CS238 - FALL 2010

Homework1- Key

) MSB:- The bit on the left is called MSB (most significant bit)

) decimal representation for unsigned binary intigers.

a) $00110101_B = 53_D$

$1\times2^5+1\times2^4+1\times2^2+1\times2^0 = 32+16+4+1 = 53_D$

(b) $10010110_B = 150_D$

$1\times2^7+2^4+2^2+2^1 = 128+16+4+2 = 150_D$

(c) $11001100_B = 204_D$

$1\times2^7+1\times2^6+1\times2^3+1\times2^2 = 128+64+8+4 = 204_D$

3) addition for binary intigers.

a) $10101111_b + 11011011_b = \boxed{1}10001010_b$ carry

```
        10101111
        11011011
-> carry 1]10001010
```

b) $10010111_b + 11111111_b = \boxed{1}10010110$ carry

```
        10010111
        11111111
carry <- [1]10010110
```

(c) $01110101 + 10101100 = \boxed{1}00100001$ carry

```
   01110101
   10101100
[1]00100001
carry
```

8) word → 16 bits

doubleword → 32bits

quaword → 64bits

) a) 12bits (b) 16bits (c) 22 bits.

) a) $\underline{0011}\,\underline{0101}\,\underline{1101}\,\underline{1010}_b = 35DA_H$

3 5 d A

b) $\underline{1100}\ \underline{1110}\ \underline{1010}\ \underline{0011} = CEA3_H$

C E A

c) $\underline{1111}\ \underline{1110}\ \underline{1101}\ \underline{1011} = FEDB_H$

F E D B

a) Hexadecimal to decimal.

) ~~62H~~ $62_H = 2+96 = 98_D$

) $1C9_H = 9+12\times16+256\times1 = 457_D$.

18) convert signed decimal to Hexadecimal.

a) $-32 = |-32| = 32 = 00100000_B$

1's complement 11011111

add 1. 1

11100000

E 0

$\boxed{-32_D = E0_H}$

(b) $|-62| = 62 = 00111110_B$

1's comple 11000001

add 1 1

11000010

C 2

$\boxed{-62 = C2_H.}$

b) a) $7F9B_H = 32667_D$.

8230_H

1000 0010 0011 0000_B to find 2's complement

0111 1101 1100 1111

1

0111 1101 11010000

$= 2^{14} + 2^{13} + 2^{12} + 2^{11} + 2^{10} + 2^{8} + 2^{7} + 2^{6} + 2^{4} = -32208_D$

$8230_H = -32208_D$.

2) binary to decimal.

a) $10000000_b = -128_D$

$$\begin{array}{r} 01111111 \\ 1 \\ \hline 10000000 \end{array}$$

) $11001100_b = -52_D$

$$\begin{array}{r} 00110011 \\ 1 \\ \hline 00110100 \end{array}$$

$00110100 = -52_D$

) $10110111_b = -73_D$

$$\begin{array}{r} 01001000 \\ 1 \\ \hline 01001001_b \end{array}$$

$01001001_b = -73_D$.

3)a) $-5_D = 00000101$ to find 2's complement which is

$$\begin{array}{r} 11111010 \\ 1 \\ \hline 11111011 \end{array}$$

$-5_D = 11111011_b$

) $-36_D \Rightarrow 00100100$ to calculate 2's complement

$$\begin{array}{r} 11011011 \\ 1 \\ \hline 11011100_b \end{array}$$

$-36_D = 11011100_b$.

) $-16_D \Rightarrow 00010000$ to calculate 2's complement.

$$\begin{array}{r} 11101111 \\ 1 \\ \hline 11110000_b \end{array}$$

$-16_D = 11110000_b$.

15) $88_D \rightarrow X$ ASCII

$58_H \rightarrow X$ ASCII.

section 1.4.2

A	B	A ∨ B	¬(A ∨ B)
0	0	0	1
0	1	1	0
1	0	1	0
1	1	1	0

A	B	¬A	¬B	(¬A ∧ ¬B)
0	0	1	1	1
0	1	1	0	0
1	0	0	1	0
1	1	0	1	0

) 16.