

# Hands-on Lab: Stored Procedures



**Estimated time needed:** 20 minutes

Stored Procedures in SQL are a type of database object that allow you to encapsulate a series of SQL statements into a single routine. They are stored in the database data dictionary and can be invoked from an application program or from the database command interface. Stored procedures can accept input parameters and return multiple values of output parameters. They can also include control-of-flow constructs such as loops and conditional statements. Stored procedures offer several benefits including improved performance, higher productivity, ease of use, and increased scalability. They also provide a mechanism for enforcing business rules and data integrity in the database system.

## Objectives

After completing this lab, you will be able to:

- Create stored procedures
- Execute stored procedures

## Software Used in this Lab

In this lab, you will use [MySQL](#). MySQL is a Relational Database Management System (RDBMS) designed to efficiently store, manipulate, and retrieve data.



To complete this lab you will utilize MySQL relational database service available as part of IBM Skills Network Labs (SN Labs) Cloud IDE. SN Labs is a virtual lab environment used in this course.

## Database Used in this Lab

`Mysql_learners` database has been used in this lab.

## Data Used in this Lab

The data used in this lab is internal data. You will be working on the **PETSALE** table.

ID ▲	ANIMAL	SALEPRICE
1	Cat	450.09
2	Dog	666.66
3	Parrot	50.00
4	Hamster	60.60
5	Goldfish	48.48

This lab requires you to have the PETSALE table populated with sample data on mysql phpadmin interface. You might have created and populated a PETSALE table in a previous lab.

For this lab, you need to create a database PETS in the phpMyAdmin interface. Download the PETSALE-CREATE-v2.sql script below, upload it to console under the PETS database. Upon execution, the script will create a new PETSALE table dropping any previous PETSALE table if exists, and will populate it with the required sample data.

- [PETSALE-CREATE-v2.sql](#)

## Stored Procedure: Exercise 1

In this exercise, you will create and execute a stored procedure to read data from a table on mysql phpadmin using SQL.

1. You will create a stored procedure routine named **RETRIEVE\_ALL**.
  - This **RETRIEVE\_ALL** routine will contain an SQL query to retrieve all the records from the PETSALE table, so you don't need to write the same query over and over again. You just call the stored procedure routine to execute the query everytime.
  - To create the stored procedure routine, copy the code below and paste it to the textarea of the **SQL** page. Click **Go**.

```
DELIMITER //
CREATE PROCEDURE RETRIEVE_ALL()
BEGIN
    SELECT * FROM PETSALE;
END //
DELIMITER ;
```


Run SQL query/queries on database Mysql\_learners: 

```
1 DELIMITER //  
2  
3 CREATE PROCEDURE RETRIEVE_ALL()  
4  
5 BEGIN  
6  
7     SELECT * FROM PETALE;  
8  
9  
10 END //  
11  
12 DELIMITER ;
```

Clear

Format

Get auto-saved query

☐ Bind parameters 

[ Delimiter ; ] ☐ Show this query here again ☐ Retain query box ☐ Rollback when finished ☒ Enable foreign key checks

Hide query box

✓ MySQL returned an empty result set (i.e. zero rows). (Query took 0.0064 seconds.)

```
CREATE PROCEDURE RETRIEVE_ALL() BEGIN SELECT * FROM PETALE; END
```

2. To call the RETRIEVE\_ALL routine, open another **SQL** tab by clicking **Open in new Tab**

The screenshot shows the phpMyAdmin web interface. The browser address bar displays the URL: `lakshmih-8080.theiadocker-1-labs-prod-theiak8s-4-tor01.proxy.cognitiveclass.ai/tbl_sql.php?db=HR&table=EMPLOYEES`. The interface has a top navigation bar with tabs: Browse, Structure, SQL, Search, Insert, Export, and Import. The 'SQL' tab is active. Below the tabs, a red box highlights a context menu with the following options: 'Open link in new tab', 'Open link in new window', 'Open link in incognito window', 'Save link as...', 'Copy link address', and 'Inspect'. The 'Open link in new tab' option is selected. The main content area is titled 'Run SQL query/queries on table HR' and contains a text area with the SQL query: `1 SELECT * FROM `EMPLOYEES``. Below the text area are buttons for 'SELECT \*', 'SELECT', 'INSERT', 'UPDATE', 'DELETE', 'Clear', 'Format', and 'Get auto-s'. There is also a checkbox for 'Bind parameters' and a section for query options: 'Delimiter' (set to semicolon), 'Show this query here again', 'Retain query box', and 'Rollback when finished'. The left sidebar shows the database structure with 'HR' selected, and its sub-tables: DEPARTMENTS, EMPLOYEES, JOBS, JOB\_HISTORY, LOCATIONS, information\_schema, mysql, Mysql\_learners, PETRESCUE, PETSale, performance\_schema, and sys.

