UML Diagram Explanation with Example

1. What is a UML Diagram?

UML (Unified Modeling Language) is a standardized way to visualize the design of a software system.
It helps in describing the structure and behavior of a system in a visual format, making it easier for developers, analysts, and stakeholders to understand.
UML is not a programming language but a communication tool for software design.

2. Types of UML Diagrams

UML diagrams are mainly categorized into:

Structural Diagrams: Show the static structure of a system (e.g., Class Diagram, Object Diagram, Component Diagram, Deployment Diagram).
Behavioral Diagrams: Show the dynamic behavior of a system (e.g., Use Case Diagram, Sequence Diagram, Activity Diagram, State Diagram).

3. UML Example: Library Management System

Example System: Library Management System

We will show examples for:
A) Class Diagram (Structural)
B) Use Case Diagram (Behavioral)
C) Sequence Diagram (Behavioral)

A) Class Diagram (Structural)

Class: Book
- title: String
- author: String
- isbn: String

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+ getDetails()

+ issueBook()

Class: Member

- name: String

- memberId: int

- booksIssued: int

+ borrowBook()

+ returnBook()

Relationship: Member "borrows" Book (Association)

B) Use Case Diagram (Behavioral)

Actors: Librarian, Member

Use Cases: Issue Book, Return Book, Search Book

Member -> Search Book

Member -> Borrow Book

Librarian -> Issue Book

Librarian -> Return Book

C) Sequence Diagram (Behavioral)

Scenario: Borrow Book

Member -> LibrarySystem: clickBorrow()

LibrarySystem -> Book: checkAvailability()

Book -> LibrarySystem: confirmAvailability()

LibrarySystem -> Book: issueBook()

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4. Why Use UML?

Why use UML?

- Improves communication between team members
- Detects problems early before coding
- Provides clear documentation
- Makes onboarding new developers easier