KØBENHAVNS UNIVERSITET

Noter

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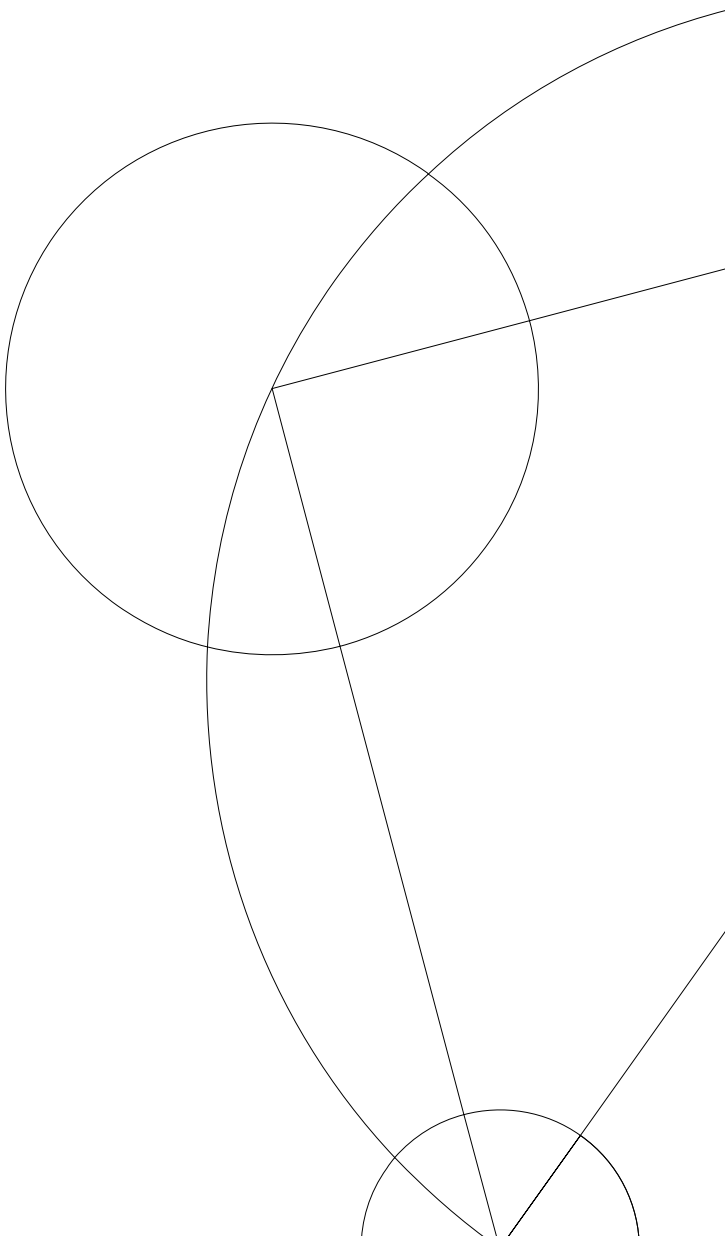
AD 2023



11. februar 2025

Indhold

How to organize data?

Entity–relationship (ER) model

What Should We Learn Today?

- Explain the concepts of entity (set), relationship (set) and express these concepts in entity-relationship (E/R) diagrams
- Explain and express constraints (key, uniqueness, and ref. integrity) in E/R diagrams
- Explain and capture in E/R diagrams weak entity sets and ISA hierarchies
- Analyze trade-offs and argue for the advantages and disadvantages of an E/R design
- Explain what a data model is, along with the distinction between schemas and instances
- Define and explain the relational data model
- Define and explain the main classes of integrity constraints in the relational model, in particular key and foreign key constraints
- Model relational schemas and express them in SQL

