Handling Databases with PHP

Session 18

Objectives

- *Describe Database APIs*
- *Explain the process of connecting to a database*
- *Explain the use of data access functions*
- *Explain SQL queries using PHP*
- *Explain HTML tables using SQL queries*

Introduction

- Relational Database Management System (RDBMS):
  - Stores data in tables that are linked with common fields, known as keys
  - MS Access, Oracle, and MySQL are the different types of RDBMS
- In the Linux operating system, MySQL is mostly preferred because it is an open source software, and is easy to use

Database APIs

- Database APIs allows developers to write applications that are movable or easily accessible between the database products
- Some of the common database APIs are:
  - Native-Interface
  - Open Database Connectivity (ODBC)
  - Java Database Connectivity (JDBC)
  - Common Object Request Broker Architecture (CORBA)

- PHP supports MySQL database for accessing data from the database
  - **Connecting to a Database**
    - A Web site connects to a database to access and store information
    - Steps for connecting to a database are as follows:
      - Open the database connection
      - Work with the database
      - Close the database connection

- PHP and MySQL are automatically installed while customizing the installation of Linux operating system
- A connection needs to be establish to the MySQL server and PHP with the help of `mysql_connect()` function
- This function takes three arguments:
  - Name of the machine on which the database is running
  - Database username
  - Database user password

- Connecting to the MySQL server is as follows:

Syntax

```
$link_id = mysql_connect("host_name","user_name","password");
```

Where,

host_name - specifies the name of the server on which the database is running. The default location of MySQL server is localhost

user_name - specifies the username

password - specifies the password to connect to the database

link_id - stores the return value of the connection

- **mysql.php** - Connecting to the MySQL server

Snippet

```
<?php
$link_id
mysql_connect("localhost","root","abc123");
?>
```

In the code,
root is the username.
localhost is the server name.
abc123 is the password.

- Before starting work with the database, a connection needs to be established with the MySQL server
- PHP provides the following functions to work with the MySQL database:
  - **`mysql_list_dbs()`-** This function displays all the databases available on the server

The `mysql_list_dbs()` function is as follows:

Syntax

```
mysql_list_dbs($link_id);
```

where,

link_id - specifies the return value of the connection

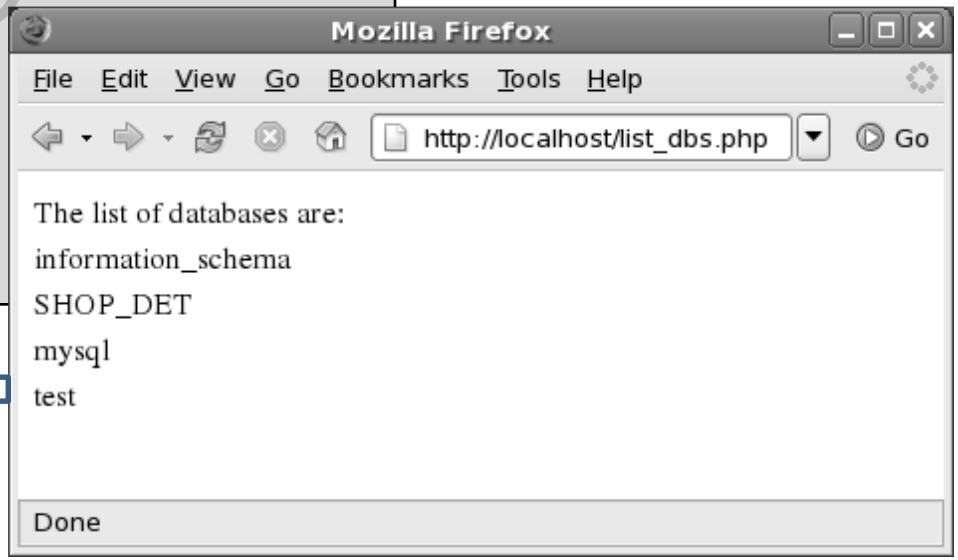
- **`list_dbs.php`** – Displaying all the databases present on the server

Snippet

```
<?php
$connect = mysql_connect('localhost', 'root', '');
$db_list = mysql_list_dbs($connect);
echo "The list of databases are:<br>";
while ($row = mysql_fetch_object($db_list))
{
echo $row->Database . "<br>";
}
?>
```

Displays the list of the databases that are present in the instance of MySQL.

