

Name:

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COE 301/ICS 233, Term 161

Computer Architecture & Assembly Language

Quiz# 2 Solution

Date: Tuesday, Nov. 8, 2016

Q1. Given that **Multiplicand=1010** and **Multiplier=1011**, using **signed multiplication** hardware, show the **signed** multiplication of **Multiplicand** by **Multiplier**. The result of the multiplication should be an 8 bit **signed** number in HI and LO registers. Show the steps of your work.

Iteration	Multiplicand	Sign	Product = HI,LO
0	Initialize (LO = Multiplier)		0000 101 1
1	LO[0] = 1 => ADD	1	1010 1011
	Shift Product = (HI, LO) right 1 bit		1101 010 1
2	LO[0] = 1 => ADD	1	0111 0101
	Shift Product = (HI, LO) right 1 bit		1011 101 0
3	LO[0] = 0 => Do nothing	1	1011 1010
	Shift Product = (HI, LO) right 1 bit		1101 110 1
4	LO[0] = 1 => SUB	0	0011 1101
	Shift Product = (HI, LO) right 1 bit		0001 1110

Q2. Given that **Dividend=1011** and **Divisor=0010**, Using the **unsigned division** hardware, show the **unsigned** division of **Dividend** by **Divisor**. The result of division should be stored in the Remainder and Quotient registers. Show the steps of your work.

Iteration	Remainder (HI)	Quotient (LO)	Divisor	Difference
0	Initialize	1011	0010	
1	1: SLL, Difference	0110	0010	1111
	2: Diff < 0 => Do Nothing	0110	0010	
2	1: SLL, Difference	1100	0010	0000
	2: Rem = Diff, set lsb Quotient	110 1	0010	
3	1: SLL, Difference	1010	0010	1111
	2: Diff < 0 => Do Nothing	1010	0010	
4	1: SLL, Difference	0100	0010	0001
	2: Rem = Diff, set lsb Quotient	0001	0101	0010