UML Class Diagram

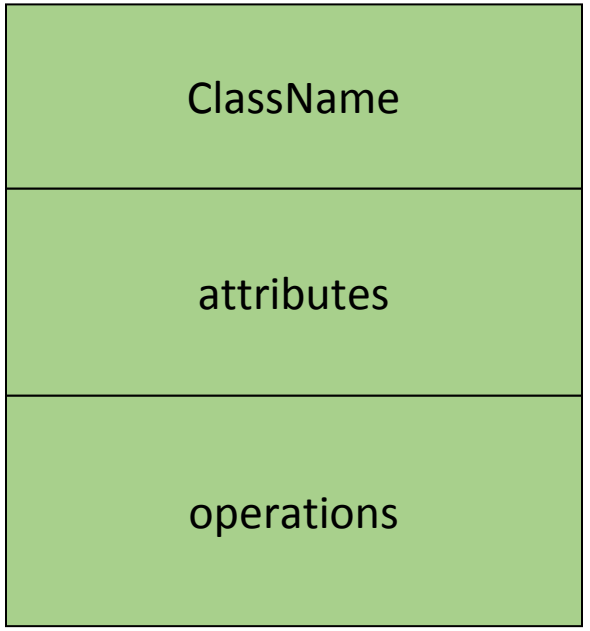
UML Class Diagrams

- What is a UML class diagram?

UML class diagram: a picture of the classes in an OO system, their fields and methods, and connections between the classes that interact or inherit from each other

- What are some things that are not represented in a UML class diagram?
  - details of how the classes interact with each other
  - algorithmic details; how a particular behavior is implemented

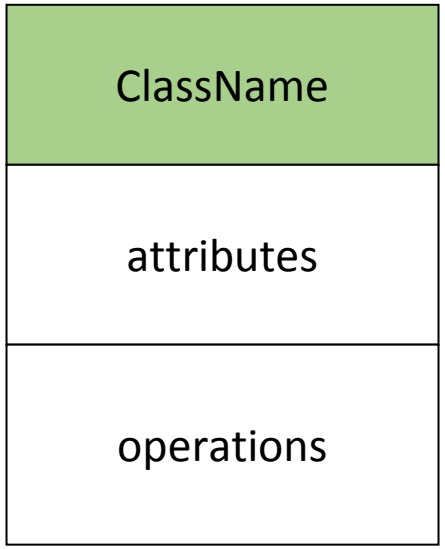
Classes



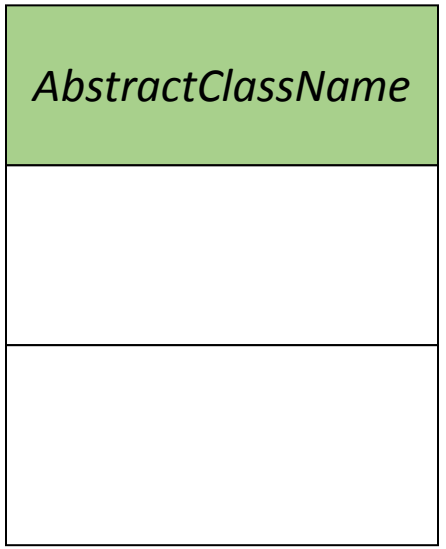
A *class* is a description of a set of objects that share the same attributes,
operations, relationships, and semantics.

Graphically, a class is rendered as a rectangle, usually including its name, attributes, and operations in separate,
designated compartments.

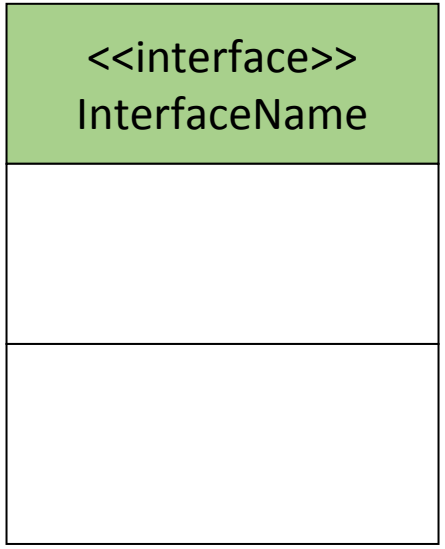
Class Names



It always appears in the top-most compartment.