Displays the output:



- **`mysql_select_db()`-** This function defines the database that will be used for the connection

The `mysql_select_db()` function is as follows:

Syntax

```
mysql_select_db("database_name", $link_id);
```

Where,

database_name - specifies the database name

link_id - specifies the return value of the connection

- **mysql_select_db.php** - Connecting to the MySQL database

Snippet

```
<?php
$server = "";
$username = "root";
$password = "";
$connect_mysql  =  mysql_connect($server,  $username,  $password);

$mysql_db = mysql_select_db("mysql", $connect_mysql);
if(!$mysql_db)
{
 die("Connection failed");
}
else
{
 echo "Current Database is selected";
}
?>
```

- **`mysql_list_tables()` –** This function displays a list of all the tables available in the specified database

The `mysql_list_tables()` function is as follows:

Syntax

```
mysql_list_tables("database_name", $link_id);
```

Where,

database_name - specifies the database name

link_id - specifies the return value of the connection

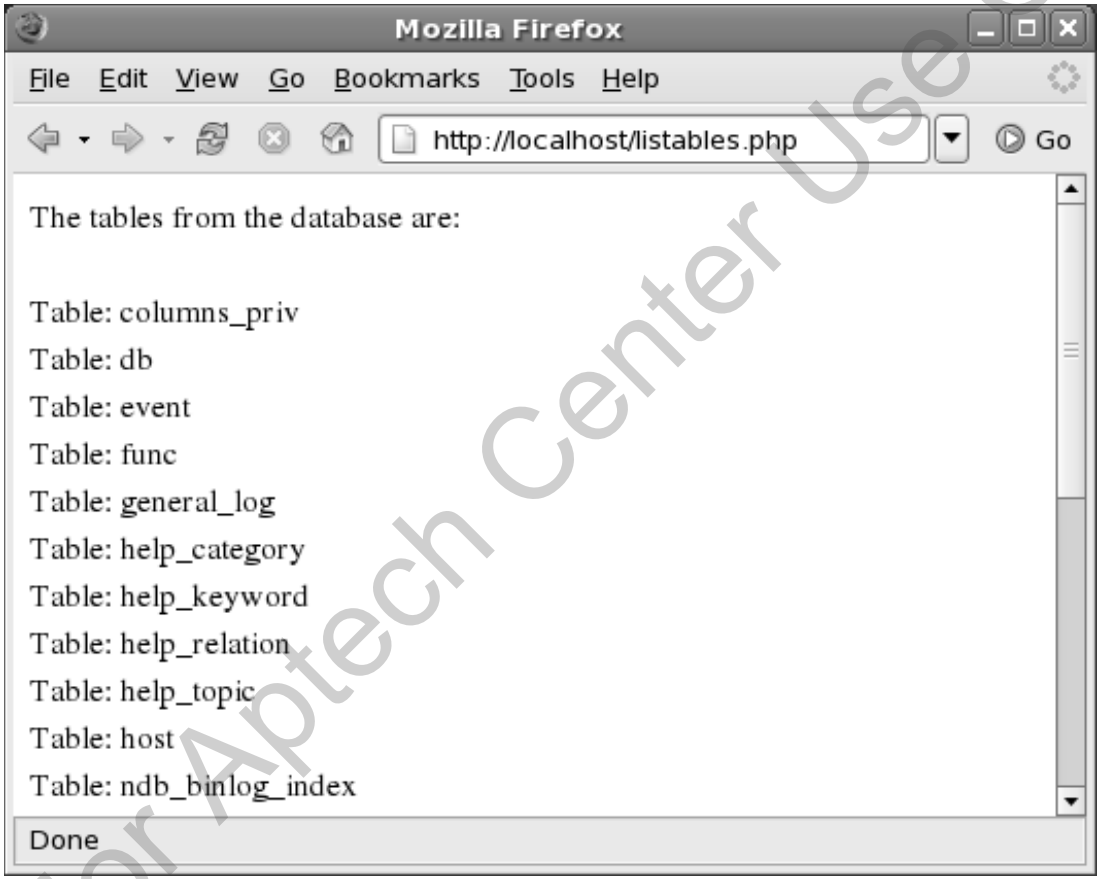
- **listables.php** - To list all the tables of the MySQL database

