

For this lab, I decided to make my program a little more general-purpose than either of the mini-projects assigned, so while the program still does everything the instructions require, it will work for any database you want to create.

I went ahead and created separate methods for several common functions, CREATE, DROP, INSERT, UPDATE, DELETE, QUERY, and VIEWMETADATA. The program dynamically builds your SQL commands throughout the execution of the method by requesting specific inputs from the user, and will execute the statement once you confirm it is correct. The entire program runs through a loop, with an action confirmation before every command (in case you wish to exit the program) and will restart the loop when the action is completed, or an error is encountered. There is also the option to restart the method if the SQL command appears to be incorrect.

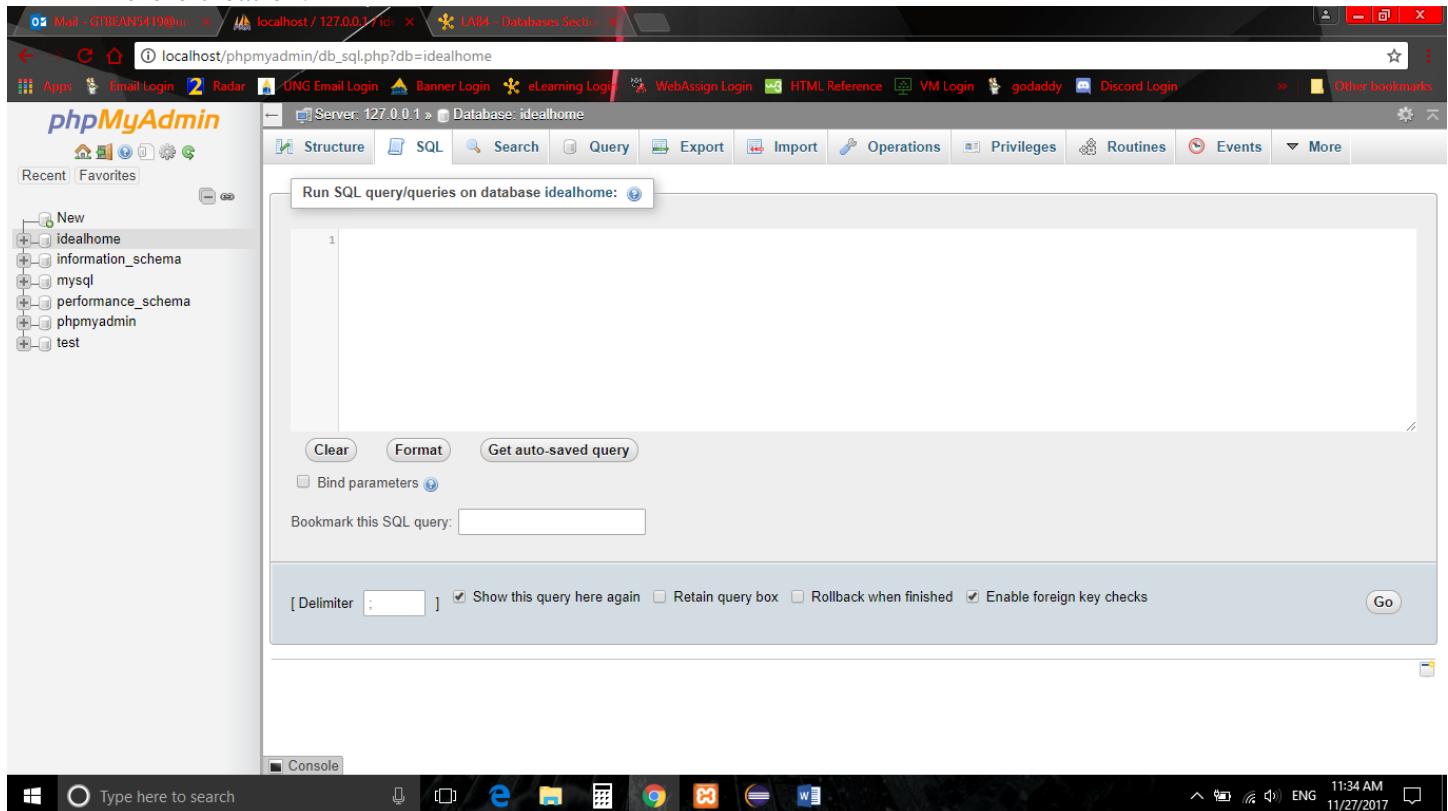
The CREATE and DROP portions are fairly simple, and only execute those two commands, while the UPDATE, INSERT, and DELETE methods are all a little more complicated since they require input for WHERE clauses and values to update or insert.

The query builder only takes in simple queries with a SELECT, FROM, and optional WHERE clause, but nothing much more advanced than that. It will also convert the number of attributes requested to a “\*” if it is confirmed that all of the attributes from the given tables are being selected.

