Template Week 1 – Bits & Bytes

Student number:566787

Assignment 1.1: Bits & Bytes intro

What are Bits & Bytes?

Bit is the smallest data in a computer and can be only 1 or 0. Bits is used like fundamental block of binary code, the language of computers, where each beat means binary choice, such as ON or OFF or True or False.

Bytes contain 8 bits and generally used to represent character of data such as letter or symbol. Also, bytes are used to measure file sizes or memory capacity.

What is a nibble?

Nibble consists of four bits. Also known as half of byte.

What relationship does a nibble have with a hexadecimal value?

Nibble has special relationship with hexadecimal value because one nibble directly represents one hexadecimal digit.

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

Since you can read it much more easily and with less mistakes

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

Byte can be represented as two hexadecimal values.

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

Demical subnet: 255.255.0.0

To divide bytes we have **.** as separator

255 = 1111 1111

(2^7 + 2^6 + 2^5 + 2^4 + 2^3 + 2^2 + 2^1 + 2^0) * 1 = 128 + 64 + 32 + 16 + 8 + 4 + 2 + 1 = 255

0 = 0000 0000

(2^7 + 2^6 + 2^5 + 2^4 + 2^3 + 2^2 + 2^1 + 2^0) * 0 = 0

Assignment 1.2: Your favourite colour

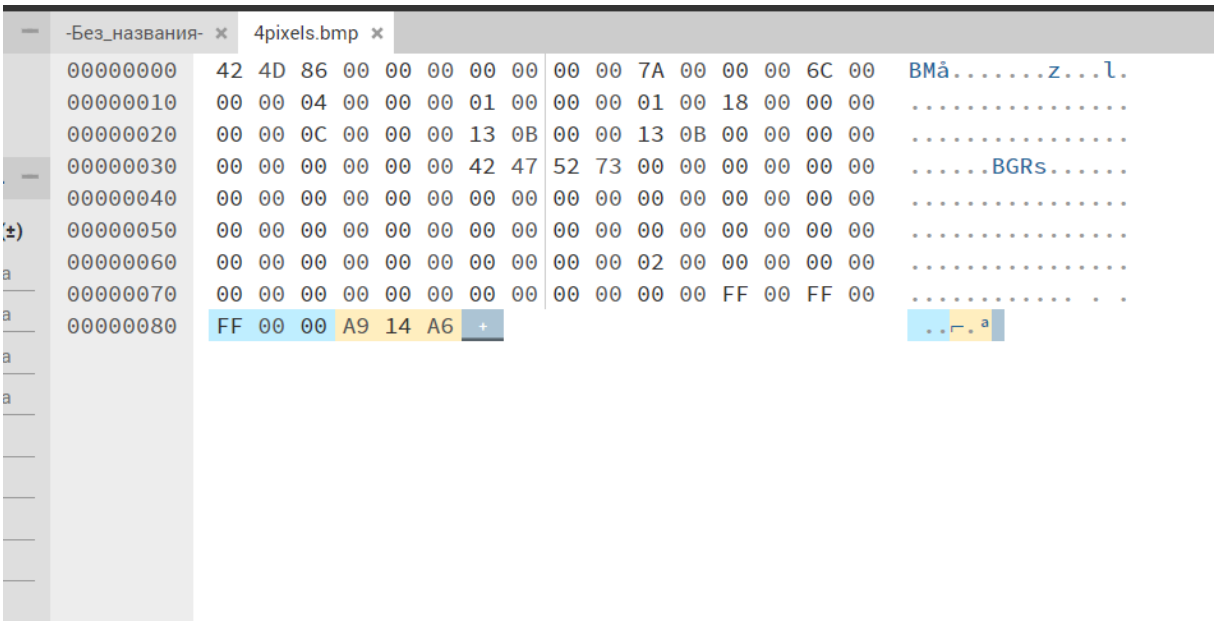
Hexadecimal colour code:

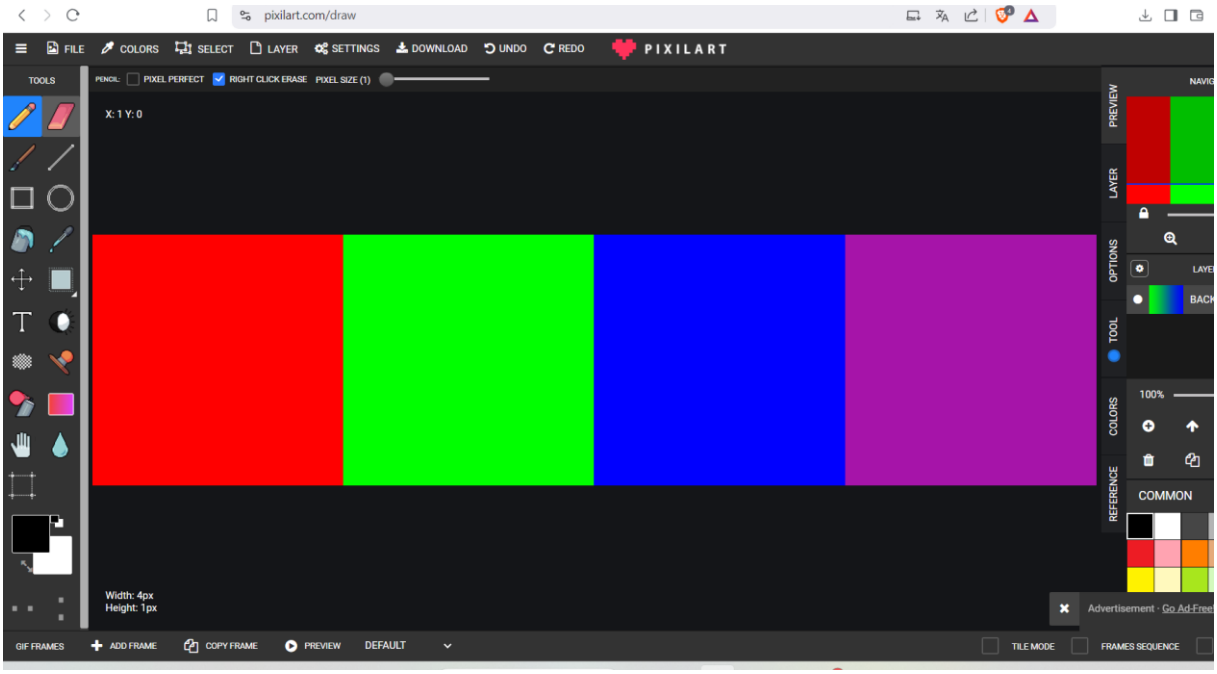
#a6149a

Assignment 1.3: Manipulating binary data

Colour	Colour code hexadecimaal (RGB)	Big Endian	Little Endian
RED	FF 00 00	FF 00 00	00 00 FF
GREEN	00 FF 00	00 FF 00	00 FF 00
BLUE	00 00 FF	00 00 FF	FF 00 00
WHITE	FF FF FF	FF FF FF	FF FF FF
Favourite (previous assignment)	A6 14 9A	A6 14 9A	A9 14 6A

Screenshot modified BMP file in hex editor:




pixilart.com/draw
FILE
COLORS
SELECT
LAYER
SETTINGS
DOWNLOAD
UNDO
REDO
PIXILART
TOOLS
PENCIL:
PIXEL PERFECT
RIGHT CLICK ERASE
PIXEL SIZE (1)
X: 1 Y: 0
PREVIEW
LAYER
OPTIONS
TOOL
COLORS
REFERENCE
100%
COMMON
Width: 4px
Height: 1px
Advertisement · Go Ad-Free
GIF FRAMES
ADD FRAME
COPY FRAME
PREVIEW
DEFAULT
TILE MODE
FRAMES SEQUENCE

Bonus point assignment – week 1

Convert your student number to a hexadecimal number and a binary number.

566787

Binary = 1000 1010 0110 0000 0011

Hex = 8A603

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

566787 ÷ 2 = 283393, remainder 1

283393 ÷ 2 = 141696, remainder 1

141696 ÷ 2 = 70848, remainder 0

70848 ÷ 2 = 35424, remainder 0

35424 ÷ 2 = 17712, remainder 0

17712 ÷ 2 = 8856, remainder 0

8856 ÷ 2 = 4428, remainder 0

4428 ÷ 2 = 2214, remainder 0

2214 ÷ 2 = 1107, remainder 0

1107 ÷ 2 = 553, remainder 1

553 ÷ 2 = 276, remainder 1

276 ÷ 2 = 138, remainder 0

138 ÷ 2 = 69, remainder 0

69 ÷ 2 = 34, remainder 1

34 ÷ 2 = 17, remainder 0

17 ÷ 2 = 8, remainder 1

8 ÷ 2 = 4, remainder 0

4 ÷ 2 = 2, remainder 0

2 ÷ 2 = 1, remainder 0

1 ÷ 2 = 0, remainder 1

566787 ÷ 16 = 35424, remainder 3

35424 ÷ 16 = 2214, remainder 0

2214 ÷ 16 = 138, remainder 6

138 ÷ 16 = 8, remainder 10

8 ÷ 16 = 0, remainder 8

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