Delete the default line which appears so that you will get a blank window.

Copy the code below and paste it to the textarea of the **SQL** page. Click **Go**.

```
CALL RETRIEVE_ALL;
```

11 `CALL RETRIEVE_ALL;`

☐ Bind parameters

Delimiter  ☐ Show this query here again
 ☐ Retain query box
 ☐ Rollback when finished
 ☒ Enable foreign key checks

Hide query box

✓ Showing rows 0 - 4 (5 total, Query took 0.0010 seconds.)

`CALL RETRIEVE_ALL`

☐ Show all | Number of rows:  Filter rows:

Options

	ANIMAL	SALEPRICE	SALEDATE	QUANTITY
1	Cat	450.09	2018-05-29	9
2	Dog	666.66	2018-06-01	3
3	Parrot	50.00	2018-06-04	2
4	Hamster	60.60	2018-06-11	6
5	Goldfish	48.48	2018-06-14	24

3. You can view the created stored procedure routine RETRIEVE\_ALL. On the left panel, expand the **PETS** database option and click on **Procedures** to view the procedure.

Current server: phpMyAdmin demo - M

Recent Favorites

Type to filter these, Enter t

performance\_schema

PETS

Procedures

Tables

New

PETSALE

## Routines

☐ Check all

Name	Type	Returns
<input type="checkbox"/> RETRIEVE_ALL	PROCEDURE	<a href="#">Edit</a> <a href="#">Execute</a> <a href="#">Export</a> <a href="#">Drop</a>

[phpMyAdmin Demo Server](#): Git information missing!

4. If you wish to drop the stored procedure routine RETRIEVE\_ALL, copy the code below and paste it to the textarea of the **SQL** page. Click **Go**.

```
DROP PROCEDURE RETRIEVE_ALL;
CALL RETRIEVE_ALL;
```

The screenshot shows a MySQL IDE window with a toolbar at the top containing buttons for Structure, SQL, Search, Query, Export, Import, Operations, Privileges, and Routines. The SQL editor contains the following code:

```

1
2 DROP PROCEDURE RETRIEVE_ALL;
3
4 CALL RETRIEVE_ALL;
5
6

```

Below the editor are buttons for Clear, Format, and Get auto-saved query. There is a checkbox for Bind parameters. At the bottom, there are checkboxes for Show this query here again, Retain query box, Rollback when finished, and Enable foreign key checks (checked). The Delimiter is set to semicolon.

An error message is displayed in a red box at the bottom:

**Error**  
 SQL query: [Copy](#)  
  
 CALL RETRIEVE\_ALL  
  
 MySQL said: [?](#)  
 #1305 - PROCEDURE Mysql\_learners.RETRIEVE\_ALL does not exist

## Stored Procedure: Exercise 2

In this exercise, you will create and execute a stored procedure to write/modify data in a table on MySQL using SQL.

You will create a stored procedure routine named **UPDATE\_SALEPRICE** with parameters **Animal\_ID** and **Animal\_Health**.

- This **UPDATE\_SALEPRICE** routine will contain SQL queries to update the sale price of the animals in the PETSale table depending on their health conditions, **BAD** or **WORSE**.
- This procedure routine will take animal ID and health condition as parameters which will be used to update the sale price of animal in the PETSale table by an amount depending on their health condition. Suppose that:
  - For animal with ID XX having BAD health condition, the sale price will be reduced further by 25%.
  - For animal with ID YY having WORSE health condition, the sale price will be reduced further by 50%.
  - For animal with ID ZZ having other health condition, the sale price won't change.
- To create the stored procedure routine, copy the code below and paste it to the text area of the **SQL** page. Click **Go**.

```

DELIMITER @
CREATE PROCEDURE UPDATE_SALEPRICE (IN Animal_ID INTEGER, IN Animal_Health VARCHAR(5))
BEGIN
  IF Animal_Health = 'BAD' THEN
    UPDATE PETSale
    SET SALEPRICE = SALEPRICE - (SALEPRICE * 0.25)
    WHERE ID = Animal_ID;
  ELSEIF Animal_Health = 'WORSE' THEN
    UPDATE PETSale
    SET SALEPRICE = SALEPRICE - (SALEPRICE * 0.5)
    WHERE ID = Animal_ID;
  ELSE
    UPDATE PETSale

