

## CmpE 473 Internet Programming

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## JDBC

Examples from [java.sun.com](http://java.sun.com)

### JDBC (1)

- Java DataBase Connectivity
  - Access to data in relational databases or spreadsheet
- Packages
  - java.sql: Access to DB
  - javax.sql: Also, server side capabilities
- Need a driver between JDBC and the DB
  - Existing JDBC-ODBC bridge
- Open source DBMS: MySql, PostgreSQL

### JDBC (2)

- Establish a connection with the DBMS
  - `Class.forName("sun.jdbc.odbc.JdbcOdbcDriver");`
  - Loads the jdbc-odbc bridge driver
- Connect with the driver
  - `String url = "jdbc:odbc:dbname"`
  - `Connection con = DriverManager.getConnection(url, "pyolum", "pass");`
- URL always starts with jdbc:
- Followed by the subprotocol name:
- The rest depends on where the database is
  - Ex: `jdbc:z1MySQL://luna.oit.unc.edu/CES`
- con: open connection to make SQL statements

## JDBC (3)

- General rule for executing SQL statement
  - Write the SQL query
  - Convert it into a string
  - Create a statement object
  - Call `Statement.executeUpdate` with the string for UPDATE and CREATE queries OR
  - Call `Statement.executeQuery` with the string for SELECT queries
- Use `java.sql.Types` for datatypes in SQL queries

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## Example (1)

- CREATE TABLE COFFEES  
(COF\_NAME VARCHAR(32),  
SUP\_ID INTEGER,  
PRICE FLOAT,  
SALES INTEGER,  
TOTAL INTEGER)
- String `createTableCoffees` =  
"CREATE TABLE COFFEES "  
"(COF\_NAME VARCHAR(32), SUP\_ID INTEGER, PRICE  
FLOAT, "  
"SALES INTEGER, TOTAL INTEGER)";
- `Statement stmt = con.createStatement();`
- `stmt.executeUpdate(createTableCoffees);`

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## Example (2)

- `ResultSet` object keeps a set of rows of data
- Use `.next` to move through a `ResultSet`  
`ResultSet rs = stmt.executeQuery("SELECT COF_NAME,  
PRICE FROM COFFEES");`
- To retrieve data, use a `getDataType` method that matches the entry  
`String query = "SELECT COF_NAME, PRICE FROM COFFEES";`  
`ResultSet rs = stmt.executeQuery(query);`  
`while (rs.next()) {`  
    `String s = rs.getString("COF_NAME"); //Note conversion to string`  
    `float n = rs.getFloat("PRICE"); //Note conversion to Java float`  
    `System.out.println(s + " " + n);`  
}
- Watch out for type conversions.
  - Ex: You can use `getBytes` to retrieve a float!

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## Example (3)

- Alternative SELECT (with column numbers)  
`ResultSet rs = stmt.executeQuery(query);`  
`while (rs.next()) {`  
    `String s = rs.getString(1);`  
    `int n = rs.getInt(2);`  
    `System.out.println(n + " pounds of " + s + " sold to date.");`  
}
- Update table  
`String updateString = "UPDATE COFFEES "  
"SET SALES = 75 " +  
"WHERE COF_NAME LIKE 'Colombian'";`
- `stmt.executeUpdate(updateString);`

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## Prepared Statement

- Prepared Statement
  - Fix the SQL query when creating the statement
  - SQL will be precompiled by the DBMS
  - Speed things up
- PreparedStatement updateSales =  
    con.prepareStatement("UPDATE  
    COFFEES SET SALES = ? WHERE  
    COF\_NAME LIKE ?");
- updateSales.setInt(1, 75)
- updateSales.setString(2, "Colombian")
- updateSales.executeUpdate();

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## Join

- Consult two tables to get the results

```
String query = " SELECT COFFEES.COF_NAME " +  
"FROM COFFEES, SUPPLIERS " +  
"WHERE SUPPLIERS.SUP_NAME LIKE 'Acme, Inc.' " +  
"and SUPPLIERS.SUP_ID = COFFEES.SUP_ID";
```

```
ResultSet rs = stmt.executeQuery(query);  
System.out.println("Coffees bought from Acme, Inc.: ");
```

```
while (rs.next()) {  
    String coffeeName = rs.getString("COF_NAME");  
    System.out.println(" " + coffeeName);  
}
```

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## Transactions

- Group statements to be committed at once

```
con.setAutoCommit(false);  
PreparedStatement updateSales = con.prepareStatement( "UPDATE COFFEES  
SET SALES = ? WHERE COF_NAME LIKE ?");  
updateSales.setInt(1, 50);  
updateSales.setString(2, "Colombian");  
updateSales.executeUpdate();
```

```
PreparedStatement updateTotal = con.prepareStatement( "UPDATE COFFEES  
SET TOTAL = TOTAL + ? WHERE COF_NAME LIKE ?");  
updateTotal.setInt(1, 50);  
updateTotal.setString(2, "Colombian");  
updateTotal.executeUpdate();  
con.commit();  
con.setAutoCommit(true);
```

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