Modeling Relational Databases

Modelling and Optimisation for Product Development

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Why do we need modeling?

- Modelling in engineering disciplines:
  - Organize ideas.
  - Gradually refine solution.
- Modelling in SE:
  - Better analysis: know the problem.
  - Better design: know the solution.

Object Oriented Design

- World is made out of objects.
- Objects are grouped in classes.
- Objects has attributes (data) and operations (behavior).
- OO approach is close engough to reality, thus a good modelling paradigm.
- Many programming languages adopte this approach (Java, C++…).

Unified Modeling Language.

- ISO standard (ISO/IEC 19501:2005).
- Not a methodology by itself.
- A set of diagrams.
  - Use case diagram,
  - Class diagram,
    - Model-View-Controller Diagram.
  - Sequence Diagram…

Class Diagram

- Classes.
- Attributes.
- Operations.
- Scope.
- Relations.
  - Object-level
    - Association,
    - Aggregation,
    - Composition.
  - Class-level
    - Generalization.

Exercises

Need for Persistence

- Non-volatile data.
- Flat files?
- The relational model.
  - Relation ⇔ Table
  - Tuple ⇔ Row
- Database Management Systems (DBMS).
- Field: name and type.
- Tables: set of fields.
- Record: related filed values.

Relational Database Modeling

- Entity-Relationship Diagram.
- Class Diagram → ERD.
  - Find persistent objects.
  - Classes → Tables.
  - Attributes → Fields.
    - Keys.
  - Objects → Records.
  - Association, aggregation, and composition.
  - Inheritance?