```

```

        SET SALEPRICE = SALEPRICE
      WHERE ID = Animal_ID;
    END IF;
  END @
DELIMITER ;

```

Server: mysql5500 Database: mysql\_learners

Structure SQL Search Query Export Import Operations Privileges Routines

Run SQL query/queries on database **mysql\_learners**:

```

15
16 ELSE
17     UPDATE PETALE
18     SET SALEPRICE = SALEPRICE
19     WHERE ID = Animal_ID;
20
21 END IF;
22
23 END @
24
25 DELIMITER ;
26

```

Clear Format Get auto-saved query

☐ Bind parameters

[ Delimiter ; ] ☐ Show this query here again ☐ Retain query box ☐ Rollback when finished ☒ Enable foreign key checks

Hide query box

✓ MySQL returned an empty result set (i.e. zero rows). (Query took 0.0214 seconds.)

```

CREATE PROCEDURE UPDATE_SALEPRICE ( IN Animal_ID INTEGER, IN Animal_Health VARCHAR(5) ) BEGIN IF Animal_Health = 'BAD' THEN
(SALEPRICE * 0.25) WHERE ID = Animal_ID; ELSEIF Animal_Health = 'WORSE' THEN UPDATE PETALE SET SALEPRICE = SALEPRICE -
PETALE SET SALEPRICE = SALEPRICE WHERE ID = Animal_ID; END IF; END

```

1. Let's call the UPDATE\_SALEPRICE routine. We want to update the sale price of animal with ID 1 having **BAD** health condition in the PETALE table. open another **SQL** tab by clicking **Open in new Tab**

The screenshot shows the phpMyAdmin web interface. The browser address bar displays the URL: `lakshmih-8080.theiadocker-1-labs-prod-theiak8s-4-tor01.proxy.cognitiveclass.ai/tbl_sql.php?db=HR&table=EMPLOYEES`. The phpMyAdmin interface has a left sidebar with a tree view of databases and tables. The 'HR' database is selected, and the 'EMPLOYEES' table is highlighted. The main panel shows the 'SQL' tab, with a context menu open over it. The menu options are: 'Open link in new tab' (highlighted with a red box), 'Open link in new window', 'Open link in incognito window', 'Save link as...', 'Copy link address', and 'Inspect'. The SQL query area contains the text: `1 SELECT * FROM `EMPLOYEES``. Below the query area are buttons for 'SELECT \*', 'SELECT', 'INSERT', 'UPDATE', 'DELETE', 'Clear', 'Format', and 'Get auto-s'. There is also a checkbox for 'Bind parameters' and a section for query options: '[ Delimiter ; ]', 'Show this query here again', 'Retain query box', and 'Rollback when finished'.

Delete the default line which appears so that you will get a blank window.

Copy the code below and paste it to the textarea of the **SQL** page. Click **Go**.

Note if you have dropped RETREIVE\_ALL procedure rerun the creation script of that procedure before executing these lines.

```
CALL RETRIEVE_ALL;  
CALL UPDATE_SALEPRICE(1, 'BAD');  
CALL RETRIEVE_ALL;
```



Showing rows 0 - 4 (5 total, Query took 0.0007 seconds.)

CALL RETRIEVE\_ALL

Show all

Number of rows: 25

Filter rows: Search this table

+ Options

ID	ANIMAL	SALEPRICE	SALEDATE	QUANTITY
1	Cat	450.09	2018-05-29	9
2	Dog	666.66	2018-06-01	3
3	Parrot	50.00	2018-06-04	2
4	Hamster	60.60	2018-06-11	6
5	Goldfish	48.48	2018-06-14	24

Note: #1265 D

Showing rows

CALL RETRIEVE\_A

Show all

+ Options

ID	ANIMAL	S
1	Cat	
2	Dog	
3	Parrot	
4	Hamster	
5	Goldfish	

2. Let's call the UPDATE\_SALEPRICE routine once again. We want to update the sale price of animal with ID 3 having **WORSE** health condition in the PETSALE table. copy the code below and paste it to the textarea of the SQL page. Click **Go**. You will have all the records retrieved from the PETSALE table.

```
CALL RETRIEVE_ALL;
CALL UPDATE_SALEPRICE(3, 'WORSE');
CALL RETRIEVE_ALL;
```

Showing rows 0 - 4 (5 total, Query took 0.0007 seconds.)

