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Exercises in Modeling Methods in Computer Science, Winter 2005/06
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Exercise 8  Submit until 20.12.2005, 4 p.m.

Task 17: Class relations

Given the following situation:

Otto Meier is a member of an association of anonymous informatics-lovers (short: AIL). The Muller family (Elke Muller, Richard Muller and their children Hanna, Eva and Lisa) is also a member. As there is a special proposition from AIL the Mullers participate not as individuals, but as a family, so the whole family is one member in AIL. Every AIL-member (either individual or family) receives monthly association periodical at his address. Hanna Muller takes her studies in other city than her parents and can read the periodical always only with delay, because it is sent to the family address.

Someone else has identified the following classes for this situation:

- Association
- Person
- Family
- Periodic
- Association member

Task:

(a) Please, define with the help of the above text appropriate relations between these classes. Try to find minimum one inheritance relation, one aggregation relation and one association relation. Give reasons for every found relation why you have chosen exactly this type (inheritance, aggregation, association).

(b) How many objects of concerned class can stay at one side of each relation? (Specify the cardinality of the relations.) Justify your answer.

(c) Represent these classes and relations in UML. For the classes it is enough to give the names, no methods or properties should be given here.

(d) Which objects (instances) of the mentioned classes could you identify in the text? Give all the classes for each object, which instance it is. (also mother classes)

8 Points
Task 18: Class design

The following situation is given:
A company wants to manage an auto park. Therefore, all the vehicles should be modeled. The firma has in stock not only motor vehicles, but also bicycles and trailers.

- Cars and lorries have KFC contraction (notation) and the year of manufacture.
- For lorries, in addition the number of axes and the weight in tons are important.
- Cars can be four-seated or two-seated.
- All vehicles have a serial number.
- All motor vehicles could be tanked.
- Bicycles have a year of manufacture and frame size.
- Trailers have a year of production and number of axes.
- Every vehicle could be put at a collaborator’s disposal. A trailer could only then be given to a collaborator, when he has a vehicle from a firm.

Task:

(a) What classes can you define for the situation?
(b) What are the relations between identified classes and why?
(c) Present also properties for the found classes, where it makes sense. In case of inheritance, please pay attention, to locate properties at the mother class, where it makes sense.
(d) Assign the found classes, where it makes sense, with methods tank and put_into_disposal. In case of inheritance, be sure to show both: mother class methods and child class methods, if they behave differently.
(e) Please, show an UML class diagram to your draft, and give also the properties and methods for the classes.
(f) Is there any state of affairs in this situation that you did not model? If yes, then what?

Hints:
For the tasks c) and d) it is enough to give the properties and methods in the class diagram (in the solution for e)). They could be nevertheless solved separately from e). (Then in text form.)

12 Points