

MySQL Database and Java Programs

Downloading and Installing MySQL

MySQL is a free database that can be downloaded from the web-site, <http://www.mysql.com> . The specific download URL is <http://dev.mysql.com/downloads/index.html> . MySQL can be used to create a database and query it using Structured Query Language (SQL).

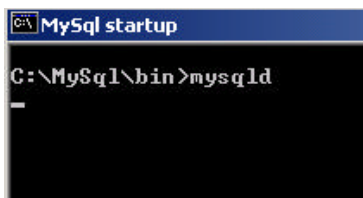
After downloading MySQL onto your computer, you can install it using the installer that comes with it. There is an excellent tutorial on the MySQL web-site. The URL for it is <http://dev.mysql.com/doc/mysql/en/Tutorial.html> . This gives extensive information on how to use MySQL.

To install MySQL after downloading, unzip it into a folder called `mysql`, and then in Windows Explorer click on **setup.exe**. If you downloaded the version that comes with an installer, it will create a directory structure with a number of subfolders. The important ones are **bin** and **data**. The first contains the applications that run the database service, and the second is where the databases you create will be stored.

While you are downloading and installing programs, you might also want to get the MySQL Connector/ODBC that allows you to connect to a MySQL database server from a Java program. This can be found at <http://www.mysql.com/products/connector/odbc/> . This file, *MyODBC-standard-3.51.07-win.exe*, is an application, so all you have to do is click on it in Windows Explorer to install it. When installed, it registers the driver with the Windows operating system.

Starting and Stopping the MySQL Database Server

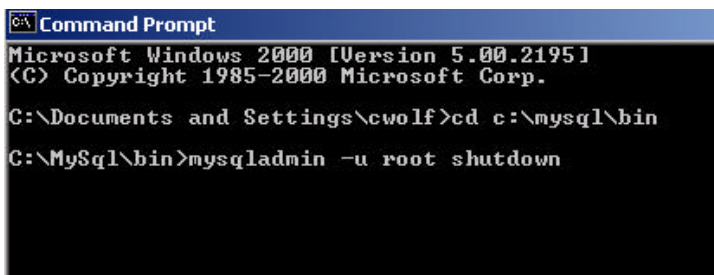
There are two ways to start the MySQL server. The simplest method is to run the file *mysqld.exe* found in the **bin** folder. This will create a Command Prompt window.



This window cannot be used or closed. In order to close it, you have to shut down the MySQL server. This is done with the command

```
mysqladmin -u root shutdown
```

This must be done in a second command prompt window.



When you type this command, the first window will disappear, but the second will not. You can close it in the usual way with the X in the upper right hand corner.

Both of these commands can be stored in batch files. These can be called `MySQLstartup.bat` and

`MySQLshutdown.bat`. The files can consist of just the single line commands. You can also put short cuts to them on your desktop, should you wish.

The second way to start the MySQL server is to install it as a *service* in Windows. You can do this if the operating system on your computer is Windows NT or later. Installing MySQL as a

Windows service is done by typing `mysqld - - install`. You should be able to do this in the `c:` directory (in a Command Prompt window). However, to be sure, do so from the `MySQL\bin` folder.

```
Command Prompt
Microsoft Windows 2000 [Version 5.00.2195]
(C) Copyright 1985-2000 Microsoft Corp.
C:\Documents and Settings\cwolf>cd c:\mysql\bin
C:\MySQL\bin>mysqld --install_
```

This registers MySQL as a Windows service that will be started when Windows starts and stopped when Windows is closed down. If you do this, you can use MySQL any time that your computer is turned on.

You can view all the Windows services by going into **Control Panel/ Administrative Tools/ Services**. You can view all the services registered with Windows there and can see if they have started or not.

You can stop the server even if it is registered as a service with the same command as before, `mysqldadmin -u root shutdown`. You can also remove the server from the registry with the command, `mysqld - - remove`.

Creating a Database

First start MySQL and go to a second Command Prompt window. Change directories to `MySQL\bin` and then type `mysql`. You should see the following screen:

```
Command Prompt - mysql
Microsoft Windows 2000 [Version 5.00.2195]
(C) Copyright 1985-2000 Microsoft Corp.
C:\Documents and Settings\cwolf>cd c:\mysql\bin
C:\MySQL\bin>mysql
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 1 to server version: 4.0.18-max-debug
Type 'help;' or '\h' for help. Type '\c' to clear the buffer.
mysql>
```

In this window, you can create a database, add tables and data to it, and make queries. There are two important things to remember. The command, `quit`, is used to exit the MySQL monitor, and all other commands **must** end with semicolons.

