Entity/Relationship: Applications

Case study 1 (Modelling by example)
Jean Harris, born in Magdeburg and living in street Breiter weg 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 be not more than one year. Also, 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 water machines. Is that changes something to the model?
- For used electric things, he prefers 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. Is our E-R to be adapted?

Case study 2 (Modelling by description)
We assume having Airports characterized by: name, location, staff and the Shed. Such airport 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.

- Complete the UoD with this such realities?

The shed itself includes the maintenance shed with their name and the airplanes responsible for; each airplane is characterized by its airpalneNumber.

- Include these information in the model?

Connection may belong to a non stop flight including the Flightnumber, Price, and charter or not. Such non stop flights have PlaneCrew and schedule with time table including the route, departureTime, departureDay, ArrivalDay. To each non stop flight an airplane may assigned and passeger may booked for it.

- Adapt the model?

From the airport shuttle services have to be organized with a precise timetable, They are destinedated to any town in the country that we suppose we know its location and its number of habitant. Airline compagnies should have at least an agency in the airport with a specific number of staff. Airline compagnies have a fleetof aircrafts, headoffice and trademark and they offers connection.

- Add this information to the model?
**Case study 3** (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 mayor or of a town, or the head or a Minister 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 4** (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. NSERC), 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.
- 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?

**Case study 5** (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”. The later correspond to an invoice to be send to the customer with the total amount to pay. Adapt the CM in consequence?
Case study 6 (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. But 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 5 for each book.

Linda has no chance, the wanted book does not exist. In this case, 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.