

Score: _____ Name: _____

ECE 3055 A Quiz 1 – Spring 2005

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 0x01000 contains 0x30552031. Note: 0x indicates hexadecimal and all answers must be in hexadecimal, default is decimal in the MIPS assembly language source file. A MIPS memory word or register contains 32-bits. Use XXXXXXXX for an undefined value.

```

                LW      S3, 0x01000
                SLL    S4, S3, 4
                AND    S3, S4, S3
                ADD    S2, S3, S4
                LUI    S5, 0x3055
                ORI    S5, S5, 37
                SUB    S6, S4, S3
                BNE   S3, S6, LABEL1
                ADDI   S6, S0, -2
LABEL1:        SW      S6, 0x01000
    
```

After execution of the MIPS code sequence above,

R2 = 0x 05A20320 (in hexadecimal)

R3 = 0x 00500010 (in hexadecimal)

2 pts. each

R4 = 0x 05520310 (in hexadecimal)

R5 = 0x 30550025 (in hexadecimal)

Memory Location 0x01000 contains: 0x 05020300 (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. Assume no branch delay slot is present.

<u>MIPS Instruction</u>	<u>Meaning</u>
ADD Rd, Rs, Rt	- Rd = Rs + Rt (R – register (S))
AND Rd, Rs, Rt	- Rd = Rs bitwise logical AND Rt (R – register (S))
ORI Rd, Rs, Immed	- Rd = Rs bitwise logical OR Immediate value
LUI Rd, Immed	- Rd = 16-bit Immediate value high 16-bits, 0's low 16-bits
BNE Rs, Rt, address	- Branch to address, only if Rs not equal to Rt
LW Rd, address	- LOAD - Rd gets contents of memory at address
SRL Rd, Rs, count	- Shift right logical (use 0 fill) by count bits
SUB Rd, Rs, Rt	- Rd = Rs - Rt
SW Rd, address	- STORE - memory at address gets contents of Rd
XOR Rd, Rs, Rt	- Rd = Rs bitwise logical XOR Rt