

Score: _____ Name: _____

ECE 3055 A Quiz 1 – Fall 2002

The following RISC assembly language program is executed on a MIPS processor. Fill in the register values that will be present, after execution of this program. A summary of MIPS instructions is included at the bottom of the page – for anyone unfamiliar with the MIPS instruction set. Prior to execution of the program, memory location 0x0400 contains 0x20303055. Note: 0x indicates hexadecimal and all answers must be in hexadecimal. A MIPS memory word or register contains 32-bits.

```

LW      $3, 0x0400
SLL     $4, $3, 4
ADD     $2, $3, $4
AND     $3, $4, $3
LUI     $5, 0x3055
ORI     $5, $5, 7
SUB     $6, $4, $3
BEQ     $3, $6, LABEL1
ADDI    $6, $0, -2
LABEL1: SW      $6, 0x0400
    
```

2 pts / blank

After execution of the MIPS code sequence above,

R2 = 0x 233335A5 (in hexadecimal)

R3 = 0x 00000050 (in hexadecimal)

R4 = 0x 03030550 (in hexadecimal)

R5 = 0x 30550007 (in hexadecimal)

- 1 if only 1 hex digit wrong

Memory Location 0x0400 contains: 0x FFFFFFFE (in hexadecimal)

The MIPS processor contains thirty-two 32-bit registers, \$0 through \$31. \$0 always contains a zero. By default, all arithmetic operations use two's complement arithmetic.

<u>MIPS Instruction</u>		<u>Meaning</u>
ADD	Rd, Rs, Rt	- Rd = Rs + Rt (R – register (\$))
AND	Rd, Rs, Rt	- Rd = Rs bitwise logical AND Rt (R – register (\$))
ORI	Rd, Rs, <i>Immed</i>	- Rd = Rs bitwise logical OR <i>Immediate</i> value
LUI	Rd, <i>Immed</i>	- Rd = <i>Immediate</i> value high 16-bits, 0's low 16-bits
BEQ	Rs, Rt, <i>address</i>	- Branch to <i>address</i> , only if Rs equal to Rt
LW	Rd, <i>address</i>	- LOAD - Rd gets contents of memory at <i>address</i>
SLL	Rd, Rs, <i>count</i>	- Shift left logical (<i>use 0 fill</i>) by <i>count</i> bits
SUB	Rd, Rs, Rt	- Rd = Rs - Rt
SW	Rd, <i>address</i>	- STORE - memory at <i>address</i> gets contents of Rd
XOR	Rd, Rs, Rt	- Rd = Rs bitwise logical XOR Rt