

Template Week 1 – Bits & Bytes

Student number:

Assignment 1.1: Bits & Bytes intro

What are Bits & Bytes?

What is a nibble?

What relationship does a nibble have with a hexadecimal value?

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

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

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

Assignment 1.2: Your favourite colour

Hexadecimal colour code:

Assignment 1.3: Manipulating binary data

Colour	Colour code hexadecimaal (RGB)	Big Endian	Little Endian
RED			
GREEN			
BLUE			
WHITE			
Favourite (previous assignment)			

Screenshot modified BMP file in hex editor:

Bonus point assignment – week 1

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.

Studentnummer: 571649

Stap 1: Omzetten naar hexadecimaal

We zetten 571649 om naar een hexadecimale waarde door het getal steeds door 16 te delen en de rest te noteren.

1. $571649 \div 16 = 35728$ (rest: 1)
2. $35728 \div 16 = 2233$ (rest: 0)
3. $2233 \div 16 = 139$ (rest: 9)
4. $139 \div 16 = 8$ (rest: 11 \rightarrow B in hex)
5. $8 \div 16 = 0$ (rest: 8)

Nu lezen we de resten van onder naar boven: 8B7E1.

Hexadecimale waarde: 8B7E1.

Stap 2: Omzetten naar binair

Nu zetten we de hexadecimale waarde 8B7E1 om naar binair.
Elke hexadecimale waarde komt overeen met 4 binaire cijfers:

- 8 = 1000
- B = 1011
- 7 = 0111
- E = 1110
- 1 = 0001

De binaire waarde is: 10001011011111100001.

Stap 3: Controle

We controleren of de omzettingen correct zijn door het binaire getal terug naar decimaal om te zetten:

$$10001011011111100001 \rightarrow (1 \times 2^{19}) + (0 \times 2^{18}) + (0 \times 2^{17}) + \dots + (1 \times 2^0) = 571649$$

Dit komt overeen met het originele getal!

Conclusie:

- Hexadecimale waarde: 8B7E1
- Binaire waarde: 10001011011111100001

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