

# CSCI 2321 (Principles of Computer Design), Spring 2004

## Quiz 4 Solution

1. (10 points) Suppose that at the beginning of a clock cycle the following is true:

- The program counter (PC) has a value of 8.
- The instruction memory's location 8 contains the binary representation of the MIPS assembler instruction `slt $t0, $s0, $s1`, namely 0000 0010 0001 0001 0100 0000 0010 1010.
- Register `$s0` contains 2.
- Register `$s1` contains 1.

Using Figure 5.19 (p. 360), trace through what happens during the clock cycle. At the point at which values are written into state elements, what values will the following have? Give each in binary form with the appropriate number of bits.

- Input of program counter register (PC). **Solution:** 0000 ... 0000 1100 (32 bits)
- Inputs of register file:
  - Read register 1. **Solution:** 10000
  - Read register 2. **Solution:** 10001
  - Write register. **Solution:** 01000
  - Write data. **Solution:** 0000 ... 0000 (32 bits)
- Inputs and output of ALU:
  - Input 1: **Solution:** 0000 ... 0010 (32 bits)
  - Input 2: **Solution:** 0000 ... 0001 (32 bits)
  - Output (value, not Zero): **Solution:** 0000 ... 0000 (32 bits)
- `RegWrite` control signal: **Solution:** 1
- `ALUSrc` control signal: **Solution:** 0