For the purpose of the screenshots, I have chosen to do the first mini-project, the one where I create the modified company database:

### 1. Creating the database and tables:

Before creation:



## Creation in the java program:

The screenshot shows the Eclipse IDE interface. In the top left, the package explorer shows a project named 'Database - LAB4' and a file named 'Kronos'. The main editor window contains Java code for creating a database. The code includes imports for `java.sql.\*` and `java.util.\*`, and defines a class `Databases\_LAB4` with a static method `query` that creates a database named 'COMPANY'. Below the code is a terminal window showing the execution of the code and the creation of the 'COMPANY' database.

```
1 package databaseTest;
2 import java.sql.*;
3 import java.util.*;
4
5 public class Databases_LAB4
6 {
7     static String query = "";
8     static Scanner scan = new Scanner (System.in);
9 }
10
11 @ Javadoc Declaration Console
12 Database_LAB4 [Java Application] C:\Program Files\Java\jre1.8.0_151\bin\javaw.exe (Nov 27, 2017, 11:35:56 AM)
13 Perform action? (Y/N)
14 y
15 Would you like to CREATE, DROP, DELETE, UPDATE, INSERT, QUERY, or VIEW/METADATA?
16 create
17 Connected to database
18 Would you like to create a DATABASE, or a TABLE?
19 database
20 What would you like to call your database?
21 company
22 Does this query or update look correct? (Y/N)
23
24 CREATE DATABASE `COMPANY`
25 y
26 Perform action? (Y/N)
```

After creation:

The screenshot shows the phpMyAdmin interface. The left sidebar shows databases: 'company', 'idealhome' (selected), 'information\_schema', 'mysql', 'performance\_schema', 'phpmyadmin', and 'test'. The main area shows the 'Structure' tab for the 'idealhome' database. A SQL query window is open with the placeholder text 'Run SQL query/queries on database idealhome:'. Below the query window are buttons for 'Clear', 'Format', and 'Get auto-saved query'. At the bottom of the window are checkboxes for 'Bind parameters', 'Bookmark this SQL query:', and options for 'Delimiter' (set to ';'), 'Show this query here again' (checked), 'Retain query box', 'Rollback when finished', and 'Enable foreign key checks'. The status bar at the bottom indicates the time as 11:36 AM on 11/27/2017.

Creating tables within the new database:

## Before creation:

The screenshot shows the phpMyAdmin interface. The left sidebar lists databases: New, company, idealhome, information\_schema, mysql, performance\_schema, phpmyadmin, and test. The 'idealhome' database is selected. The main area has tabs for Structure, SQL, Search, Query, Export, Import, Operations, Privileges, Routines, Events, and More. A sub-tab 'Run SQL query/queries on database idealhome:' is active. Below it is a large text area for SQL queries. Buttons include Clear, Format, Get auto-saved query, Bind parameters, and a Go button. At the bottom are checkboxes for Delimiter, Show this query here again, Retain query box, Rollback when finished, and Enable foreign key checks.

## Creation within the java program:

### Employee:

The screenshot shows the Eclipse IDE interface. The top bar includes File, Edit, Source, Refactor, Navigate, Search, Project, Run, Window, Help, and Quick Access. The Package Explorer shows a Database - LAB4 project. The main editor window displays Java code for creating a database table:

```
1 package databaseTest;
2 import java.sql.*;
3 import java.util.*;
4
5 public class Databases_LAB4 {
6     static String query = "";
7     static Scanner scan = new Scanner (System.in);
8 }
```

Below the editor is a terminal window titled 'Databases\_LAB4 [Java Application] C:\Program Files\Java\jre1.8.0\_151\bin\javaw.exe (Nov 27, 2017, 11:35:56 AM)'. It shows the following interaction:

```
table
What is the name of the database you want to create the table in?
company
What would you like to call your table?
employee
How many attributes are there for your table?
5
What is one of the attributes? (This should include the name, the data type, and any limits (Ex: yourattr varchar(maxlength))
Fname varchar(15) not null
What is one of the attributes? (This should include the name, the data type, and any limits (Ex: yourattr varchar(maxlength))
Lname varchar(15) not null
What is one of the attributes? (This should include the name, the data type, and any limits (Ex: yourattr varchar(maxlength))
SSN varchar(9) not null
What is one of the attributes? (This should include the name, the data type, and any limits (Ex: yourattr varchar(maxlength))
Supper_ssn varchar(9) not null
What is one of the attributes? (This should include the name, the data type, and any limits (Ex: yourattr varchar(maxlength))
Dno int
Which of the previous attributes is the primary key?
Fname
Does this query or update look correct? (Y/N)
CREATE TABLE COMPANY.EMPLOYEE(FNAME VARCHAR(15) NOT NULL, LNAME VARCHAR(15) NOT NULL, SSN VARCHAR(9) NOT NULL, SUPPER_SSN VARCHAR(9) NOT NULL,
y
Perform action? (Y/N)
```

Department:

workspace - Java - Database - LAB4/src/databaseTest/Databases\_LAB4.java - Eclipse

File Edit Source Refactor Navigate Search Project Run Window Help

Package Explorer Database - LAB4 Kronos

Databases\_LAB4.java databaseTest.java

```
1 package databaseTest;
2 import java.sql.*;
3 import java.util.*;
4
5 public class Databases_LAB4
6 {
7     static String query = "";
8     static Scanner scan = new Scanner (System.in);
9 }
```

@ Javadoc Declaration Console

Databases\_LAB4 [Java Application] C:\Program Files\Java\jre1.8.0\_151\bin\javaw.exe (Nov 27, 2017, 11:35:56 AM)

Connected to database

Would you like to create a DATABASE, or a TABLE?

table

What is the name of the database you want to create the table in?

company

What would you like to call your table?