Snippet

```
<?php
$dbname = 'mysql';
if (!mysql_connect('127.0.0.1', 'root', ''))
{
 echo 'Could not connect to mysql';
 exit;
}
$sql = "SHOW TABLES FROM $dbname";
$result = mysql_query($sql);
echo " The tables from the database are: <br><br>";
```

```
if (!$result)
 $result = mysql_query($sql);
echo " The tables from the database are: <br><br>";
if (!$result)
{
 echo "DB Error, Unable to list tables<br>";
 echo 'MySQL Error: ' . mysql_error();
 exit;
}
while ($row = mysql_fetch_row($result))
{
echo "Table: {$row[0]}<br>";
}
?>
```

Displays the following output:



All the tables available in the mysql database are listed and stored in the $result variable.

- **mysql_num_rows()** - This function displays the number of rows present in the specified table

The `mysql_num_rows()` function is as follows:

Syntax

```
mysql_num_rows("table_name");
```

Where,

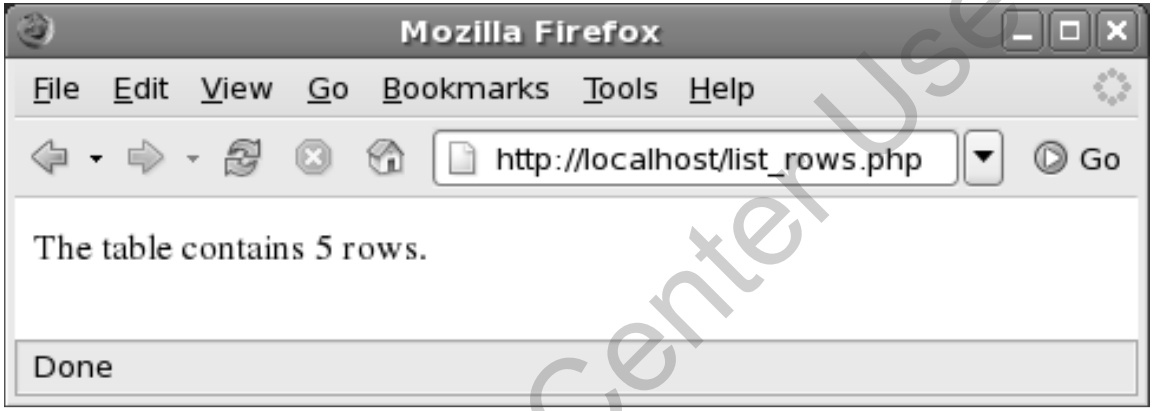
table_name - specifies the name of the table for displaying the number of rows

- **`list_rows.php`** - Listing the number of rows from a table in a database

Snippet

```
<?php

$connect = mysql_connect("localhost", "root", "");

mysql_select_db("mysql", $connect);

$result = mysql_query("SELECT * FROM user", $connect);


$rows = mysql_num_rows($result);

echo "The table contains $rows rows.<br>";

?>
```

Displays the following output:



The number of rows from the table are listed.

Closing the Connection 1-3

- The connection with MySQL server can be closed with the help of the `mysql_close()` function
- The `mysql_close()` function is as follows:

Syntax

```
mysql_close($link_id);
```

Where,

link_id - specifies the return value of the connection

Closing the Connection 2-3

- **`conn_close.php`** - Closing the connection to the MySQL database

Snippet

```
<?php

$connect = mysql_connect("localhost", "root", "");

mysql_select_db("mysql", $connect);

$result = mysql_query("SELECT * FROM user", $connect);

$rows = mysql_num_rows($result);

echo "The table contains $rows rows.<br><br>";

mysql_close($connect);

echo "The connection to the database has been closed.";

?>
```

Closing the Connection 3-3

Displays the following output:

Data Access Functions 1-4

- PHP provides the following functions for accessing data from the database:
  - **`mysql_query()`** - Executes MySQL query for retrieving data from tables and commands such as `SELECT`, `SHOW`, `EXPLAIN`, and `DESCRIBE` can be used with this function