MySQL comes with two databases in the data folder, `mysql` and `test`. Use the `show databases;` command to see information about them. You can create a new database with the command, `create database produce;` where `produce` is the name for your database. If you now type `show databases;` again, you will see an additional database in the list.

Any time now that you wish to work with this database, all you have to do is type `use produce;`
Then you can add data, make queries, etc.

```
Command Prompt - mysql
Type 'help;' or '\h' for help. Type '\c' to clear the buffer.
mysql> show databases;
+-----+
| Database |
+-----+
| mysql    |
| test     |
+-----+
2 rows in set (0.00 sec)

mysql> create database produce;
Query OK, 1 row affected (0.05 sec)

mysql> show databases;
+-----+
| Database |
+-----+
| mysql    |
| produce  |
| test     |
+-----+
3 rows in set (0.00 sec)

mysql>
```

The new database is empty and has no tables. You can create a table for the database with the SQL command:

Create Table table_name (column_name1 datatype1, column_name2 datatype2, ...);

For our example this can be

create table Fruit (id varchar(10), name varchar(20), variety varchar(20), quantity int(5));

```
Command Prompt - mysql
+-----+
| mysql    |
| produce  |
| test     |
+-----+
3 rows in set (0.00 sec)

mysql> use produce;
Database changed
mysql> show tables;
Empty set (0.00 sec)

mysql> create table Fruit (id varchar(10), name varchar(20), variety varchar(20),
, quantity int(5));
Query OK, 0 rows affected (0.14 sec)

mysql> show tables;
+-----+
| Tables_in_produce |
+-----+
| fruit              |
+-----+
1 row in set (0.01 sec)

mysql>
```

You can use this window to insert data into the database, show contents, etc., using standard SQL commands. These operations can also be done using a Java program. Before doing that, however, we will add an item to the table with the following command:

insert into fruit values ('123-45', 'Apples', 'Red Delicious', 20);

We can see what is in the entire table with the SQL command *select*.

select * from fruit;

This returns a table containing everything (*) in the database table, fruit.

```
Command Prompt - mysql
+-----+
3 rows in set (0.00 sec)

mysql> use produce;
Database changed
mysql> show tables;
+-----+
| Tables_in_produce |
+-----+
| fruit              |
+-----+
1 row in set (0.00 sec)

mysql> insert into fruit values ('123-45', 'Apples', 'Red Delicious', 20);
Query OK, 1 row affected (0.01 sec)

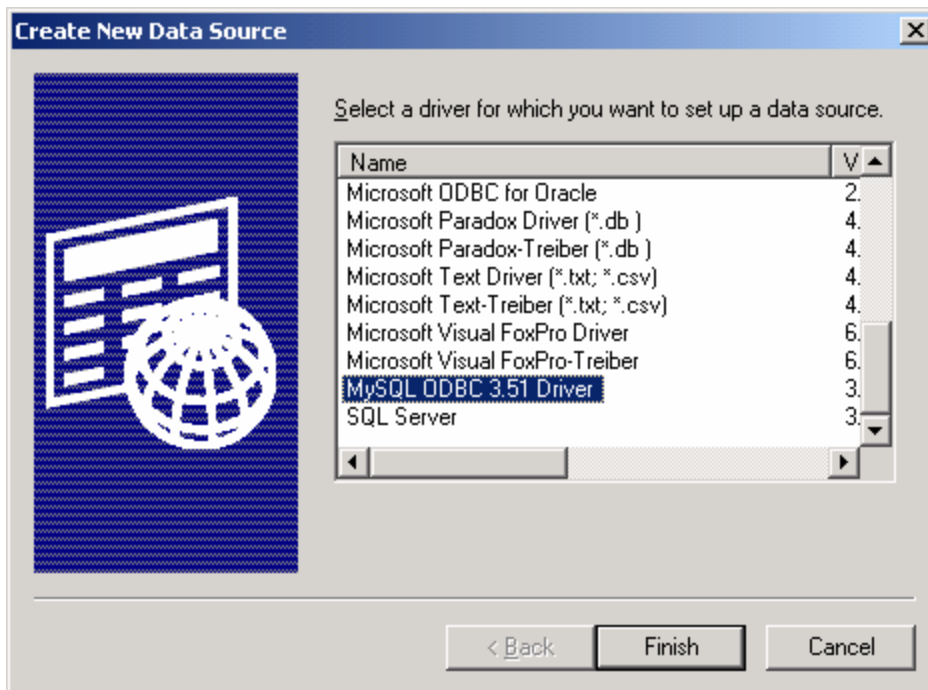
mysql> select * from fruit;
+-----+-----+-----+-----+
| id      | name  | variety      | quantity |
+-----+-----+-----+-----+
| 123-45  | Apples | Red Delicious | 20       |
+-----+-----+-----+-----+
1 row in set (0.02 sec)

mysql>
```