Department

How many attributes are there for your table?

4

What is one of the attributes? (This should include the name, the data type, and any limits (Ex: yourattr varchar(maxlength))

Dname varchar(15) not null

What is one of the attributes? (This should include the name, the data type, and any limits (Ex: yourattr varchar(maxlength))

Dnumber int not null

What is one of the attributes? (This should include the name, the data type, and any limits (Ex: yourattr varchar(maxlength))

Mgr\_ssn varchar(9) not null

What is one of the attributes? (This should include the name, the data type, and any limits (Ex: yourattr varchar(maxlength))

Dlocation varchar(30) not null

Which of the previous attributes is the primary key?

dname

Does this query or update look correct? (Y/N)

CREATE TABLE COMPANY.DEPARTMENT(DNAME VARCHAR(15) NOT NULL, DNUMBER INT NOT NULL, MGR\_SSN VARCHAR(9) NOT NULL, DLOCATION VARCHAR(30) NOT NULL,

y

Perform action? (Y/N)

Type here to search 11:43 AM 11/27/2017

Works\_on:

workspace - Java - Database - LAB4/src/databaseTest/Databases\_LAB4.java - Eclipse

File Edit Source Refactor Navigate Search Project Run Window Help

Package Explorer Database - LAB4 Kronos

Databases\_LAB4.java databaseTest.java

```
1 package databaseTest;
2 import java.sql.*;
3 import java.util.*;
4
5 public class Databases_LAB4
6 {
7     static String query = "";
8     static Scanner scan = new Scanner (System.in);
9 }
```

@ Javadoc Declaration Console

Databases\_LAB4 [Java Application] C:\Program Files\Java\jre1.8.0\_151\bin\javaw.exe (Nov 27, 2017, 11:35:56 AM)

Would you like to CREATE, DROP, DELETE, UPDATE, INSERT, QUERY, or VIEWMETADATA?

create

Connected to database

Would you like to create a DATABASE, or a TABLE?

table

What is the name of the database you want to create the table in?

company

What would you like to call your table?

works\_on

How many attributes are there for your table?

3

What is one of the attributes? (This should include the name, the data type, and any limits (Ex: yourattr varchar(maxlength))

Essn varchar(9) not null

What is one of the attributes? (This should include the name, the data type, and any limits (Ex: yourattr varchar(maxlength))

Pno int not null

What is one of the attributes? (This should include the name, the data type, and any limits (Ex: yourattr varchar(maxlength))

hours int not null

Which of the previous attributes is the primary key?

essn

Does this query or update look correct? (Y/N)

CREATE TABLE COMPANY.WORKS\_ON(ESSN VARCHAR(9) NOT NULL, PNO INT NOT NULL, HOURS INT NOT NULL, PRIMARY KEY (ESSN))

y

Perform action? (Y/N)

## Project:

The screenshot shows the Eclipse IDE interface. In the top left, the title bar says "workspace - Java - Database - LAB4/src/databaseTest/Databases\_LAB4.java - Eclipse". The menu bar includes File, Edit, Source, Refactor, Navigate, Search, Project, Run, Window, and Help. The Package Explorer view shows two projects: "Database - LAB4" and "Kronos". The main editor area contains Java code for creating a database and a table. Below the editor is a terminal window titled "Databases\_LAB4 [Java Application] C:\Program Files\Java\jre1.8.0\_151\bin\javaw.exe (Nov 27, 2017, 11:35:56 AM)". The terminal output shows the creation of a database named "company" and a table named "project" with four columns: Pname (VARCHAR(30) NOT NULL), Pnumber (INT NOT NULL), Plocation (VARCHAR(30) NOT NULL), and Dnum (INT NOT NULL). Primary key constraints are applied to Pname and Pnumber. The user is prompted to perform the action, and the response is "y".

```
1 package databaseTest;
2 import java.sql.*;
3 import java.util.*;
4
5 public class Databases_LAB4
6 {
7     static String query = "";
8     static Scanner scan = new Scanner (System.in);
9 }
10
11 Javadoc Declaration Console
12 Databases_LAB4 [Java Application] C:\Program Files\Java\jre1.8.0_151\bin\javaw.exe (Nov 27, 2017, 11:35:56 AM)
13 Connected to database
14 Would you like to create a DATABASE, or a TABLE?
15 table
16 What is the name of the database you want to create the table in?
17 company
18 What would you like to call your table?
19 project
20 How many attributes are there for your table?
21 4
22 What is one of the attributes? (This should include the name, the data type, and any limits (Ex: yourattr varchar(maxlength))
23 Pname varchar(30) not null
24 What is one of the attributes? (This should include the name, the data type, and any limits (Ex: yourattr varchar(maxlength))
25 Pnumber int not null
26 What is one of the attributes? (This should include the name, the data type, and any limits (Ex: yourattr varchar(maxlength))
27 Plocation varchar(30) not null
28 What is one of the attributes? (This should include the name, the data type, and any limits (Ex: yourattr varchar(maxlength))
29 Dnum int not null
30 Which of the previous attributes is the primary key?
31 Pnumber
32 Does this query or update look correct? (Y/N)
33
34 CREATE TABLE COMPANY.PROJECT(PNAME VARCHAR(30) NOT NULL, PNUMBER INT NOT NULL, PLOCATION VARCHAR(30) NOT NULL, DNUM INT NOT NULL, PRIMARY KEY
35 y
36 Perform action? (Y/N)
```

