Supplement: Tutorial for Java DB

For Introduction to Java Programming
By Y. Daniel Liang

This supplement covers the following topics:

- What is a Java DB
- Setting up a Java DB
- Accessing Java DB console from the command prompt
- Creating and connecting a Java DB
- Running script files in Java DB
- Developing Java programs using Java DB
- Running Java programs with Java DB from the command prompt
- Running Java programs with Java DB from NetBeans
- Running Java programs with Java DB from Eclipse

NOTE: Please use JDK 1.8 or high with this tutorial. Assume that your JDK home directory is at c:\Program Files\Java\jdk1.8.0. If not, change it accordingly in the following context.

0 Introduction

Java comes with an embedded relational database called *Java DB*. Java DB is the same as Apache Derby. Apache Derby is an open source relational database system developed using Java. Oracle bundled Apache Derby in Java and rebranded it as Java DB. Since Java DB is part of Java, you can develop Java applications using Java DB without having to install a third-party relational database system. Java DB is ideal for a small database application.

1 Setting up Java DB

To use Java DB from the command prompt, you need to set path environment variable to include c:\Program Files\Java\jdk1.8.0\db\bin. c:\Program Files\Java\jdk1.8.0 is your JDK 1.8 install home directory. If you install your JDK in a different directory, change it accordingly.

2 Accessing Java DB Console from the Command Prompt

Open a Command Prompt window and change to the directory to where you would run your Java program and enter the command **ij**, as shown in Figure 1.

Figure 1

You can start Java DB console from the command prompt.

3 Creating and Connecting to a Database

You can create or connect to a database from the ij prompt using the following command (See Figure 2):

```
connect 'jdbc:derby:javabook;create=true;user=scott;password=tiger';
```

This command creates a database named javabook with username scott and password tiger.

To connect to an existing database using the following command:

```
connect 'jdbc:derby:javabook;user=scott;password=tiger';
```

After a database is created or connected, you can use SQL commands to access and manipulate the database.

Note that the database you created is in the directory where you launch the Java DB console. As shown in Figure 2, the javabook database is created under c:\book.

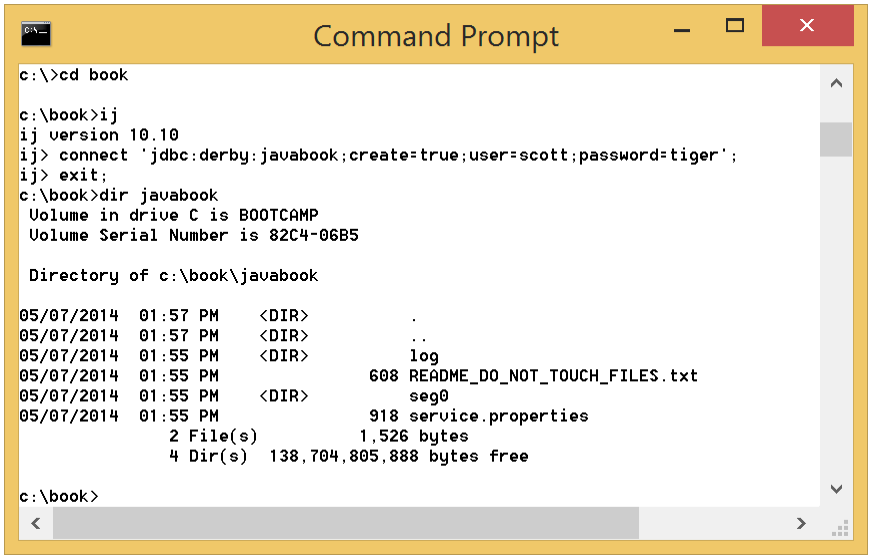

Figure 2

The database is located in the directory where you launch the Java DB console.

