Project 1

COMP-3350

1.A) 0110 = 6, 0001 = 1, 1111 = F; **$(61F)_{16}$**

1.B) 1000 = 8, 1111 = F, 1100 = C; **$(8FC)_{16}$**

1.C) 0001 = 1, 0110 = 6, 0100 = 4, 0101 = 5; **$(1645)_{16}$**

2.1.A) 1100 1010 = negative 64 + 8 + 2; **$(-74)_{d}$**

2.1.B) 1111 0010 = negative 64 + 32 + 16 + 2; **$(-114)_{d}$**

2.1.C) 1000 0111 = negative 4 + 2 + 1; **$(-7)_{d}$**

2.2.A) 1100 1010 = negative 32 + 16 + 4 + 1; **$(-53)_{d}$**

2.2.B) 1111 0010 = negative 8 + 4 + 1; **$(-13)_{d}$**

2.2.C) 1000 0111 = negative 64 + 32 + 16 + 8; **$(-120)_{d}$**

2.3.A) 1100 1010 = (negative 32 + 16 + 4 + 1) - 1; **$(-54)_{d}$**

2.3.B) 1111 0010 = (negative 8 + 4 + 1) – 1; **$(-14)_{d}$**

2.3.C) 1000 0111 = (negative 64 + 32 + 16 + 8) – 1; **$(-121)_{d}$**

3.1.A) **$(1110\ 0100)_{2\ SM}$** = negative 64 + 32 + 4 = -100

3.1.B) **$(1001\ 0000)_{2\ SM}$** = negative 16 = -16

3.1.C) **$(1001\ 0101)_{2\ SM}$** = negative 16 + 4 + 1 = -21

3.1.D) **$(1000\ 0000)_{2\ SM}$** = negative 0 = -0 could also be 0000 0000 because -0 = 0

3.2.A) **$(1001\ 1011)_{2\ ones}$** ; using one's complement method of flipping all digits of the signed magnitude representation except leading signed bit

3.2.B) **$(1110\ 1111)_{2\ ones}$** ; using one's complement method of flipping all digits of the signed magnitude representation except leading signed bit

3.2.C) **$(1110\ 1010)_{2\ ones}$** ; using one's complement method of flipping all digits of the signed magnitude representation except leading signed bit

3.2.D) **$(1111\ 1111)_{2\ ones}$** ; (or 0000 0000) using one's complement method of flipping all digits of the signed magnitude representation except leading signed bit

3.3.A) **$(1001\ 1100)_{2\ twos}$** ; using two's complement method of flipping all digits of the signed magnitude representation except leading signed bit then adding +1

3.3.B) **$(1111\ 0000)_{2\ twos}$** ; using two's complement method of flipping all digits of the signed magnitude representation except leading signed bit then adding +1

3.3.C) **$(1110\ 1011)_{2\ twos}$** ; using two's complement method of flipping all digits of the signed magnitude representation except leading signed bit then adding +1

3.3.D) **$(0000\ 0000)_{2\ twos}$** ; using two's complement method of flipping all digits of the signed magnitude representation except leading signed bit then adding +1

4.A) **(Range is 0 ≤ number ≤ 127)** because unsigned means no negative possible.

4.B) **(Range is -64 ≤ number ≤ 63)** it can get as low as -64 with two's complement but -63 with one's complement or signed magnitude form

5.1) **$(1000)_2$** = 1000 ^ 1100 because 0^0 = 0, 0^1 = 0, 1^1 = 1

5.2) **$(1110)_2$** = 1000 v 1110 because 0v0 = 0, 0v1 = 1, 1v1 = 1

5.3) **$(1000)_2$** because (1000^1110) = 1000 and (1001^1110) = 1000 and (1000 v 1000) = 1000

6) 25 -65. I will be using two's complement to add them. 25 as two's complement is 0001 1001 and 65 as two's complement is 0100 0001. Then convert 65 to -65 and -65 as two's complement is 1011 1111. Then I perform the operation of 0001 10001 + 1011 1111. All the carry overs' are discarded and you are resulted in **$(1101\ 1000)_{2\ two's}$**

7) 1101 1000 = negative 32 + 4 + 2 + 1 = -40 in decimal form. So, **$(1101\ 1000)_{2\ two's} = (-40)_d$**