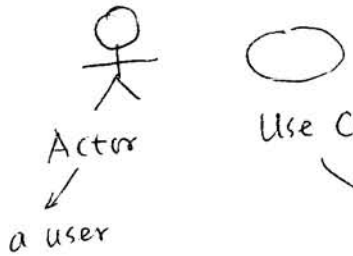
# Unified Modeling Languages (UML)

- UML is a non-proprietary specification language for object modeling
- It is a general-purpose modeling language that includes a standardized graphical notation used to create an abstract model of a system.

## Types of UML Diagrams

1. Use Case Diagram: displays the relationship among actors and use cases.
   - a set of scenarios that describe an interaction between a user and a system.

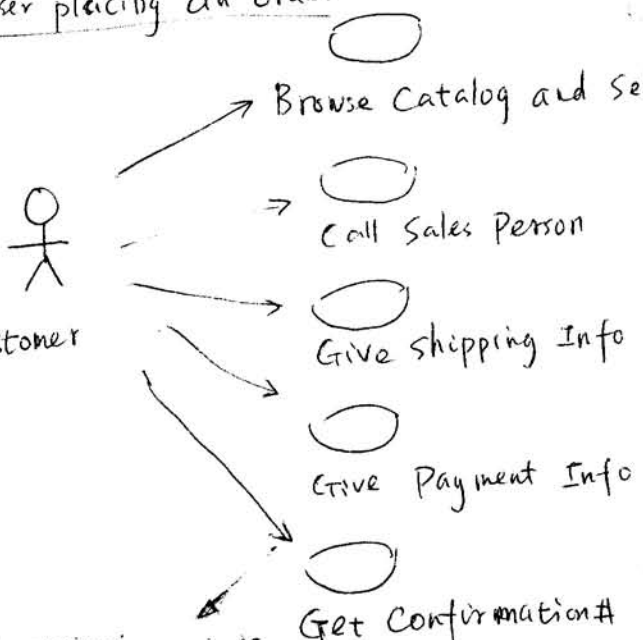
Two main components of a use case diagram:



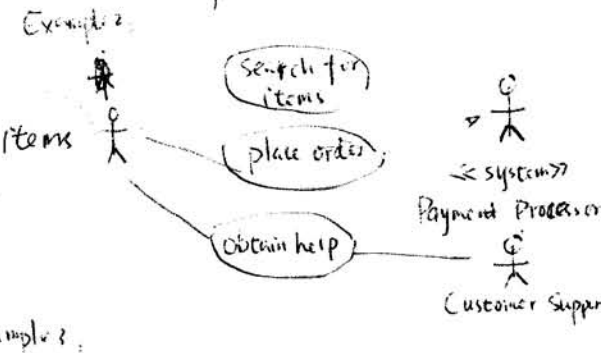

Actor → a user

Use Case → an external view of the system that represents some action the user might perform in order to complete a task.

Eg. A user placing an order




Example:



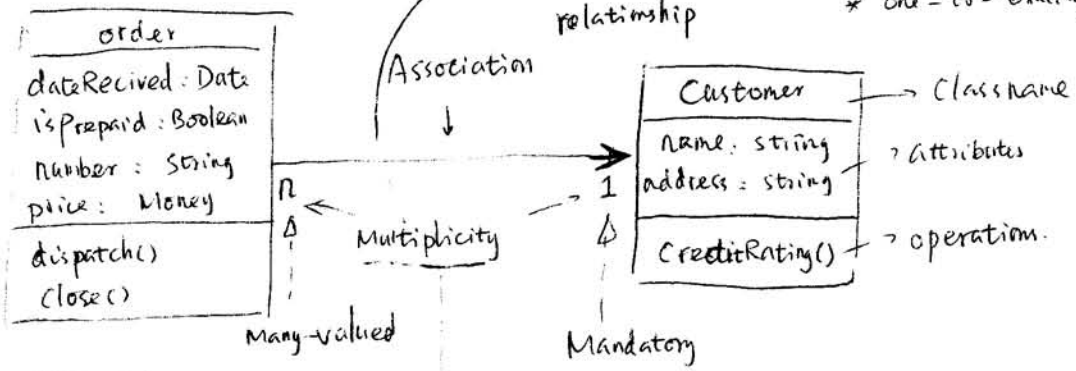

Example:

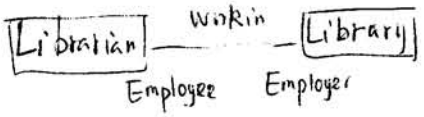
A arrowhead is optional, and is often used to indicating the direction of the initial invocation of the relationship. The arrowheads can be sometimes confused with data flow in a complex system

2. Class Diagrams: models class structure and contents using design elements such as classes, packages and objects. It also displays relationships such as containment, ~~insta~~heritance, associations and others.