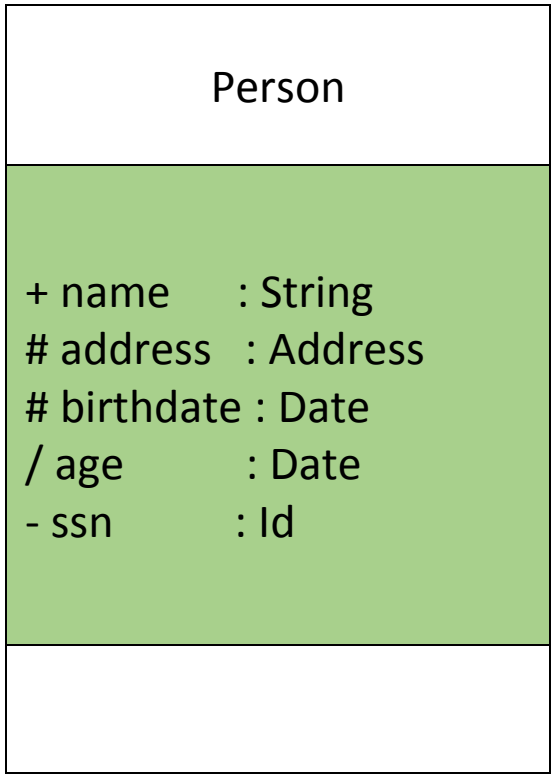


Should be written in italic format as shown in figure.



Should have the word interface as shown in figure.

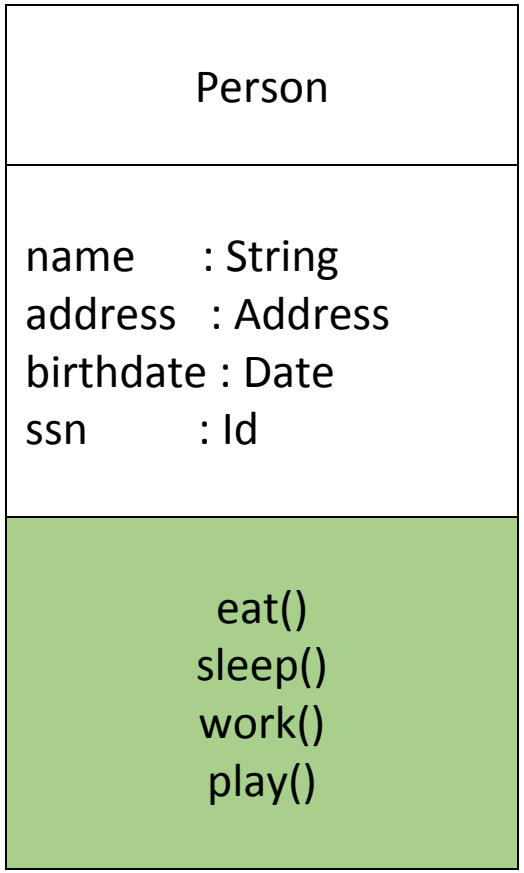
Class Attributes (Cont'd)



Attributes can be:

