What's the OOD and give an example

Object-Oriented Design (OOD) is the process of using an object-oriented methodology to design a computing system or application. It enables the implementation of a software solution based on the concepts of objects. In OOD, we focus on designing the system architecture or layout, usually after completing an object-oriented analysis (OOA). Here's how it works:

Object-Oriented Analysis (OOA): In this phase, we analyze the problem domain, identify requirements, and create a conceptual model. We define use cases, system relationships, and other relevant data.

Object-Oriented Design (OOD): After OOA, we move to the design phase. Here, we take the analysis data as input and design the system' s classes and objects. We define their relationships, interfaces, and implementations.

Example of OOD:

Let's consider a simple example of an online bookstore system. We'll focus on designing the classes and objects for this system:

Classes:

Book: Represents a book with attributes like title, author, and ISBN.

Customer: Represents a customer with attributes like name, address, and email.

Order: Represents an order placed by a customer, containing books and order details.

Inventory: Manages the stock of available books.

Payment: Handles payment processing.

Object Relationships:

A Customer can place an Order.

An Order contains one or more Book items.

The Inventory keeps track of available books.

The Payment interacts with the customer for payment processing.

Interfaces and Implementation:

Define methods for adding/removing books from the inventory.

Implement payment processing logic.

Create user-friendly interfaces for customers to browse books and place orders.

By following OOD principles, we create a well-structured system that is modular, maintainable, and extensible. Each class encapsulates its behavior, and the system as a whole is easier to understand and modify.