CS 341l Fall 2009 Homework 2 Key

10 points, due Wednesday, 16 September by 10am directly to me by email (jedcrandall@gmail.com).

You can "check your answers in the back of the book," so to speak, by sending me an email prior to the deadline with your answers and I'll tell you which ones are right so you can correct them before your final submission, so it should be easy to get a 10.

#1 (2 points) How many basic blocks are in this snippet of MIPS code:

```
     addi $s2, $s2, 50
     bne  $s2, $s1, ThatPlace
     sub  $t0, $t0, $t4
     addi $t4, $t4, -1
     j    Done
ThatPlace:
     sub  $t0, $t0, $t5
     addi $t5, $t5, -1
Done:
     addi $v0, $t0, 0
```

There are four basic blocks

#2 (2 points) How many basic blocks are in this snippet of MIPS code:

```
  li    $t6, 1
  li    $t7, 4
  sw    $t6, theArray($0)
  sw    $t6, theArray($t7)
  li    $t0, 8
loop:
  addi  $t3, $t0, -8
  addi  $t4, $t0, -4
  lw    $t1, theArray($t3)
  lw    $t2, theArray($t4)
  add   $t5, $t1, $t2
  sw    $t5, theArray($t0)
  addi  $t0, $t0, 4
  blt   $t0, 160, loop
  jr    $ra
```

There are three basic bocks

#3 (6 points, 0.5 points each) Label each of the following instructions as R-type, I-type, J-type, or pseudo-instruction (you should always label some as "pseudo-instruction"unless it can be encoded as a single 32-bit MIPS instruction, in which case you should choose R, I, or J based on how it would be encoded):

```
bne  $t1, $t2, SomePlace      (I)

bgt  $t1, $t2, SomePlace      (pseudoinstruction)

addi $t2, $t2, -1             (I)

add  $t2, $t2, $t4            (R)

jal  MyFunction               (J)

jr   $ra                      (R)

sll  $t5, $t5, 12             (R)

lw   $s1, 8($s0)              (I)

lw   $s1, 0($s0)              (I)

sw   $s1, 8($s0)              (I)

j    Someplace                (J)

slt  $t5, $t6, $s0            (R)
```