CSCE 212: Quiz 3 **Fall 2009**

Name (please print):_____ **Total points: ___/30**

Instructions
This is a CLOSED BOOK and CLOSED NOTES quiz. However, you may use calculators, scratch paper, and the green MIPS reference card from your textbook. Ask the instructor if you have any questions. Good luck!

1. (20 points) Suppose you must write a sequence of instructions that scans an array of 3 integers to find its minimum value (which is stored in register $s2). You are considering the following two implementations.

Implementation #1	**Implementation #2**

`li $s0,0`
`li $s1,12`
`li $s2,1000`
`loop: beq $s0,$s1,exit`
`lw $t0,vals($s0)`
`blt $t0,$s2,gotone`
`j skip`
`gotone: or $s2,$0,$t0`
`skip: addi $s0,$s0,4`
`j loop`
`exit:`
	`li $s0,0`
	`li $s1,12`
	`li $s2,1000`
	`loop: lw $t0,vals($s0)`
	`bge $t0,$s2,skip`
	`or $s2,$0,$t0`
	`skip: addi $s0,$s0,4`
	`blt $s0,$s1,loop`

The number of cycles required for each instruction type are shown below:

Instruction type	Cycles
R-type and ADDI	2
Branch and Jump	5
Load and Store	9
Load Immediate	1

Assume the values stored in the vals array is [12,10,8]. Determine which implementation is faster and by how much.

2. (10 points) Suppose we choose implementation #2 and we need to boost its overall performance. Suppose we can tweak the processor's microarchitecture such that loads and stores now only require 4 cycles. What is the overall speedup of the code segment?