CALL RETRIEVE\_ALL

Show all

Number of rows: 25

Filter rows: Search this table

Options

ID	ANIMAL	SALEPRICE	SALEDATE	QUANTITY
1	Cat	337.57	2018-05-29	9
2	Dog	666.66	2018-06-01	3
3	Parrot	50.00	2018-06-04	2
4	Hamster	60.60	2018-06-11	6
5	Goldfish	48.48	2018-06-14	24

Showing rows 0 - 4 (5 total, Query took 0.0007 seconds.)

CALL RETRIEVE\_ALL

Show all

Number of rows: 25

Filter rows: Search this table

Options

ID	ANIMAL	SALEPRICE	SALEDATE	QUANTITY
1	Cat	337.57	2018-05-29	9
2	Dog	666.66	2018-06-01	3
3	Parrot	25.00	2018-06-04	2
4	Hamster	60.60	2018-06-11	6
5	Goldfish	48.48	2018-06-14	24

Query results operations

3. You can view the created stored procedure routine UPDATE\_SALEPRICE. Click on the **Routines** and view the procedure.

The screenshot shows the MySQL Routines interface. At the top is a navigation bar with tabs: Structure, SQL, Search, Query, Export, Import, Operations, Privileges, and Routines. The Routines tab is active. Below the navigation bar is a 'Routines' section with a table listing database routines. The table has columns: Name, Action, Type, and Returns. Two routines are listed: RETRIEVE\_ALL and UPDATE\_SALEPRICE, both of type PROCEDURE. Below the table are controls for the selected routine, including a 'Check all' checkbox and 'With selected:' options for Export and Drop. Below the Routines section is a 'New' section with an 'Add routine' button.

Name	Action	Type	Returns
<input type="checkbox"/> RETRIEVE_ALL	Edit  Execute  Export  Drop	PROCEDURE	
<input type="checkbox"/> UPDATE_SALEPRICE	Edit  Execute  Export  Drop	PROCEDURE	

☐ Check all    With selected: Export Drop

**New**

Add routine

4. If you wish to drop the stored procedure routine UPDATE\_SALEPRICE, copy the code below and paste it to the textarea of the **SQL** page. Click **Go**.

```
DROP PROCEDURE UPDATE_SALEPRICE;  
CALL UPDATE_SALEPRICE;
```

The screenshot shows the MySQL SQL interface. The query area contains the following code:

```
7  
8  
9 DROP PROCEDURE UPDATE_SALEPRICE;  
10  
11 CALL UPDATE_SALEPRICE;
```

Below the query area are buttons: Clear, Format, and Get auto-saved query. There is also a checkbox for 'Bind parameters'. Below these are options: [ Delimiter ; ] (with a text input field), Show this query here again, Retain query box, Rollback when finished, and Enable foreign key checks (checked). Below the options is a 'Hide query box' link. At the bottom is an 'Error' section with a red background. It contains the text 'SQL query: Copy' and the error message: '#1305 - PROCEDURE Mysql\_learners.UPDATE\_SALEPRICE does not exist'.

Clear    Format    Get auto-saved query

☐ Bind parameters

[ Delimiter ; ]    ☐ Show this query here again    ☐ Retain query box    ☐ Rollback when finished    ☒ Enable foreign key checks

Hide query box

**Error**

SQL query: [Copy](#)

DROP PROCEDURE UPDATE\_SALEPRICE

**MySQL said:**

#1305 - PROCEDURE Mysql\_learners.UPDATE\_SALEPRICE does not exist

# Conclusion

Congratulations! You have completed this lab on creating stored procedures in MySQL.

You are now able to:

- Write a stored procedure as per requirement
- Call or Execute a stored procedure
- Drop a stored procedure once its utility is over

## Author(s)

[Lakshmi Holla](#)

[Malika Singla](#)

[Abhishek Gagneja](#)

© IBM Corporation 2023. All rights reserved.