

SWE 510: Object-Oriented Programming in Java

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Main Topics

- Java and Databases
 - Java database connectivity (JDBC)
- Java Network Programming
- Web programming with Java (JSP/Servlet)

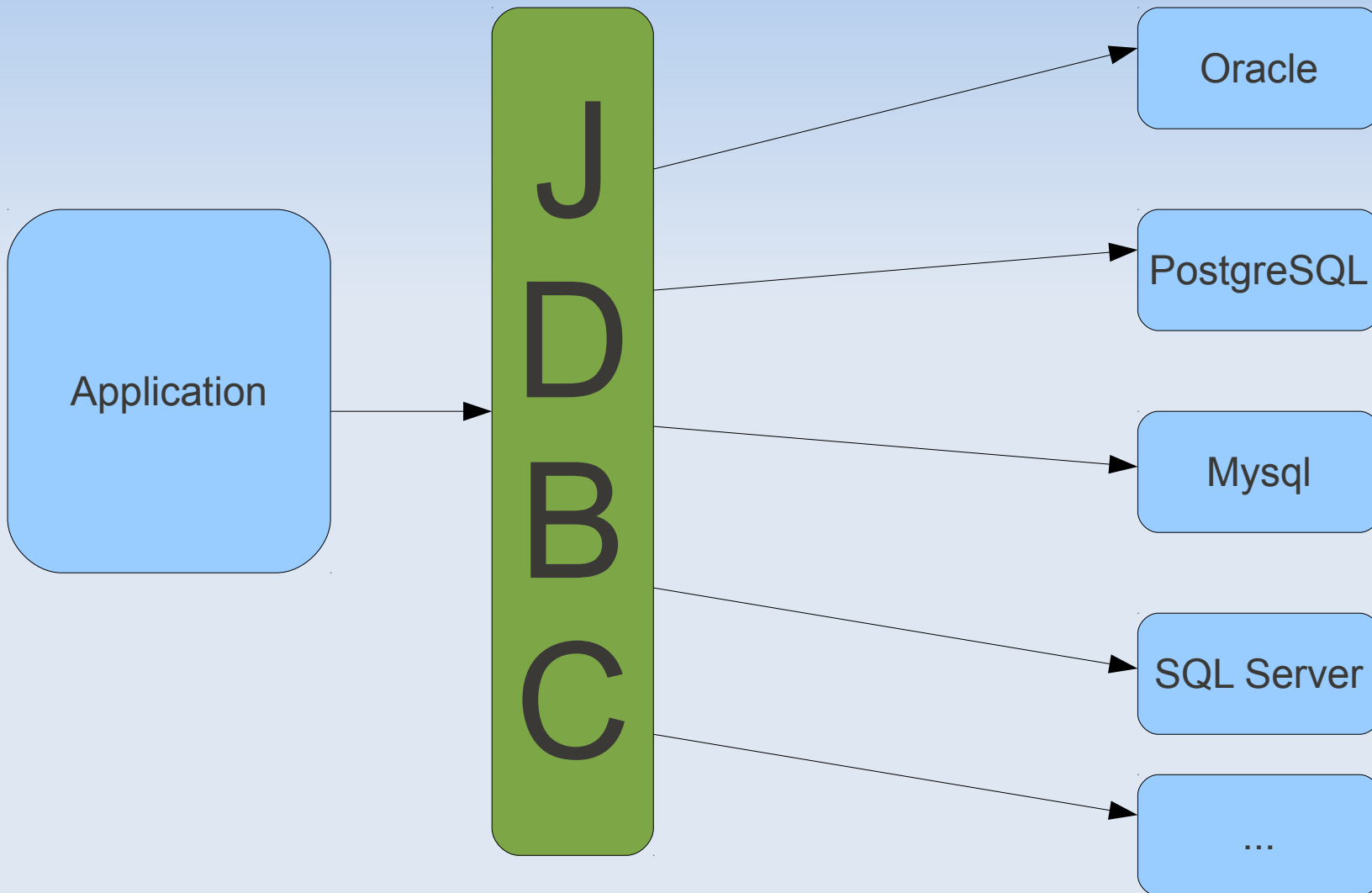
Java Database Programming

- Database management systems (DBMS):
 - Programs that control the creation, maintenance, modification, and use of organized data
 - DBMSs are widely used in many organizations
 - Common database systems:
 - Oracle
 - PostgreSQL
 - Mysql
 - Microsoft SQLServer
 - ...
 - DBMSs help manage data effectively in a uniform way
 - Structed data
 - Provides query languages for data manipulation

Java Database Connectivity

- JDBC provides an interface for how Java programs can access database systems
 - Java provides portability to run on different computer platforms
 - JDBC provides portability to use Java with different database systems with minimal change.
 - Key concepts:
 - Connections: communication channel between program and database system
 - Statements: query/update commands to be passed to database
 - Result Sets: data retrieved from database

JDBC



Demo

JDBC Example

Network Programming in Java

- Network communication allows two processes to communicate through message communication
 - the two processes could reside on the same computer, or could be on two different hosts on the Internet
 - Network communication is handled by network sockets – communication endpoints between two processes. Sockets are identified by:
 - Port number
 - Protocol
 - Host address

Network Sockets

- Server sockets:
 - Normally listens to connections at a fixed port number:
 - Creates a (server) socket
 - Binds it to a port
 - Listens to incoming connection
 - Accepts incoming connect
 - Responds to client request through the socket
 - Closes incoming connection and waits for new connection
- Client sockets:
 - Normally obtains a temporary port number to connect to a server socket:
 - Creates a (client) socket
 - Connects to server
 - Communicates with server through the socket
 - Closes connection

Demo

Echo Server

Java Web Programming

- Java programming at server side:
 - Process user input
 - Generate dynamic pages
- Types
 - Servlets
 - Server Pages

Demo

Servlet Demos

GUI Programming

Demo