

ICS 233, Term 072

Computer Architecture & Assembly Language

Quiz# 5

Date: Monday, April 21, 2008

- Q.1.** Given that **Multiplicand=1110** and **Multiplier=1011**. Using the **refined 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 by filling the given table.

Iteration		Multiplicand	Sign	Product = HI,LO
0	Initialize (LO = Multiplier)	1110		0000 1011
1	LO[0] = 1 => ADD		1	1110 1011
	Shift Product = (HI, LO) right 1 bit	1110		1111 0101
2	LO[0] = 1 => ADD		1	1101 0101
	Shift Product = (HI, LO) right 1 bit	1110		1110 1010
3	LO[0] = 0 => Do Nothing		1	1110 1010
	Shift Product = (HI, LO) right 1 bit	1110		1111 0101
4	LO[0] = 1 => SUB (ADD 2's comp.)	0010	0	0001 0101
	Shift Product = (HI, LO) right 1 bit			0000 1010

- Q.2.** Given that **Dividend=1110** and **Divisor=0110**. Using the **refined 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 by filling the given table.

Iteration		Remainder	Quotient	Divisor	Difference
0	Initialize	0000	1110	0110	
1	1: SLL, Difference	0001	1100	0110	1011
	2: Diff < 0 => Do Nothing				
2	1: SLL, Difference	0011	1000	0110	1101
	2: Diff < 0 => Do Nothing				
3	1: SLL, Difference	0111	0000	0110	0001
	2: Rem = Diff, set lsb Quotient	0001	0001		
4	1: SLL, Difference	0010	0010	0110	1100
	2: Diff < 0 => Do Nothing				