Computer Mathematics

Week 4 Examples

1. For each of the given binary representations, convert the decimal values into their bit patterns. Assume **4-bit** binary numbers.

	bit pattern (4-digit binary)				
value	*unsigned*	*sign-magnitude*	*biased ($k = 8$)*	*1's complement*	*2's complement*
6					
-6					

2. Perform the following binary calculations using a **4-bit, 2's complement, signed** representation. For each addition, indicate whether or not a signed overflow occurs.

$0101 + 0010 = \_\_\_\_\_{}_2$ Overflow (Y/N) ?____

$0100 + 0100 = \_\_\_\_\_{}_2$ Overflow (Y/N) ?____

$0000 + 1000 = \_\_\_\_\_{}_2$ Overflow (Y/N) ?____

$1111 - 0001 = \_\_\_\_\_{}_2$ Overflow (Y/N) ?____

$0111 - 1111 = \_\_\_\_\_{}_2$ Overflow (Y/N) ?____

$0000 - 1000 = \_\_\_\_\_{}_2$ Overflow (Y/N) ?____

3. Widen the following 2's complement binary numbers from **4 bits** to **8 bits**.

4-bit	*8-bit*	*4-bit*	*8-bit*
0111	_____	1000	_____

4. For each of the given binary representations, convert the bit patterns into their decimal values.

	numeric value (decimal)				
pattern	*unsigned*	*sign-magnitude*	*biased ($k = 8$)*	*1's complement*	*2's complement*
0000					
0001					
0111					
1000					
1001					
1111					