

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!

- (10 points) Compile the following Java code into MIPS assembly language. Assume a, b, and c are stored in memory as words.

```

c = 0;
for (i = a ; i < b ; i++) c = c + i;
    li $s0,0           # $s0=c
    lw $s1,a           # $s1=i=a
    lw $s2,b           # $s2=b
loop: bge $s1,$s2,exit # pre-test condition
      add $s0,$s0,$s1  # loop body
      addi $s1,$s1,1   # iterate
      j loop           # loop to start
exit: sw $s0,c        # update c in memory (need i too?)
    
```

- (5 points) Assemble the following assembly language instruction into a machine language instruction, using hexadecimal representation:

```
SLL $2, $3, 12
```

opcode	rs	rt	rd	shamt	func
0000 00	00 000	0 0011	0001 0	011 00	00 0000

**00031300**

- (5 points) Show how the following pseudoinstruction is translated into machine instructions.

```
beq $s0, 45, loop1
```

```

addi $1,$0,45
beq $s0,$1,loop1
    
```

- (10 points) Assume I want to load values from an array of **half words** named **vals**. Identify and explain any bugs in the code below.

```

loop:  LW $s0, vals($s1)
      ADDI $s1, $s1, 1
      BNEZ $s0, loop
    
```

**LH**      **2**