EEE339/336 Problem Sheet 3 – NJP/PIR

Considering the block diagram of the CPU:

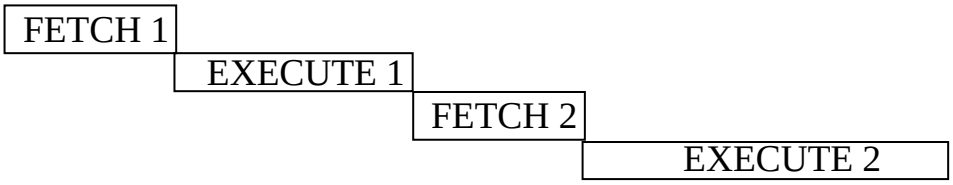
1. Why do we need an address register (AR)? Why not just take the address of the next instruction directly from the program counter (PC) register?

2. Why do we need bi-directional buffers on the bus connecting the internal data bus to the memory chip?

3. Why do we need an instruction register (IR)?

4. Why is there an input to the program counter (PC) from the internal data bus?

5. A typical section of the timeline for the Fetch-Execute cycle of a processor can be depicted as follows:



   Why are the Fetch phases the same duration? And why are the Execute phases of different duration?

6. Explain the term *microcode* in the context of a CPU. What is the role of microcode and how is it implemented? Discuss the advantages/disadvantages of the CPU instructions being implemented in microcode.

7. What is meant by *hardwired control* in the context of a CPU? Discuss the advantages and disadvantages of hardwired control.

8. Which of the previous two methods of control would be preferred in a RISC type of processor and why?