Element of Bus Design

1. Bus type
    I. Dedicated Bus
        - A dedicated bus is only reserved for a Single or specific purpose.
    II. Multiplexed Bus
        - Using a same line for multiple purposes.
2. Method of Arbitration.
    I. Centralized Arbitration.
        - Only one device decides who can use the bus.
        - The devices send desired requests to the arbiter and grants access based on a rule
    II. Distributed Arbitration
        - No central controller. **Each device contains logic** to determine bus access.
3. Timing
    I. Synchronous Bus
        - All devices uses common clock.
        - All the data transfers happen at fixed intervals.
    II. Asynchronous Bus
        - Instead of devices communicate using handshaking signals
4. Bus Width
    I. Address Bus Width
        - Determines how many memory locations can be addressed.
    II. Data Bus Width
        - Indicates How much data can be transferred at once

5. Data Transfer Types.
    I. Read:- The CPU or a devices request data from memory or I/O.
    II. Write:- The CPU or a device sends data to a memory location.
    III. Read-Modify-Write:- A special atomic operation.
    IV. Read-After-Write:- Ensures a recent write a visible immediately.
    V. Block Transfer:- Transfer a sequence of data words in one go.