Week 4 OO Design

Relationships:

Connections between classes that show how **instances of one class** can be associated with **instances of another class**.

There are several types of relationships in class diagrams, including:

1. Association:

A general linkage between two classes that shows how instances of one class connect to instances of another.

2. Aggregation:

A special form of **association** that represents a "whole-part" relationship,
indicating that one class is a part of another class **but still exists independently**.

3. Composition:

A stronger form of **aggregation** that indicates a "whole-part" relationship where the part **cannot exist independently of the whole.**

4. Inheritance (Generalization):

Indicates a kind of "is-a" relationship between a general class (superclass) and a more specialized class (subclass)

UML

Unified Modeling Language, is a standardized modeling language that enables developers to specify, visualize, construct, and document artifacts of a software system.
a critical tool in **object-oriented design** and software development processes.

1. **Class Diagrams**: Show the **static structure** of the system models, including *classes, attributes, operations, and the relationships among objects*, such as inheritance and associations.

2. **Use Case Diagrams**: Illustrate the functionality of the system from an end-user perspective, showing the system's various functions and the actors that interact with them.
3. **Sequence Diagrams**: Represent the interaction between objects in a sequential order; it shows how operations are carried out and how data flows within the system over time.
4. **Activity Diagrams**: Depict the workflow of the system, highlighting the sequence of actions and control flows from one activity to another.
5. **State Diagrams**: Describe the state changes of a system or an object in response to events, focusing on the states an object goes through in its lifetime.
6. **Component Diagrams**: Focus on the organization and dependencies among a set of components, showing the structure of the system at a high level.
7. **Deployment Diagrams**: Describe the physical deployment of artifacts on nodes, such as hardware or network infrastructure.