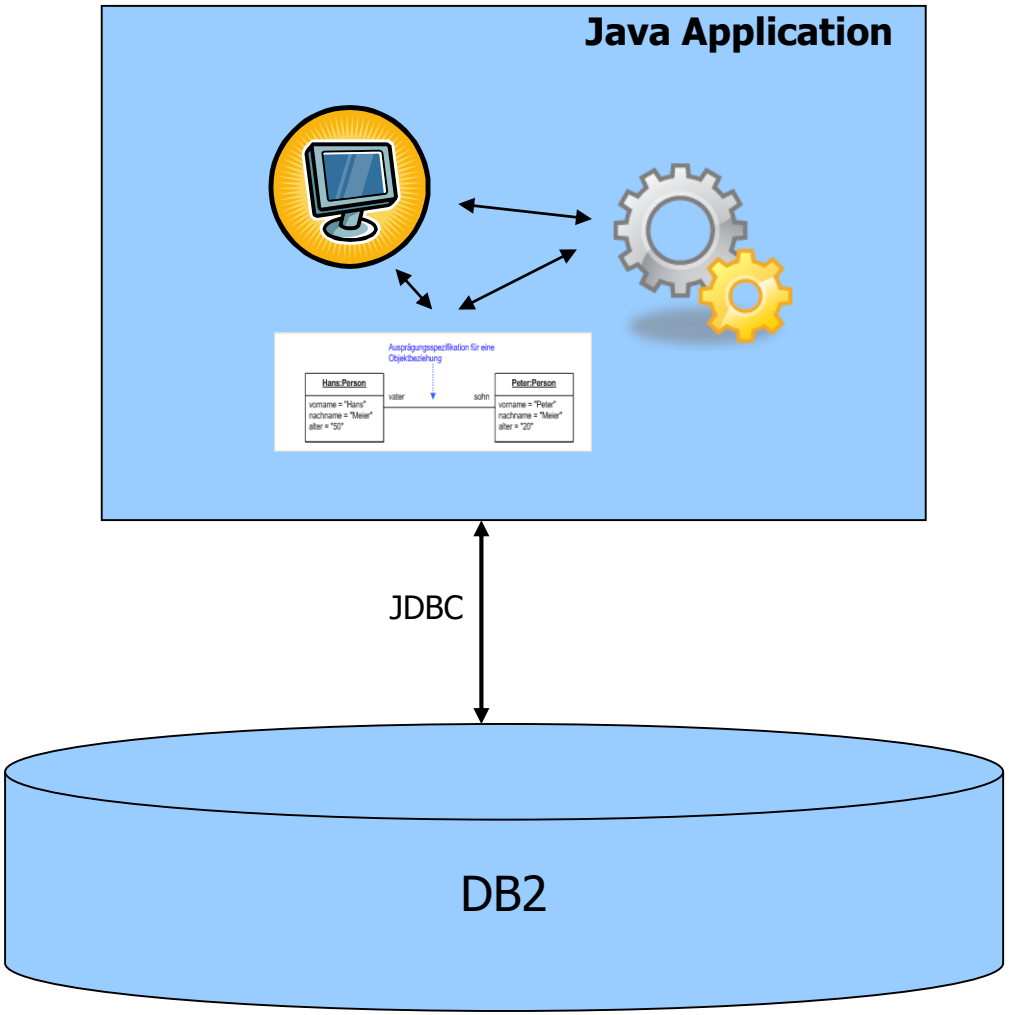
Databases and Information Systems

Relational Database Applications

Overview


Java Application
Ausprägungsspezifikation für eine Objektbeziehung
Hans:Person
vorname = "Hans"
nachname = "Meier"
alter = "50"
vater
sohn
Peter:Person
vorname = "Peter"
nachname = "Meier"
alter = "20"
JDBC
DB2

JDBC

- Load driver:
  ```
  Class.forName("com.ibm.db2.jcc.DB2Driver");
  ```
  This causes the registration of the driver in java.sql.DriverManager

- Open a connection:
  ```
  Connection con =
  DriverManager.getConnection(
  "jdbc:db2://host:port/dbname","username","passwd");
  ```

- Execute simple queries:
  ```
  Statement stm = con.createStatement();
  ResultSet rs = stm.executeQuery("SELECT …");
  int num = stm.executeUpdate("INSERT …");
  boolean b = stm.execute("sqlquery");
  ```

JDBC: Prepared Statements

- Precompiled queries with placeholders

  Example:

```
PreparedStatement pstm =
con.prepareStatement("INSERT INTO
USERS(UserName,Name,FName) VALUES (?,?,?)");

pstm.setString(1, "ccanady");
pstm.setString(2, "Craig");
pstm.setString(3, "Canady");
pstm.executeUpdate();
```

