Team #:____ Name:________________________
Absent:

1. Assuming 4-bit BINARY numbers, perform the following additions:

a)for unsigned numbers: 0100_2 (4_{10}) 1001_2 (9_{10})
+ $\underline{0110_2}$ (6_{10}) + $\underline{1010_2}$ (10_{10})

b) for signed numbers: 0100_2 (4_{10}) 0100_2 (4_{10}) 1100_2 (-4_{10})
(two's compliment) + $\underline{0110_2}$ (6_{10}) + $\underline{1010_2}$ (-6_{10}) + $\underline{1010_2}$ (-6_{10})

2. For **4-bit unsigned numbers**, when do we have overflow and get the wrong result during addition? (Hint: think about the carry bits into and/or out of the most-significant bit)

3. a) For **4-bit signed numbers**, complete the following table about signed overflow:

Sign of Operands for addition		**Expected Sign of Result**	**Wrong Sign of Result (indicates overflow)**
Operand 1	**Operand 2**		
+	+		
+	-	These two rows cannot cause signed overflow in addition	
-	+		
-	-		

b) For **4-bit signed numbers**, when do we have overflow and get the wrong result during addition? (Hint: think about the carry bits into and/or out of the most-significant bit)

4. How would you subtract two signed, 2's-complement numbers? Try the following:

0110_2 (6_{10}) 0011_2 ($+3_{10}$) 1111_2 (-1_{10})
- $\underline{0111_2}$ (7_{10}) - $\underline{1111_2}$ (-1_{10}) - $\underline{0011_2}$ ($+3_{10}$)

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5. Use Booth's algorithm to calculate the 8-bit product of 0110_2 x 1101_2.

Multiplicand	"Initial Product"	"Multiplier"	"Previous bit"
0 1 1 0	0 0 0 0	1 1 0 1	0

– Multiplicand

1 0 1 0