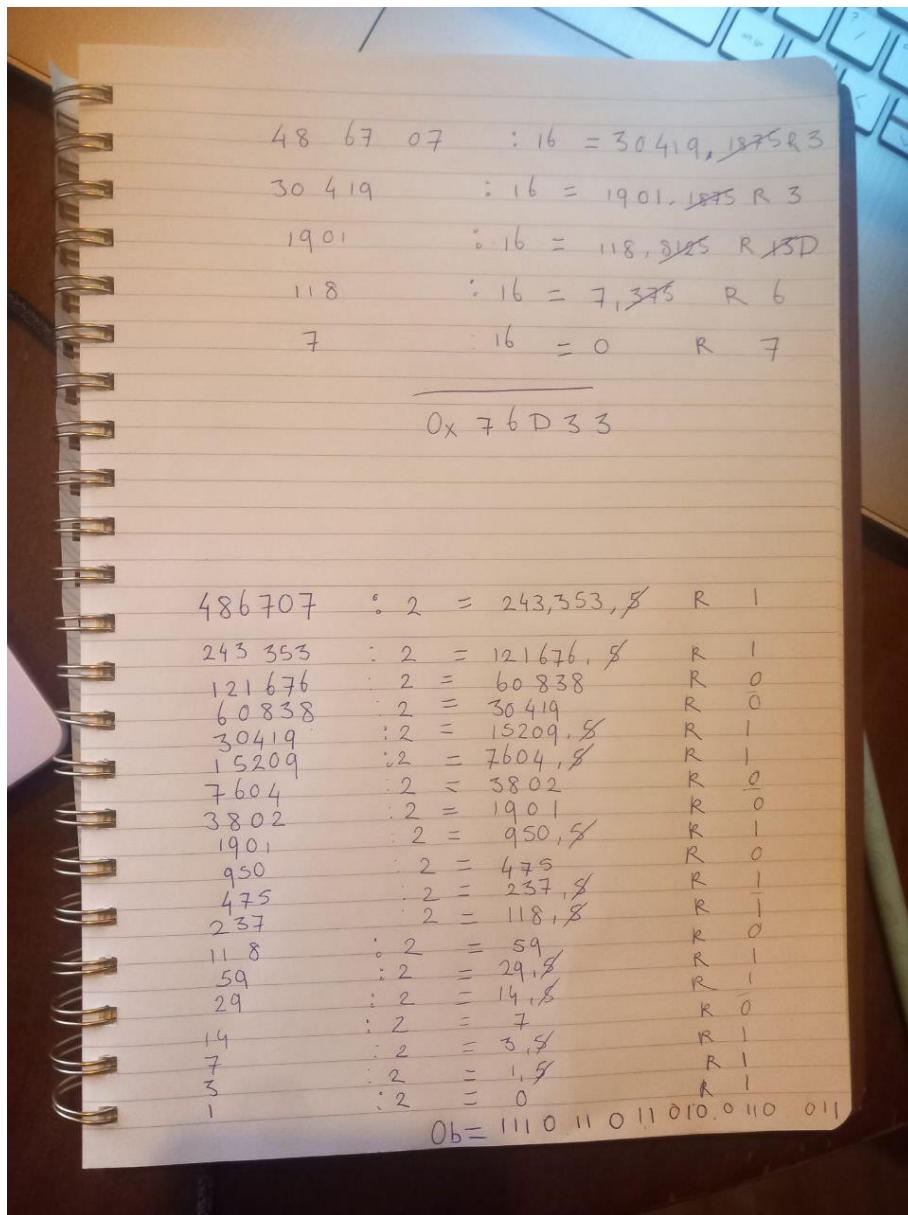


Assignment 1.4: Student number to HEX and Binary

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: 486707



My studentnumber 486707 in hexadecimal is 0x76D33 as shown on my notebook. It is calculated by dividing the number by 16, then writing down the answer for the next division, and multiplying the number behind the comma by 16 again to get the remainder. When there is no more division by 16 possible the hexadecimal value can be read by reading the calculation of the remainder from bottom to top.

My studentnumber 486707 in binary is 1110110110100110011. It was calculated by diving the number by 2 and multiplying the number behind the comma by 2 again to get the remainder. When there is no more division by two possible the binary number can be read by reading the remainder calculations from bottom to top.

From To

Decimal Hexadecimal

Enter decimal number

486707 10

= Convert × Reset ⚡ Swap

Hex result

$(486707)_{10} = (76D33)_{16}$

Hex number (5 digits)

76D33 16

Hex signed 2's complement (8 digits)

00076D33 16

Binary number (19 digits)

1110110110100110011 2

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