Registering the MySQL Database with Windows

In order to connect to a database with a Java program, the database must be registered with the Windows operating system. When doing so, you have to specify the appropriate driver. For MySQL this is the MySQL Connector/ODBC. You must install it before it can be used.

To do the registration, go into **Control Panel / Administrative Tools / Data Sources (ODBC)**. From there, choose to **Add** a new database. On the next screen, choose the MySQL ODBC 3.51 Driver. You will have to scroll down to find it.



When you type Finish, you should see the next screen.

MySQL ODBC 3.51 Driver - DSN Configuration, Version 3.51.07 [X]

This dialog helps you in configuring the ODBC Data Source Name, that you can use to connect to MySQL server

DSN Information

Data Source Name:

Description:

MySQL Connection Parameters

Host/Server Name(or IP):


Database Name:

User:

Password:

Port (if not 3306):

SQL command on connect:



Fill in the Data Source Name and the Database Name. If you want, you can add a username and password, but this is optional. Notice that the box does not ask for the location of the database. MySQL assumes that the database will be located in the data folder. If you want to put it somewhere else, you will have to specify a path as well as a name.

MySQL ODBC 3.51 Driver - DSN Configuration, Version 3.51.07 [X]

This dialog helps you in configuring the ODBC Data Source Name, that you can use to connect to MySQL server

DSN Information

Data Source Name:

Description:

MySQL Connection Parameters

Host/Server Name(or IP):


Database Name:

User:

Password:

Port (if not 3306):

SQL command on connect:



You can use any name you wish for the Data Source Name. But you must use the name you actually gave the database for the Database Name. The Data Source Name is the one that will be used in your program, not the Database Name.

Using a Java Program to Connect to a Database

Java programs use a jdbc-odbc bridge to connect to a database. This can be done with the commands

```
Class.forName ("sun.jdbc.odbc.JdbcOdbcDriver");
Connection con = DriverManager.getConnection ("jdbc:odbc:deli");
```

Where deli is the Data Source Name given before.

This creates a connection to the database that can be used throughout the program. The following program uses the connection to obtain a *ResultSet* that is generated by a SQL query. The query *Selects* everything (*) from the database and returns the data. The data is then displayed on the screen in the *while* statement. SQL is not case sensitive, so you can use either upper or lower case in the queries.

```
/ Fruit connects to a database and displays its contents on the screen.
import java.sql.*;
```

```
public class Fruit
{
    public static void main (String [] args) throws Exception
    {
        Class.forName ("sun.jdbc.odbc.JdbcOdbcDriver");
        Connection con = DriverManager.getConnection ("jdbc:odbc:deli");
        Statement stmt = con.createStatement ();
        String query = "Select * from fruit";

        ResultSet rs = stmt.executeQuery (query);
        System.out.println ("Fruit Table Results");
        while (rs.next ())
        {
            System.out.println ();
            System.out.println ("ID: " + rs.getString ("id"));
            System.out.println ("Name: " + rs.getString ("name"));
            System.out.println ("Variety: " + rs.getString ("variety"));
            System.out.println ("Quantity: " + rs.getInt ("quantity"));
        }
        con.close ();
    }
} // Fruit
```

Java programs can also be used to insert, update and delete data and to alter tables or even create them. Once a connection to a database has been made, any SQL statement can be executed.