+ public
# protected
- private
/ derived

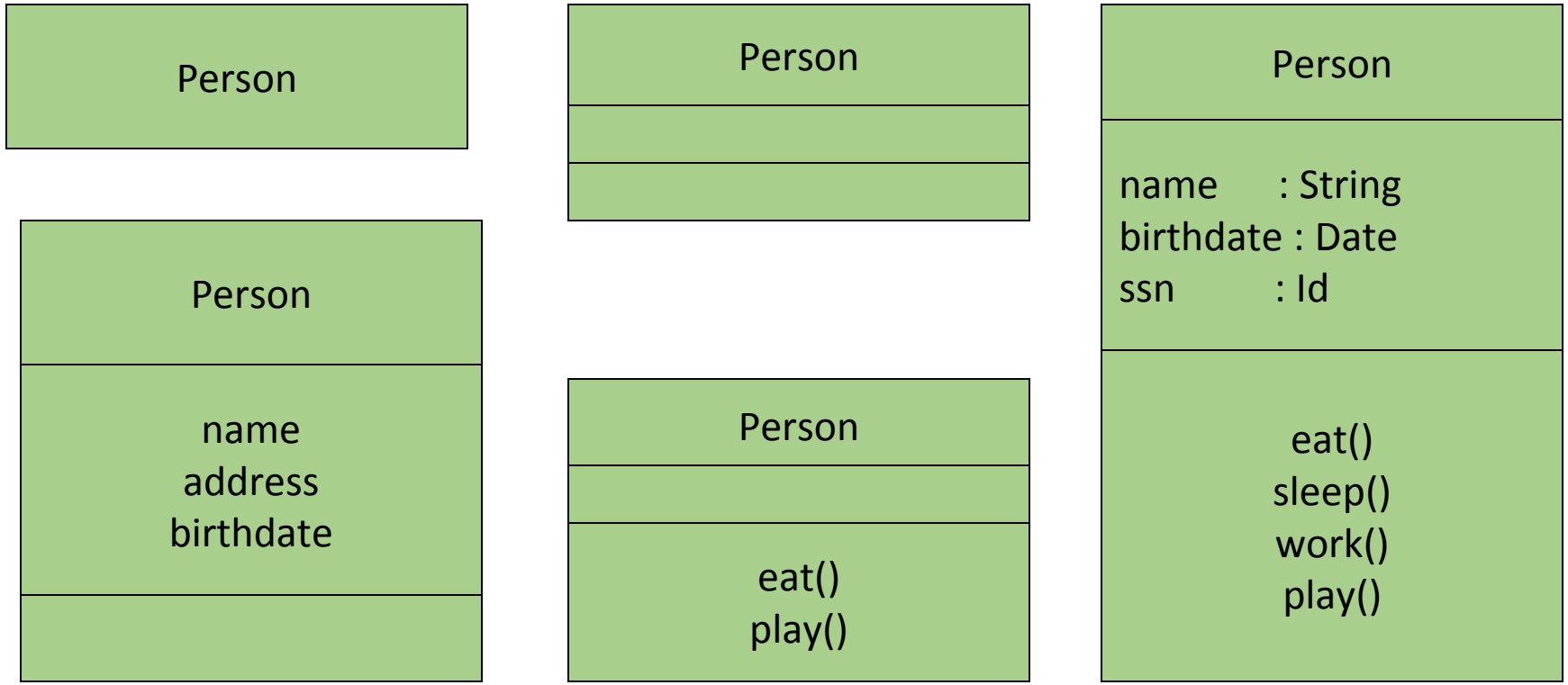
Class Operations



Operations describe the class behavior and appear in the third compartment.

Depicting Classes

When drawing a class, you needn’t show attributes and operation in every diagram.



