#1

Homework 2

0 = 000000

13 = 001101 I've done by expanding 13 to powers of 2 ($13 = 2^3 + 2^2 + 2^0$) $\Rightarrow$

$\Rightarrow 13 = 0 \cdot 2^5 + 0 \cdot 2^4 + 1 \cdot 2^3 + 1 \cdot 2^2 + 0 \cdot 2^1 + 1 \cdot 2^0 \Rightarrow$

$\Rightarrow 13_{10} = 001101_2$ and then added 2 additional zeroes to the left to make 6-bit.

24 = 011000 the same as with 13

63 = 111011 the same as with 13

Signed:

16 = 010000 the same as with 13

$-2 = (000010 \wedge 111111) + 1 = 111101 + 1 =$

$= 111110$

31 = 011111

$-32 = (100000 \wedge 111111) + 1 = 011111 + 1 =$

$= 100000$

№2

$000101 = 0 \cdot 2^5 + 0 \cdot 2^4 + 0 \cdot 2^3 + 1 \cdot 2^2 + 0 \cdot 2^1 + 1 \cdot 2^0 =$

$= 3$

$101011 = 32 + 8 + 2 + 1 = 43$

$1111111 = 32 + 16 + 8 + 4 + 2 + 1 = 63$

$100000 = 32$

№3

$7 = 7$

$240 =$

$240 \mid 16$
$16 \mid 15$
80
-80
0

$15 \mid 16$
$0 \mid 0$
15
F

$= F0$

$171 =$

$171 \mid 16$
$16 \mid 10$
11
-0
11

$10 \mid 16$
$0 \mid 0$
10

$= AB$

$126 = \left| 126 \mid 16 \right.$
$-112 \mid 7$
$14 \left. \right| = 7E$

№4

0x3C = 00111100

0x7E = 01111110

0xFF = 11111111

0xA5 = 10100101

№5

1. (00111100 ^ 11111111) + 1 = 11000100
2. (01111110 ^ 11111111) + 1 = 10000010
3. (11111111 ^ 11111111) + 1 = 00000001
4. (10100101 ^ 11111111) + 1 = 01011011

№6

0xDEADBEEF

Big endiem

0xDE, 0xAD, 0xBE, 0xEF

0 1 2 3

Little endiem

0xEF, 0xBE, 0xAD, 0xDE

3 2 1 0

№7

5 bit → 8-bit

$7 = 00111 \Rightarrow 00000111$

$15 = 01111 \Rightarrow 00001111$

$-16 = 10000 \Rightarrow 11110000$

$-5 = 11011 \Rightarrow 11111011$

№8

$7 = 0111$

$9 = 1001$

$$\begin{array}{r} {\scriptstyle 1} \\ 0111 \\ +\ 1001 \\ \hline 10000 \end{array} \Rightarrow$$

we have only 4 bits

$\Downarrow$

$1000 = 8$

$4 = 0100$

$-5 = (0101 \wedge 1111) + 1 = 1011$

$$\begin{array}{r} 0100 \\ +\ 1011 \\ \hline 1111 \end{array}$$

$\Downarrow$

$1111 = 15$