Assignment 1

[1] Convert the following binary numbers into their decimal format:

(a) 111000.0110 =56.375
(b) 11111100 =252
(c) 111000111100 =3644
(d) 0.10101011 =0.66796875
(e) 11001111.001=207.125
(f) 110011.110011 =51.796845

[2] Convert the following decimal numbers into their binary equivalent:

(a) 12 =1100
(b) 64 =1000000
(c) 8812 =10001001101100
(d) 46.32=101110.010100011110101111000000
(e) 29.1875 =11101.0011
(f) 196.58 =11000100.1001010001111010111

[3] Convert the following hexadecimal numbers into their decimal equivalent:

(a) AB =171
(b) 1970 =6512
(c) 3F.AD =63.67578125
(d) C2.4 =194.2

[4] Convert the following decimal numbers into their hexadecimal format:

(a) 10 =A
(b) 110 =6E
(c) 360.5 =168.8
(d) 33.71875 =21.B8

[5] Convert the following octal numbers into their decimal equivalent:

(a) 421 =273
(b) 654 =428
(c) 31.62 =25.78125
(d) 102.11 =66.140625

[6] Convert the following decimal numbers into their octal format:

(a) 45 =55
(b) 241=361
(c) 123.25 =371.2
(d) 23.1258 =27.100321

[7] Convert the following octal numbers into their binary equivalent:

(a) 246 =10100110
(b) 540 =101100000
(c) 541.254 =101100001.0101011
(d) 1025.55 =1000010101.101101

[8] Convert the following binary numbers into their octal format:

(a) 1010101010 =1252
(b) 1111011 =173
(c) 11010101.11 =325.6
(d) 11001000.0110 =310.3

[9] Convert the following hexadecimal numbers into their binary equivalent:

(a) F47C =1111010001111100
(b) 12B0 =1001010110000
(c) A08.E4 =101000001000.111001
(d) D15.4C =110100010101.010011

[10] Convert the following binary numbers into their hexadecimal format:

(a) 111010100 =1D4
(b) 10110101111 =5AF
(c) 11010101.001=D5.2
(d) 11001111.011110 =CF.78

[11] Find the 2's complement representation in 8 bits for the following decimal numbers:

(a) 12 =00001100

(b) - 45 =00101101 , 1's -45=11010010 , 2's -45=1101001

(c) 60 =00111100

(d) - 120 =01111000, 1's -120=10000111 , 2's -120= 10001000

[12] Find the decimal equivalent of the following signed binary numbers (2's complement form):

(a) 0101 0101=85

(b) 1111 1111=2's=11111111, 1's =11111110

(c) 1000 0001=

(d) 1010 1010=

[13] Perform subtraction on the given unsigned binary numbers using the 2's complement of the subtrahend. Where the result should be negative, find its 2's complement and affix a minus sign.

(a) 10011 - 10010 =11011 + 00111 = 00010=2 =(27 –25 = 2)

(b) 100010 - 100110 =110100 + 101011 = 011111=31 = (52 –21 = 31)

(c) 1001 – 110101 =1011 + 010000= 011011=37 =(11 –48= –37)

(d) 101000 - 10101 =101010 + 010101= 111111 = - 000001 (42 –43=-1)

[14] Convert decimal +49 and +29 to binary, using the signed-2's-complement representation and enough digits to accommodate the numbers. Then perform the binary equivalent of (+29) + (-49), (-29) + (+49), and (-29) + (-49). Convert the answers back to decimal and verify that they are correct.

[15] A = 5D and B = CA that are 8 bit numbers in 2's complement system. Perform each of the indicated operations and determine the value of X in HEX and in Decimal. For each case indicate if an overflow occurs or not:

(a) X = - A

(b) X = A + B

(c) X = A - B

14)

46+29=75 in signed 2's 01001011

46 in 2'= 00101110 => -46 : 11010010

29 in 2's = 00011101 => -29 : 11100011

29+(-46) =-17

00011101

11010010

11101111 = -(100010001) -17

-29+46=17

11100011

00101110

110110101 = 17

-29+(-46)=-75

11100011

11010010

110110101 = -(01001011) = -75

15)

A = $(5D)_{16}$= $(0101\ 1101)_2$

B = $(CA)_{16}$=$(1100\ 1010)_2$

2's =$(00110110)_2$=$(36)_{16}$

= B = $(-36)_{16}$

a. X= -A=2's of A =$(10100011)_2$=$(A3)_{16}$= $(163)_{10}$

b. X = A + B = $(5D)_{16}$+ $(CA)_{16}$= $(1\ 27)_{16}$= $(27)_{16}$ = $(39)_{10}$

c. X = A –B = A + (-B) = $(5D)_{16}$+ $(36)_{16}$= $(93)_{16}$= $(147)_{10}$