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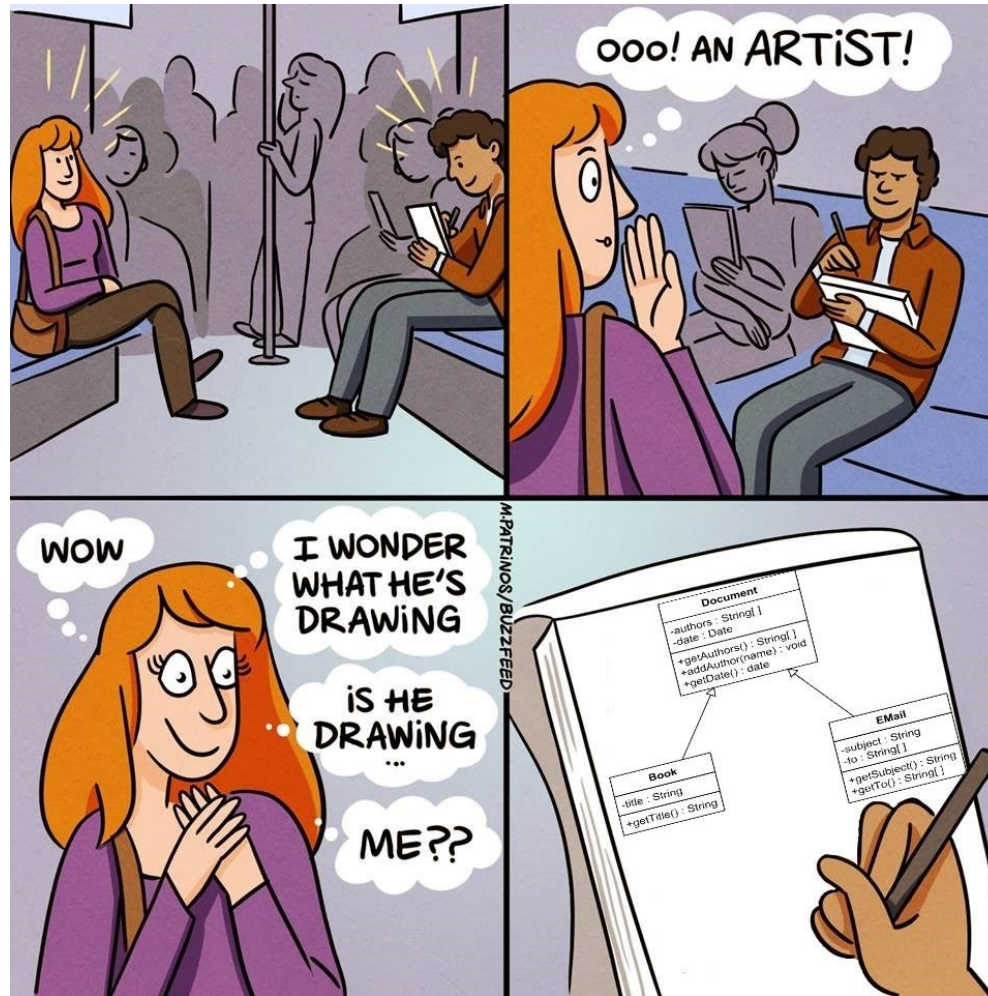
# Class Diagram

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# Class Diagrams

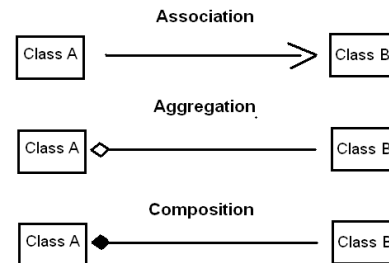
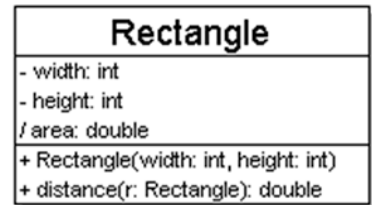
- Diagrams that allow analysts
  - to specify the static structure of a system
  - according to the object-oriented approach .
- Used to describe the class model

# Class Diagram



# Class Diagrams

- Elements of a class diagram :
  - Classes
  - Relations between classes
    - Associations
    - Compositions
    - Aggregations
    - Generalizations



# Classe

## ID Class ( Class Name )

Campaign
code description annual Cost expected cost
pay() do Budget()

- Refers to specific objects, but the must abstract
- Nouns associated with the textual description of a problem
- Choose carefully the names
- using singular

## Attributes

- Values that characterize the objects of a class
- Types : Real, Integer , Text, Boolean , Enumerated , ...