The `mysql_query()` function is as follows:

Syntax

```
mysql_query(query, link_id);
```

Where,

query - specifies the MySQL query

link_id - specifies the return value of the connection

Data Access Functions 2-4

- **`mysql_fetch_array()`** - Retrieves the rows of the table and saves it as an array. It is an extended version of `mysql_fetch_row()` function

The `mysql_fetch_array()` function is as follows:

Syntax

```
mysql_fetch_array("table_name");
```

Where,

table_name - specifies the name of the selected table

- **mysql_field_len()** - Displays the length of the specified field

The `mysql_field_len()` function is as follows:

Syntax

```
mysql_field_len("table_name", "field_name");
```

Where,

table_name - specifies the table name

field_name - specifies the field name for which the length needs to be displayed

- **`mysql_num_fields()`** - Displays the number of fields in the specified table

The `mysql_num_fields()` function is as follows:

Syntax

```
mysql_num_fields("table_name");
```

Where,

table_name - specifies the table name

- Before executing the SQL queries in PHP, a database connection must be established
- Create a table named `USER_CONTACT` in the `USER` database with the fields as shown in table

Field Name	Data Type	Constraint
USER_ID	INT	NOT NULL PRIMARY KEY
USER_NAME	CHAR(25)	NOT NULL
USER_EMAIL_ID	CHAR(25)	

- **mysqltable.php -** To create a table using SQL commands in PHP

Snippet

```
<?php
$server = "";
$username = "root";
$password = "";
$connect_mysql = mysql_connect($server, $username, $password);
if($connect_mysql)
{
echo "Connection established<BR>";
}
else
{
  die("Unable to connect to the database<BR>");
}
$sql_table = "CREATE TABLE USER_CONTACT("."USER_ID INT NOT NULL PRIMARY KEY,
"."USER_NAME CHAR(25) NOT NULL, "."USER_EMAIL_ID CHAR(25)".")";

if(mysql_query($sql_table))
{
 echo "Table is created<BR>";
}
```

```
else
{
 die("Unable to create the table<BR>");
}
?>
```

Displays the following output:

The **USER_CONTACT** table is created in the USER database.

Executing SQL Queries in PHP

- In the code, the `USER_CONTACT` table is created in the USER database
- The table is created using the `CREATE` command in MySQL
- The records in the table are inserted with the HTML `FORM` method

