



Exercise Sheet 2: Data Modelling I (until Thursday, 03.11.2016)

Please note: you need **50%** of all exercise points to receive the *Studienleistung* for this lecture. In order to pass the RDB I Module, you need both the *Studienleistung* **and** you need to pass the exam. Exercises have to be turned in until **Thursday before the lecture** either in the lecture hall or into our mailbox (Informatikzentrum 2nd floor). Please do not forget your **Matrikelnummer** and your **tutorial group number** on your solutions. Your solutions may be in German or English. Unless otherwise specified: **Always use your own words!**

Exercise 2.1 – Database Design (5 Points)

- a) In databases, the data's *specific semantics* are very important. Explain, what **data specific semantics** mean and why it is needed. (2 points)
- b) Explain the concepts of physical and logical data independence. (2 points)
- c) Explain the concept of universe of discourse (1 point)

Exercise 2.2 – ER Modelling (10 Points)

- a) Explain the differences between an **entity** and an **entity type** with an example (2 Points)
- b) Explain what a derived attribute is and provide an example? (2 Points)
- c) How does a derived attribute affect **redundancy**? (2 Points)

- d) Why do we need **key** attributes? (1 Point)
- e) Explain the following: (3 Points)
- Relationship type
 - Relationship set
 - Relationship

Exercise 2.3 (3 Points)

Draw a Chen ER-Diagram for the following entity type:

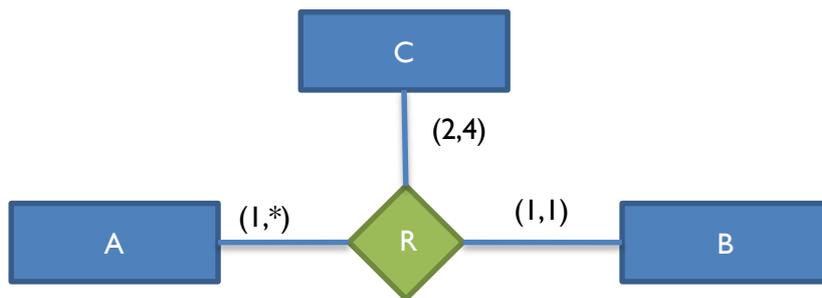
Employee = (id, first_name, last_name, (address (street, no, zip, city)), {telephone (handy, home, office)})

Exercise 2.4 (4 Points)

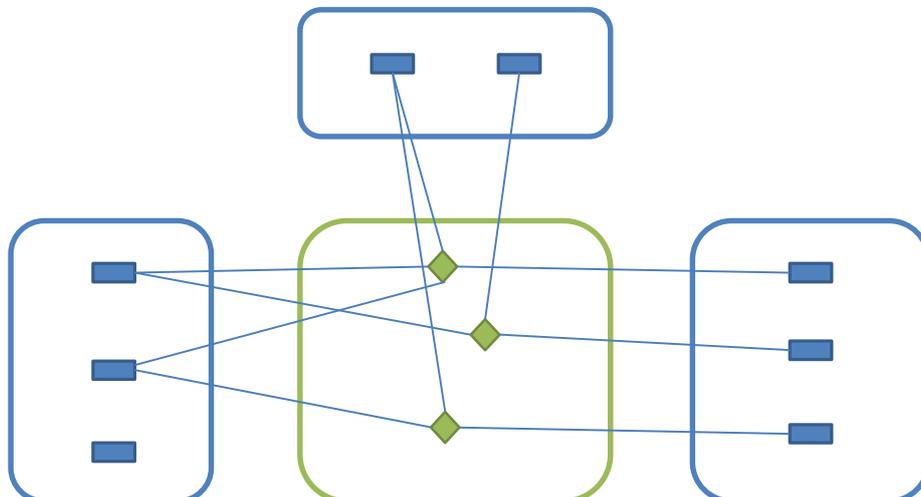
Give an example ER diagram of a weak entity and its corresponding strong entity. The weak entity should have an own key attribute. Also provide a textual representation of all entity types in the ER diagram. **Note:** the example must be different to the ones presented in the lecture.

Exercise 2.5 (4 Points)

Given the following ER-Diagram:



Is the relationship set **r** described in the following figure a valid instance of the relationship type **R**? If not, list all conflicts that violate the constraints described in the ER-Diagram above and provide an adaptation of **r** that would make **r** a valid instance of **R**.



Exercise 2.6 (6 Points)

Create an ER diagram (Chen) for the following scenario:

You are organizing an exhibition. There are a number of halls identified by a unique number. Additionally each hall has a name. In each hall there are several stands described by a number which is only unique within the hall. Stands are rent by Companies. Companies are identified by the company's name. Besides the stands there are special rooms for presentations identified by a number. Companies may register a presentation in a fixed time slot. Time slots do not change during the exhibition and are identified by a start time and an end time.