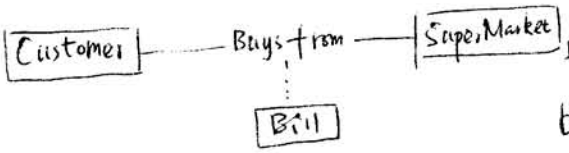
Example 1: Association relationship.

One class can be related to another in a
* one-to-one
* one-to-many
* one-to-one or more
* one-to-exactly n

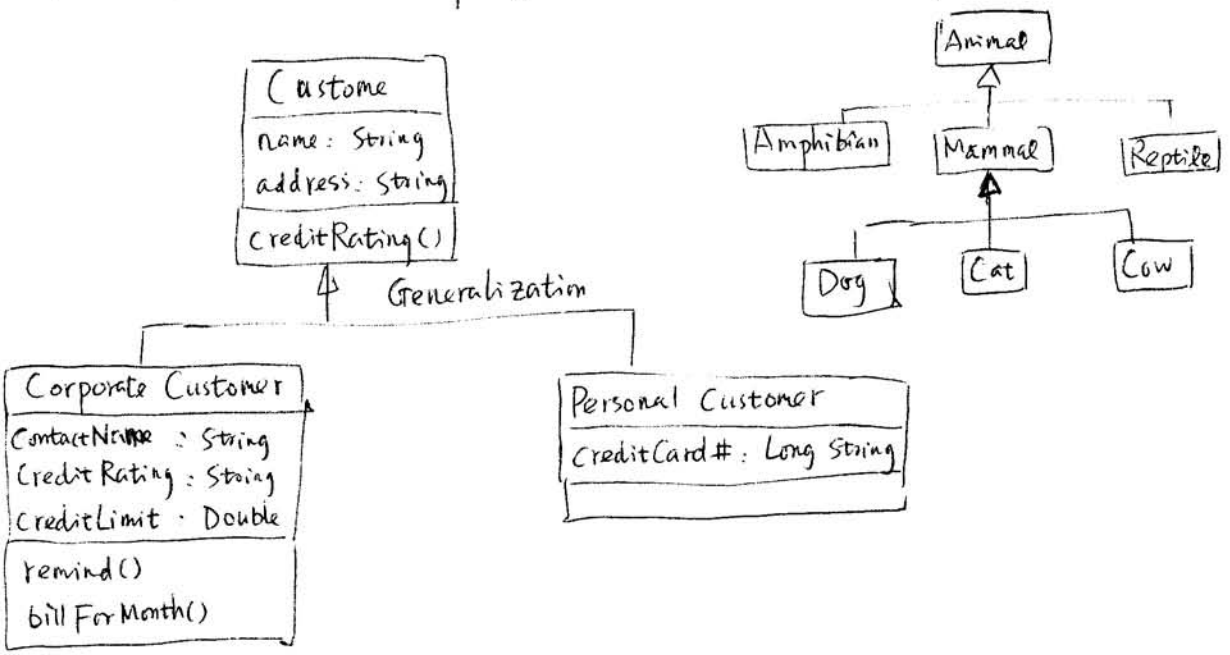




The multiplicity of the association denotes the number of objects that can participate in the relationship.