## After creation:

The screenshot shows the phpMyAdmin interface. The browser address bar shows "localhost/phpmyadmin/db\_sql.php?db=idealhome". The sidebar on the left lists databases: New, company, department, employee, project, works\_on, idealhome, information\_schema, mysql, performance\_schema, phpmyadmin, and test. The main panel shows the "Structure" tab for the "idealhome" database. It displays the table structure with columns: Pname, Pnumber, Plocation, and Dnum. Below the table structure, there is a SQL query editor with a placeholder "Run SQL query/queries on database idealhome:". The query box is empty, and there are buttons for "Clear", "Format", "Get auto-saved query", and "Bind parameters". At the bottom of the query editor, there are options for "Delimiter", "Show this query here again", "Retain query box", "Rollback when finished", and "Enable foreign key checks".

2. Insertion and deletion from each table (The custom error messages can be found in the try/catch blocks for each method, and print clearly when there is an error):

## Employee before insertion:

The screenshot shows the phpMyAdmin interface for a MySQL database named 'company'. The 'employee' table is selected. The table structure includes columns: FNAME, LNAME, SSN, SUPPER\_SSN, and DNO. A query in the SQL tab shows an empty result set: 'MySQL returned an empty result set (i.e. zero rows). (Query took 0.0042 seconds)'.

## Insertion from the java program:

The screenshot shows the Eclipse IDE interface with a Java project named 'Database - LAB4'. The 'Databases\_LAB4.java' file contains Java code for inserting data into a MySQL database. The code uses JDBC to connect to the 'company' database and insert values into the 'employee' table. The 'Console' tab shows the execution of the code and the resulting database interaction.

```
1 package databaseTest;
2 import java.sql.*;
3 import java.util.*;
4
5 public class Databases_LAB4
6 {
7     static String query = "";
8     static Scanner scan = new Scanner (System.in);
9
10    public static void main(String[] args) {
11        try {
12            Class.forName("com.mysql.jdbc.Driver");
13            Connection con = DriverManager.getConnection("jdbc:mysql://localhost:3306/company", "root", "root");
14            Statement st = con.createStatement();
15            st.executeUpdate(query);
16            System.out.println("Data Inserted successfully");
17        } catch (Exception e) {
18            e.printStackTrace();
19        }
20    }
21 }
```

Console output:

```
Databases_LAB4 [Java Application] C:\Program Files\Java\jre1.8.0_151\bin\javaw.exe (Nov. 27, 2017, 11:35:56 AM)
Would you like to CREATE, DROP, DELETE, UPDATE, INSERT, QUERY, or VIEWMETADATA?
insert
Connected to database
What is the name of the database you want to insert into?
company
What is the name of the table in this database?
employee
How many attributes are in this table?
5
Enter the values for the attributes in order, make sure the data types are correct.
Griffin
Enter the values for the attributes in order, make sure the data types are correct.
Bean
Enter the values for the attributes in order, make sure the data types are correct.
11111111
Enter the values for the attributes in order, make sure the data types are correct.
22222222
Enter the values for the attributes in order, make sure the data types are correct.
4
Does this query or update look correct? (Y/N)
Y
Perform action? (Y/N)
```

## After the Insertion:

The screenshot shows the phpMyAdmin interface for the 'company' database. The 'employee' table is selected. A single row is visible in the results table:

	FNAME	LNAME	SSN	SUPPER_SSN	DNO
<input type="checkbox"/>	Griffin	Bean	11111111	22222222	4

Below the table, there are buttons for 'Edit', 'Copy', 'Delete', 'Check all', 'With selected:', and 'Export'. The status bar at the bottom right shows the time as 1:38 PM and the date as 11/27/2017.

## Deletion from employee:

Before Deletion:

This screenshot is identical to the one above, showing the 'employee' table with the same single row of data. The status bar at the bottom right shows the time as 1:39 PM and the date as 11/27/2017.

## Deletion from the Java program:

The screenshot shows the Eclipse IDE interface. In the top left, it says "workspace - Java - Database - LAB4/src/databaseTest/Databases\_LAB4.java - Eclipse". The menu bar includes File, Edit, Source, Refactor, Navigate, Search, Project, Run, Window, Help. The toolbar has various icons for file operations. The Package Explorer shows a "Database - LAB4" project with a "Kronos" folder. The central workspace shows two files: "Databases\_LAB4.java" and "databaseTest.java". The code in "Databases\_LAB4.java" is as follows:

```
1 package databaseTest;
2 import java.sql.*;
3 import java.util.*;
4
5 public class Databases_LAB4
6 {
7     static String query = "";
8     static Scanner scan = new Scanner (System.in);
9 }
```