- **usercontact.php** - Inserting records in the USER_CONTACT table

Snippet

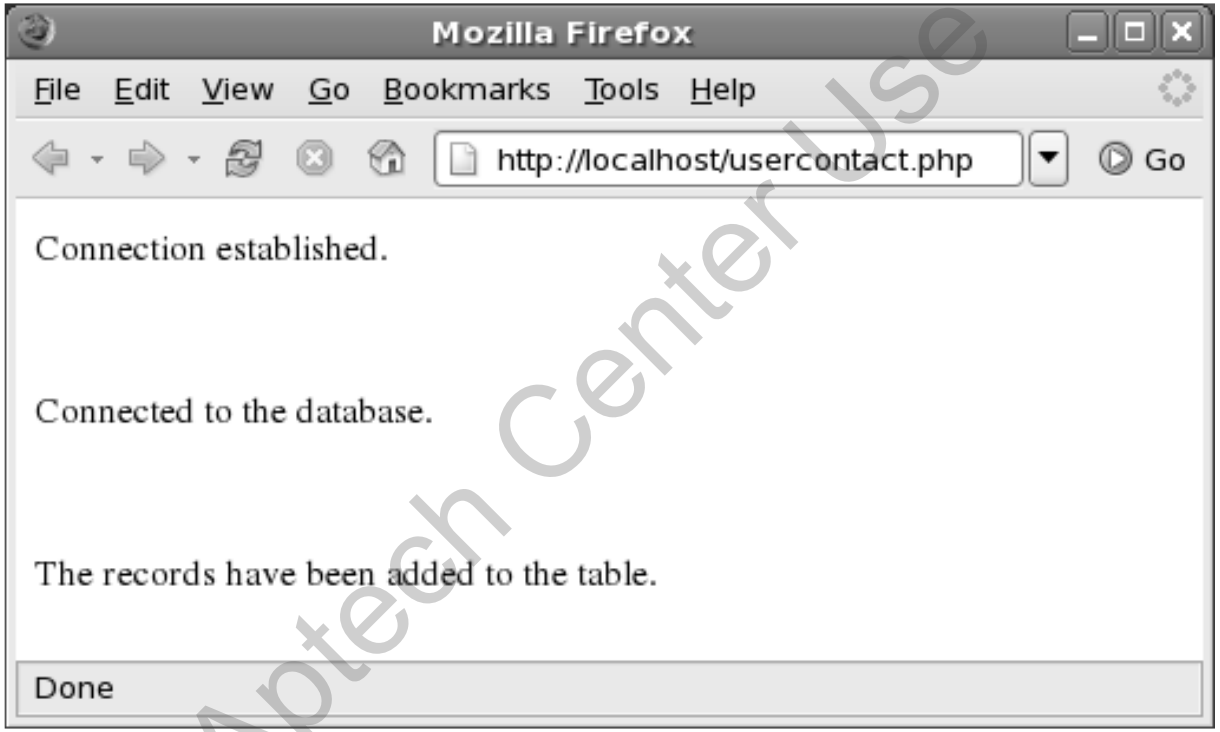
```
<?php
$server = "";
$username = "root";
$password = "";
$connect_mysql = mysql_connect($server, $username,
$password);
if($connect_mysql)
{
 echo "Connection established.";
}
else
{
 die("Unable to connect");
```

```
}
$db = "user";
$mysql_db = mysql_select_db($db);
if($mysql_db)
{
    echo "<BR><BR>Connected to the database.";
}
else
{
    die("Unable to connect to the database");
}
$sql_insert = "INSERT INTO user_contact (user_id, user_name,
user_email_id)
VALUES (101,'John','john@mail.com')";
$result = mysql_query($sql_insert);
```

Executing SQL Queries in PHP

```
if($result)

{

echo "<BR><BR>The records have been added to the table.";

}

else

{

echo "Unable to insert records.";

mysql_error();

}

?>
```

Displays the following output:



Records are inserted in the table using the **INSERT** command

- Using the SELECT command, a data can be accessed from the tables
- **displaytable.php** - Displaying the records of the USER_CONTACT table from the USER database

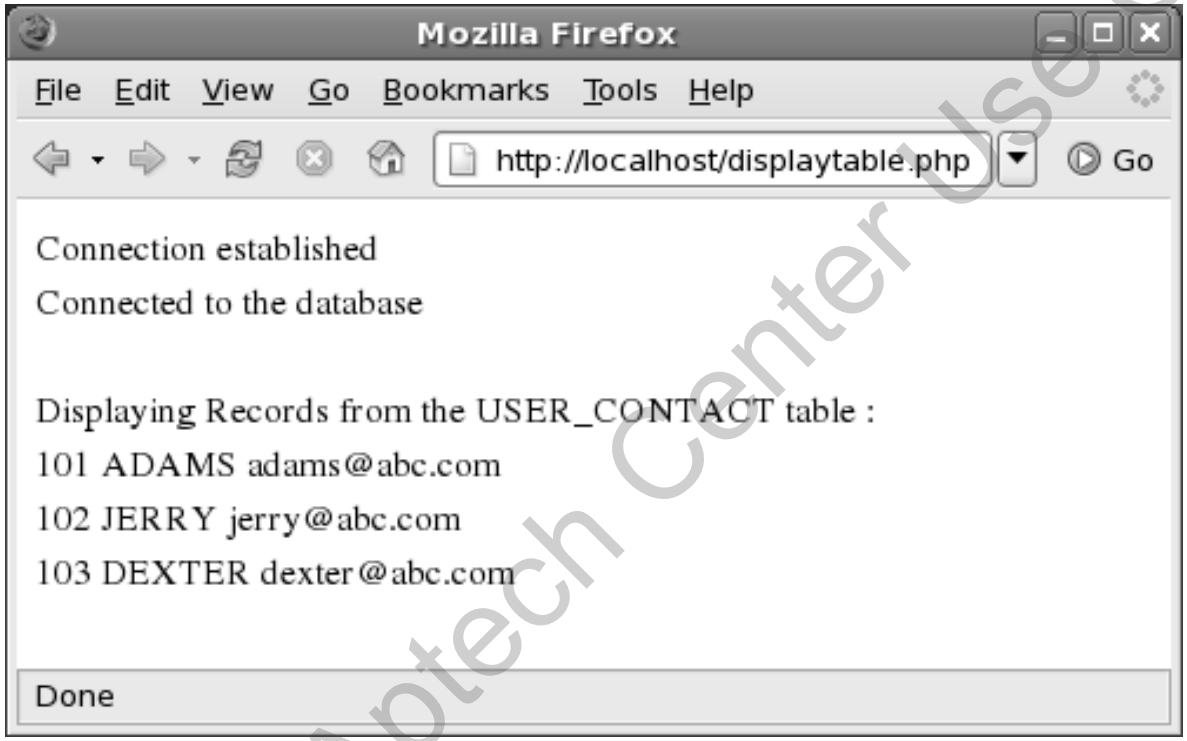
Snippet

```
<?php

$server = "";

$username = "root";

$password = "";

$connect_mysql  =  mysql_connect($server,  $username,
$password);

if($connect_mysql)
```

```
{
 echo "Connection established<br>"; }
else
{
 die("Unable to connect<br>");
}
$mysql_db = mysql_select_db("USER");
if($mysql_db)
{
 echo "Connected to the database<br>";
}
else
{
 die("Unable to connect to the database<br>");
```

```
}
$sql_disp=("SELECT * FROM USER_CONTACT;");
echo "<br>Displaying Records from the USER_CONTACT table:<br>";
$result = mysql_query($sql_disp);
while ($row = mysql_fetch_array($result))
{
 echo "$row[USER_ID] ";
echo "$row[USER_EMAIL_ID] <br>";
}
?>
```

