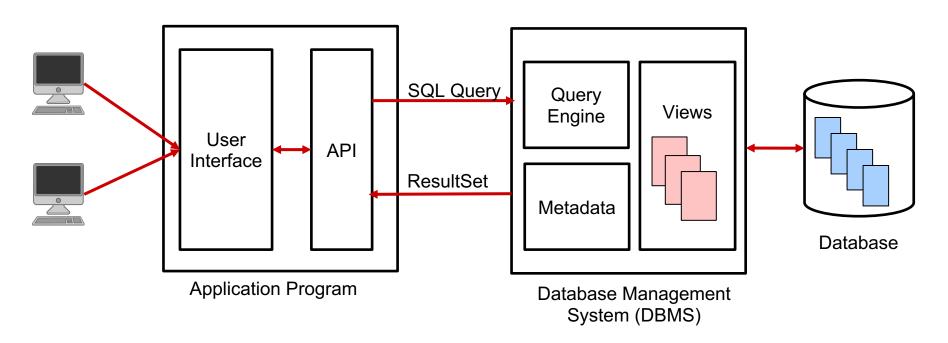
#### **Database Programming with JDBC**

CS3200: Database Design

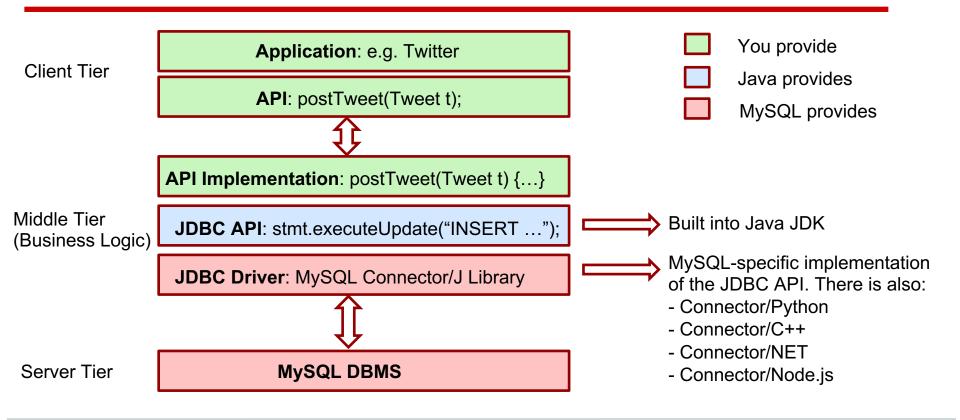
CS5200: Database Systems

## **Database Application**

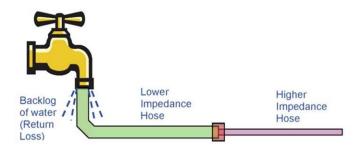


(Usually running on a separate server)

#### **APIs and Drivers**



#### Impedance Mismatch

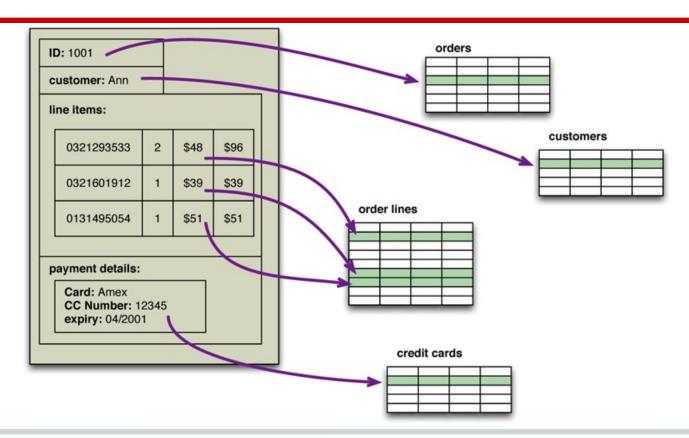


In this context, refers to several issues that arise when OO language interacts with RDBMS

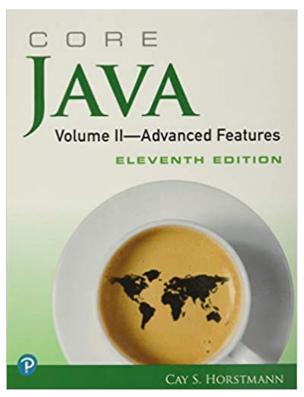
- Differences in data types
- Query results as row/column
- Limited compile-time error detection w.r.t. SQL

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### Impedance mismatch problem



# **Recommended Reading**



- Chapter 5. Database Programming (Sections 1-5, 8)
- Freely available through Safari / ProQuest

## **Typical Programming Sequence**

- 1. Connect to DBMS
  - URL, database name, user/pw, driver
  - Sometimes persistent for performance

- 2. Arbitrary interactions
  - Transactions via SQL / JDBC calls

3. Close the connection

#### **Query Sequence**

- 1. Generate SQL
  - Could be static or composed of algorithmic/user-contributed parts

2. Execute: ResultSet rs = stmt.execute(sql)

3. Process results while (rs.next() != null) { ... }

#### **Prepared Query Sequence**

- 1. Generate parameterized SQL
  - Could be static or composed of algorithmic parts (typically nothing user-contributed)
- 2. Bind values to SQL parameters
  - Could be static or algorithmic/user-contributed
- 3. Execute
- 4. Get results

## Stored Programs vs. API-driven Application

	Stored Program	API-Driven Application
Technology Stack	MySQL	MySQL, JDBC, Java
Business Logic	Built-in	Separated out
Schema Change Impact	Store-programs might change but API calls to stored programs unaffected.	API Implementation might need to change, but API <i>interface</i> should be unaffected
Developer Talent	Database developers	Database developers Software developers
Impedance mismatch	Avoided. Everything done inside the DBMS	Must be tackled by the software developers
Vendor lock-in	High: Stored programming dialects vary - may be difficult to migrate to a new vendor	Low: JDBC relies more on SQL statements that are more standard.

## Data Science vs. Data Engineering

**Data Scientist**: Performs descriptive statistics to develop insights, build models, solve a business need.

**Data Engineer**: Architect large scale data processing systems typically using relational, NoSQL, messaging, and distributed computing platforms.

#### Data Engineering

#### Data Science



#### Diverse technologies with blurred boundaries

