CSC230 Assignment 1

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Question 1

a) 65536

b) 1010110110011100

c) AD9C

d) 256 (-128...127)

e) 4294967296 (-2147483648...2147483647)

Question 2

ai) 100

50	rem. = 0
25	rem. = 0
12	rem. = 1
6	rem. = 0
3	rem. = 0
1	rem. = 1
0	rem. = 1

$(100)_{10} = (1100100)_2$

aii) 256

128	rem. = 0
64	rem. = 0
32	rem. = 0
16	rem. = 0
8	rem. = 0
4	rem. = 0
2	rem. = 0
1	rem. = 0
0	rem. = 1

$(256)_{10} = (100000000)_2$

bi) 16536

1033	rem. = 8
64	rem. = 9
4	rem. = 0
0	rem. = 4

$(16536)_{10} = (4098)_{16}$

bii) 65536

4096	rem. = 0
256	rem. = 0
16	rem. = 0
1	rem. = 0
0	rem. = 1

$(65536)_{10} = (10000)_{16}$

c) 0x4C32CB
The highlighted position has a position value of 4096.
If translated to binary, 24 bits are need to represent this numeral.

d) Assuming a 16 bit system:

$(1250)_{10} = 0000\ 0100\ 1110\ 0010$

$(325)_{10} = 0000\ 0001\ 0100\ 0101$
$(-325)_{10} = 1111\ 1110\ 1011\ 1011$ (two's complement)

e) $(377)_8 = (011\ 111\ 111)_2 = (FF)_{16}$
$(1037)_8 = (001\ 000\ 011\ 111)_2 = (21F)_{16}$

Question 3

a) $(9A2)_{16} = (16*((9*16)+A))+2 = (2466)_{10}$

$(1000)_{16} = (16*((16*((1*16)+0))+0))+0 = (4096)_{10}$

b)
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0b10111010
0b01001001   AND
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0b00001000
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c)
```
0b10111010
0b01001001   OR
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0b11111011

d) 0b10111010
0b01001001 XOR

0b11110011

e) 0xA9BC = 0b 1010 1001 1011 1100
NOT(0b1010100110111100) = 0b0101011001000011 = 0x5643

Question 4

a) [--byte--]
11110000 OR
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b) [--byte--]
11110000 AND
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c) 0x18 = 0b00011000
0b00110000 = 0x30 (left shfted)

d) 0b01100000 = 0x60 (left shifted again)

e) Assuming no "1"s are discarded, shifting a value to the left doubles its value; shifting it to the right halves it.
Note: if a "1" is discarded, the corresponding discarded value is subtracted from the result. For left-shifts, it is the most significant binary positional value; for right shifts it is the value 1.