Software Engineering

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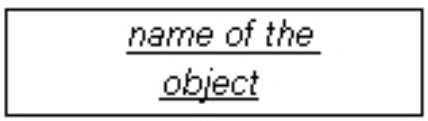
Object diagram

- shows: a complete or partial view of the structure of a modeled system at a specific time. This snapshot focuses on some particular set of object instances and attributes, and the links between the instances.
- Often used to provide examples, or act as test cases for the class diagrams.
- Object diagrams are connected graphs: Nodes are objects, edges are connections between objects (links).
- an instantiation of the class diagram

Object diagram



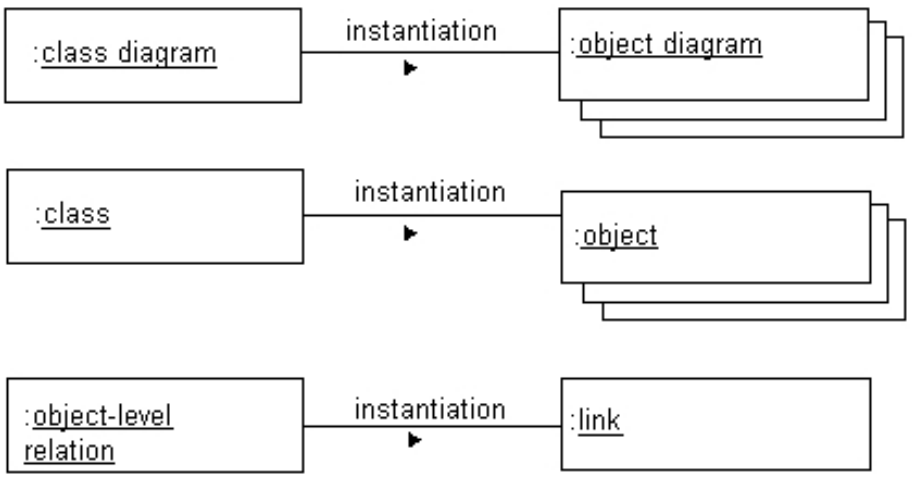
Object diagram


```
Foo bar = new Foo();
```

Object diagram

- many object diagrams belong to a class diagram
- no multiplicity in relations, but the number of objects must be proper to the multiplicity in class-level relation
- no inheritence relationship (because of the objects)
- relations take over the properties

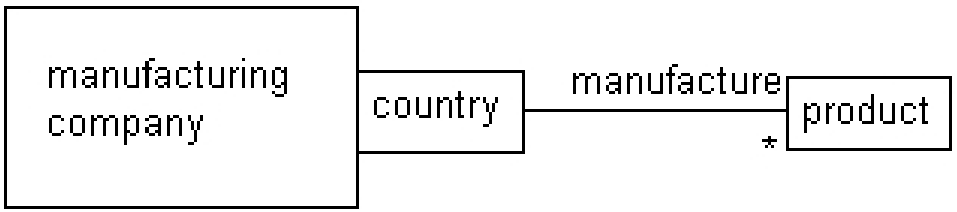
Object diagram



Example

Consider the following scenario and draw a proper class diagram: Multinational manufacturing companies manufacture many products. A product is made in only one country.

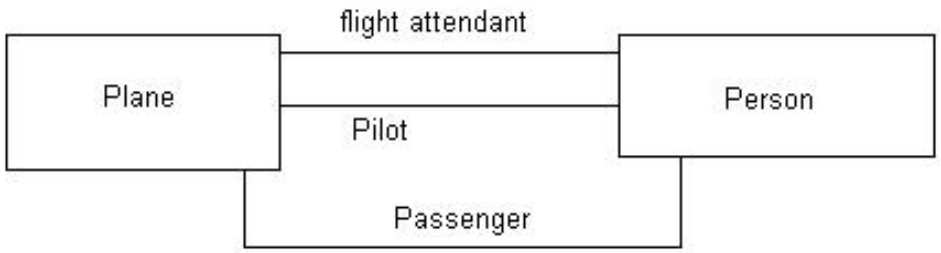
Solution



Exercise

Consider the following scenario and draw a proper class diagram: Many people can be found on a plane: pilots, passengers and flight attendants. 2 pilots are needed. At least one passenger is on the plane. At least 2, but not more than 5 flight attendants can be found on a plane.

