Object Oriented Programming

Week 3 Part 2
UML (Unified Modeling Language)
Class Diagrams
Inheritance

Lecture

- What is UML

- Class Diagrams

- Animal Example in Class Diagrams

What is UML?

UML

- UML or Unified Modeling Language is a standard visual description language for system design

- Created by Grady Booch, Ivar Jacobson, and James Rumgaugh 1994-1995

UML use in Industry

- UML is widely know but no longer used as a design tool

- Detailed design before implementation has declined in favor of agile design

- UML is now used as a tool to communicate between developers in planning and standup meetings
  - Often sketched on whiteboards and photographed
  - Drawing and design tools rarely used

Value of UML

- Knowledge of UML today is largely as a communication vehicle

- It is widely known and often used to discuss object oriented designs

- We will use UML to describe concepts in class, but not as a design tool

  – This practice is similar to that currently used in industry
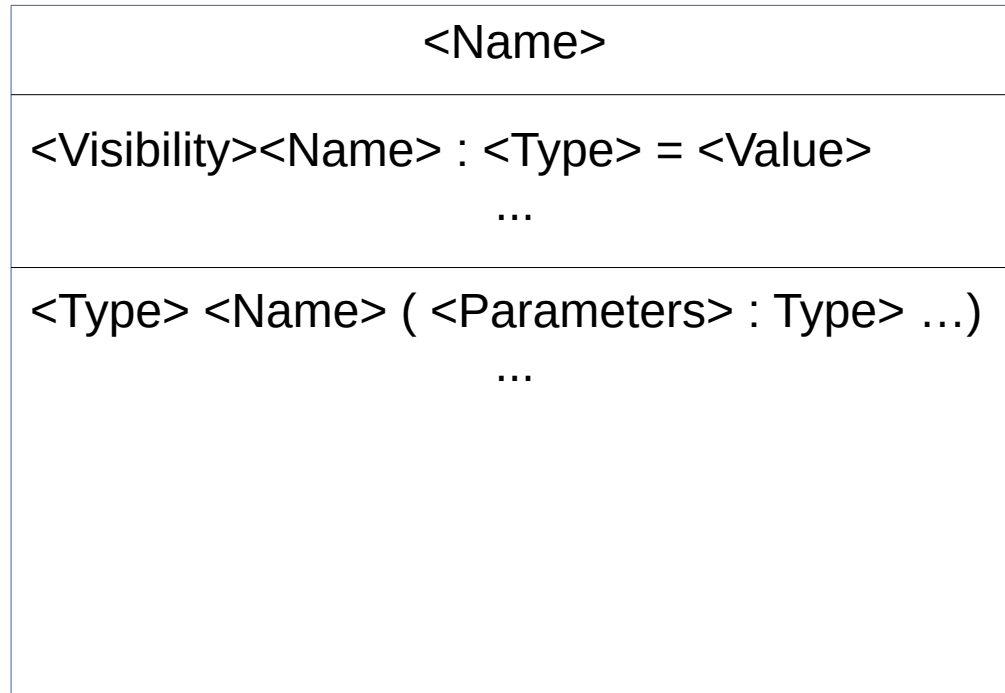
UML Diagrams

- Structural diagrams
  - Class digram
  - Component diagram
  - Deployment diagram
  - Object diagram
  - Package diagram
  - Profile diagram

- Behavioral diagrams
  - Activity diagram
  - Communication diagram
  - Interaction overview diagram
  - Sequence diagram
  - State diagram
  - Timing Diagram
  - Use case diagram

Commonly Used Diagrams

- Class Diagrams

    – Describe the static relationship between classes

- Sequence Diagrams

    – Describe the dynamic relationship between classes

- Use Case Diagrams
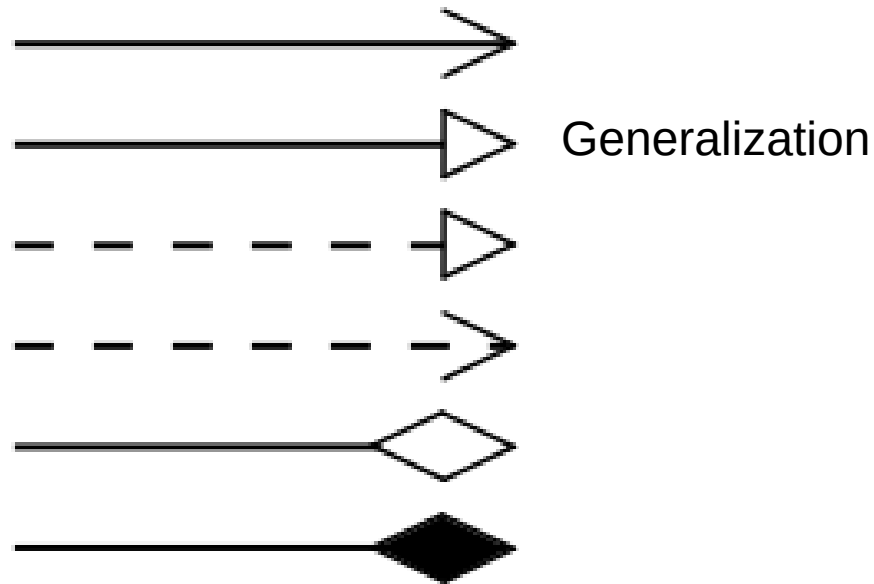
    – Describe the use of the system as a whole

