Template Week 1 – Bits & Bytes

Student number: 563437

Assignment 1.1: Bits & Bytes intro

What are Bits & Bytes?

Bit: smallest unit of data in a computer system, it has two possible values: 0 or 1, which represent the binary system.

Byte: group of 8 bits, it commonly represents a letter, number or symbol.

What is a nibble?

Group of 4 bits, half the size of a byte, it can represent 16 different values: from 0000 to 1111 in binary, which corresponds to numbers from 0 to 15 in hexadecimal.

What relationship does a nibble have with a hexadecimal value?

A nibble and a hexadecimal value are directly related because a nibble represents exactly one hexadecimal digit. Since 4 bits can represent 16 different values (from 0000 to 1111 in binary) these 16 values directly map to the 16 hexadecimal digits, which range from 0 to F.

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

Because of compactness: hexadecimal is much shorter than binary, so is easier to read and handle. Direct Mapping: each hexadecimal digit corresponds directly to a 4-bit binary value, making the conversion between them simple.

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

The relationship is that a byte consists of 8 bits, each hexadecimal digit represents 4 bits (1 nibble). Therefore, 2 hexadecimal digits are needed to represent a full byte (8 bits).

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

In a IPv4 subnet there are 4 octets, each one has 8 bits because it can represent numbers from 0 to 255. So 8 bits x 4 octets= 32 bits.

Assignment 1.2: Your favourite colour

Hexadecimal colour code: #03ff03

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.

563437/2= 281718,5= 1

281718/2= 140859= 0

140859/2= 70429,5= 1

70429/2= 35214,5= 1

35214/2= 17607= 0

17607/2= 8803,5= 1

8803/2= 4401,5= 1

4401/2= 2200,5= 1

2200/2= 1100= 0

1100/2= 550= 0

550/2= 275= 0

275/2= 137,5= 1

137/2= 68,5= 1

68/2= 34= 0

34/2= 17= 0

17/2= 8,5= 1

8/2= 4= 0

4/2= 2=0

2/2= 1= 0

½= 0,5= 1

Binary= 10001001100011101101

Hexadecimal (using the hexadecimal to binary table) = 898ED

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