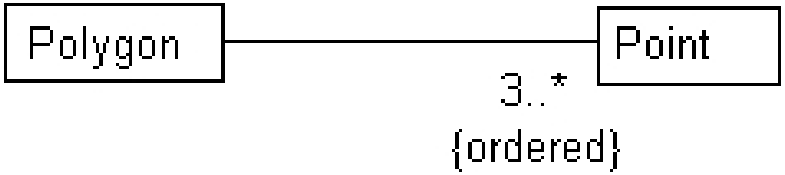
Solution



Exercise

Draw a class diagram about the following scenario:
Polygons have at least 3 different points.

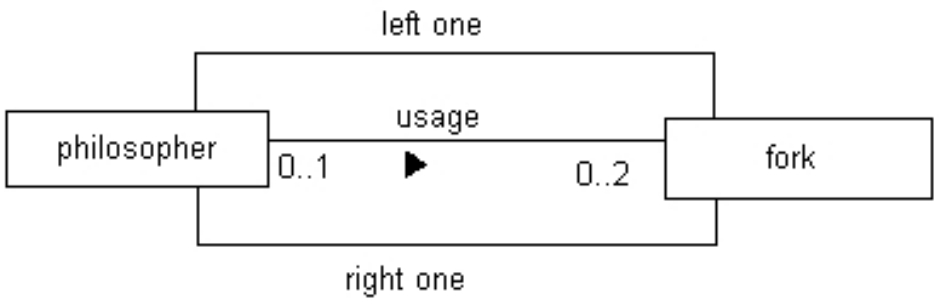
Solution



Exercise

Consider the following scenario and draw a proper class diagram: Dining philosopher wants to eat. Two forks (a left one and a right one) is needed. One fork cannot be used simultaneously by more philosophers.

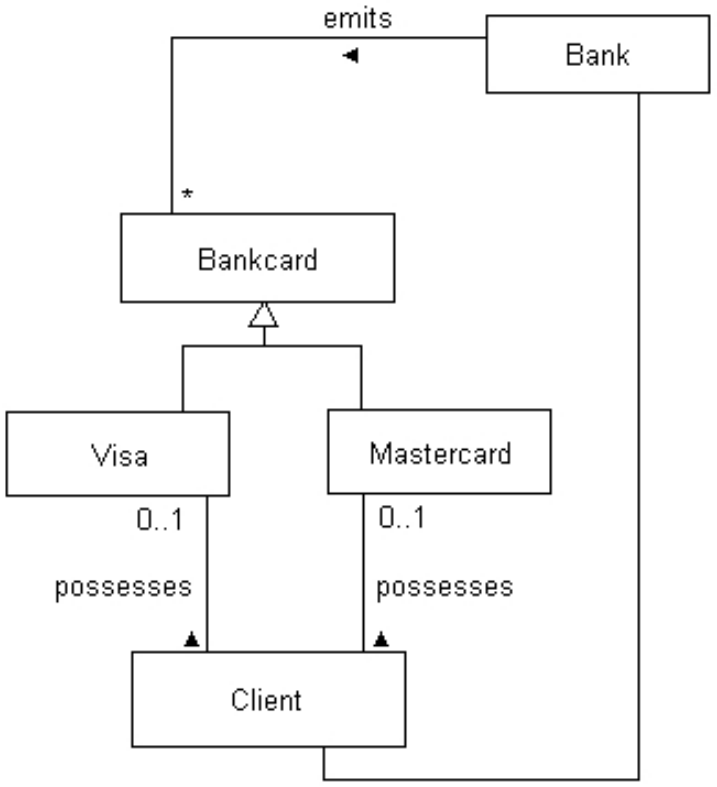
Solution



Exercise

Draw a class diagram about the following scenario:
Banks emit bankcards. Bankcards have two types: Visa and Mastercard. Clients have bankcards. A Client may possess one Visa card and one Mastercard card.