4 Running a Script File

You can execute a script file from the **ij** prompt using the run command. For example, the following command creates and initializes a database used in the text.

run 'c:\book\createsampletables_javadb.txt'

The createsampletables_mysql.txt can be downloaded from
www.cs.armstrong.edu/liang/intro10e/supplement/createsampletables_javadb.txt

5 Developing Java Programs with Java DB

The following is a sample program to access a Java DB from a Java program:

Listing 1 **SimpleJdbcUsingJavaDB.java**

```
1  import java.sql.Connection;
2  import java.sql.DriverManager;
3  import java.sql.ResultSet;
4  import java.sql.SQLException;
5  import java.sql.Statement;
6
7  public class SimpleJdbcUsingJavaDB {
8    public static void main(String[] args)
9        throws SQLException, ClassNotFoundException {
10     // Load the driver
11     Class.forName("org.apache.derby.jdbc.EmbeddedDriver");
12     System.out.println("Driver loaded");
13
14     // Connect to a database
```

```
15      Connection connection = DriverManager.getConnection
16        ("jdbc:derby:javabook;user=scott;password=tiger");
17      System.out.println("Database connected");
18
19      // Create a statement
20      Statement statement = connection.createStatement();
21
22      // Execute a statement
23      ResultSet resultSet = statement.executeQuery
24        ("select firstName, mi, lastName from Student where lastName "
25          + " = 'Smith'");
26
27      // Iterate through the result and print the student names
28      while (resultSet.next())
29        System.out.println(resultSet.getString(1) + "\t" +
30          resultSet.getString(2) + "\t" + resultSet.getString(3));
31
32      // Close the connection
33      connection.close();
34    }
35  }
```

The program loads the driver for accessing a Java DB in line 11. Loading a driver is optional, because Java is capable of discovering the driver automatically. The database URL for a Java DB is **jdbc:derby:databasename** for an embedded version. For a network version, the URL is **jdbc:derby://hostname:portnumber/database**. The network version enables you to access a Java DB on a remote host. Lines 16-17 can also be written as follows:

```
Connection connection = DriverManager.getConnection
  ("jdbc:derby:javabook", "scott", "tiger");
```

The rest of the code is the same as in Listing 32.1 SimpleJdbc.java in the text.

6 Running Java Programs with Java DB from Command Prompt

To run the program in Listing 1 from the command prompt, you need to set up the proper classpath to include the driver files. Java provides a setup file named setEmbeddedCP.bat. You can just run this file to set up the proper classpath. This file is located at **c:\Program Files\Java\jdk1.8.0\db\bin**. Before executing this file, open the file using NotePad and change the following line in the file

@set DERBY_INSTALL=

to

@set DERBY_INSTALL=c:\Program Files\Java\jdk1.8.0\db

Figure 3 shows a sample run for executing this file and running Listing 1 from the command prompt.

Figure 3

Executing setEmbeddedCP.bat to sets up proper class path for locating drivers.

7 Running Java Programs with Java DB from NetBeans

To run Java programs with Java DB from NetBeans, you need to add Java DB from the Libraries node in the project pane as shown in Figure 4. From the Libraries node, choose *Add Library* to display the Add Libraries dialog box, as shown in Figure 5.

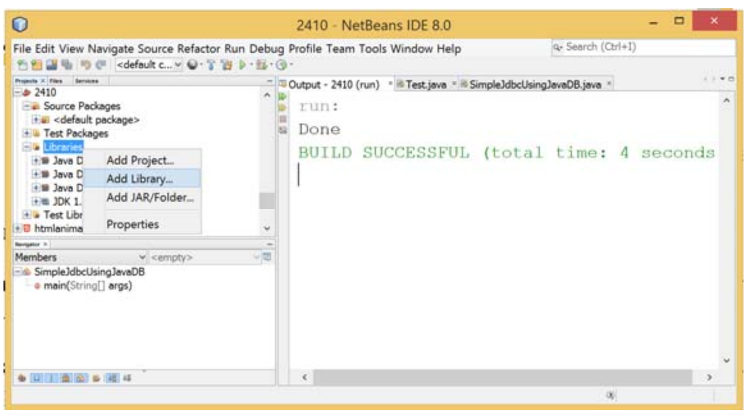

Figure 4

The Libraries node contains the library used in the project.

