Ch # 7 Exercises
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7.4, page# 232;

What are there two different registers (MAR and MDR) associated with memory?
Ans :- The address that the PC in the processor pulls from the memory is really stored in the MAR in the processor. When the CPU needs a piece of data to process, it actually pulls the address from the memory. Along with the control signal, the address that is contained in the MAR will be transferred to memory. The memory then delivers the address's contents to the processor after receiving it. The data that has been transmitted from the memory is then stored in the processor's register MDR. Data from the MDR will then be transmitted to the IR for decoding, following which the processor will handle the data.

7.11, page# 232;

Suppose that the instruction format for a modified Little Man Computer requires two consecutive locations for each instruction. The high-order digits of the instruction are located in the first mail slot, followed by the low –order digits. The IR is large enough to hold the entire instruction and can be addressed as IR [high] and [IR] low to load it. You may assume that the op code part of the instruction uses IR [high] and that the address is found in IR [low]. Write the fetch-execute cycle for an ADD instruction on this machine.

Ans :-

/ Cycle for fetching and executing an ADD instruction

PC →MAR

MDR → IR [high]

PC + 1 → PC

PC →MAR

MDR → IR [low]

IR [low] → MAR

MDR + A → A

PC + 1 → PC

Explanation:

- MDR is given IR[high] value, while MAR is given PC.
- Increase PC's value by 1.
- Once more, A is given MDR and MAR is given PC.
- Increase the value of PC by 1 at the conclusion.