## Operations

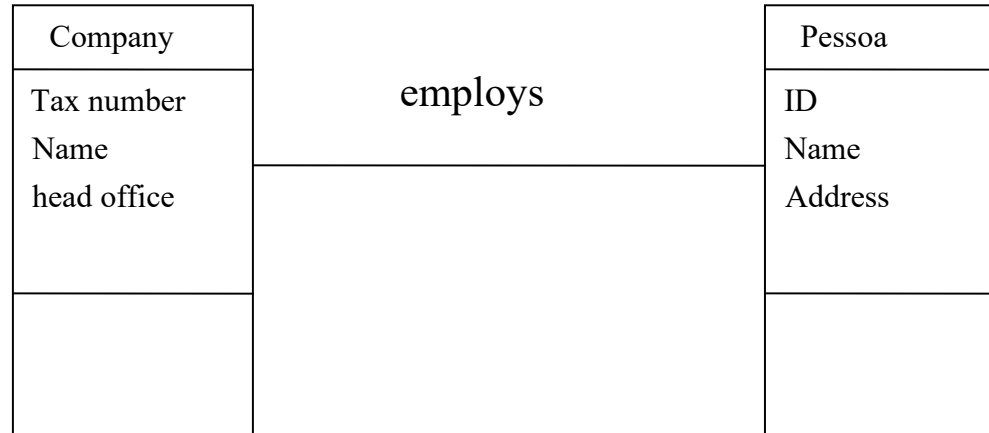
- Behaviors of the class ( service, method)

# Relationship

- A relationship UML establishes the connection between elements
- A relationship is graphically represented by a given type of line.
- In object-oriented modeling the three most important types of relationships are:
  - Associations
  - Generalizations
  - Dependencies

# Association

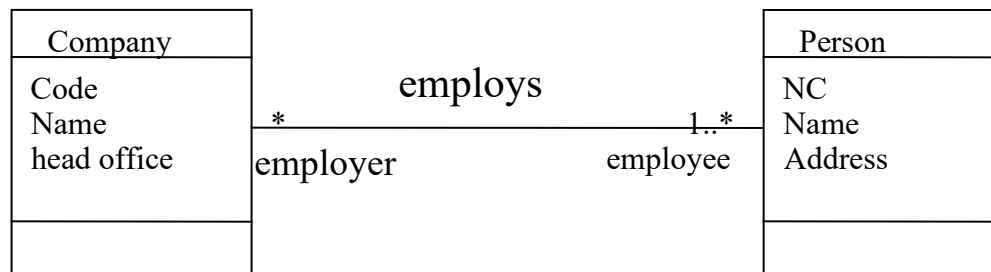
A relationship of association, or simply association is a structural relationship that specifies that objects of a class are linked to other objects.



# Association

An association is represented in UML by a solid line complemented by:

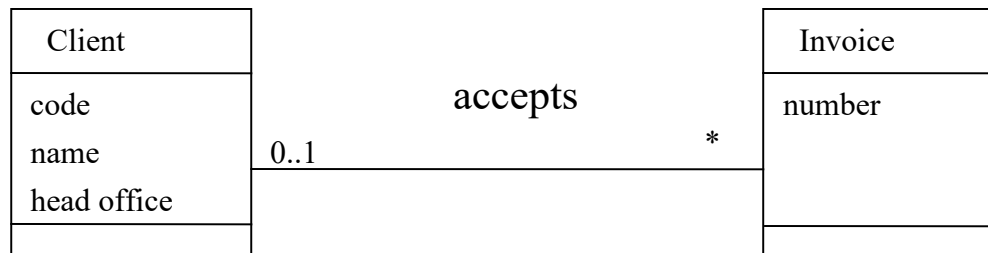
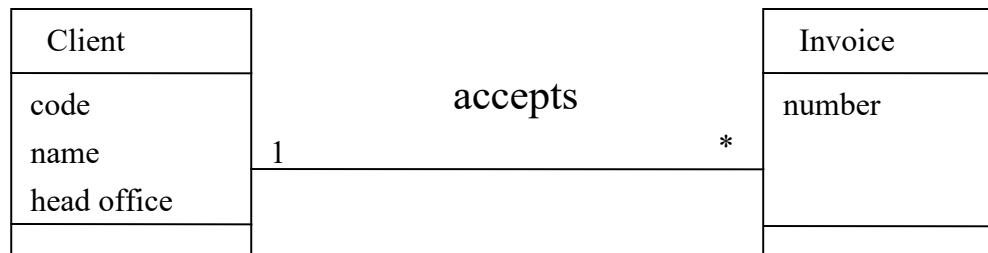
- The name
- The role of each participant in the association
- The multiplicity of each participant in the association
- The type of aggregation



