Template Week 1 – Bits & Bytes

Student number:

589845

Assignment 1.1: Bits & Bytes intro

What are Bits & Bytes?

A byte is 8 bits.

A bit can hold a 0 or 1

A byte can hold a maximum value of 256, 2^8

What is a nibble?

A nibble is 4 bits (1/2 of a byte)

What relationship does a nibble have with a hexadecimal value?

One nibble is the maximum value of one number in hexadecimal value.

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

More readable

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

One byte has a maximum value of FF

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

1 Byte = 8 bits

IPv4 = 4 byte (255.255.255.255)

4 bytes * 8 = 32 bits

Assignment 1.2: Your favourite color
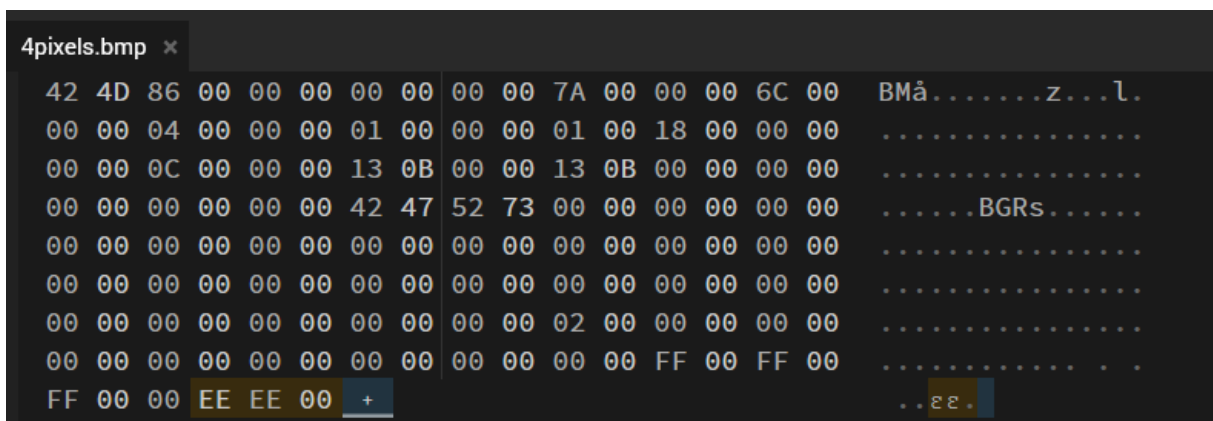
Hexadecimal color code:

#00eeee

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)	00eeee	00eeee	eeee00

Screenshot modified BMP file in hex editor:
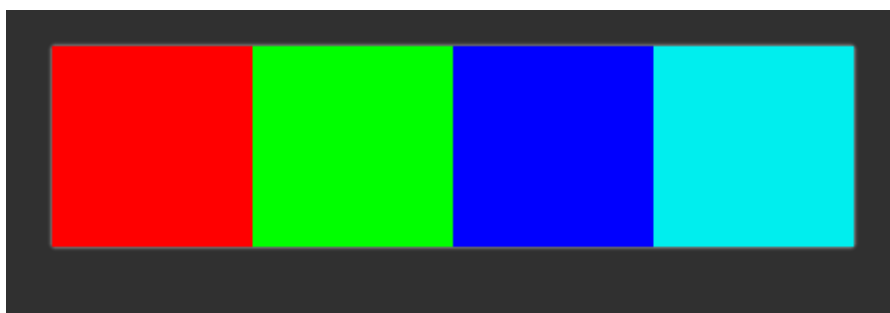
Assignment 1.4: Student number to HEX and Binary

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.

From Decimal to Hexadecimal:

1. 589845 / 16 = 36865,   remainder 5
2. 36865 / 16 = 2304,   remainder 1
3. 2304   / 16 = 144,   remainder 0
4. 144   / 16 = 9,   remainder 0
5. 9   / 16 = 0,   remainder 9

Answer: #90015

From Hexadecimal to binary:

1. 9 in hexadecimal = 1001 in binary
2. 0 in hexadecimal = 0000 in binary
3. 0 in hexadecimal = 0000 in binary
4. 1 in hexadecimal = 0001 in binary
5. 5 in hexadecimal = 0101 in binary

Answer: 1001 0000 0000 0001 0101

To check:

1. 1 x 524.288   = 524.288
2. 0 x 262.144   = 0
3. 0 x 131.072   = 0
4. 1 x 65.536   = 65.536

5. 0 x 32.768   = 0
6. 0 x 16.384   = 0
7. 0 x 8.192   = 0
8. 0 x 4.096   = 0

9. 0 x 2.048   = 0
10. 0 x 1.024   = 0
11. 0 x 512   = 0
12. 0 x 256   = 0

13. 0 x 128   = 0
14. 0 x 64   = 0
15. 0 x 32   = 0
16. 1 x 16   = 16

17. 0 x 8   = 0
18. 1 x 4   = 4

19. 0 x 2   = 0
20. 1 x 1   = 1

Anwser: 524.288 + 65.536 + 16 + 4 + 1 = 589845

Ready? Save this file and export it as a pdf file with the name: **week1.pdf**