



JDBC Tutorial

CSCI 201

Principles of Software Development

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Outline

- JDBC Tutorial
- Program

Download MySQL



- Hopefully you have already downloaded the MySQL Community Server, but if not, download it from <http://dev.mysql.com/downloads/>
- You will also need the MySQL Workbench from the same URL

The screenshot shows a web browser window displaying the MySQL Community Downloads page. The browser's address bar shows the URL <http://dev.mysql.com/downloads/>. The page features the MySQL logo and the tagline "The world's most popular open source database". A navigation menu includes "MySQL.com", "Downloads", "Documentation", and "Developer Zone". Below this, there are tabs for "Enterprise" and "Community", and a secondary menu with "Yum Repository", "APT Repository", "SUSE Repository", "Windows", and "Archives". The main content area is titled "MySQL Community Downloads" and lists several products with their current release versions and download links:

- MySQL Community Server (GPL)** (Current Generally Available Release: 5.6.23)
MySQL Community Server is the world's most popular open source database.
[DOWNLOAD](#)
- MySQL Cluster (GPL)** (Current Generally Available Release: 7.4.4)
MySQL Cluster is a real-time, open source transactional database.
[DOWNLOAD](#)
- MySQL Fabric (GPL)**
MySQL Fabric provides a framework for managing High Availability and Sharding.
[DOWNLOAD](#)

On the right side of the page, there are two highlighted boxes for commercial editions:

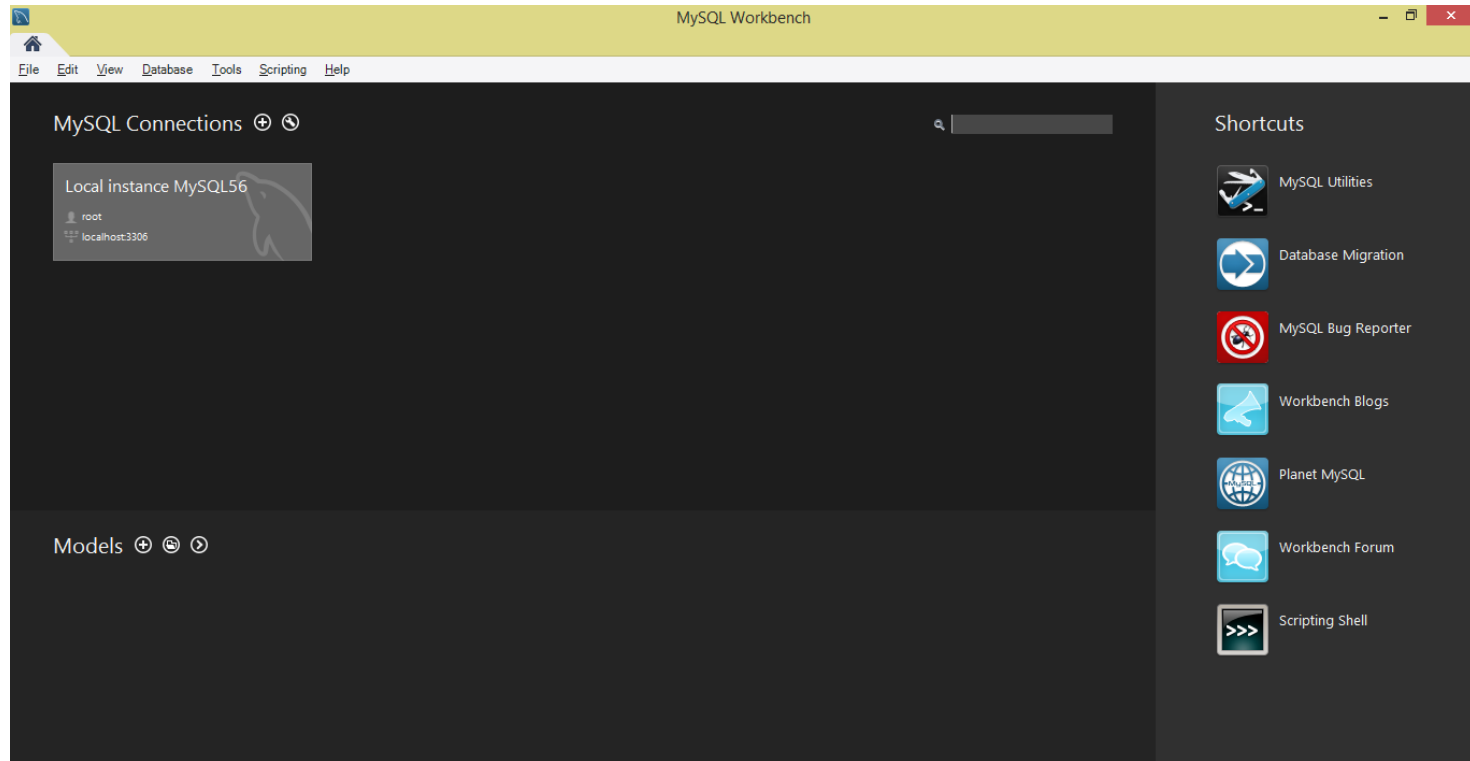
- MySQL Enterprise Edition (commercial)**
MySQL Enterprise Edition includes the most comprehensive set of advanced features and management tools for MySQL.
[Learn More >](#)
[Download from Oracle eDelivery >](#)
- MySQL Cluster CGE (commercial)**
MySQL Cluster is a real-time, transactional database designed for fast, always-on access to data under high throughput conditions. Plus, it includes everything in MySQL Enterprise Edition.
[Learn More >](#)