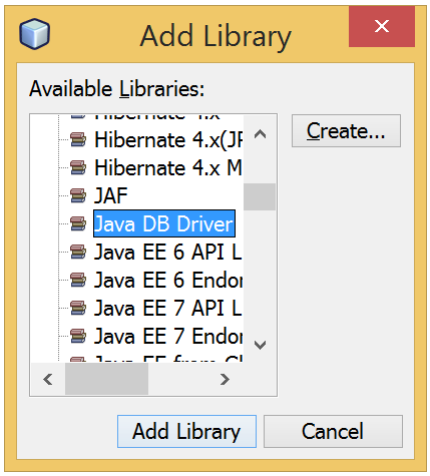

Figure 5

You need to add Java DB Driver to the library for accessing Java DB.

NOTE: When you run your Java programs from NetBeans, you may access a Java DB database that is different from the one you run from the command prompt. Your database is located in the working directory of your IDE.

8 Running Java Programs with Java DB from Eclipse

To run Java programs with Java DB from Eclipse, you need to add Java DB drivers to the Project Java Build Path. Right-click the project node and choose Properties to display the property dialog box for the project, as shown in Figure 6. In the Libraries tab, click the Add External JARs to add c:\Program Files\Java\jdk1.8.0\db\lib\derby.jar, c:\Program Files\Java\jdk1.8.0\db\lib\derbyclient.jar, and c:\Program Files\Java\jdk1.8.0\db\lib\derbynet.jar to the library.

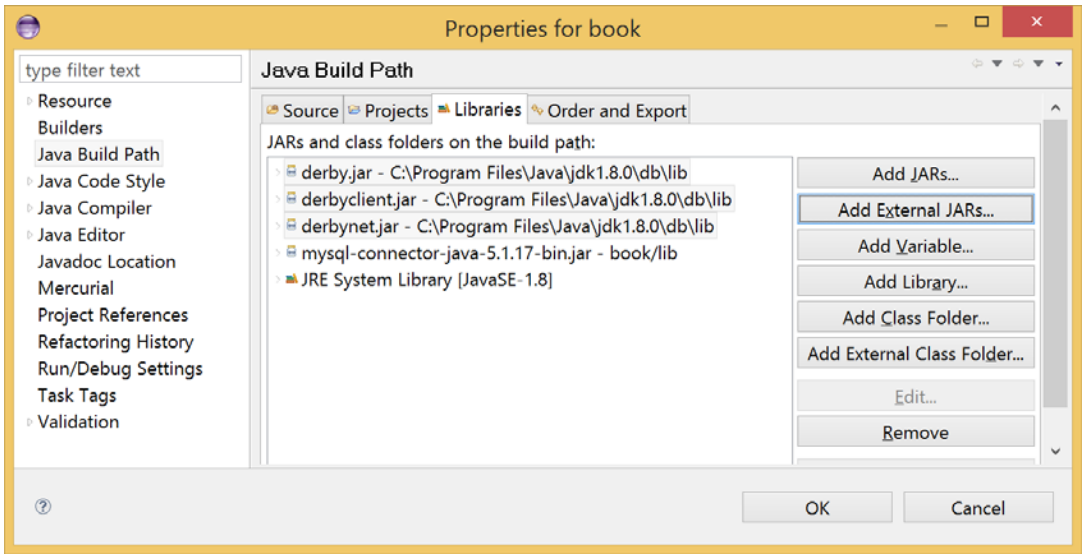

Figure 6

The jar files for the Java DB drivers are added to the Java Build Path.

NOTE: When you run your Java programs from Eclipse, you may access a Java DB database that is different from the one you run from the command prompt. Your database is located in the working directory of your IDE.