The "Console" tab in the bottom right shows the output of running the Java application. It starts with an "INSERT" statement, followed by a series of prompts for a delete operation:

```
INSERT COMPANY.EMPLOYEE VALUES ('Griffin', 'Bean', '111111111', '222222222', '4')
y
Perform action? (Y/N)
y
Would you like to CREATE, DROP, DELETE, UPDATE, INSERT, QUERY, or VIEWMETADATA?
delete
Connected to database
What is the name of the database you would like to delete from?
company
What is the name of the table this value exists in?
employee
How many attributes would you like to use in the WHERE clause?
1
What attribute would you like to use in the WHERE clause?
fname
Enter the value for that attribute for the tuple you would like to delete.
Griffin
Does this query or update look correct?

DELETE FROM COMPANY.EMPLOYEE WHERE FNAME = 'Griffin'
y
Are you sure you want to delete this tuple? (Y/N)
y
Perform action? (Y/N)
```

## After Deletion:

The screenshot shows the phpMyAdmin interface. The browser address bar shows "localhost/phpmyadmin/sql.php?server=1&db=company&table=employee&pos=0". The sidebar on the left lists databases: company, department, employee, project, works\_on, idealhome, information\_schema, mysql, performance\_schema, phpmyadmin, test. The main area shows the "employee" table with the following structure:

FNAME	LNAME	SSN	SUPPER_SSN	DNO

A SQL query in the top right pane shows the result of a select query:

```
MySQL returned an empty result set (i.e. zero rows). (Query took 0.0065 seconds.)
```

```
SELECT * FROM `employee`
```

Below the table, there are "Query results operations" and "Bookmark this SQL query" sections.

## Insertion into Department:

## Before Insertion:

The screenshot shows the phpMyAdmin interface for a MySQL database named 'company'. The 'department' table is selected. The table structure includes columns: DNAME, DNUMBER, MGR\_SSN, and DLOCATION. A query in the SQL tab shows all rows from the department table, resulting in zero rows. The interface also includes tabs for Browse, Structure, SQL, Search, Insert, Export, Import, Privileges, Operations, Tracking, and Triggers.

## Insertion in the Java program:

The screenshot shows the Eclipse IDE environment. A Java project named 'Database - LAB4' is open in the Package Explorer. The 'Databases\_LAB4.java' file contains the following code:

```
1 package databaseTest;
2 import java.sql.*;
3 import java.util.*;
4
5 public class Databases_LAB4
6 {
7     static String query = "";
8     static Scanner scan = new Scanner (System.in);
9 }
```

The Java code is running in the Javadoc tab of the IDE's interface. The terminal window shows the execution of the Java application:

```
Databases_LAB4[Java Application] C:\Program Files\Java\jre1.8.0_151\bin\javaw.exe (Nov 27, 2017, 11:35:56 AM)
Perform action? (Y/N)
y
Would you like to CREATE, DROP, DELETE, UPDATE, INSERT, QUERY, or VIEWMETADATA?
insert
Connected to database
What is the name of the database you want to insert into?
company
What is the name of the table in this database?
department
How many attributes are in this table?
4
Enter the values for the attributes in order, make sure the data types are correct.
Research
Enter the values for the attributes in order, make sure the data types are correct.
4
Enter the values for the attributes in order, make sure the data types are correct.
11111111
Enter the values for the attributes in order, make sure the data types are correct.
Atlanta
Does this query or update look correct? (Y/N)
y
INSERT COMPANY.DEPARTMENT VALUES ('Research', '4', '11111111', 'Atlanta')
y
Perform action? (Y/N)
```

## After Insertion:

The screenshot shows the phpMyAdmin interface for the 'company' database. The 'department' table is selected. A single row is visible in the results table:

	DNAME	DNUMBER	MGR_SSN	DLOCATION
1	Research	4	111111111	Atlanta

Below the results table, there are buttons for 'Edit', 'Copy', 'Delete', and 'Export'. The status bar at the bottom indicates the URL as `localhost/phpmyadmin/sql.php?server=1&db=company&table=department&pos=0`.

## Deletion from Department:

### Before Deletion:

This screenshot is identical to the one above, showing the 'department' table with one row: Research (DNUMBER 4). The status bar at the bottom indicates the URL as `localhost/phpmyadmin/sql.php?server=1&db=company&table=department&pos=0`.

