

# Introduction to Objects

Object-Oriented Analysis and Design  
CSCI 6448 - Fall 1998  
Kenneth M. Anderson

# Overview of Lecture

- Concepts
- Objects & Object Lifecycles
- Domains and a brief example
- Relationship to Objectory
- (At any point, please ask questions about the lecture and/or the assigned reading)

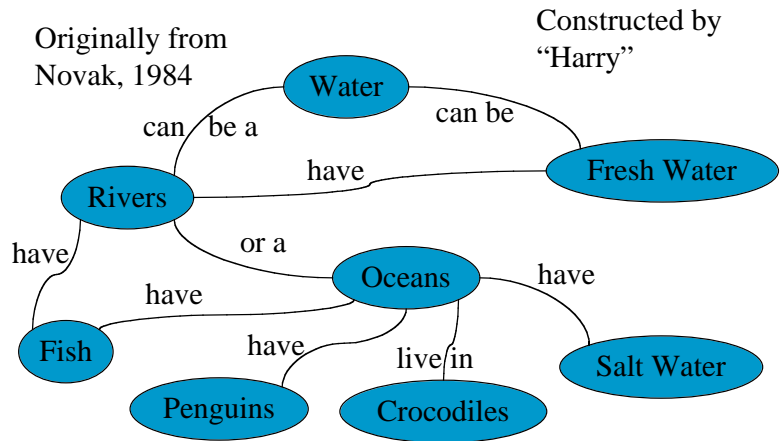
CSCI 6448  
Kenneth M. Anderson

# Concepts

- A concept is an idea or notion that humans apply to the things, or objects, in their awareness
- Concepts influence a human's perception of reality, helping them to make sense of the world around them

CSCI 6448  
Kenneth M. Anderson

# Example from textbook



CSCI 6448  
Kenneth M. Anderson



## Properties of the Example

- Humans, at a young age,
  - Can form concepts
  - Can construct symbols for concepts
  - Can use symbols to communicate meaning
- Note
  - Concepts help classify objects
  - Classification captures and conveys knowledge

CSCI 6448  
Kenneth M. Anderson



## Types of Concepts

- Tangible
  - Flower, Bird
- Intangible
  - Honesty
- Roles
  - Policeman, Senator
- Judgements
  - Excellent critique
- Relational
  - Sibling
  - Sequential
- Events
  - Birthday
  - Concert
- Others?

CSCI 6448  
Kenneth M. Anderson



## Objects

- An object is an instance of a concept.
  - Humans classify objects as being members of one or more concepts
  - A concept defines the semantics of an object: both attributes and behavior
  - Note: all concepts are objects (being instances of the concept `Concept`) but not all objects are concepts!

CSCI 6448  
Kenneth M. Anderson



## Concepts do not require Objects

- Nothing may exist that can pass the concept's test
  - e.g. first human on Mars
- In a particular domain, concepts may serve as placeholders for objects that may exist in the future
  - For instance, bank robbers within the domain of bank security

CSCI 6448  
Kenneth M. Anderson

## Two sides of a concept

- Intension
  - Complete definition of a concept and the test an object must pass before the concept applies to it
- Extension
  - The set of all objects that pass a particular concept's test

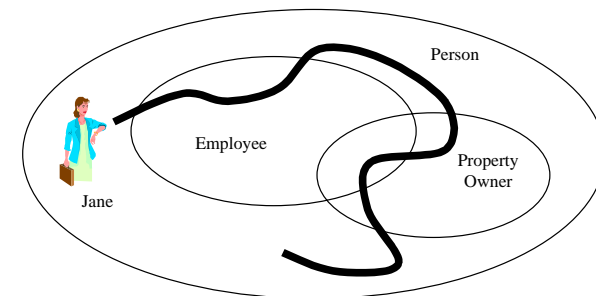
## Concept = Type = Class

- In the Object-Oriented Paradigm
  - concept, type, and class are synonymous
- In UML, classes can represent types or implementation classes
  - The symbol for a class is a rectangle
  - «type» and «implementation class» are used to distinguish the two kinds although often it can be determined by context

## Object Lifecycles

- Objects have an associated lifetime
  - They have a defined beginning and end
  - Objects evolve via changes in classification
    - Multiple classification
      - More than one concept applies to the object
    - Dynamic classification
      - The set of concepts applying to an object can change

## Example from textbook





## Domains

- A domain is a collection of objects in a selected area of interest
- A domain specification is the collection of concepts that apply to a domain
- A domain is thus the union of the extensions of all such concepts



## Chimera Domain Specification

- Applications
- Data, Information, Content
- Hypermedia Data Model
- Users
- Events
- Distribution
- (Security, Collaboration, Versioning)



## Project Domains

- Class Participation
  - For each team
    - Present brief description of project
    - Construct domain specification
  - Who wants to start? :-)



## Objectory Reflections

- The notions discussed so far lay the foundation for Elaboration
  - Concepts are used to build domain models
    - Concepts enable end-users to communicate important elements of their domain
  - Concepts are the basis for class diagrams
    - A class represents a distinct domain element and provides the mechanism to define/record the structure and behaviors of the domain