تكليف الطالب/ عبدالله عبدالكريم مفضل المجموعه الثانيه

1.3

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**The** **answer**:

* **Reading from memory**:
  1. The CPU places the memory address in the **MAR**.
  2. The address is sent via the **address bus**, and the CPU sends a read signal through the **control bus**.
  3. Memory retrieves the data and places it on the **data bus**, which transfers it to the **MBR** and then to the CPU.
* **Writing to memory**:
  1. The CPU places the address in the **MAR** and the data in the **MBR**.
  2. The address is sent via the **address bus**, and the CPU sends a write signal via the **control bus**.
  3. The data is sent through the **data bus** to the memory.

The **MAR** handles addresses, the **MBR** holds data, the **address bus** carries addresses, the **data bus** carries data, and the **control bus** manages read/write operations.

1.4

* **The** **answer**:
* **08A: 010FA210FB**  
  Load the value from address 0FA2 into the accumulator, then store the result at address 10FB.
* **08B: 010FA0F08D**  
  Load the value from address 0FA0, then jump to address 08D if a condition is met (possibly part of a loop).
* **08C: 020FA210FB**  
  Add the value from address 0FA2 to the accumulator, then store the result at address 10FB.

**What the program does:**

This program likely loads values, performs arithmetic (like addition), stores the result, and includes a loop to repeat these actions. It might be summing a series of numbers up to N or performing a similar iterative calculation.

2.2

**The** **answer**:

### a. Results

#### **Machine A**:

* **Effective CPI**: 2.22
* **MIPS**: 90.09
* **Execution Time**: 0.1998 seconds

#### **Machine B**:

* **Effective CPI**: 1.92
* **MIPS**: 104.17
* **Execution Time**: 0.2304 seconds

### b. Comments:

* **Machine B** has a lower CPI and higher MIPS, meaning it executes more instructions per second.
* **Machine A** finishes faster because it has fewer total instructions, even with a higher CPI.

**Conclusion**: Despite Machine B's higher MIPS, Machine A completes the task quicker due to a lower total instruction count.

2.3

**The** **answer**:

**a. Relative Instruction Count:**

* The VAX 11/780 executes **2/3** the number of instructions as the IBM RS/6000 for the same benchmark program.

**b. CPI Values:**

* **CPI for VAX 11/780**: 5
* **CPI for IBM RS/6000**: 1.39