

# UML Data Modeling I

## Classes

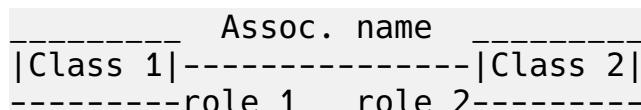
- Descriptor of a set of objects that share the same properties (semantics, attributes and relationships)
  - Concrete things
    - person, book, car, ...
  - Conceptual things
    - class, course, profession
- They are characterized by name, attributes and operations
  - for data modelling: drop operations
- The class name is usually written in the singular, with the first letter in uppercase

## Attributes

- Attributes are defined in terms of class, while values of the attributes are defined at the instance level
  - A student has the attributes: identifier, name and admission grade
  - John is a student with the ID 123, name John Smith and an admission grade of 180
- A class should not have two attributes with the same name
- Attributes can be associated with types
  - Not predefined in UML
  - Use the ones of the DBMS
- In data modelling, we can also specify a primary key (noted pk)

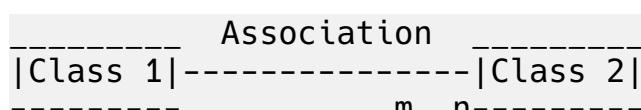
## Associations

- Relationship between objects of two classes



- As an object is an instance of a class, a **link** is an instance of an association
- The name is optional
- There may be more than one association between the same pair of classes
  - Having different names

## Multiplicity of Associations



- Each object of Class 1 is related to at least m and at most n objects of Class 2
- A \* in place of n stands for *no upper limit*
- Abbreviations
  - stands for 0..\*, that is, no restrictions
  - 1 stands for 1..1
- Default: 1..1

## Complete associations

- Every object must participate in the association
  - Complete many-to-one
    - 1..\* - 1..1
  - Complete one-to-one
    - 1..1 - 1..1
  - Complete many to many
    - 1..\* - 1..\*