Lecture 1: JDBC Introduction

What is JDBC?

JDBC (Java Database Connectivity) is a Java API that enables Java applications to interact with databases. It provides a standard interface for connecting to and working with relational databases.

What is Data?

Data is information that can be stored, processed, and retrieved. In software applications, data represents the core information that needs to be persisted beyond the application's runtime.

Where Should Data Be Stored?

Text Files - Problems:

- **No Structure**: Difficult to organize and search
- **No Data Integrity:** No validation or constraints
- **Poor Performance**: Linear search required
- **Concurrency Issues**: Multiple users can't access simultaneously
- **No Security**: No access control mechanisms

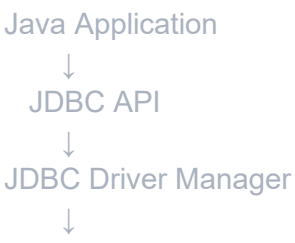
RDBMS (Relational Database Management System) - Solution:

- **Structured Storage**: Tables, rows, columns
- **Data Integrity**: Constraints, validation rules
- **Efficient Queries**: SQL for complex operations
- **Concurrency Control**: Multiple users can access safely
- **Security Features**: User authentication and authorization
- **ACID Properties**: Atomicity, Consistency, Isolation, Durability

Why JDBC?

- **Database Independence**: Same code works with different databases
- **Standardized API**: Consistent interface across database vendors
- **Flexibility**: Easy to switch between databases
- **Supported Databases**: PostgreSQL, MySQL, Oracle, H2, SQL Server, etc.

JDBC Architecture:



Database-Specific Driver

↓

Database