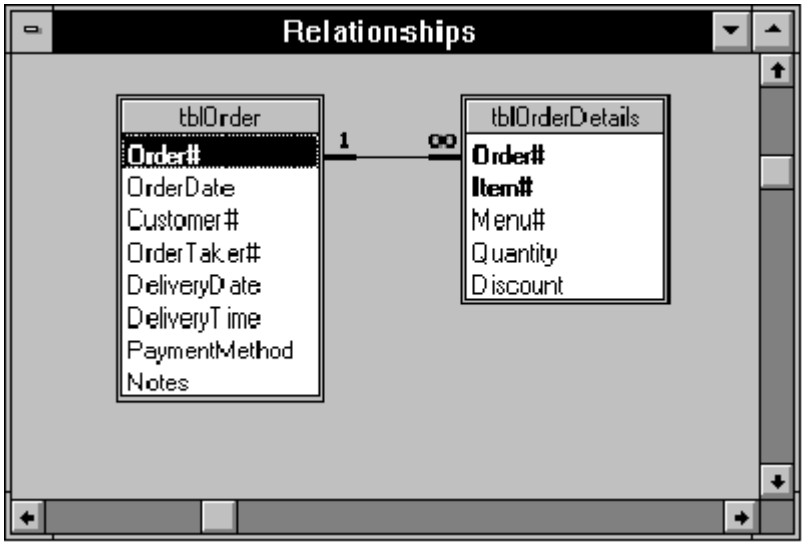
LU04a - Concept of a RDB

Learning Objectives

1. I can explain in my own words, what a relations database is and why it is widely used in all kinds of web applications.
2. I can name and explain the key components of a relational database.

A Relational Database (RDB) is a structured method for storing and organizing data. The core idea is to represent data as related tables.



Key components

- **Tables**: A collection of related data organized into rows (records) and columns (fields). Each row represents a unique entity, and columns contain specific attributes.
- **Records**: A single row in a table, representing a specific instance of data.
- **Fields**: A column in a table, defining the type of data stored in each row.
- **Relationships**: Connections between tables based on shared data. Common types include one-to-one, one-to-many, and many-to-many relationships.

Structure and Integrity

- **Primary Key**: A unique identifier for each record in a table.
- **Foreign Key**: A field in one table that references the primary key in another table, establishing a relationship.
- **Data Integrity**: Ensures data accuracy and consistency through constraints like:
  - Entity Integrity: Every table must have a primary key with no null values.
  - Referential Integrity: Foreign key values must match existing primary key values or be null.
  - Domain Integrity: Data values must conform to defined data types.

Advantages of RDBs

- **Data Consistency**: Enforced by relationships and constraints.
- **Data Security**: Access control mechanisms protect sensitive information.
- **Data Independence**: Changes to data structure can be made without affecting applications.
- **Efficient Data Access**: Indexing and query optimization enhance performance.

Common RDB Systems

- MySQL
- PostgreSQL
- Oracle Database
- Microsoft SQL Server

Vocabulary

English	German
row	Zeile
column	Spalte
entity	Objekt(-Einheit)
attribute	Eigenschaft
instance	Exemplar, Beispiel
unique	einzig(-artig)
to reference to	verweisen auf
to establish	errichten, herstellen
consistency	Widerspruchsfreiheit, Übereinstimmung
constraint	Auflage, Bedingung
to enhance	verbessern, aufwerten

References

Definition RDB: https://de.wikipedia.org/wiki/Relationale_Datenbank

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