Solutions - Quiz 2

(February 10th @ 5:30 pm)

PROBLEM 1 (30 PTS)

- Complete the following table. Use the fewest number of bits in each case:

REPRESENTATION			
Decimal	**Sign-and-magnitude**	**1's complement**	**2's complement**
-30	111110	100001	100010
-16	110000	101111	10000
-17	110001	101110	101111
-9	11001	10110	10111

- Convert the following decimal number to its 2's complement representation: -30.375

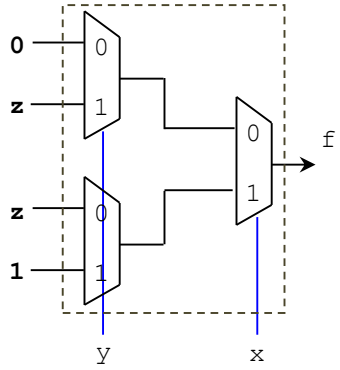
  $30.375 = 011110.011_2 \rightarrow -30.375 = 100001.101_2$

PROBLEM 2 (30 PTS)

- Implement the following function using ONLY 2-to-1 MUXs:

$$f(x,y,z) = xy + yz + xz$$

$f(x,y,z) = \bar{x}f(0,y,z) + xf(1,y,z) = \bar{x}(yz) + x(y + yz + z) = \bar{x}g(y,z) + xh(y,z)$
$g(y,z) = \bar{y}g(0,z) + yg(1,z) = \bar{y}(0) + y(z)$
$h(y,z) = \bar{y}h(0,z) + yh(1,z) = \bar{y}(z) + y(1)$



PROBLEM 3 (40 PTS)

- Complete the timing diagram of the circuit shown below: