Homework 2 Question 2

A. 0xA033 — A ⇒ 1010, 0 ⇒ 0000, 3 ⇒ 0011

⇒ $0xA033 = (1010\ 0000\ 0011\ 0011)_2$

B. 0x0CED — 0 = 0000, C = 1100, E = 1110, D = 1101

⇒ $0x0CED = (0000\ 1100\ 1110\ 1101)_2$

C. 0x12FF — 1 = 0001, 2 = 0010, F = 1111

⇒ $0x12FF = (0001\ 0010\ 1111\ 1111)_2$

D. 0x2200 — 2 = 0010, 0 = 0000

⇒ $0x2200 = (0010\ 0010\ 0000\ 0000)_2$

E. 0xF003 — F = 1111, 0 = 0000, 3 = 0011

⇒ $0xF003 = (1111\ 0000\ 0000\ 0011)_2$

Homework 2 Question 3

2^x	2^{15}	...	2^8	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
val	32768	..	256	128	64	32	16	8	4	2	1

To convert -x to two's complement hex

1. Find binary representation of x
2. invert the digits & add 1
3. Convert to hexadecimal

A. 257 ⇨ ~~$1*(2^8) + 1(2^0)$~~ ~~$1*(256)$~~

$257 = 1*(2^8) + 1*(2^0)$

⇨ 0000 0001 0000 0001

⇨ **0x0101**

B. -17,213

⇨ $-32768 + \sum_{i=0}^{14} d_i 2^i = -17,213$

⇨ $\bullet 15555 = (8192) + (4096) + (2048) + (1024) + (128) + (64) + (2)$

1011 1100 1100 0011

OR by

	2^{14}		2^9	2^8	2^5	2^4	2^3	2^2
17,213 =	0100	0011	001	1	1	101		$)_2$
flipping ⇨	1011	1100	1100	0010				$)_2$
add 1 ⇨	1011	1100	1100	0011				$)_2$

⇨ Hex ⇨ **0xBCC3**

C. 21,934

⇨ 2^{15} 2^{14} 2^{13} 2^{12} 2^{11} 2^{10} 2^{9} 2^{8} 2^{7} 2^{6} 2^{5} 2^{4} 2^{3} 2^{2} 2^{1} 2^{0}

0 1 0 1 0 1 0 1 1 0 1 0 1 1 1 0

⇨ **0x 55AE**

D. -918 2^{15} 2^{14} 2^{13} 2^{12} 2^{11} 2^{10} 2^{9} 2^{8} 2^{7} 2^{6} 2^{5} 2^{4} 2^{3} 2^{2} 2^{1} 2^{0}

918 = 0000 0011 1001 0110

invert ⇨ 1111 1100 0110 1001

Add 1 ⇨ $(1111\ 1100\ 0110\ 1010)_2$ = **0x FC6A**

E. 41 = 0000 0000 0010 1001 2^{5} 2^{3} 2^{0}

⇨ **0x0029**

Homework 2 Question 4

A. 0x7819 AND 0x829A

0111 1000 0001 1001
& 1000 0010 1001 1010
0000 0000 0001 1000 ⇨ **0x0018**

B. 0xA281 OR 0xF037

1010 0010 1000 0001
OR 1111 0000 0011 0111
1111 0010 1011 0111 ⇨ **0xF2B7**

C. NOT (NOT 0x5478 AND (NOT 0xFEED)) ⇨ ¬(0101 0100 0111 1000) & ¬(1111 1110 1110 1101)

⇨ ¬(1010 1011 1000 0111 & 0000 0001 0001 0010)

¬(0000 0001 0000 0010) = (1111 1110 1111 1101)

⇨ **0xFEFD**

D. 0x8814 XOR 0x93FA ⇨ (1000 1000 0001 0100) XOR (1001 0011 1111 1010)

(0001 1011 1110 1110) = **0x1BEE**

E. 0x2871 NOR (NOT 0xCAFE) ⇨ (0010 1000 0111 0001) NOR ¬(1100 1010 1111 1110)

(0010 1000 0111 0001) NOR (0011 0101 0000 0001)

(1100 0010 1000 1110) ⇨ **0xC28E**