## Deletion in the Java program:

The screenshot shows the Eclipse IDE interface. In the top left, it says "workspace - Java - Database - LAB4/src/databaseTest/Databases\_LAB4.java - Eclipse". The menu bar includes File, Edit, Source, Refactor, Navigate, Project, Run, Window, Help. The Package Explorer shows a "Database - LAB4" project with a "Kronos" folder. The code editor displays Java code for a "Databases\_LAB4" class. The Console tab shows the output of running the code, which performs an insert into the COMPANY.DEPARTMENT table and then deletes a tuple from the same table where DNAME = 'Research'.

```
1 package databaseTest;
2 import java.sql.*;
3 import java.util.*;
4
5 public class Databases_LAB4
6 {
7     static String query = "";
8     static Scanner scan = new Scanner (System.in);
9 }
10
11 Javadoc Declaration Console
12
13 Databases_LAB4 [Java Application] C:\Program Files\Java\jre1.8.0_151\bin\javaw.exe (Nov 27, 2017, 11:35:56 AM)
14 INSERT COMPANY.DEPARTMENT VALUES ('Research', '4', '11111111', 'Atlanta')
15 y
16 Perform action? (Y/N)
17 y
18 Would you like to CREATE, DROP, DELETE, UPDATE, INSERT, QUERY, or VIEWMETADATA?
19 delete
20 Connected to database
21 What is the name of the database you would like to delete from?
22 company
23 What is the name of the table this value exists in?
24 department
25 How many attributes would you like to use in the WHERE clause?
26 1
27 What attribute would you like to use in the WHERE clause?
28 dname
29 Enter the value for that attribute for the tuple you would like to delete.
30 Research
31 Does this query or update look correct?
32
33 DELETE FROM COMPANY.DEPARTMENT WHERE DNAME = 'Research'
34 y
35 Are you sure you want to delete this tuple? (Y/N)
36 y
37 Perform action? (Y/N)
```

## After Deletion:

The screenshot shows the phpMyAdmin interface. The browser address bar shows "localhost/phpmyadmin/sql.php?server=1&db=company&table=department&pos=0". The sidebar on the left lists databases: New, company, department, employee, project, works\_on, idealhome, information\_schema, mysql, performance\_schema, phpmyadmin, test. The main area shows the "department" table with one row: DNAME: 'Research', DNUMBER: '4', MGR\_SSN: null, DLOCATION: 'Atlanta'. A message at the top says "MySQL returned an empty result set (i.e. zero rows). (Query took 0.0042 seconds.)". Below the table are "Query results operations" and "Bookmark this SQL query" buttons.

## Insertion into the Works\_On table:

## Before Insertion:

The screenshot shows the phpMyAdmin interface for a MySQL database named 'company'. The 'works\_on' table is selected. The table structure includes columns: ESSN, PNO, and HOURS. A query is run: 'SELECT \* FROM `works\_on`', which returns zero rows. The interface also displays options for creating a view or bookmarking the query.

## Insertion in the Java program:

The screenshot shows the Eclipse IDE interface with a Java project named 'Databases\_LAB4'. The 'DatabaseTest.java' file contains code for interacting with a database. The 'Console' tab shows the execution of the program, which asks for user input to perform an 'INSERT' operation into the 'works\_on' table. The user inputs values for ESSN, PNO, and HOURS, and the program constructs the SQL query: 'INSERT COMPANY.WORKS\_ON VALUES ('1111111111', '4', '12')'. The program then prompts for a 'Perform action' confirmation.

## After Insertion:

The screenshot shows the phpMyAdmin interface for the 'company' database. The 'works\_on' table is selected. The table structure includes columns ESSN, PNO, and HOURS. A single row is present with values: ESSN 11111111, PNO 4, and HOURS 12. The interface includes a sidebar with database and table navigation, and a bottom navigation bar with various application icons.

## Deletion from the Works\_On table:

Before Deletion:

This screenshot is identical to the one above, showing the 'works\_on' table in the 'company' database with one row: ESSN 11111111, PNO 4, and HOURS 12. The interface and sidebar are consistent with the previous screenshot.

## Deletion in the Java program:

The screenshot shows the Eclipse IDE interface. In the top left, it says "workspace - Java - Database - LAB4/src/databaseTest/Databases\_LAB4.java - Eclipse". The menu bar includes File, Edit, Source, Refactor, Navigate, Project, Run, Window, Help. The Package Explorer shows a project named "Database - LAB4" with a file "Kronos". The main editor window contains Java code for a class "Databases\_LAB4" that performs a delete operation on a database table. Below the editor is a "Console" tab showing the output of running the code. The output shows the insertion of a row into the "WORKS\_ON" table, followed by a series of prompts from the Java application asking if the user wants to perform a CREATE, DROP, DELETE, UPDATE, INSERT, QUERY, or VIEWMETADATA action. The user selects "delete". The application then asks for the name of the database to delete, which is "company". It then asks for the name of the table, which is "works\_on". It asks for the number of attributes to use in the WHERE clause, which is "1". It then asks for the attribute name, which is "essn", and the value to delete, which is "11111111". Finally, it asks if the user is sure they want to delete the tuple, and the user responds with "y".

```
1 package databaseTest;
2 import java.sql.*;
3 import java.util.*;
4
5 public class Databases_LAB4
6 {
7     static String query = "";
8     static Scanner scan = new Scanner (System.in);
9 }
```

```
@ Javadoc Declaration Console
Databases_LAB4 [Java Application] C:\Program Files\Java\jre1.8.0_151\bin\javaw.exe (Nov 27, 2017, 11:35:56 AM)
INSERT COMPANY.WORKS_ON VALUES ('111111111', '4', '12')
y
Perform action? (Y/N)
y
Would you like to CREATE, DROP, DELETE, UPDATE, INSERT, QUERY, or VIEWMETADATA?
delete
Connected to database
What is the name of the database you would like to delete from?
company
What is the name of the table this value exists in?
works_on
How many attributes would you like to use in the WHERE clause?
1
What attribute would you like to use in the WHERE clause?
essn
Enter the value for that attribute for the tuple you would like to delete.
11111111
Does this query or update look correct?

DELETE FROM COMPANY.WORKS_ON WHERE ESSN = '11111111'
y
Are you sure you want to delete this tuple? (Y/N)
y
Perform action? (Y/N)
```

