Solutions - Quiz 2

(October 12th @ 5:30 pm)

PROBLEM 1 (40 PTS)

- Complete the following table:

REPRESENTATION			
Decimal	**Sign-and-magnitude**	**1's complement**	**2's complement**
0	00	1111	0
8	01000	01000	01000
23	010111	010111	010111
-10	11010	10101	10110

- Convert the following decimal number to its 2's complement representation: -10.25 (5 pts)
  $10.25 = 01010.01_2 \rightarrow -10.25 = 10101.11_2$

PROBLEM 2 (20 PTS)

- Perform the following operation in the 2's complement system, i.e., provide the summands and the result in 2's complement representation (indicate all the carries). Use the minimum number of bits to represent both the summands and the result so that the overflow bit is 0.
  ✓ -17 + 10

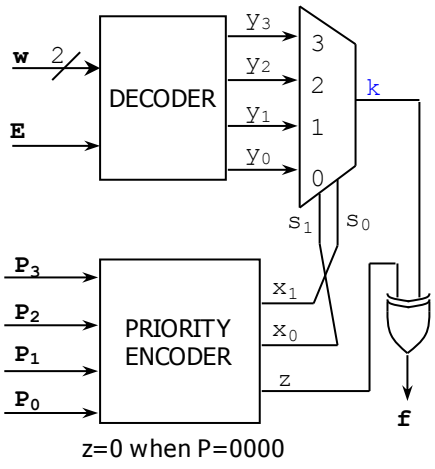
n = 6 bits
$c_6 \oplus c_5 = 0$
No Overflow

	$c_6=0$	$c_5=0$	$c_4=1$	$c_3=1$	$c_2=1$	$c_1=0$	$c_0=0$	
-17 =	1	0	1	1	1	1		+
+10 =	0	0	1	0	1	0		
-7 =	1	1	1	0	0	1		

$-17 + 10 = -7 \in [-2^5, 2^5-1] \rightarrow$ no overflow

PROBLEM 3 (40 PTS)

- Complete the timing diagram of the circuit shown below: $y = y_3 y_2 y_1 y_0$, $x = x_1 x_0$



z=0 when P=0000