Prof: Ali Karime

ITI 1100-B **Winter 2014**

Solution for Assignment 1

P 1.4 (10 points)

the sixteen bit number that is the largest is 1111 1111 1111 1111, and the largest number in decimal is $2^{16}-1 = (65535)_{10}$.

In hexadecimal the number is $(FFFF)_{16}$

P 1.8

a) $(431)_{10} \rightarrow (\ \ )_2$.

431 | 2
430 | 215
(1) 214 | 107
(1) 106 | 53
(1) 52 | 26
(1) 26 | 13
(0) 12 | 6
(1) 6 | 3
(0) 2 | 1
(1) 0 | 0
(1)

$(431)_{10} \rightarrow (110101111)_2$ (10 points)

b) $(431)_{10} \rightarrow (\ \ )_{16}$

431 | 16
416 | 26
(15) 16 | 1
(10) 0 | 0
(1)

$(431)_{10} \rightarrow (1AF)_{16}$ (10 points)

$(1 \quad A \quad F)_{16}$

$(0001 \ 1010 \ 1111)_2$

of course method b is faster.

Prof: Ali Karime

P 1.10

a) $(\underbrace{0001}.\underbrace{1001}0)_2$

$(1 \; . \; 9)_{16}$

and

$(1.10010)_2 = 1 + 2^{-1} + 2^{-4} = (1.5625)$

(5 points)

So) $(1.10010)_2 \to (1.9)_{16}$

$(1.10010)_2 \to (1.5625)_{10}$ (5 points)

b) $(110.010)_2 \longrightarrow (6.4)_{16}$ and $(110.010)_2 = (6.25)_{10}$

the reason why the answer in (b) is 4 times the answer in (a) is because 110.010 is the same as 1.10010 except that it is shifted by two places.

P 1.11

```
111011 | 101
101    |------
-----  | 1011.11
01001
  101
------
001001
   101
-------
0001000 0
    1 01
--------
   00110
     101
   -----
     001  we can stop here.
```

$\boxed{111011 \div 101 = 1011.11}$

(10 points)

Prof: Ali Karime

P 1.14

a) 1's {00010000} = 11101111 (5 points)

2's {00010000} = 11110000

b) 1's {0000 0000} = 1111 1111 (5 points)

2's {0000 0000} = 00000000

c) 1's {11011010} = 00100101 (5 points)

2's {11011010} = 00100110

P 1.18

c) 1001 − 110101 = 1001 + 2's {110101} = 1001 + 001011

$$\begin{array}{r} 001001 \\ 001011 \\ \hline 010100 \end{array}$$

no end carry, therefore the answer is −2's(010100) = −101100 (5 points)

d) 101000 − 10101 = 101000 − 010101 = 101000 + 2's (010101)

= 101000 + 101011 = $\underline{\underline{010011}}$ (5 points)

P 1.23

$$\begin{array}{r} 791 \\ +\ 658 \\ \hline 1449 \end{array}$$

$$\begin{array}{ccc} 0111 & 1001 & 0001 \\ 0110 & 0101 & 1000 \\ \hline 1110 & 1110 & 1001 \\ +\ 0110 & +\ 0110 & \\ \hline 1\ 0100 & 0100 & \end{array}$$

(10 points)

the answer is $(1\ 0100\ 0100\ 1001)_{BCD}$

Prof: Ali Karime

P 1.24

6	4	2	1		decimal Equivalent
0	0	0	0	⟶	0
0	0	0	1	⟶	1
0	0	1	0	⟶	2
0	0	1	1	⟶	3
0	1	0	0	⟶	4
0	1	0	1	⟶	5
0	1	1	0	⟶	6 or
0	1	1	1	⟶	7 or
1	0	0	0	⟶	6
1	0	0	1	⟶	7
1	0	1	0	⟶	8
1	0	1	1	⟶	9
1	1	0	0	don't care	
1	1	0	1	don't care	
1	1	1	0	don't care	
1	1	1	1	don't care.	

(15 points)