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Object Oriented Analysis and Design CAT1

1. **Three visibility modes in a class**

➤ **Public:** These members can be accessed by any other part of the program.

➤ **Private:** These members can only be used inside the class itself. No outside code or derived classes can access them.

➤ **Protected:** These members can be accessed inside the class and by classes that inherit from it, but not by other parts of the program.

2. **Three components of an Object Model in the scenario:**

➤ **Objects:** The actual books in the library.

➤ **Classes:** The blueprint, like a "Book" class that describes properties every book has.

➤ **Messages:** How objects interact, for example, a student borrowing or returning a book.

3. **Characteristics of an object in the scenario:**

➤ **State:** This includes things like if the book is loanable, or if it's lost or damaged.

➤ **Behavior:** What the book can do or what happens to it like getting loaned, returned, or disposed.

➤ **Identity:** Each book has a unique identity so it can be tracked individually.

4. **Goals of the design phase in object-oriented design:**

➤ To create a detailed plan of the system by defining classes, their behaviors, and how they relate.

➤ To ensure the system is easy to understand, maintain, and add onto later.

5. **Four reasons software is complex:**

➤ Software solves difficult real-world problems.

- ➢ It needs to work in many different situations and handle many different cases.

- ➢ Software must be flexible for changes.

- ➢ Managing how software is built and making sure everyone working on it is coordinated is hard.

6. **Brief explanation of terms linked to the scenario:**

- ➢ **Class:** The "Book" class that describes all book objects.

- ➢ **Inheritance:** Different types of books (like reference or loanable) can be special versions of the "Book" class.

- ➢ **Polymorphism:** A function like "borrow" might work differently depending on whether the book is loanable or not.

- ➢ **Abstraction:** Students don't need to see all the details about how books are tracked; they just see if they can borrow or return them.

7. **Four states the book object has:**

- ➢ Available for loan

- ➢ Loaned out

- ➢ Lost (if not returned for over 12 months)

- ➢ Disposed (if damaged or no longer needed)