

Microprocessor and Microcontroller

Microprocessor Operations

- Microprocessor is a programmable digital device, designed with **registers**, **flip-flop** and **timing elements**.
- The microprocessor has a set of instructions, designed internally to **manipulate** and data communicate with peripherals.
- This process of data manipulation and communication is determined by the logical design of microprocessor called the Architecture.

- All the microprocessor operations can be classified in the three general categories:
 - Microprocessor **initiated** operations.
 - **Internal** operations
 - Peripheral (or external) initiated operations.

Microprocessor initiated operations.

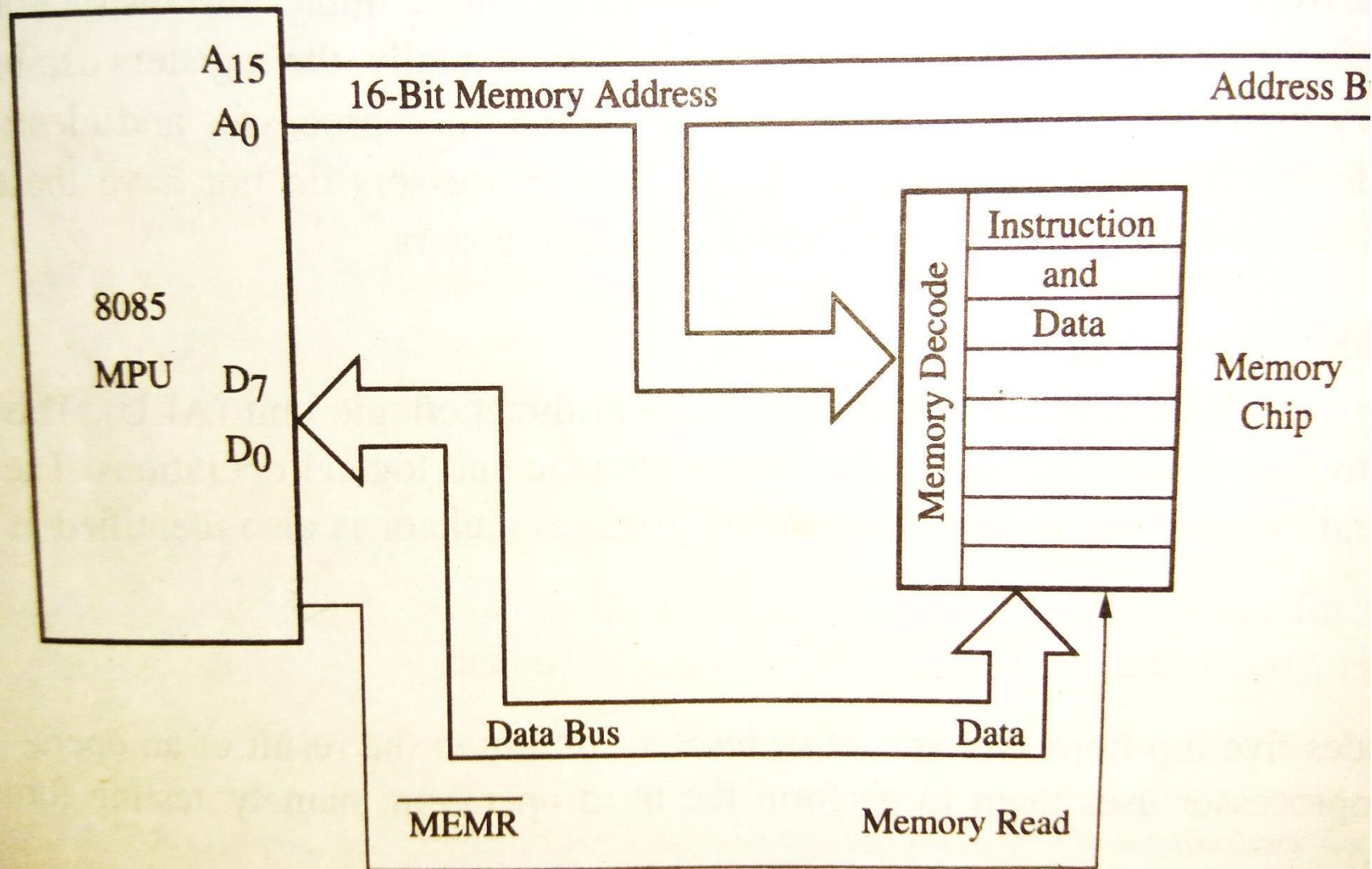
The MPU performs primarily Four operations-

1. **Memory Read:** Reads Data or Instruction from memory.
2. **Memory Write:** Write data into memory.
3. **I/O Read:** Accepts data from input devices.
4. **I/O Write:** Send data to output devices.

