CmpE213 – Digital Systems Design

Homework 3

The 8051 - internal and external hardware

1. Say you saw the following control lines become active at the following times:

   - Fetch
     - PSEN/ = 0
     - ir_we = 1
     - pcalu_op = INC_PC
     - pc_we = 1
   - Decode
     - PSEN/ = 0
     - aux_we = 1
     - pcalu_op = INC_PC
     - pc_we = 1
   - Execute
     - pcalcu_op = PC_ADD
     - pw_we = 1

   A) What instruction was executed? Can you narrow it down to just a single instruction based on what was shown? If you cannot, suggest a set of instructions. B) How do you know this instruction or one from this set of instructions was executed?

2. To use one of the ports as an input (e.g. P0.3 or P3.1, etc), you must write a 1 to it first. In a few sentences (and maybe a small sketch), explain why. (PS. I love to ask this question on tests).

3. Why is it possible that after the following code sequence:

   ```
   SETB P1.0
   MOV C,P1.0
   ```

   that C may contain a zero? (SETB P1.0 sets bit zero of port 1. MOV C,P1.0 moves the value at port 1,bit 0 into C, the carry flag). Explain your answer. If we had written a zero to P1.0 instead (CLR P1.0), could we ever read a one into C with the MOV C,P1.0 instruction?

4. Do the problems on the following page (NOTE: If you are reading this from the internet, you will need to get the following page from me).