## After Deletion:

The screenshot shows a web browser window with multiple tabs open. The active tab is "localhost/phpmyadmin/sql.php?server=1&db=company&table=works\_on&pos=0". The page title is "phpMyAdmin". The left sidebar shows a tree view of the database structure, including the "works\_on" table under the "company" database. The main content area shows a SQL query: "SELECT \* FROM `works\_on`" and the result: "MySQL returned an empty result set (i.e. zero rows). (Query took 0.0046 seconds.)". Below the query, there are sections for "Query results operations" (Create view) and "Bookmark this SQL query" (Label: [input field], Let every user access this bookmark, Bookmark this SQL query button). At the bottom of the page, the URL is "localhost/phpmyadmin/sql.php?server=1&db=company&table=works\_on&pos=0".

Insertion into the Project table:

## Before Insertion:

The screenshot shows the phpMyAdmin interface for a MySQL database named 'company'. The 'project' table is selected. The SQL query 'SELECT \* FROM `project`' is run, resulting in an empty result set. The table structure is displayed with columns: PNAME, PNUMBER, PLOCATION, DNUM. Below the table, there are operations like 'Create view' and 'Bookmark this SQL query'.

## Insertion in the Java program:

The screenshot shows the Eclipse IDE environment. A Java project named 'Database - LAB4' is open, with files 'Databases\_LAB4.java' and 'databaseTest.java' visible. The 'Console' tab is active, showing the output of a Java application. The application is performing an 'INSERT' operation into the 'project' table of the 'company' database. The terminal output includes:

```
Perform action? (Y/N)
y
Would you like to CREATE, DROP, DELETE, UPDATE, INSERT, QUERY, or VIEWMETADATA?
insert
Connected to database
What is the name of the database you want to insert into?
company
What is the name of the table in this database?
project
How many attributes are in this table?
4
Enter the values for the attributes in order, make sure the data types are correct.
Project1
Enter the values for the attributes in order, make sure the data types are correct.
4
Enter the values for the attributes in order, make sure the data types are correct.
Atlanta
Enter the values for the attributes in order, make sure the data types are correct.
4
Does this query or update look correct? (Y/N)

INSERT COMPANY.PROJECT VALUES ('Project1', '4', 'Atlanta', '4')
y
Perform action? (Y/N)
```

## After Insertion:

The screenshot shows the phpMyAdmin interface for the 'company' database. The left sidebar lists databases like 'New', 'company', 'idealhome', etc. The 'project' table is selected under the 'company' database. The main area displays the results of the query 'SELECT \* FROM `project`'. One row is shown: Project1, 4, Atlanta, 4. Below the table, there are buttons for 'Edit', 'Copy', 'Delete', and 'Export'. At the bottom, there's a 'Query results operations' section with options like 'Print', 'Copy to clipboard', 'Export', 'Display chart', and 'Create view'. A 'Bookmark this SQL query' section allows labeling the query and setting access permissions. The status bar at the bottom shows system information: Windows logo, search bar, taskbar icons (e.g., File Explorer, Edge, Chrome), battery level, ENG, 1:54 PM, 11/27/2017.

PNAME	PNUMBER	PLOCATION	DNUM
Project1	4	Atlanta	4

Deletion from the Project table:

## Before Deletion:

Showing rows 0 - 0 (1 total, Query took 0.0039 seconds.)

SELECT \* FROM `project`

	PNAME	PNUMBER	PLOCATION	DNUM
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	Project1	4	Atlanta	4

Query results operations

Print  Copy to clipboard  Export  Display chart  Create view

Bookmark this SQL query

Label:  Let every user access this bookmark

Console

## Deletion in the Java program:

workspace - Java - Database - LAB4/src/databaseTest/Databases\_LAB4.java - Eclipse

File Edit Source Refactor Navigate Search Project Run Window Help

Databases\_LAB4.java

```
1 package databaseTest;
2 import java.sql.*;
3 import java.util.*;
4
5 public class Databases_LAB4
6 {
7     static String query = "";
8     static Scanner scan = new Scanner (System.in);
```

@ Javadoc Declaration Console

Databases\_LAB4 [Java Application] C:\Program Files\Java\jre1.8.0\_151\bin\javaw.exe (Nov 27, 2017, 11:35:56 AM)

```
INSERT COMPANY.PROJECT VALUES ('Project1', '4', 'Atlanta', '4')
y
Perform action? (Y/N)
y
Would you like to CREATE, DROP, DELETE, UPDATE, INSERT, QUERY, or VIEWMETADATA?
delete
Connected to database
What is the name of the database you would like to delete from?
company
What is the name of the table this value exists in?
project
How many attributes would you like to use in the WHERE clause?
1
What attribute would you like to use in the WHERE clause?
pname
Enter the value for that attribute for the tuple you would like to delete.
Project1
Does this query or update look correct?

DELETE FROM COMPANY.PROJECT WHERE PNAME = 'Project1'
y
Are you sure you want to delete this tuple? (Y/N)
y
Perform action? (Y/N)
```

## After Deletion:

The screenshot shows the phpMyAdmin interface for a MySQL database named 'company'. The 'project' table is selected. A message at the top states: "MySQL returned an empty result set (i.e. zero rows). (Query took 0.0043 seconds)." Below this, a SQL query is displayed: "SELECT \* FROM `project`". The results table is empty. On the left, a tree view shows the database structure with tables like 'company', 'department', 'employee', and 'works\_on'. On the right, there are operations like 'Create view' and 'Bookmark this SQL query'.