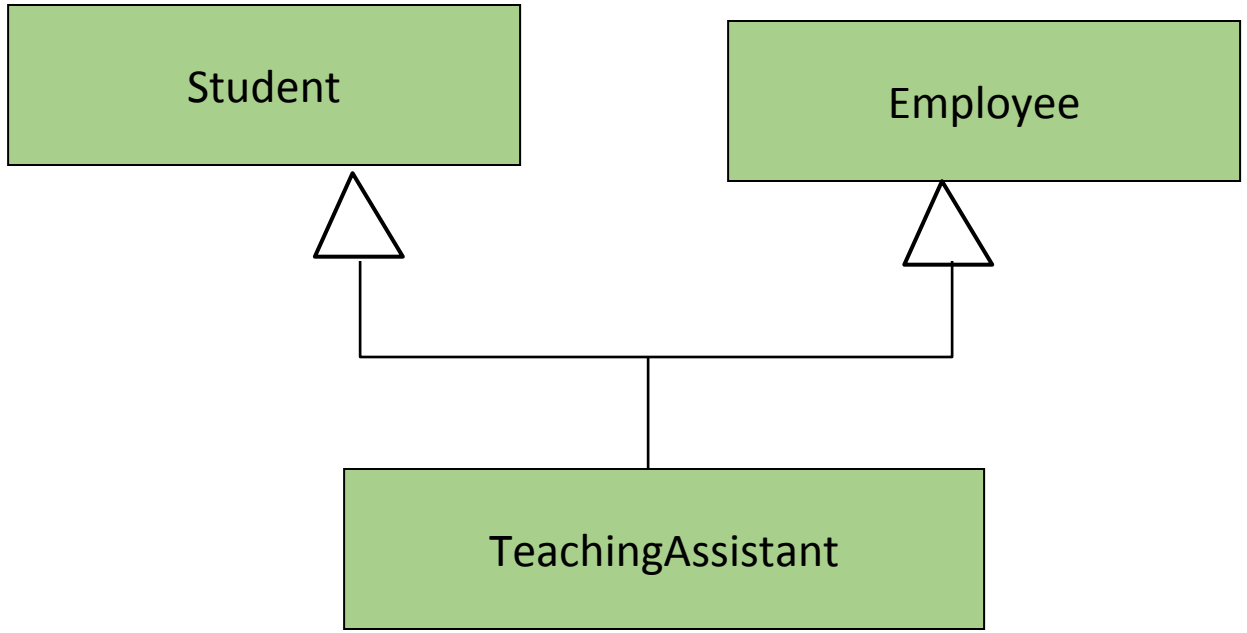
Relationships between Classes

- **generalization**: an inheritance relationship
  - inheritance between classes
  - interface implementation

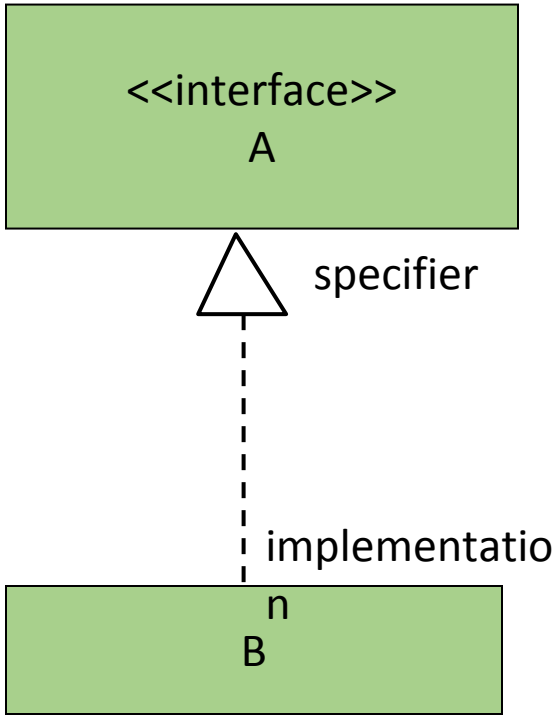
- **association**: a usage relationship
  - dependency
  - aggregation
  - composition

Generalization Relationships

- UML permits a class to inherit from multiple super-classes, although some programming languages (*e.g.,* Java) do not permit multiple inheritance.