A sidebar on the left lists various MySQL products: MySQL on Windows, MySQL Yum Repository, MySQL APT Repository, MySQL SUSE Repository, MySQL Community Server, MySQL Cluster, MySQL Fabric, MySQL Utilities, MySQL Workbench, MySQL Proxy, MySQL Connectors, and Other Downloads with a link to <https://edelivery.oracle.com>.

MySQL Workbench



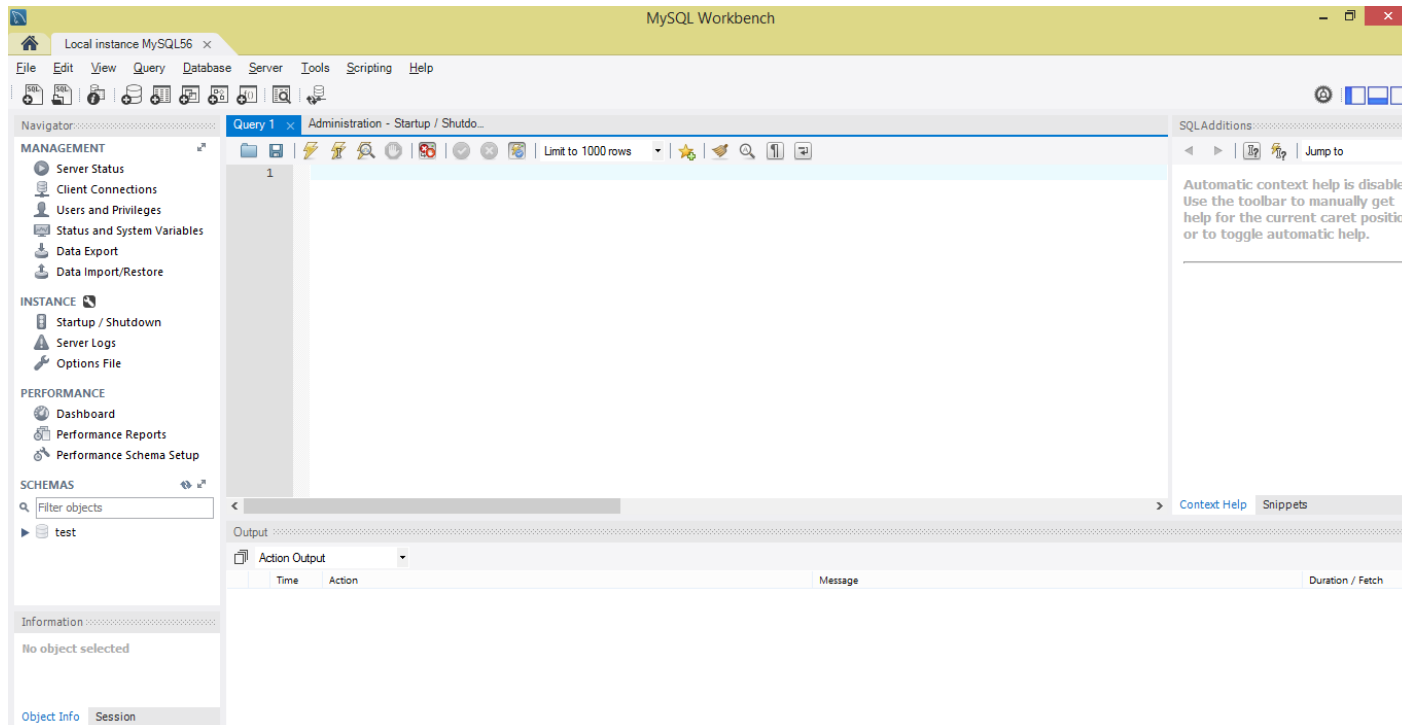
- After installing MySQL and the MySQL Workbench, run MySQL and then run the Workbench
- Click on the “Local instance MySQLxx” box that is displayed