All these communications between MPU and Peripheral device is done in following ways:

- **Step1**: Identify the peripheral or the memory location (with address).
- **Step2**: Transfer binary information (data and instruction)
- **Step3**: Provide timing and synchronisation signals

The processor perform these operation with the help of three busses: Address bus, data bus, Control bus



Internal data Operation

The internal architecture of the 8085 microprocessor determine how and what operation can be performed with the data. These are:

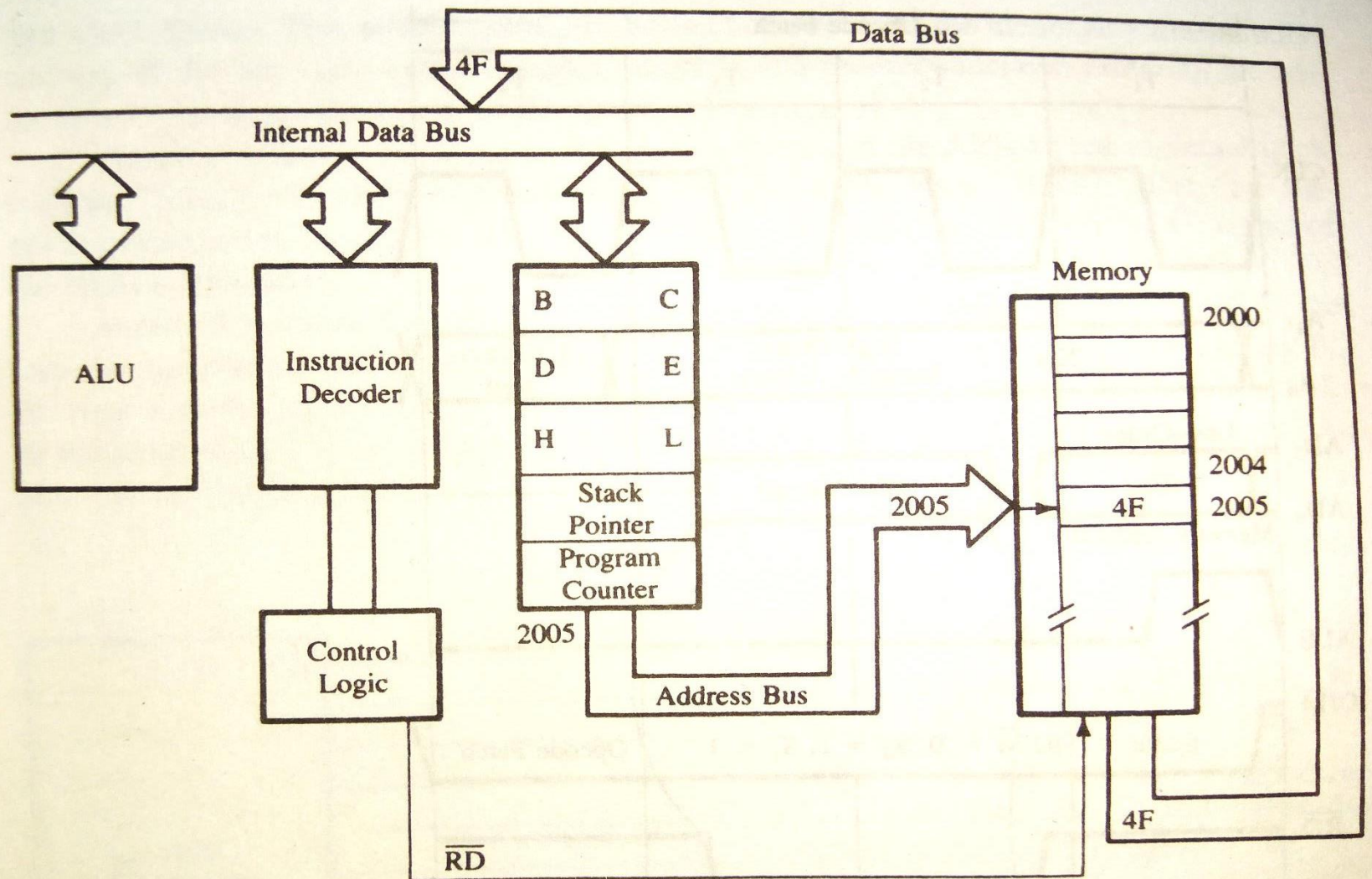
1. Store 8 bit data.
2. Perform arithmetic and logical operations.
3. Test for the conditions.
4. Sequence the execution of instructions.
5. Store data temporarily during execution in defined R/W memory called stack.

To perform these operations, the microprocessor requires an ALU, control signal and internal buses.

Peripheral Initiated operation

- External device or signal can initiate the following operations for which individual pins of the microprocessor are assigned: **Reset**, **Interrupt**, **Ready**, **Hold** etc.

Microprocessor Communication and Bus Timing



- Step1: PC places the 16 bit memory address on address bus, 20H in A15-A8 and lower order 05 placed in AD7-AD0 and ALE goes high. Similarly IO/M goes low as it is memory operation.
- Step2:

