6124515196 - Krishna Warfade - D11

Assignment 2

1.] Binary Addition

(a) $1011_2 + 1101_2 = 11000_2$

```
  1011
+ 1101
------
 11000
```

(b) $100101_2 + 110011_2 = 1011000_2$

```
  100101
+ 110011
--------
 1011000
```

(c) $11110_2 + 10101_2 = 110011_2$

```
  11110
+ 10101
-------
 110011
```

(d) $110111_2 + 101101_2 = 1100100_2$

```
  110111
+ 101101
--------
 1100100
```

(e) $1000111_2 + 1110001_2 = 10111000_2$

```
  1000111
+ 1110001
---------
 10111000
```

2.] Convert 25_{10} & 17_{10} to binary & add:

→ $25_{10} = (11001)_2$

	25
1	12
0	6
0	3
1	1
	0

$17_{10} = (10001)_2$

	17
1	8
0	4
0	2
0	1
1	0

$$11001_2 + 10001_2 = (101010)_2$$

[3.] $(11101)_2 + (11010)_2$

~~3.] $110110_2 + (11010)_2$~~

~~10110~~

$$\begin{array}{r} 11101 \\ +\ 11010 \\ \hline (110111)_2 \end{array}$$

$2^0 \times 1 + 1 \times 2 + 1 \times 2^2 + 0 \times 2^3 + 1 \times 2^4 + 1 \times 2^5$

$= 1 + 2 + 4 + 1 + 16 + 32$

$(110111)_2 = (56)_{10}$

4.] $110110_2 + 10101_2$

$$\begin{array}{r} 110110 \\ +\ 10101 \\ \hline 1001011_2 \end{array}$$

$= 1 + 2 + 8 + 64$

$= (75)_{10}$

5.]

a. $11011_2 - 1010_2$

$$\begin{array}{r} 11011 \\ -\ 1010 \\ \hline (10001)_2 \end{array}$$

b. $100101_2 - 11011_2$

$$\begin{array}{r} 100101 \\ -\ 11011 \\ \hline (001010)_2 \end{array}$$

c. $11110_2 - 10101_2$

two's Complement of 10101

01011

$$\begin{array}{r} 11110 \\ +\ 01011 \\ \hline (101001) \end{array}$$

Carry ⊗ → ignore

d. $10101_2 - 1101_2$

1's Complement of 1101 = 0010.

$$\begin{array}{r} 10101 \\ +\ 00101 \\ \hline 10111 \\ \hline \xrightarrow{1^s} \boxed{01000} \end{array}$$

e. $1001001_2 - 110111_2$

$$\begin{array}{r} 1001001 \\ -\ 110111 \\ \hline 0010010 \end{array}$$

6.] $50_{10} - 27_{10} = 110010_2 - 11011$

	2		2
	50		27
0	25	1	13
1	12	1	6
0	6	0	3
0	3	1	1
1	1	1	0
1	0		

2's Comp. of $011011 = 100101$

$$\begin{array}{r} 110010 \\ +\ 100101 \\ \hline \cancel{1}\,010111_2 \end{array}$$

7.] $111001_2 \longrightarrow (57)_{10}$

$-011011_2 \quad -(27)_{10}$

$011110 \quad (30)_{10}$

8.] $1011101_2 - 100101_2$

1011101_2

$-\ 0100101_2$

0111000_2

q.] $10010_2 - 10100_2$

2's of 10100 is 01011

$$\begin{array}{r} 01011 \\ +1 \\ \hline 01100 \end{array}$$

$$\begin{array}{r} 10010 \\ +\ 01100 \\ \hline \text{carry:0}\ 11110 \end{array}$$

→ ans. is -ve & in 2's.

$$\begin{array}{r} 00001 \\ 11011 \\ +1 \\ \hline -(00010)_2 \end{array}$$