MySQL Workbench



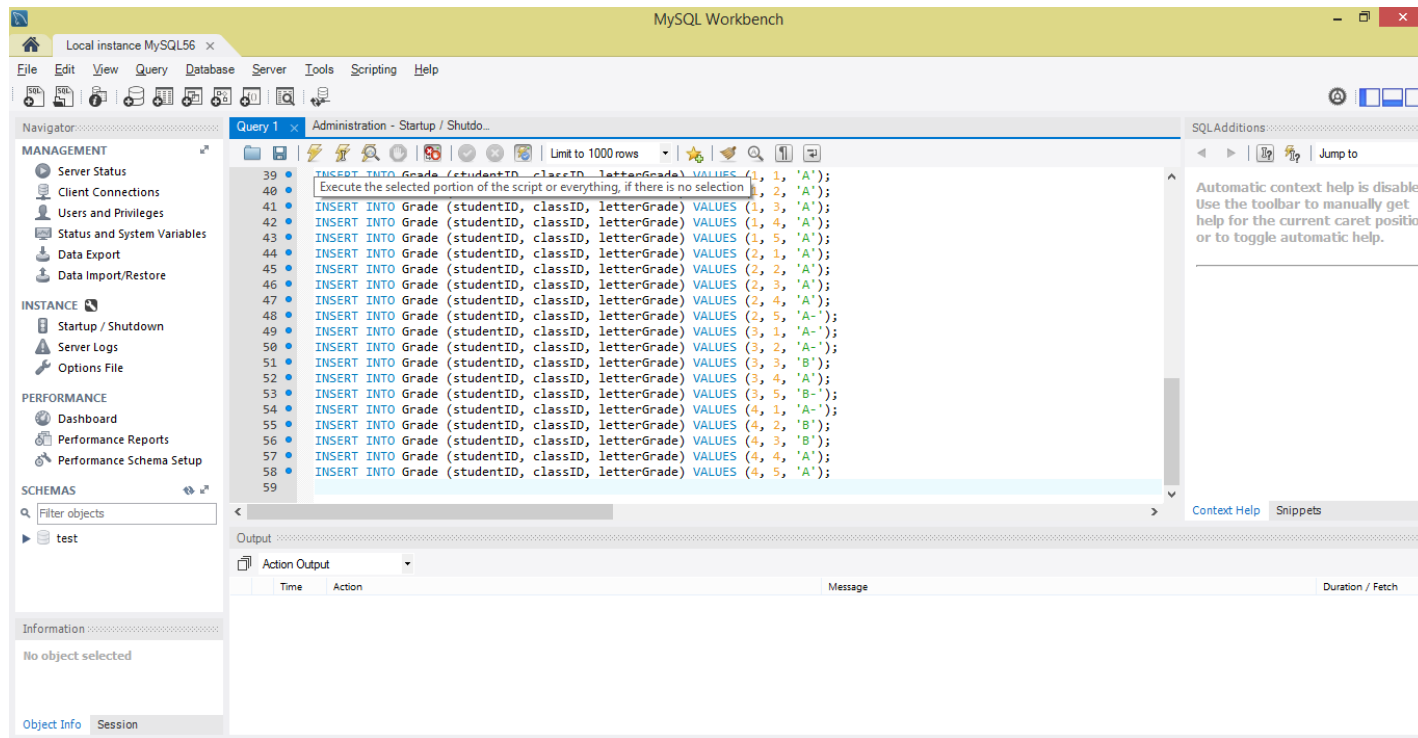
- If the MySQL server is running, you will see the window below
- If the MySQL server is not running, no schemas will be showing
 - › Click on Startup/Shutdown and click the Start Server button
 - › You should hopefully see what is below when you click the Query 1 tab at the top