Displays the following output:



The records such as **USER_ID**, **USER_NAME**, and **USER_EMAIL_ID** from the **USER_CONTACT** table are displayed

- The DELETE and UPDATE commands enable to modify the contents of the table
- **delete_record.php** - To delete a record from the table

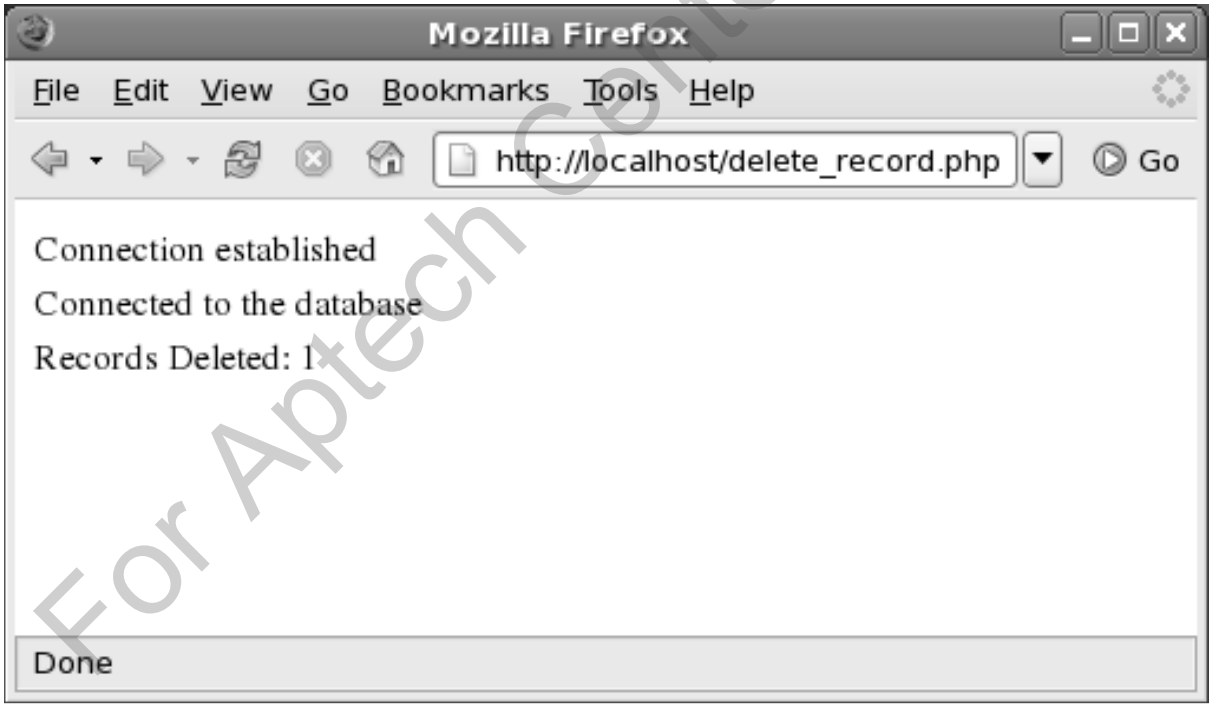
Snippet

```
<?php

$server = "";

$username = "root";

$password = "";

$connect_mysql = mysql_connect($server, $username, $password);

if($connect_mysql)

{

   echo "Connection established<br>";

}
```

```
else
{
 die("Unable to connect<br>");
}
$mysql_db = mysql_select_db("USER");
if($mysql_db)
{
echo "Connected to the database<br>";
}
else
{
 die("Unable to connect to the database<br>");
}
$sql_delete = ("DELETE FROM USER_CONTACT WHERE USER_ID = '101'");
$result = mysql_query($sql_delete);
if($result)
{
 echo "Records Deleted: $result<br>";
}
```

```
else
{
     echo "RECORDS NOT FOUND IN THE TABLE<br>";
     mysql_error();
}
?>
```

