EER Mapping Example

Question 6.3, Part A

Given the EER model for an electricity market (on Page 144):
- *Map the EER model to a relational model representation.*
- *Clearly indicate the primary and foreign key relationships. (Use the commands \pk and \fk.)*

Producer, Reseller

Producer(<u>ProdName</u>, Location)

Reseller(<u>BrandName</u>, NumEmployees, Manager)

Sells(*<u>ProdName</u>*, *<u>BrandName</u>*)
- ProdName references Producer
- BrandName references Reseller

Customer (all types)

Customer(<u>CustID</u>, ContractType, *ContractWith*)
- ContractWith references BrandName in Reseller

Residential(*<u>CustID</u>*, Household-size)
- CustID references Customer

Business(*<u>CustID</u>*, VAT-number)
- CustID references Customer

Power Plant, Regulator

Regulator(<u>Province</u>, Manager)

PowerPlant(<u>PlantID</u>, MWH, Location, *Province*)
- Province references Regulator

Owns(*<u>ProdName</u>*, *<u>PlantID</u>*)
- ProdName references Producer
- PlantID references PowerPlant

Gas, Wind, Nuclear

Gas(*<u>PlantID</u>*, Pipelines)   PlantID references PowerPlant

Wind(*<u>PlantID</u>*, Mills)   PlantID references PowerPlant

Nuclear(*<u>PlantID</u>*, Reactors)   PlantID references PowerPlant

Question 6.4, Part B

Given the EER model for the airline business (on Page 145):
- *Discuss semantics that cannot be enforced by the EER model.*
- *Discuss the possible loss of semantics in the relational model.*

The following semantics cannot be enforced by the EER model:

Temporal aspects:
- A contract between a customer and an electricity reseller could be limited in time.
- The size of a household could change from year to year.
- The number of windmills of a power plant could change.

Consistency across multiple relationship types:
- The model cannot enforce that the power plant of an electricity producer that is located in a certain province is regulated by the local regulator of that same province.
- The model cannot enforce that one person is not both the manager of an electricity reseller and of a local regulator at the same time.

Integrity rules:
- Household size should not be larger than 15.
- A VAT number should have a fixed format of ten digits.
- The province of the local regulator should be a valid province of the country we are creating this model for.

The following semantics were lost in the relational mapping:

- The disjointness of the specialization of Power Plant into Gas, Wind, and Nuclear cannot be enforced.
- The disjointness of the specialization of Customer into Residential and Business cannot be enforced.
- The minimum cardinality of 1 in the relationship type Owns between Electricity Producer and Power Plant cannot be enforced.
- The minimum cardinality of 1 in the relationship type Sells between Electricity Producer and Electricity Reseller cannot be enforced.