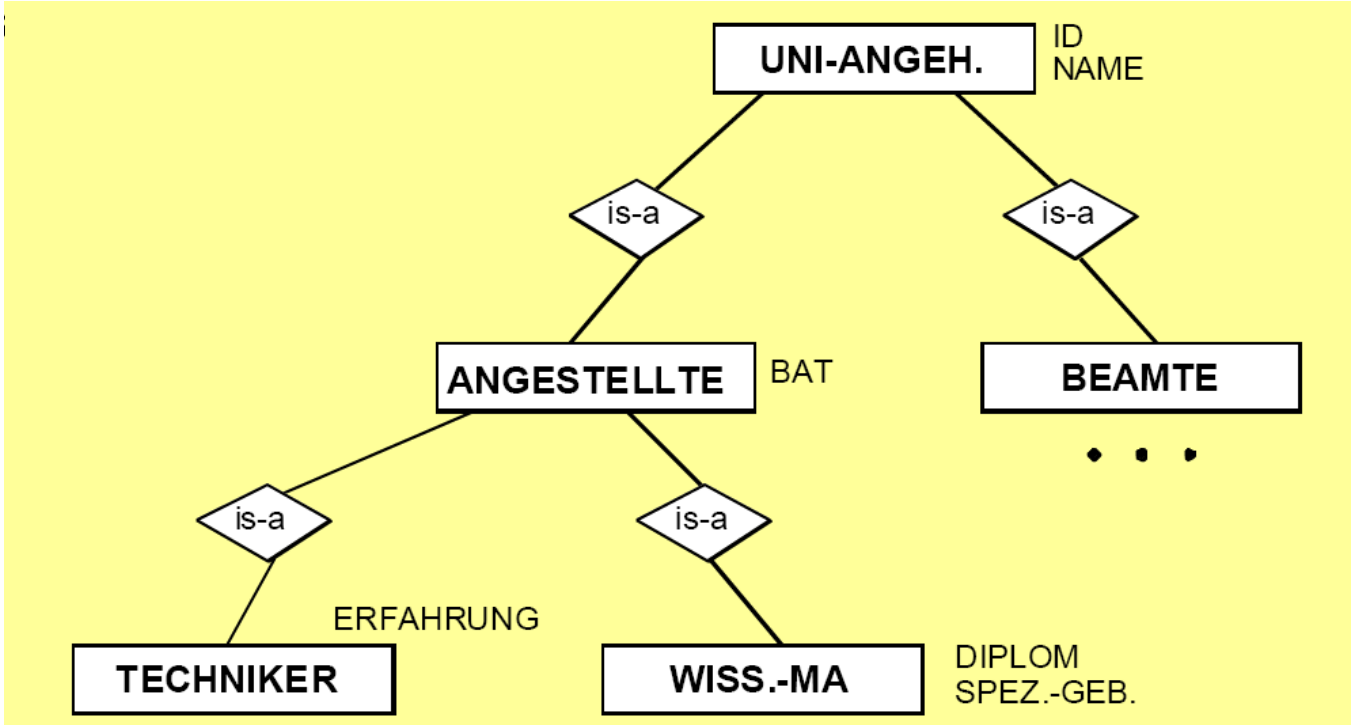
JDBC: Transaction Handling

- JDBC Default: Each statement executes in a transaction (autocommit mode)
- Might lead to inconsistencies!
- Controlling autocommit:

```
con.setAutoCommit(false);
//perform insert/update/delete operations
…
if(success)
    con.commit();
else
    con.rollback();
```

Generalisation in the relational model

- RM has no inheritance
- "Faking" inheritance is limited
- Example:



Generalisation: Horizontal Partitioning

- Horizontal Partitioning
  - Each instance is saved only once in its respective table (*Table per Class*)

UNI-ANGEH.	ID	NAME
	111	Ernie

ANGESTELLTE	ID	NAME	BAT
	007	Garfield	Ia

TECHNIKER	ID	ERFAHRUNG	NAME	BAT
	123	SUN	Donald	IVa

WISS.-MA.	ID	DIPLOM	SEPZ.-GEB.	NAME	BAT
	333	Informatik	RECOVERY	Daisy	IIa
	765	Mathematik	ERM	Grouch	IIa

Generalisation: Vertical Paritioning

- Instances are decomposed by their properties (*Joined Subclasses*)
- ID is duplicated

UNI-ANGEH.	ID	NAME
	007	Garfield
	111	Ernie
	123	Donald
	333	Daisy
	765	Grouch

ANGESTELLTE	ID	BAT
	007	Ia
	123	IVa
	333	IIa
	765	IIa

TECHNIKER	ID	ERFAHRUNG
	123	SUN

WISS.-MA	ID	DIPLOM	SPEZ.-GEB
	333	Informatik	ERM
	765	Mathematik	MAD

Generalisation: Full Redundancy

- Each instance is saved in every table of its inheritance hierarchy
- Attributes are repeated

UNI-ANGEH.	ID	NAME
	007	Garfield
	111	Ernie
	123	Donald
	333	Daisy
	765	Grouch

ANGESTELLTE	ID	NAME	BAT
	007	Garfield	Ia
	123	Donald	IVa
	333	Daisy	IIa
	765	Grouch	IIa

TECHNIKER	ID	NAME	BAT	ERFAHRUNG
	123	Donald	IVa	SUN

WISS.-MA	ID	NAME	BAT	DIPLOM	SPEZ.-GEB.
	333	Daisy	IIa	Informatik	RECOVERY
	765	Grouch	IIa	Mathematik	ERM

Generalisation: Single Table

- Considered unelegant
- All instances are saved in one table
- Non-existing attributes are NULLed
- *Discriminator Column*: Indicates Type of the row