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Semantic Technology Institute
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PS Introduction to Modeling

Assignment 2

Exercise 1 (ORM Basics – 6 points)

ORM describes a conceptual modelling approach. A nice introduction to this topic is given by Terry Halpin (ORM-Intro, linked on the website). Read the document (p. 1 - 5) for a better understanding of the topic, to answer some basic questions in subtask a and to solve subtask b:

- Describe the concepts of (a) *elementary facts* (positive example / negative example) (b) *predicate* / *inverse predicate*, (c) *reference mode* and (d) *arity* with your own words (don't copy definitions).
- As a first case study, have a look at Table 1 including some social network profiles. The assigned group defines the access grants within the social network. Execute step 1 & step 2 of the CSDP as mentioned in the ORM-Intro (Table 1).

Profile-ID	Name	Country	Validation-Date	group	grants
213	John F	Innsbruck	12.04.2014	1	standard user
124	John G	New York	12.04.2019	2	NSA
214	John S	Bozen	29.09.2014	1	standard user
121	John R	Wien	22.03.2014	1	standard user
433	John K	Singapur	unlimited	3	admin

Tabelle 1: Social network output

- Now, uniqueness constraints (UC) need to be defined (p. 5-7). Please explain the differences between all 4 binary constraints in Figure 1 and give an example for each of them.

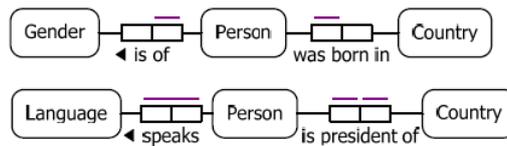


Abbildung 1: Binary constraints

- Check out the two ternary facts. *The moon „Luna“ orbits planet „Earth“ in 27 days. The student „John“ received his degree „MSc“ from school „University of Innsbruck“.* Which of them are elementary? Explain why/why not with the help of the $n-1$ rule from the lecture. Maybe Figure 5 from ORM-Intro gives you a hint.
- Explain the differences between the exclusion, exclusive-or and the inclusive-or constraint.
- Finally, Figure 2 shows an excerpt of the final diagram (ORM-Intro page 11). As you can see, the old ORM syntax is used. Please explain the meaning of the excerpt with your own words (objects, predicates, constraints) and draw the diagram with the new syntax (cf. Lecture). The pdf document ORM2-Graph (linked on website) presents you a compact overview.

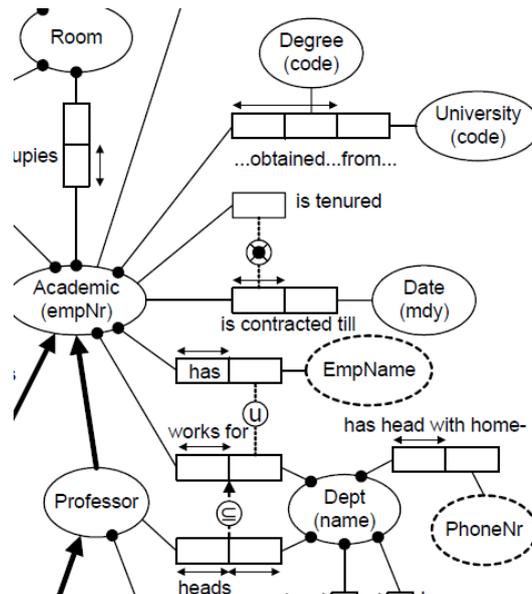


Abbildung 2: Excerpt of final ORM

Exercise 2 (ORM modelling – 6 points)

These exercises are taken from the book *Information Modeling and Relational Databases*.

- A template for a ternary fact type is shown. For each of the fact tables provided, add the uniqueness constraints, assuming that the population is significant in this regard.

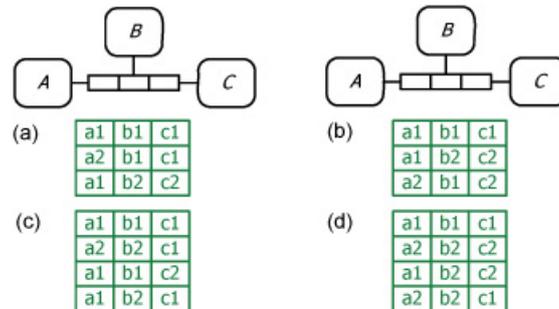


Abbildung 3: Ternary facts

- The names and gender of various people are indicated below:
 - Male: Hansi, Thomas
 - Female: Mathilda, Christine, Maria
 1. Express the information about Hansi and Mathilda in unary facts.
 2. Draw a conceptual schema diagram based on this choice
 3. Express the same information in terms of binary elementary facts.
 4. Draw a conceptual schema diagram based on this choice.
- A car dealer maintains a database on all the cars in stock. Each car is identified by the vehicle identification number (VIN) displayed on a plate attached to the car (e.g., on its dashboard). For each car the dealer records the model (e.g., Kia Ceed SW), the year of manufacture (e.g., 2012), the retail price (e.g., \$ 14,000), and the color (e.g., dark blue). Because of space limitations the dealer will never have in stock more than one car of the same model, year, and color at the same time. The dealer also keeps figures on the number of cars of a particular model and color that are sold in any given year. For example, in 2012, five dark blue Kia Ceed SW were sold. Draw the conceptual schema diagram, including all uniqueness constraints.

Enter your anticipated points and send your final solution and explanations (txt and pdf files only!) to anna.fensel@uibk.ac.at until Wednesday the 11th of November 2015, 16:00.