### 3. Query menu (dummy data added for the purpose of output):

The screenshot shows the Eclipse IDE environment. In the center, a Java file named 'Databases\_LAB4.java' is open, containing code related to database testing. Below the editor, a terminal window titled 'Console' shows the output of a Java application named 'DatabaseTest'. The console output includes a series of questions and answers, such as 'What is the name of the table this attribute comes from?' followed by 'employee'. It also shows the execution of a SQL query: 'SELECT \* FROM COMPANY.EMPLOYEE WHERE EMPLOYEE.FNAME = 'Griffin' AND EMPLOYEE.SSN = '1111111111''. The response to the query is 'Griffin Bean 1111111111 2222222222 4'. At the bottom of the terminal, it asks 'Perform action? (Y/N)'.

#### 4. Metadata check:

workspace - Java - Database - LAB4/src/databaseTest/Databases\_LAB4.java - Eclipse

File Edit Source Refactor Navigate Search Project Run Window Help

Package Explorer Database - LAB4 Kronos

Databases\_LAB4.java databaseTest.java

```
1 package databaseTest;
2 import java.sql.*;
3 import java.util.*;
4
5 public class Databases_LAB4
6 {
7     static String query = "";
8     static Scanner scan = new Scanner (System.in);
```

@ Javadoc Declaration Console

Databases\_LAB4 [Java Application] C:\Program Files\Java\jre1.8.0\_151\bin\javaw.exe (Nov 27, 2017, 11:35:56 AM)

```
SELECT * FROM COMPANY.EMPLOYEE WHERE EMPLOYEE.FNAME = 'Griffin' AND EMPLOYEE.SSN = '1111111111'
y Griffin Bean 1111111111 2222222222 4
Perform action? (Y/N)
y Would you like to CREATE, DROP, DELETE, UPDATE, INSERT, QUERY, or VIEWMETADATA?
viewmetadata
Connected to database
Would you like to view the databases (D), tables within a database (TD), or the columns of a table (CT)?
td
What is the name of the database?
company
Does this query or update look correct? (Y/N)

SHOW TABLES FROM COMPANY
y department
employee
project
works_on

Perform action? (Y/N)
```

Type here to search

File Edit Source Refactor Navigate Search Project Run Window Help

Package Explorer Database - LAB4 Kronos

Databases\_LAB4.java databaseTest.java

```
1 package databaseTest;
2 import java.sql.*;
3 import java.util.*;
4
5 public class Databases_LAB4
6 {
7     static String query = "";
8     static Scanner scan = new Scanner (System.in);
```

@ Javadoc Declaration Console

Databases\_LAB4 [Java Application] C:\Program Files\Java\jre1.8.0\_151\bin\javaw.exe (Nov 27, 2017, 11:35:56 AM)

```
works_on

Perform action? (Y/N)
y Would you like to CREATE, DROP, DELETE, UPDATE, INSERT, QUERY, or VIEWMETADATA?
viewmetadata
Connected to database
Would you like to view the databases (D), tables within a database (TD), or the columns of a table (CT)?
ct
What is the name of the database?
company
What is the name of the table?
employee
Does this query or update look correct? (Y/N)

SHOW COLUMNS FROM COMPANY.EMPLOYEE
y FNAME
LNAME
SSN
SUPPER_SSN
DNO

Perform action? (Y/N)
```

Type here to search

File Edit Source Refactor Navigate Search Project Run Window Help

Package Explorer Database - LAB4 Kronos

Databases\_LAB4.java databaseTest.java

```
1 package databaseTest;
2 import java.sql.*;
3 import java.util.*;
4
5 public class Databases_LAB4
6 {
7     static String query = "";
8     static Scanner scan = new Scanner (System.in);
```

@ Javadoc Declaration Console

Databases\_LAB4 [Java Application] C:\Program Files\Java\jre1.8.0\_151\bin\javaw.exe (Nov 27, 2017, 11:35:56 AM)

```
works_on

Perform action? (Y/N)
y Would you like to CREATE, DROP, DELETE, UPDATE, INSERT, QUERY, or VIEWMETADATA?
viewmetadata
Connected to database
Would you like to view the databases (D), tables within a database (TD), or the columns of a table (CT)?
ct
What is the name of the database?
company
What is the name of the table?
employee
Does this query or update look correct? (Y/N)

SHOW COLUMNS FROM COMPANY.EMPLOYEE
y FNAME
LNAME
SSN
SUPPER_SSN
DNO

Perform action? (Y/N)
```

2:04 PM ENG 11/27/2017

2:04 PM ENG 11/27/2017