

# Mappings and Associations

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

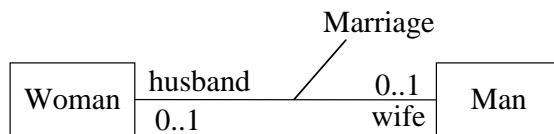
## Overall Goal of this Lecture

- Introduce the notions of “association” and “mapping”
- Provide examples of their use
- Present the UML notation for them

CSCI 6448  
Kenneth M. Anderson

## Relationships

- What is a relationship?
  - It is an explicit linking of two or more types



- What are they good for?
  - Capturing knowledge of a particular domain

CSCI 6448  
Kenneth M. Anderson

## Definitions

- A tuple (or link) is an immutable coupling (or linking) of objects. It can be treated as an object in its own right.
- Example tuples
  - {Hillary, Bill}
  - {Leysia, Ken}
  - {Shelby, Jim}

CSCI 6448  
Kenneth M. Anderson



## Immutable

- A tuple is immutable.
  - Change a value and it's a new tuple!
- Scenario
  - Jim marries Shelby.
  - Trouble brews and they get a divorce
  - Jim marries Jill, but it doesn't work out
  - Jim and Shelby reconcile and marry again
  - How many tuples?



## Answer to Scenario

- Three Tuples
  - {Jim, Shelby}
  - {Jim, Jill}
  - {Jim, Shelby}
- Shelby is not replaced by Jill...an entirely new tuple is constructed.
- When Jim and Shelby remarry, a new tuple is constructed since the original was deleted



## Why is this important?

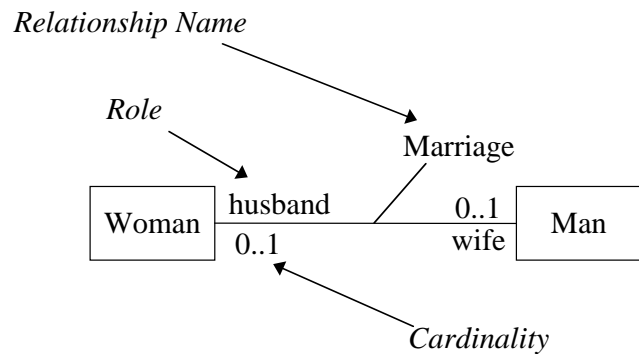
- Object Identity
  - As mentioned in Lecture 7, each object has a unique identity
  - In the case of a tuple, the elements construct the identity, change an element, you change the tuple
  - These rules allow designers to plot the lifecycles of objects within their systems



## Definitions Continued

- A relationship (or relation) is a type whose instances are tuples
- Note: When we see the word type we can substitute the word 'class'
- Hence, relationships are classes and can have associated structure (attributes) and behavior (operations)

## Example in Detail



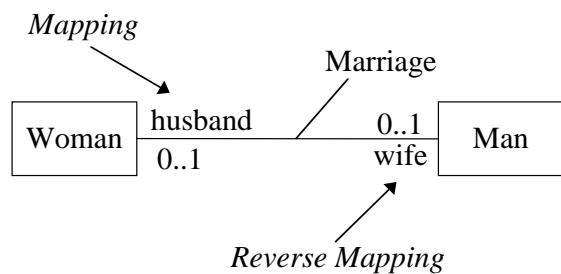
CSCI 6448  
Kenneth M. Anderson

## An additional definition

- A mapping assigns the objects of one type to the objects of another type.
- A relationship can be specified by  $n$  mappings where  $n$  is equal to the number of elements in the relationship's tuples

CSCI 6448  
Kenneth M. Anderson

## Mapping Example



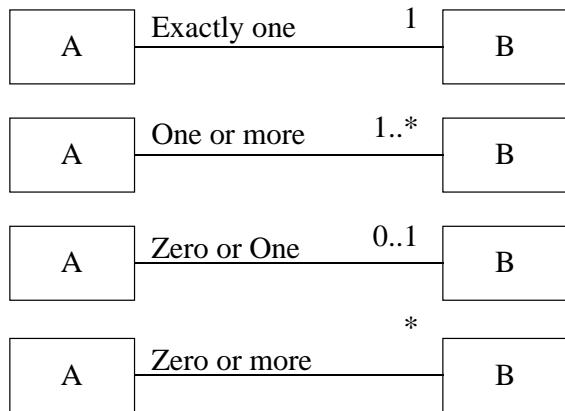
CSCI 6448  
Kenneth M. Anderson

## Cardinality Constraints

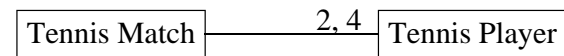
- A cardinality constraint limits the number of objects that are associated with a mapping.
- For instance, a husband mapping is limited to at most one man

CSCI 6448  
Kenneth M. Anderson

## Cardinalities

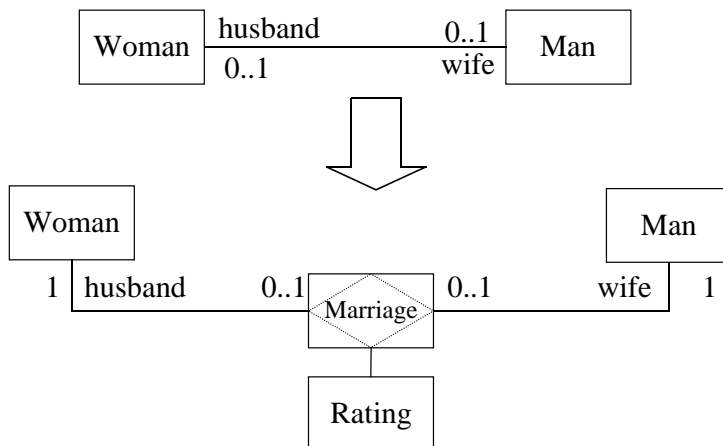


## Cardinalities can be expressive



A tennis match consists of two or four players

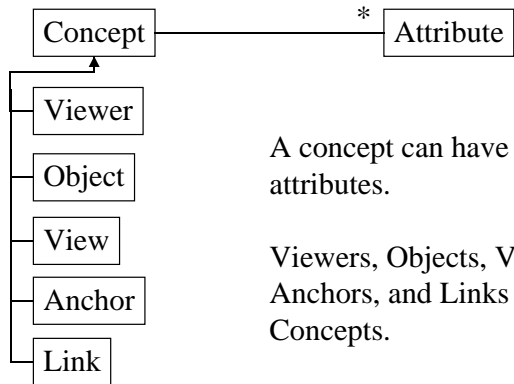
## Relationship as Class



## Chimera Example

- Chimera's Hypermedia Data Model
  - Viewers
  - Objects
  - Views
  - Anchors
  - Links
  - Attributes
  - Hyperwebs

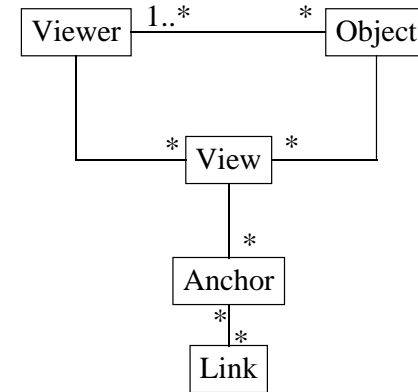
# Concepts and Attributes



A concept can have zero or more attributes.

Viewers, Objects, Views, Anchors, and Links are all Concepts.

# Data Model Relationships



# Hyperwebs