Displays the following output:



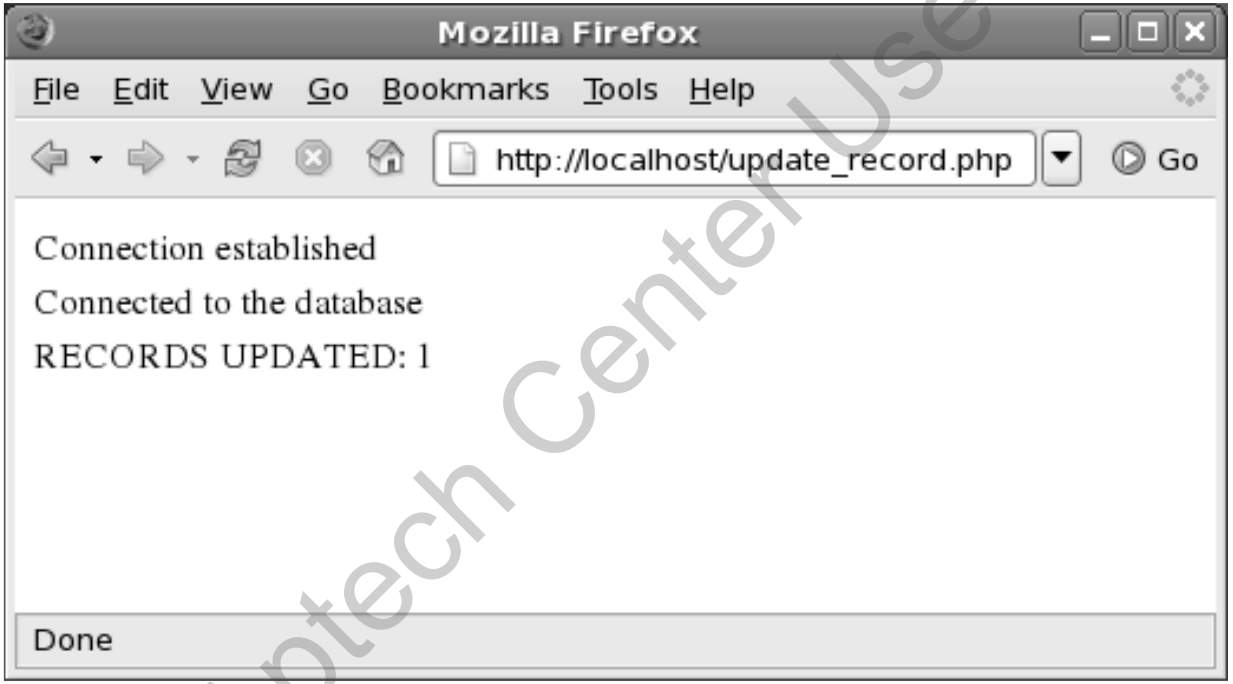
- **update_record.php** - Updating a record in the table

