ER Modelling

In this exercise you will practice conceptual data modelling using ER diagrams.

Exercise 1
You want to store data about Persons (Person) with a surname (Name), first name (FirstName), personal identification number (PersonNo), place of residence (Place) and Zip code (Plz) in a database. Define the relationship between Person and Place in an ER diagram for the following cases:

a) a Person can only have one place of residence (Place)
b) a Person can have multiple places of residence (Place) (e.g., temporary accommodation)

Define the cardinality and participation constraints of the relationship and identify the key attributes.

Exercise 2
You want to store the Course participation of students in a database. You need to store the Name, First Name and Matrikel-No. of the students, as well as the Course-No., Name and Room in which the course takes place. Define the ER model in an ER diagram.

Exercise 3
Christoph is a student and takes a number of courses, but he also works as a Tutor. We therefore need to store additional information in the model (-> his function) extending the course participation. How can the ER model from Exercise 2 be extended? What happens if the course takes place in multiple rooms?

Exercise 4

Extend your ER model from exercise 1 with the following requirement: People (person) may have mobile phones with GPS functions, and may choose to synchronise their mobile data with the database and thus store Routes. The routes stored are defined by 2-dimensional points [x and y coordinate] and a recording time. Each route can be named.

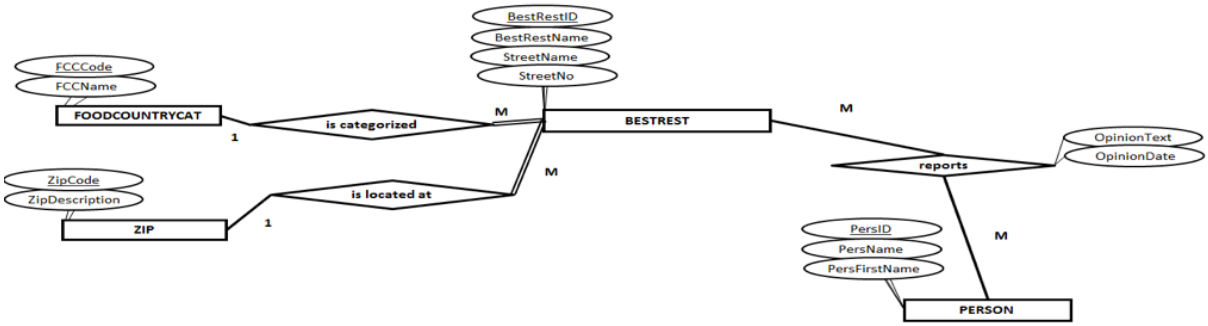
Exercise 5
You own an art gallery, and would like to use database system to manage the gallery. The gallery keeps information about artists, their names (which are unique), birthplaces, date of birth and a description for their style. For each piece of artwork, the artist, the year it was made, its unique title, its type of art (e.g., painting, lithograph, sculpture, photograph), and its price must be stored. Pieces of artwork are also classified into groups of various kinds, for example, portraits, still-lifes, abstractions, or works of the 19th century; a given piece may belong to more than one group.

Each group is identified by a name (like those just given) that describes the group. Finally, galleries keep information about customers. For each customer, galleries keep that person's customer id, name, an address text, total amount of CHF spent in the gallery, and the artists and groups of art that the customer tends to like.

Draw the ER diagram for the database.

Exercise 6

In Lab 2 we had the example of best restaurants being reported by users. The underlying ER model (=relational model) that we used looked like this:



In a first step the relations (=logical model) were designed - result not shown here. A second step was conducted by building up the tables, keys and relationships (=physical model/realisation in the DB).

a) Explore the tables, their columns, primary keys, foreign keys and dependencies in the schema of userdemo.
b) Try to identify the entity types, attributes and relationships from the ER model in the physical database tables (=comparing the ER relational model against physical data model).
c) How is the 1:N relationship 'is categorized' represented?
d) How is the N:M relationship 'reports' implemented in the physical model?