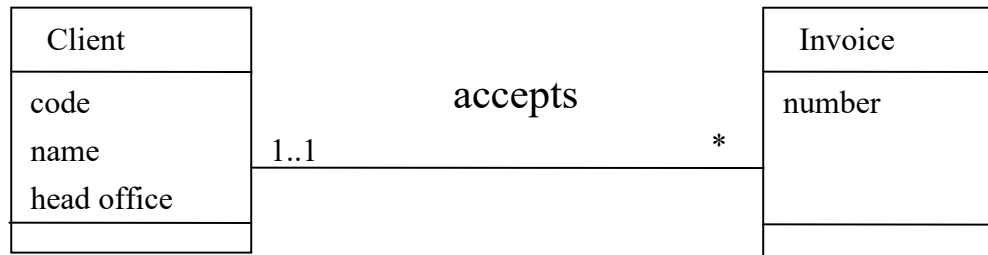
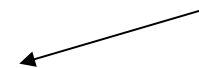


# Association

## Multiplicity



An invoice without client?



# Association

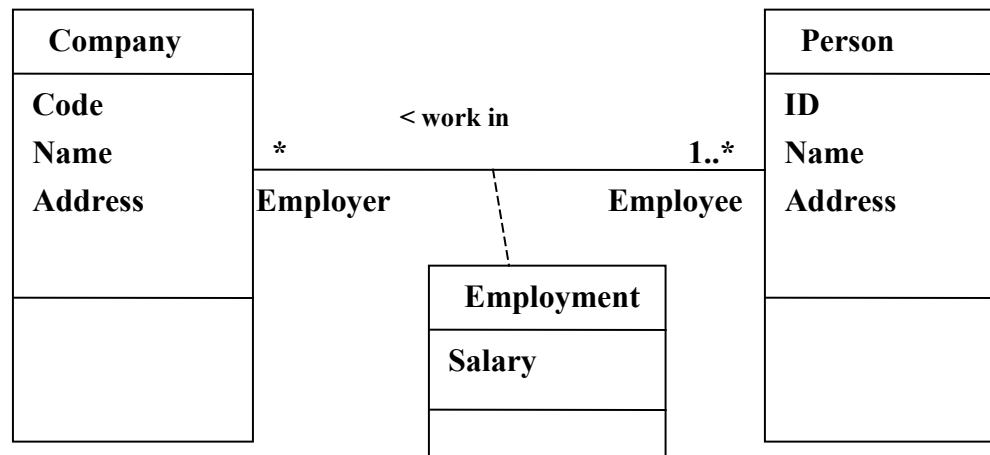
- The role is part of the association, not of class
- Multiplicity in UML
  - allows to specify cardinality, i.e. number of elements, of some collection of elements.
- Multiplicity element
  - defines some collection of elements,
  - includes multiplicity
  - includes specification of order
  - includes uniqueness of the collection elements.

# Association

- The multiplicity reflects the number of instances of a class that can relate (by association) with a single instance (s) other (s) class (es) participant (s). You can specify in UML any type of multiplicity. For example:
  - multiplicity many ( \* )
  - one or more ( 1 .. \* ) ,
  - exactly one ( 1 ) ,
  - zero or one ( 0..1 ) ,
  - a number ( e.g. 3 ) ,
  - a certain range (e.g. , 2..6 )
  - specified by more complex multiple lists ( e.g. , 0..3 , 5..7 , 10 .. \* to represent " any number of objects except for 4, 8 or 9" ) .

# Association

The association can be complex enough that it may be translated by a class (association class)



# Association

- Association between classes without aggregation:
  - both classes are on the same conceptual level (ie . A person buys a product)



# Association

- Association relationship with aggregation:
  - Translates that there is a kind of relation " is- part-of " " has-a", " consists of ...", " contains ..." or " it is part of ... "
  - An instance of a particular class has or is composed of several instances of another class.



# Association

- Composition, or composite aggregation
  - is a variant of the simple aggregation , that is added in the following semantics :
    - strong ownership of the "whole " in relation to "party" .
    - delimited lifetime ( the "parts " can not exist without the "whole" ) .
    - the "whole" is responsible for the disposal of its "parts" , or "all " is responsible for the creation and destruction of its "parts" .



# Generalization

- A relationship between a general element (eg , superclass, over-use case , super - actor) and a more specific element (eg , subclass, sub- use case , sub- actor) .
- Commonly known as a relationship of the " is- a", " is-a -kind -of" or " is" :
  - " A manager is an employee "
  - " A minister is a member of the government "
  - " A deputy is a political "





# Dependency

- A relationship of dependence, or simply dependence indicates that the change in the specification of an element can affect another element that uses it , but not necessarily the opposite.



# Bibliography

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