Rigorous Service-driven Applications: Case-study on E/R Conceptual Model

Case study 1 (Modelling by example)

Jean harris, born in Bonn and living in street Goette number 4, wants to buy some household appliances (electrical domestic products) for his new flat. He plans for tomorrow to have a new or used fridge, mark X; but in case of a used one, it should not be more than one year. Further, he requires that the price should not go beyond 200 Euros.
- Could you draw up an E-R model for Jean and any of his colleagues (students)?
- For his tee, he wants rather two new water machines. Is that changes something to the model ?
- For used electric things, he prefers to have them from friends. New things are rather bought from any store in the center of the city and which has opened in the last three years. Could you adapt the E-R model to these new requirements ?

Case study 2 (Modelling by description)

In any Online-shop products are characterized at least by their Id (product ref.), name, the available quantity and the unit Price. Products are ordered by customers (Id, name, address). Propose a CM for this?
In fact depending on the processing, Ordered Products possess current status, which may be “Pending” or “Invoiced”. With the later corresponds an invoice to be send to the customer with the total amount to pay. Adapt the CM in consequence?

Case study 3 (Modeling by description)

We assume having Airports characterized by: name, location, staff and the Shed. Such airports may be directly connected by connection with FlightType and kind of connection.
- Establish a first model for this universe of discourse (UoD)?

We also assume that any person is characterized by its name, address, telNo, Dateofbirth. We have also passengers with passportNb and nationality and staff members with job title. Such staff may be regarded as flight staff with RoutineExam and HealthCertificate or ground staff member with the department to which they belong and the Workinghours.
Case study 4 (Modelling by output)

| Listing from the (central) library of MAGDEBURG date: 14.04.2002 |

| Alex has two books |
| Harris wants the Petri net book, 1985, but no copy is left; he has the possibility to reserve it by giving its library-card number and its student registration number. Each copy is uniquely identified. Students are allowed to borrow only copies of books and not the original; the number of copies is most 5 for each book. |
| Linda has no chance, the wanted book does not exist. In this case of staff of the library may order in form another library in Germany by specifying the date of arrival and the date of its return. And then hand it to her for just one week. |

| date of borrow : 16.04.20002, date of return : 14.05.2002 |
Case study 5 (Modelling by description)

We require storing information about different kinds of bodies of water, about countries, towns, and the leaders of them. For this we consider the following facts. Every town lies in a country and may lie at one or more rivers. Rivers flow through countries (in a specific length) and flow into some kind of waters. Seas, rivers, and lakes with their names are such waters. A Person may be a a mayor or of a town, or the head of or a Minster of a country. Besides information like the population of a country or of a town the addresses, and names of persons, we associate every geographical object with a location in the world's coordinate system. That is, countries are represented by a set of closed polygons (representing their region), towns and lakes by circles, seas by closed polygons, and rivers by connected, non-overlapping lines. Distances are relevant for any river lying at a town.

- Conceive a conceptual model for this application?

Case study 6 (Modelling by description)

- Professors have a SIN, a name, an age, a rank, and a research specialty.
- Projects have a project number, a sponsor name (e.g. DGF, BMF), a starting date, an ending date, and a budget.
- Graduate students have a SIN, a name, an age, and a degree program (e.g. M.S. or Ph.D.)
- Each project is managed by one professor (principal investigator).
- Each project is worked on by one or more professors (co-investigators).
- Professors can manage and/or work on multiple projects.
- Each project is worked on by one or more graduate students (research assistants).
- When graduate students work on a project, a professor must supervise their work on the project. Graduate students can work on multiple projects, in which case they will have a (potentially different) supervisor for each one.
- Departments have a department number, a department name, and a main office.
- Departments have a professor (chairman) who runs the department.
- Professors work in one or more departments, and for each department that they work in, a time percentage is associated with their job.
- Conceive a conceptual model for this application?