MySQL Database Creation



- Copy the content of <http://www-scf.usc.edu/~csci201/lectures/Lecture16/Grades.sql> into the Query 1 text area
- Click the lightning bolt that says “Execute the selected portion of the script or everything, if there is no selection”



MySQL Database Viewing



- Click the refresh button next to SCHEMAS and you should see your new schema called **studentgrades**

The screenshot shows the MySQL Workbench interface. The left sidebar has a 'SCHEMAS' section with a search filter 'Filter objects'. Under 'SCHEMAS', 'studentgrades' is selected. The main window displays a list of SQL queries (lines 39-59) that are INSERT INTO statements for the 'Grade' table. The 'Output' pane at the bottom shows the results of these queries, with a table of 'Action Output'.

Time	Action	Message	Duration / Fetch
30 10:16:40	INSERT INTO Grade (studentID, classID, letterGrade) VALUES (3, 5, 'B-')	1 row(s) affected	0.016 sec
31 10:16:40	INSERT INTO Grade (studentID, classID, letterGrade) VALUES (4, 1, 'A-')	1 row(s) affected	0.015 sec
32 10:16:40	INSERT INTO Grade (studentID, classID, letterGrade) VALUES (4, 2, 'B')	1 row(s) affected	0.031 sec
33 10:16:41	INSERT INTO Grade (studentID, classID, letterGrade) VALUES (4, 3, 'B')	1 row(s) affected	0.031 sec
34 10:16:41	INSERT INTO Grade (studentID, classID, letterGrade) VALUES (4, 4, 'A')	1 row(s) affected	0.016 sec
35 10:16:41	INSERT INTO Grade (studentID, classID, letterGrade) VALUES (4, 5, 'A')	1 row(s) affected	0.032 sec

MySQL Database Query



- Click the arrow next to the schema to see the tables and columns
- Create a new tab by clicking the SQL+ button at the top left
- Type some queries and execute them using the lightning bolt button

The screenshot shows the MySQL Workbench interface. The left sidebar contains navigation panels for MANAGEMENT, INSTANCE, PERFORMANCE, and SCHEMAS. The SCHEMAS panel shows the 'studentgrades' database expanded to show the 'class' table. The main query editor contains the query: `SELECT * FROM class;`. The 'Execute' button (lightning bolt) is highlighted. Below the query editor, the 'Result Grid' shows the following data:

classID	prefix	number
1	CSCI	103
2	CSCI	104
3	CSCI	201
4	EE	101
5	EE	102
*	NULL	NULL

The 'Output' panel at the bottom shows the execution log:

Time	Action	Message	Duration / Fetch
38 10:19:07	select * from student LIMIT 0, 1000	4 row(s) returned	0.000 sec / 0.000 sec
39 10:19:23	SELECT * FROM class LIMIT 0, 1000	5 row(s) returned	0.000 sec / 0.000 sec

Download MySQL JDBC Driver



- Download the MySQL JDBC Driver from <http://dev.mysql.com/downloads/connector/j/>
 - › You might already have this if you downloaded the entire DBMS when you downloaded MySQL – it will be in the ConnectorJ subdirectory in the MySQL directory
- Run the installer and find the directory where you saved it!

