Template Week 1 – Bits & Bytes

Student number: 580521

Assignment 1.1: Bits & Bytes intro

What are Bits & Bytes?

- A bit is the smallest unit of data in a computer • A byte is a group of 8 bits, because computer handles data chunks

What is a nibble?

- A nibble is half of a byte, which makes 4 bits • A nibble is useful because one nibble represents a hexadecimal value

What relationship does a nibble have with a hexadecimal value?

- A nibble maps exactly to one hexadecimal value (4 bits)

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

- The data is more compact • Requires much less space

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

- A byte is exactly 2 hexadecimal values (8 bits)

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

- 255.0.0.0 11111111.00000000. 00000000. 00000000 -> 32 bits • 255.255.0.0 11111111. 11111111. 00000000. 00000000 -> 32 bits
- Etc.

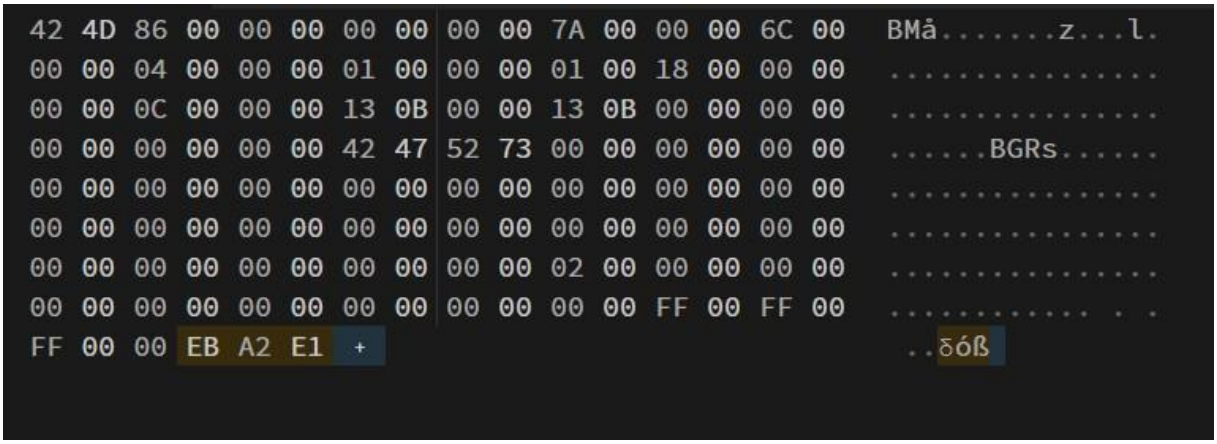
Assignment 1.2: Your favourite color

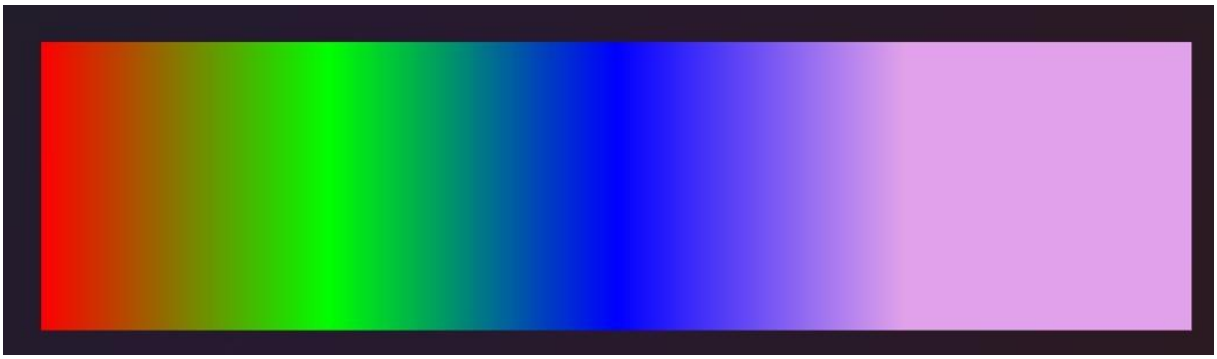
Hexadecimal color code: **#e1a2eb**

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)	**#E1A2EB**	**#E1A2EB**	**#EBA2E1**

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.

Hexadecimal number: 8DBA9

Decimal number: 1000 1101 1011 1010 1001

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

580521 / 16 = 36282 remainer is 9

36282 / 16 = 2267 remainer is 10

2267 / 16 = 141 remainer is 11

141 / 16 = 8 remainer is 13

8 / 16 = 0 remainer is 8

Result: 8DBA9

Decimal: Direct conversion from hex to decimal

8 -> 1000 ; D -> 1101 ; B -> 1011 ; A -> 1010 ; 9 -> 1001

Result: 1000 1101 1011 1010 1001

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