Class Diagrams

UML Class Symbol

<Name>
<Visibility><Name> : <Type> = <Value> ...
<Type> <Name> (<Parameters> : Type> ...) ...

+	Public
–	Private
#	Protected
/	Derived (can be combined with one of the others)
~	Package

UML Relationship Symbols

Generalization
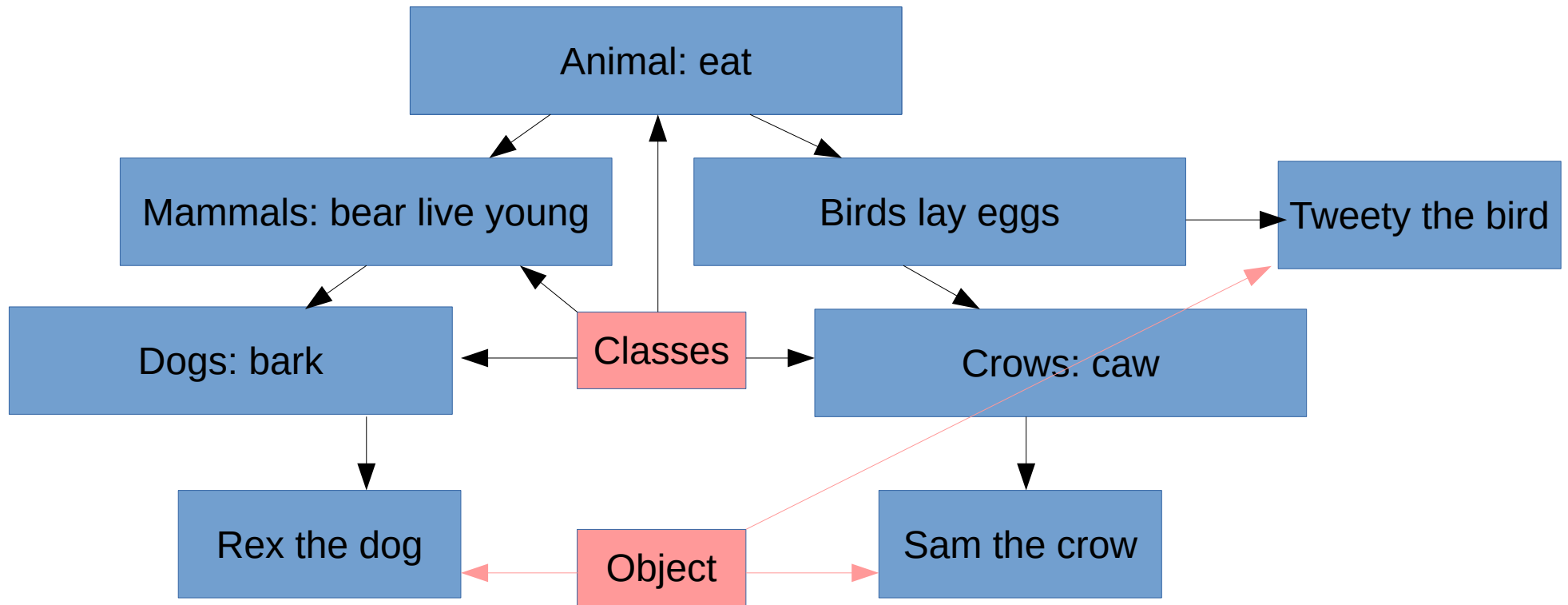
- Generalization
  - Represented by Inheritance in Java
  - Arrow points to superclass
  - Base of arrow on subclass

Animal Hierarchy in Class Diagrams

Animal Hierarchy

Animal Hierarchy in UML

Animal

-food : String

+GetFood(): String
+says(): String

Mammal

-food : String
-young : String

+GetFood(): String
+says(): String

Bird

-food : String
-young : String

+GetFood(): String
+says(): String

Dog

-food : String

+says(): String

Crow

-food : String

+says(): String