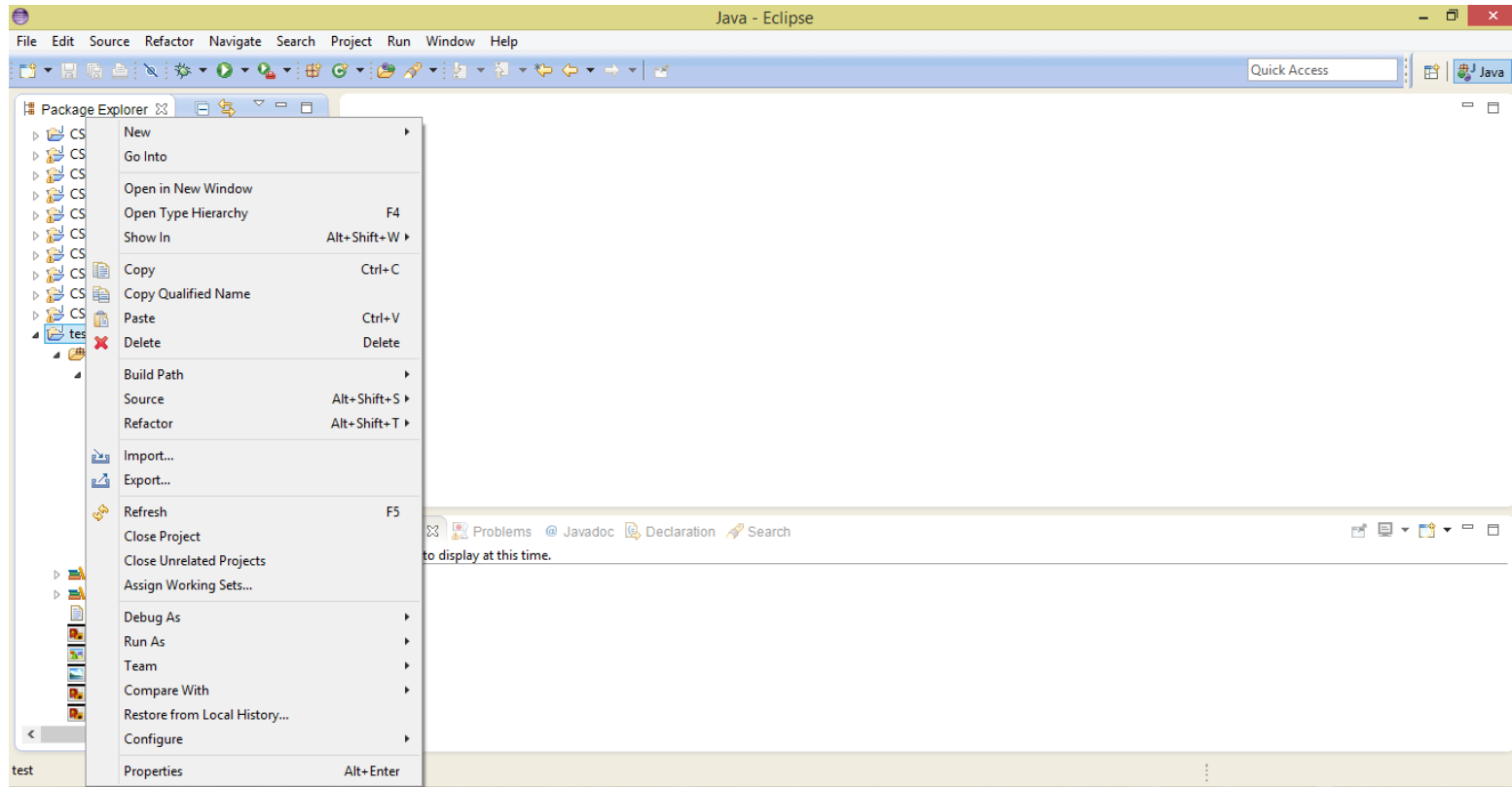
The screenshot shows the MySQL Connector/J download page. The browser address bar shows dev.mysql.com/downloads/connector/j/. The page features a navigation menu with options like Enterprise, Community, Yum Repository, APT Repository, SUSE Repository, Windows, and Archives. The main content area is titled "Download Connector/J" and includes a description: "MySQL Connector/J is the official JDBC driver for MySQL." It also provides links to "Online Documentation" and "MySQL Connector/J Installation Instructions, Documentation and Change History". A section for "Generally Available (GA) Releases" is visible, showing the "Connector/J 5.1.34" release. Under this release, there is a "Select Platform:" dropdown menu currently set to "Microsoft Windows". Below the dropdown, a table lists available download options:

Platform	Version	Size	Action
Windows (x86, 32-bit), MSI Installer	5.1.34	6.2M	Download

Adding JAR File to Eclipse Classpath



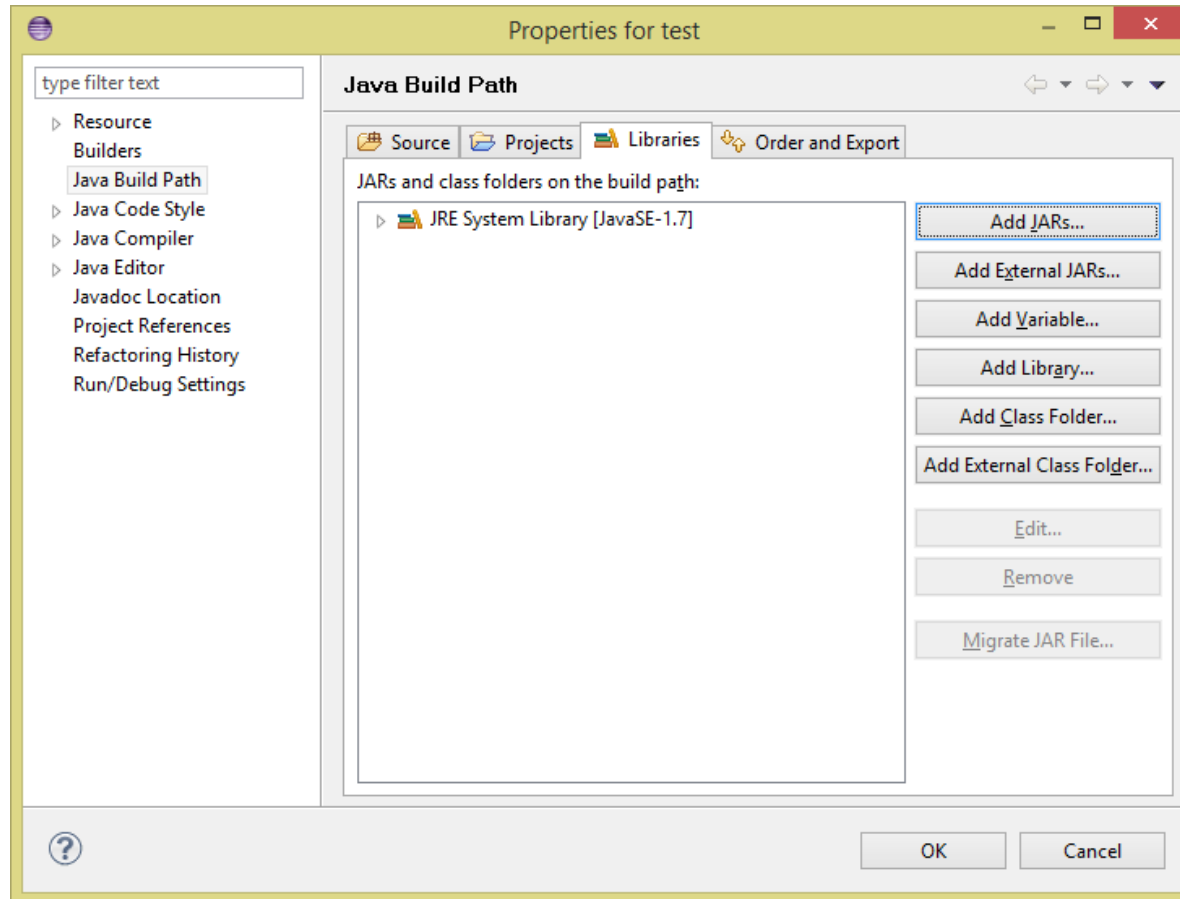
- Create a new project in Eclipse
- Right click on your project and click Properties



