ECE3210 Microprocessor Engineering

Homework 1

1. Convert the following decimal numbers to unsigned binary

(a) 63_{10} 00111111

(c) 0.625_{10} 0.101_2

2. Convert the following unsigned binary number into decimal

(a) 111001.0011 57.1875

(b) 111.0001 7.0625

3. Convert the following binary number to two's complement form

(a) 1000 0001 0111 1111

(b) 1010 1100 0101 0100

4. Convert the following into ASCII coded

(a) October 21, 1976

HEX:4F 63 74 6F62 65 72 20 32 31 2C 20 31 39 37 36

(b) "America" CR HEX:22 41 6D 65 72 69 63 61 22 (20 for space) 0D, DEC:34 65 109 101 114 105 99 97 34 (32 for space) 13

Note: CR is carriage return

5. Convert the following decimal number into single-precision floating point number

100.625

100.625 = 1100100.101 =1.100100101 x 2^6

Sign	Exponent	Significant
0	10000101	10010010100000000000000

6. Convert the following single-precision floating point numbers into decimal number

1 10000010 10010000000000000000000

Sign 1 (-)

Exponent 10000010 (127+3)

-1.1001×2^3 ->$(-12.5)_{10}$

7. Find the byte-length 2's complement representation of each of the following decimal numbers

(a) 23 17

(b) -55 -> C9

55_{10} -> $0011\ 0111_2$

-55_{10} -> $1100\ 1001_2$ -> $C9_{16}$

8. Each of the 16-bit words is a 2's complement number. Find the decimal integer that corresponds to each.

(a) 00A3 163
(b) FFFE -2

9. Use BCD to encode the following decimal number in 2 bytes. Express in binary and in hexadecimal format respectively.

230

Binary 0000 0010 0011 0000

Hex 0230

10. In a PC using an Intel 80x86 microprocessor, the number of

(a) bits in a byte is __8__

(b) bits in a hex digit is __4__

(c) bits in a doubleword is __32__

(d) bits in a single precision floating point number is __32__

(e) bytes in a word is __2__

(f) bytes in a quadword is __8__

(g) hex digits in a byte is __2__

(h) hex digits in a doubleword is __8__