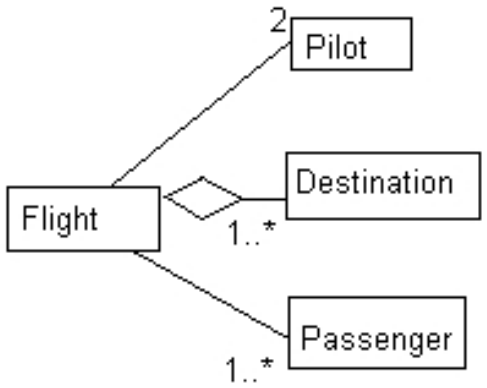
Solution


emits
Bank
*
Bankcard
Visa
Mastercard
0..1
possesses
0..1
possesses
Client

Exercise

Draw a class diagram about the following scenario:
Flights have a destination. 2 pilots are need to a flight. Many passengers can be found on a flight.
Draw an object diagram according to the class diagram.

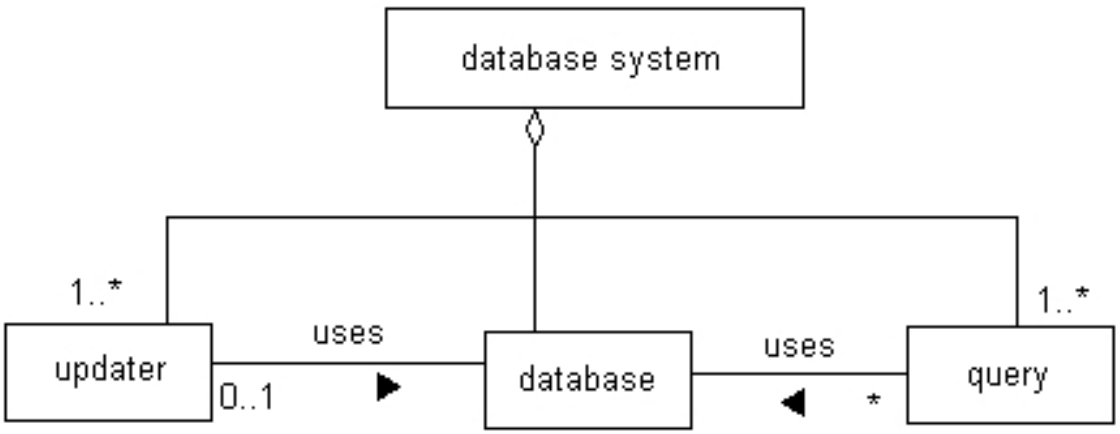
Solution



Exercise

Draw a class diagram about the following scenario:
A database system has one database, many updater and query processes. These processes use the database. At the same only one updater can be executed, but many query processes can run.

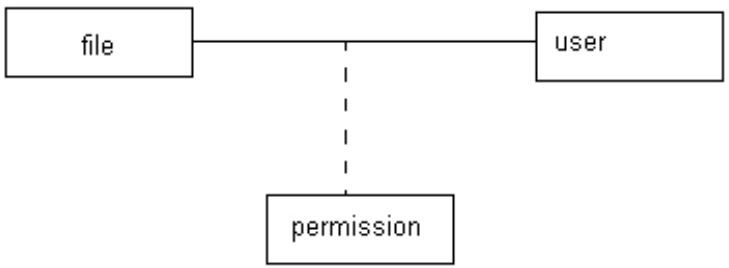
Solution



Exercise

Consider the following scenario and draw a proper class diagram: Files can be used by the users. Permissions of files are applied to the users.

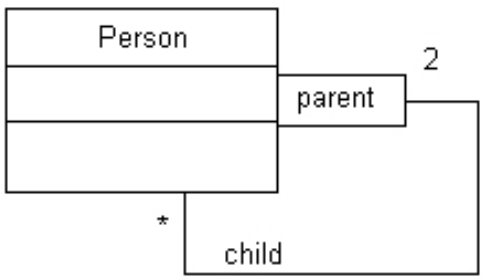
Solution



Exercise

Draw a class diagram about the following scenario:
People may have children. One person has exactly two parents.