Adding JAR File to Eclipse Classpath



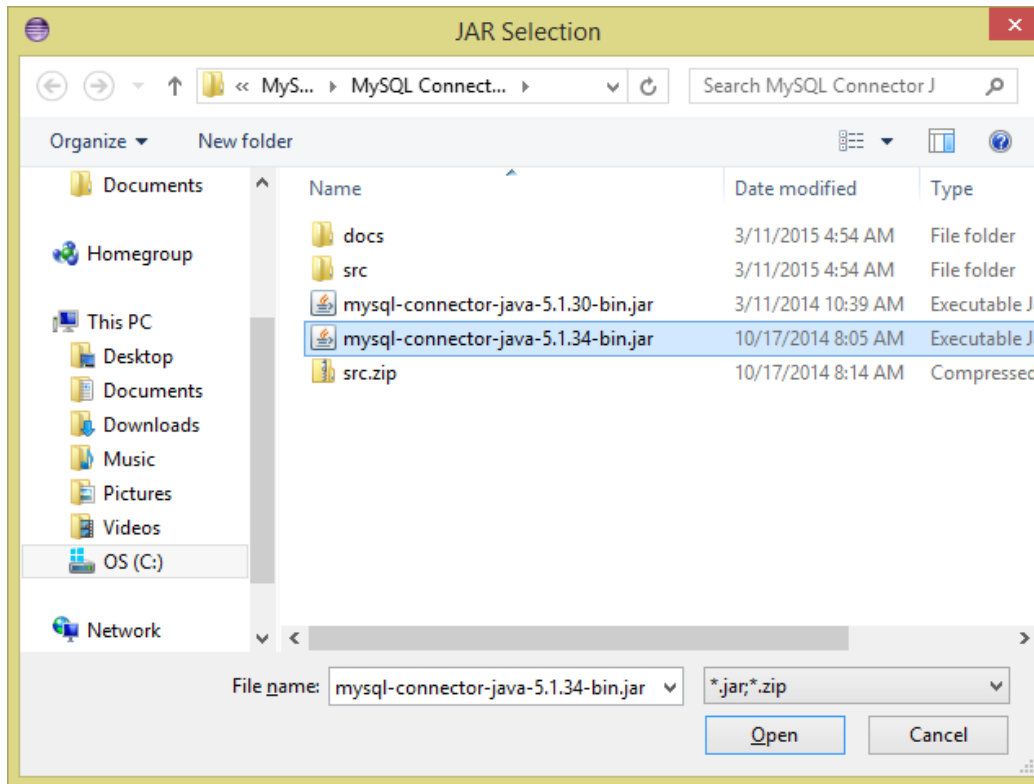
- Click Java Build Path on the left



Adding JAR File to Eclipse Classpath



- Click Add External Jar on the right and find the MySQL JDBC Driver
 - › Note that this should be in your Connector/J directory in your MySQL directory



Write the Code



- Copy the content of <http://www-scf.usc.edu/~csci201/lectures/Lecture16/JDBCTest.java> to a file named JDBCTest.java in your project
- Change the root password in the code if necessary
- Run the code and hope for the output below

