765 4 3210
1110 0100

Project 1

1: A. 0110 0001 1111
= 6 1 F = 61F

B. 1000 1111 1100
8 F C = 8FC

C. 0001 0110 0100 0101
1 6 4 5 = 1645

2.1: A. 1100 1010 $= -[2^6+0+0+2^3+0+2+0] = 64+8+2$
$= (-74)_d$

B. 1111 0010 $= -[2^6+2^5+2^4+0+0+2^1+0] = 64+32+16+2$
$= (-114)_d$

C. 1000 0111 $= -[0+0+0+0+2^2+2+1] = 4+2+1$
$= (-7)_d$

2.2: A. 1100 1010 → 1's complement => 0011 0101
$= -[2^5+2^4+2^2+1] \Rightarrow (-53)_d$

*Negative because original LMB is 1

B. 1111 0010 → 0000 1101
$= -[2^3+2^2+1] \Rightarrow (-13)_d$

C. 1000 0111 → 0111 1000
$= -[2^6+2^5+2^4+2^3] \Rightarrow (-120)_d$

2.3: A. 1100 1010 → 2's complement => 0011 0110
$= -[2^5+2^4+2^2+2] \Rightarrow (-54)_d$

B. 1111 0010 → 0000 1110
$= -[2^3+2^2+2] \Rightarrow (-14)_d$

C. 1000 0111 → 0111 1001
$= -[2^6+2^5+2^4+2^3+1] \Rightarrow (-121)_d$

-100		-16		-21		-0
2 | 100		2 | 16		2 | 21		
2 | 50	0	2 | 8	0	2 | 10	1	0
2 | 25	0	2 | 4	0	2 | 5	0	0
2 | 12	1	2 | 2	0	2 | 2	1	0
2 | 6	0	2 | 1	0	2 | 1	0	0
2 | 3	0		1		1	0
2 | 1	1					0
	1					0
						0

3. A. $(-100)_d$ = 1110 0100
1's => 1001 1011
2's => 1001 1100
B. $(-16)_d$ = 10010000
1's => 1110 1111
2's => 1 1 110000
C. $(-21)_d$ = 1 001 0101
1's = 1110 1010
2's = 1110 1011
D. $(-0)_d$ = 1000 0000
1's = 1111 1111
2's = 1000 0000

4. A. = 0 to $2^7 - 1$
= 0 to 127
B. = -2^{7-1} to $2^{7-1} - 1$
= -64 to 63

5. A. 1000 AND 1110
= 1000
B. 1000 OR 1110
= 1110
C. (1000 AND 1110) OR (1001 AND 1110)
This means 1000 OR 1001
= 1000

64 + 8 + 8

6. First convert to binary:

$(25)_d$ = 00011001

$(65)_d$ = 01000001 , To make negative => one's complement then two's complement = 10111111

then we add in binary:

```
  00011001
+ 10111111
= 11011000
```

=> to one's complement then two's:

= 1's: 00100111 => 00101000

00101000 = $(40)_d$

= $(-40)_d$

7.

$(+40)_d$ = 00101000

1's complement => 11010111

2's complement => 11011000

```
2 | 40
2 | 20   0
2 | 10   0
2 | 5    0
2 | 2    1
2 | 1    0
         1
```

Right to left