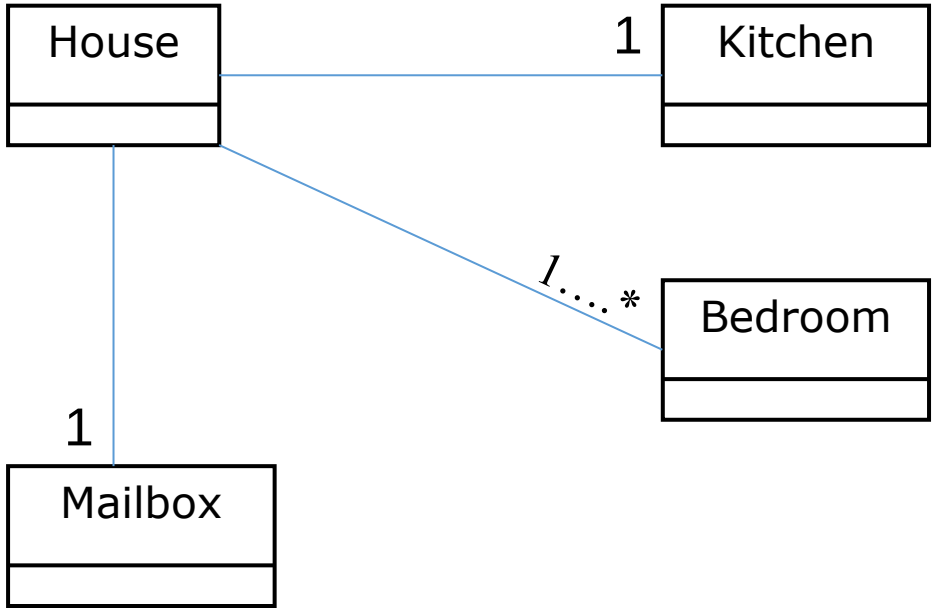
Interface Realization Relationship



A *realization* relationship connects a class with an interface that supplies its behavioral specification. It is rendered by a dashed line with a hollow triangle towards the specifier.

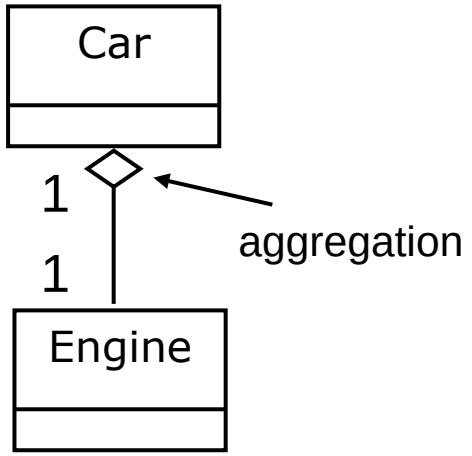
Associations: Multiplicity Indicators

Exactly one	1
Zero or one (optional association)	0….1
Zero or more	0….*
One or more	1….*
Specified range	2..4