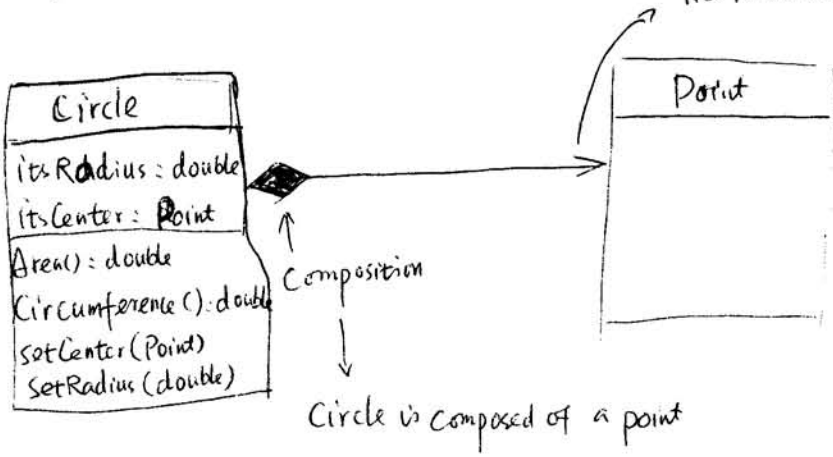


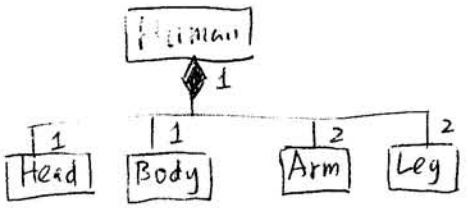

For example, an order object can be associated to only one Customer, but a customer can be associated to many orders.

Example 2: Generalization relationship. (or inheritance relatimship)



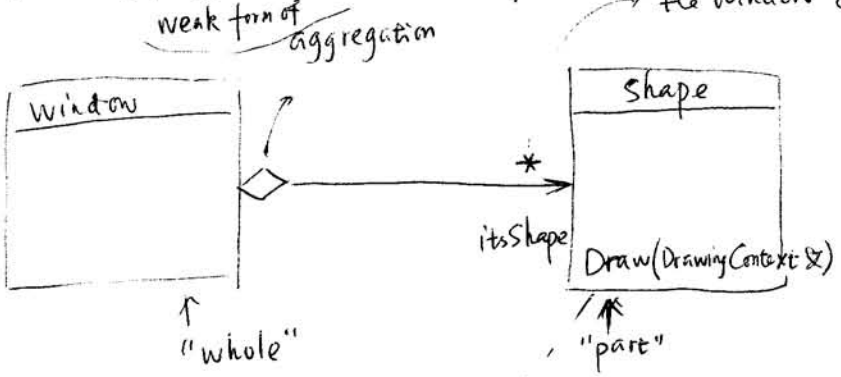
Example 3. Composition Relationship

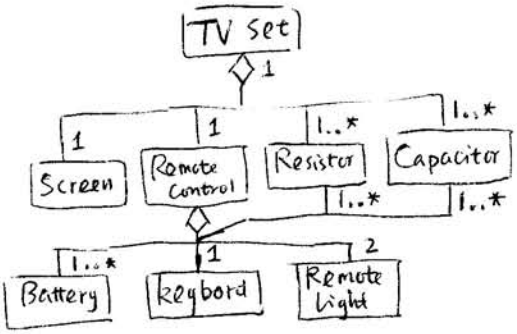


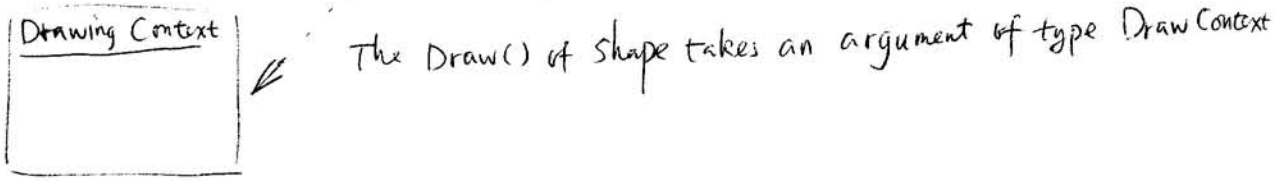

Composition relationships are a strong form of containment or aggregation, because composition also indicates that the lifetime of Point is dependent upon Circle. If Circle is destroyed, Point will be destroyed with it.

Example 4: Aggregation Relationships.




Example 5: Dependency




Example 6. Overall