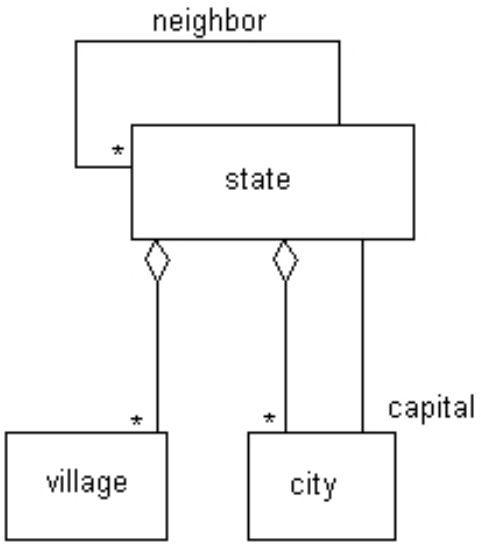
Solution



Exercise

Consider the following scenario and draw a proper class diagram: States consist of villages and cities. Every state has a capital city. Between the states there is a connection: which states are neighbors.

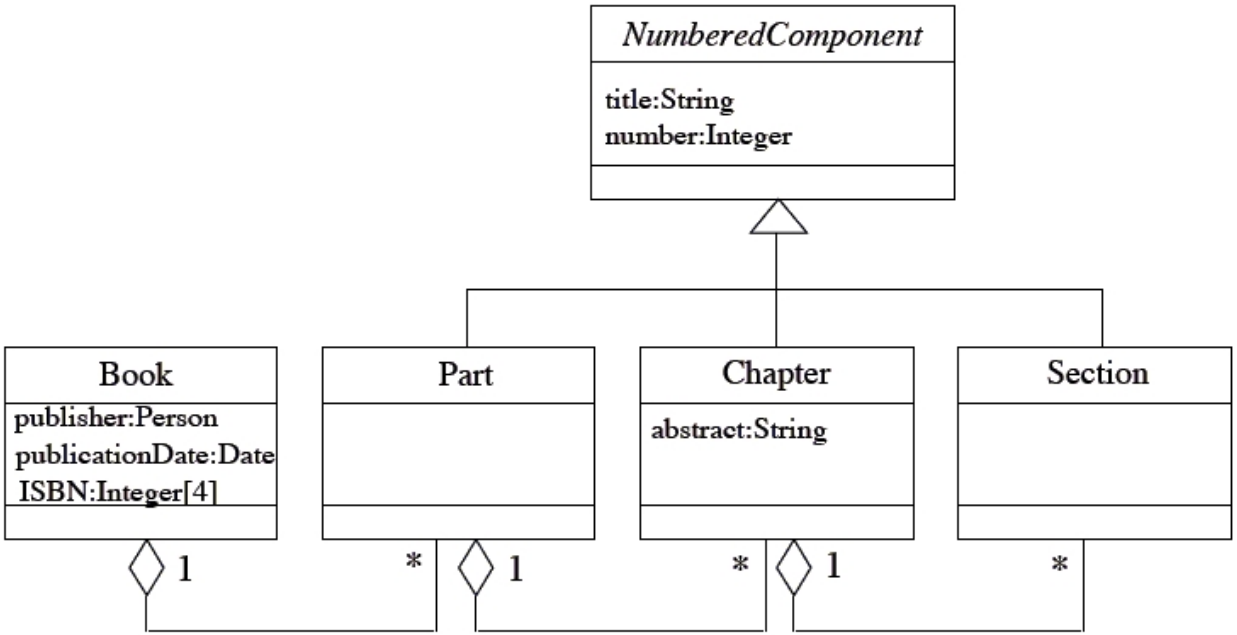
Solution



Exercise

Draw a class diagram about the following scenario:
Books consist of some parts, parts consist of some chapters, and chapters consist of some sections. Parts, chapters, sections are numbered components. Every numbered component has number and a title and every chapter contains an abstract. A book is published by Person. Books have a date of publication. ISBN is the book's unique identifier.

Solution


NumberedComponent
title:String
number:Integer
Book
publisher:Person
publicationDate:Date
ISBN:Integer[4]
Part
Chapter
abstract:String
Section
1
*
1
*
1
*

Exercise

Draw a class diagram about the following scenario:
Directed graphs consist of nodes and edges. Edges link a node to a node. Graphs have a name. More edges can point to a node. One point also can be a graph. We distinguish between the ingoing and outgoing edge because of the direction.

Solution