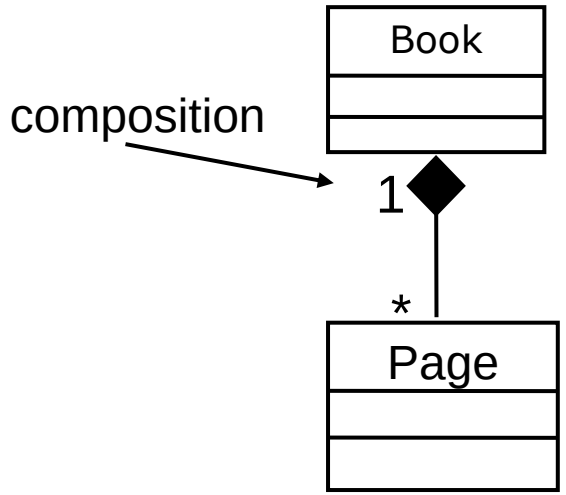


Association Types

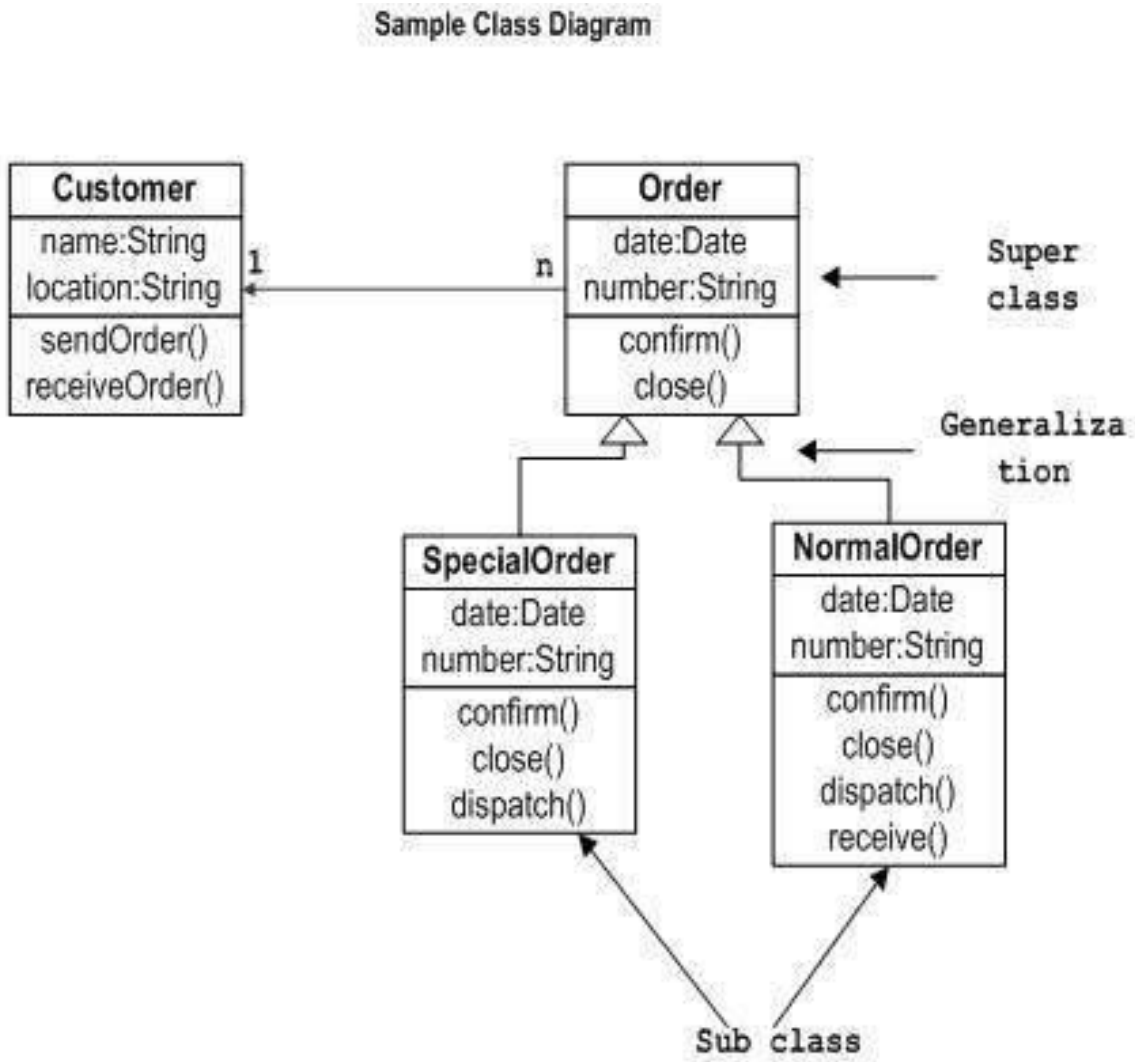
- **aggregation**: "is part of"
  - symbolized by a clear white diamond



- **composition**: "is entirely made of"
  - stronger version of aggregation
  - the parts live and die with the whole
  - symbolized by a black diamond



Example Class Diagram



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