A screenshot of the Eclipse IDE. The main editor window shows the code for JDBCTest.java. The code imports java.sql.Connection and defines a public class JDBCTest with a main method. The main method connects to a MySQL database, queries for a student named 'Sheldon', and prints the first name, last name, and student ID. The console window at the bottom shows the output: 'fname = Sheldon', 'lname = Cooper', and 'studentID = 1'.

```
import java.sql.Connection;

public class JDBCTest {

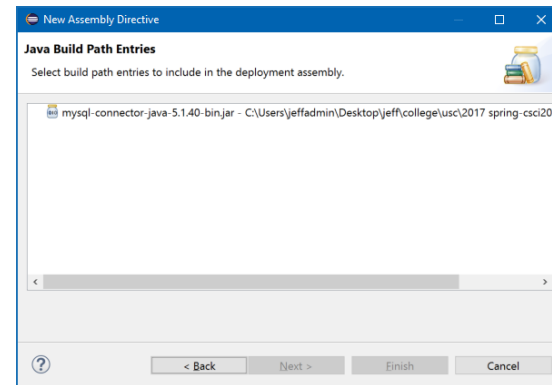
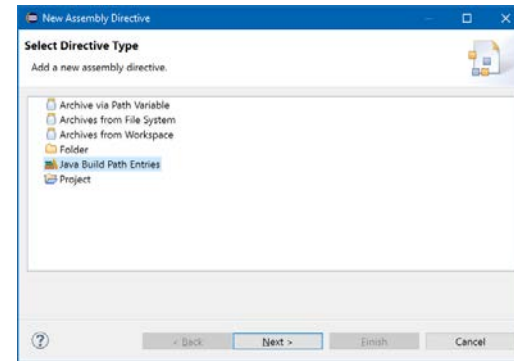
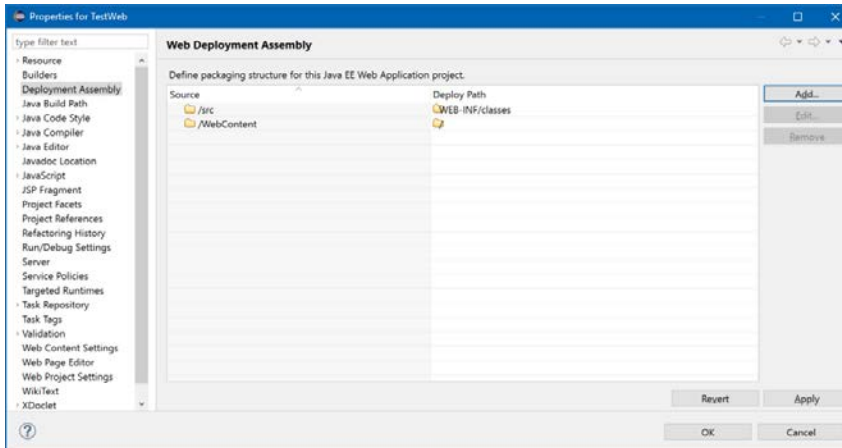
    public static void main (String[] args) {
        try {
            Class.forName("com.mysql.jdbc.Driver");
            Connection conn = DriverManager.getConnection("jdbc:mysql://localhost/StudentGrades?user=root&password=");
            Statement st = conn.createStatement();
            String name = "Sheldon";
            //ResultSet rs = st.executeQuery("SELECT * from Student where fname=' + name + '!");
            PreparedStatement ps = conn.prepareStatement("SELECT * FROM Student WHERE fname=?");
            ps.setString(1, name); // set first variable in prepared statement
            ResultSet rs = ps.executeQuery();
            while (rs.next()) {
                String fname = rs.getString("fname");
                String lname = rs.getString("lname");
            }
        }
    }
}
```

<terminated> JDBCTest [Java Application] C:\Program Files\Java\jre7\bin\javaw.exe (Mar 12, 2015, 10:26:29 AM)
fname = Sheldon
lname = Cooper
studentID = 1

Dynamic Web Application



- If you are creating a dynamic web application, after adding the JDBC jar file to the build path, you also need to add it to the deployment
 - › Go to Project->Properties->Deployment Assembly->Add
 - › Select Java Build Path Entries and click Next
 - › Select the JDBC Driver and click Finish





Outline

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- Program

Program



- Write a program to prompt the user for a class and a grade, and then the program will display all of the students who earned that grade in that class.

```
C:>java ClassGrade
Enter class prefix: CSCI
Enter class number: 103
Enter grade: A
Here are all the students in CSCI 103 who earned an A.
Sheldon Cooper
Leonard Hofstadter
```