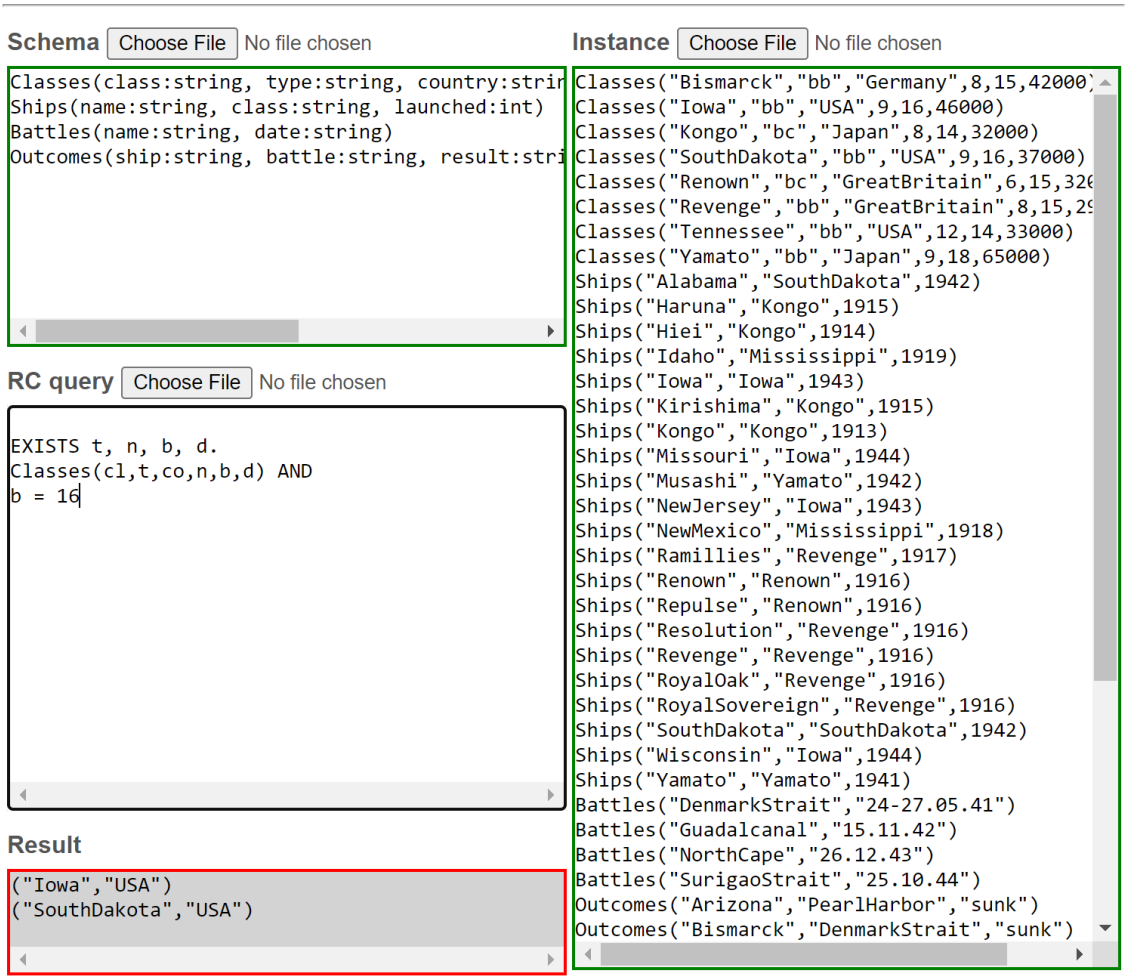
Summary of ER

- Several kinds of integrity constraints can be expressed in the ER model: key constraints, uniqueness constraints, and referential-integrity constraints. Some foreign key constraints are also implicit in the definition of a relationship set.
  - Some constraints (notably, functional dependencies) cannot be expressed in the ER model.
  - Constraints play an important role in determining the best database design for a use case.
- E/R design is subjective. There are often many ways to model a given scenario! Analyzing alternatives can be tricky. Common choices include:
  - Entity vs. attribute, entity vs. relationship, binary or n-ary relationship, whether or not to use ISA hierarchies, how to define constraints.
- Ensuring good database design: resulting relational schema should be analyzed and refined further.
- Functional dependencies and normalization techniques can be useful but cannot be captured in a E/R model. More on this later in the course

Relational model

How to query data?

Relational calculus



SQL

How to organize data consistently and efficiently?

Functional Dependencies

Normal Forms

ACID

Views triggers

How to query data efficiently?

Indexing

Join evaluation