Template Week 1 – Bits & Bytes

Student number: 590190

Assignment 1.1: Bits & Bytes intro

What are Bits & Bytes?

- A bit is the smallest single unit of data as a 0 or 1, and a Byte is a collection of 8 bits.

What is a nibble?

- A niddle is a 4-bit group, which directly corresponds to a single hexadecimal digit (0-F) because 2^4 equals 16.

What relationship does a nibble have with a hexadecimal value?

- A niddle is a 4-bit group, which directly corresponds to a single hexadecimal digit (0-F) because 2^4 equals 16.

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

- It is wise because hexadecimal condenses long, unreadable binary strings into a much shorter and human-readable format.

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

- One bye (8 bits) can be precisely and completely represented by exactly two hecadecimal digits.

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

- An Ipv4 subnet mask, like 255.255.0.0. is composed of four 8-bit numbers (octets), and the calculation is simply 8 bits *4 sections = 32bits total.
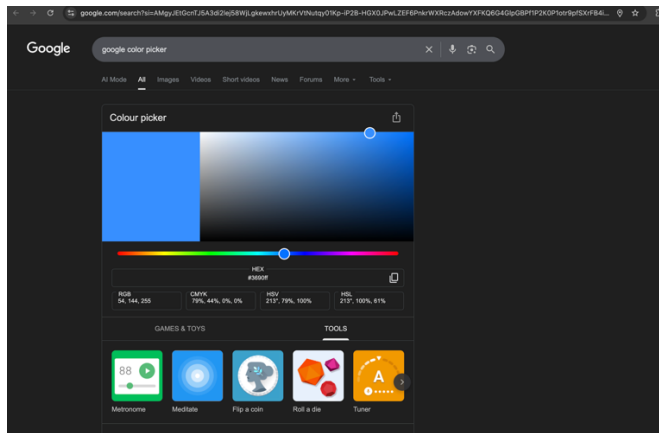   Examples of a subnet are:

    o 255.0.0.0
    o
    255.255.0.0
    o Etc. etc.

Assignment 1.2: Your favourite color
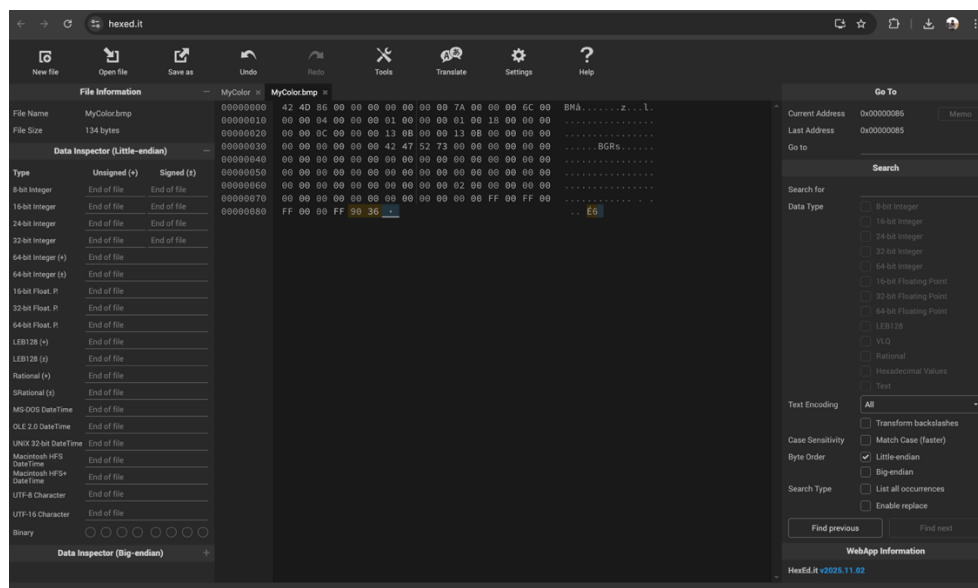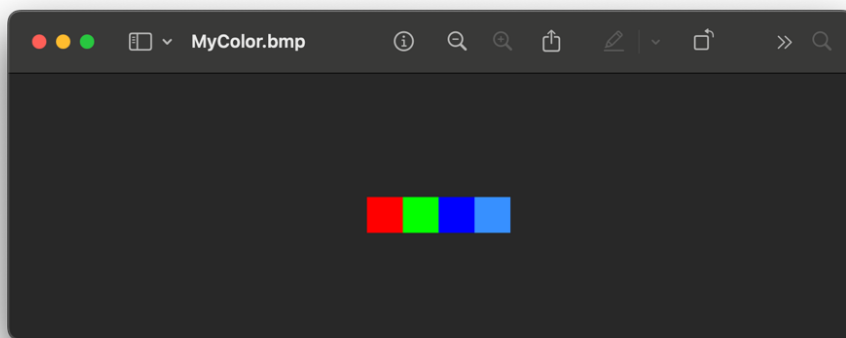
Hexadecimal color code: HEX: 3690ff

RGB: 54.144.255

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)	3690ff	3690FF	FF9036

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.

My Student Number: 590190 (Decimal)

<Decimal -> Hexadecimal>

590190/16=36886, remainder 14 (E in hex)

36886/16=2305, remainder 6

2305/16=144, remainder 1

144/16=9, remainder 0

9/16=0, remainder 9

Reading the remainders from bottom to top, the hexadecimal representation of 590190 is 9016E.

<Hexadecimal ->Binary>

9->1001

0->0000

1->0001

6->0110

E->1110

the binary representation of 9016E (hexadecimal) is 10010000000101101110.

<Hexadecimal ->Decimal> for checking

Label each digit:

- $9 \times 16^4 = 589824$

- $0 \times 16^3 = 0$

- $1X16^2=256$

- $6X16^1=96$

- $14X16^0=14$

589824+0+256+96+14=590190

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