

Exercises: Normalisation

Task 1 (from an exam)

Given the universal relation $R=\{A, B, C, D, E, F\}$ and the following functional dependencies

$F=\{\{A \rightarrow BC\}; \{C \rightarrow AD\}; \{DE \rightarrow F\}\}$

- Enumerate all the candidate keys of the relation and show how you arrive at the conclusion that they are candidate keys (apply the inference rules for functional dependencies)
- Find a superkey for the relation.

Task 2 (adapted from an exam)

Smallville Garden Club rents garden beds for cultivating plants to their members. To be sure that the beds are used as efficient as possible they want to build the following database. (Each field has beds of a certain size.)

Owns(MemberNr, MemberName, BedNr, Field, BedWidth)

- Make assumptions about the functional dependencies of the attributes.
- Which are the candidate keys of this relation?
- Which normal form is the relation in? Why?
- Normalise stepwise into BCNF

Task 3 (difficult)

Consider the following table:

Recipe Name	Category	Ingredient	Where to shop ingredient
Spaghetti Bolognese	Quick	Minced Meat	Lilliput's Butcher Shop
Spaghetti Bolognese	Quick	Spaghetti	Coop
Spaghetti Bolognese	Quick	Tomato	Lilliput's Market
Spaghetti Bolognese	For children	Minced Meat	Lilliput's Butcher Shop
Spaghetti Bolognese	For children	Spaghetti	Coop
Spaghetti Bolognese	For children	Tomato	Lilliput's Market
Pizza Margherita	Easy	Tomato	Lilliput's Market
Pizza Margherita	Easy	Basil	Lilliput's Market
Pancake	Easy	Egg	Coop
...			

- Which functional dependencies do you see?
- What is the primary key of this relation?
- Normalise stepwise into BCNF (stick to the algorithm, otherwise semantics get into your way).
- (Advanced) If you replace the semantics-carrying attributes Recipe Name, Category, Ingredient, Where to shop... by A, B, C, D, does your normalisation result change? If not: Do you see a difference in the solutions if you model this mini-world as an EER-diagram and translate it into normalised tables? You should or you did not follow the algorithm in 3.