Snippet

```
<?php
$server = "";
$username = "root";
$password = "";
$connect_mysql = mysql_connect($server, $username, $password);
if($connect_mysql)
{
    echo "Connection established<br>";
}
else
{
    die("Unable to connect<br>");
}
$mysql_db = mysql_select_db("USER");
if($mysql_db)
```

```
{
      echo "Connected to the database<br>";
}
else
{
     die("Unable to connect to the database<br>");
}
$sql_update=("UPDATE USER_CONTACT SET USER_NAME =’David’ WHERE USER_ID =’102’");
$result=mysql_query($sql_update);
if($result)
{
     echo "RECORDS UPDATED: $result<br>";
}
else
{
echo "UNABLE TO UPDATE RECORDS<br>";
mysql_error();
}
?>
```

Displays the following output:



Building HTML Tables Using SQL Queries

- HTML supports database application components for accessing the database
- The contents of the SQL tables can be displayed on the Web browser by building an HTML table structure

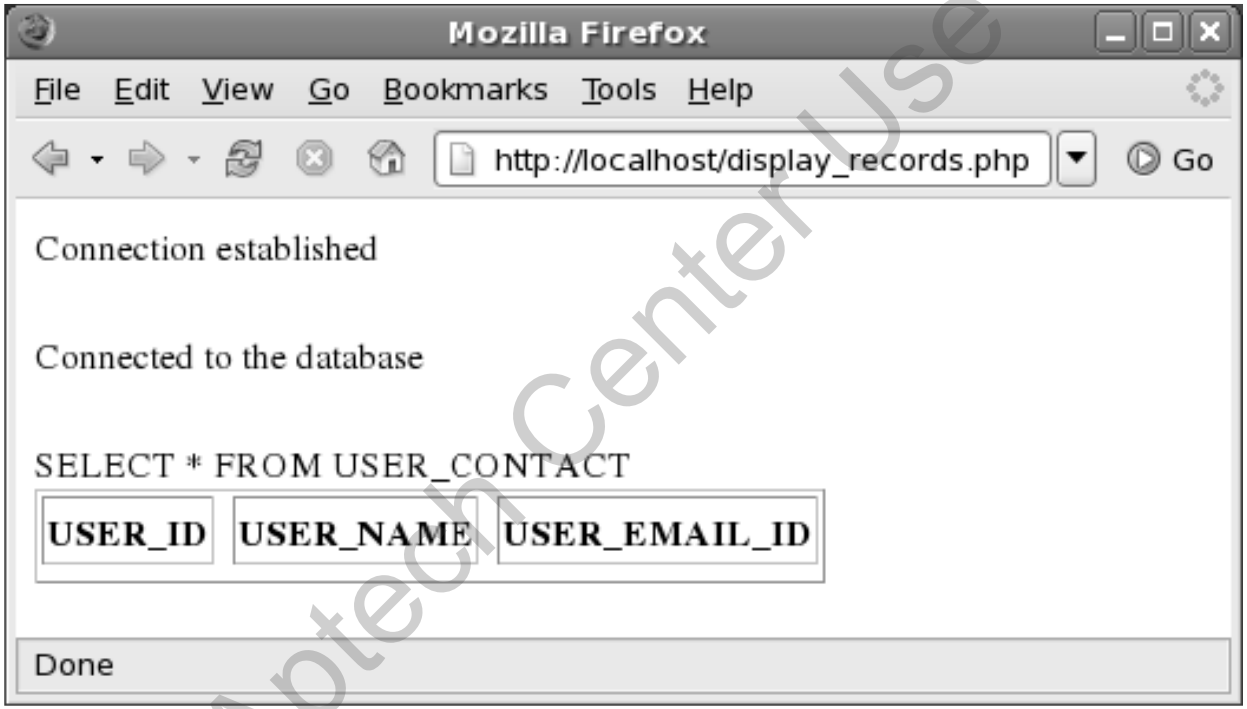
- **display_records.php** - Displaying all the records of the user_contact

Snippet

```
<HTML>
<BODY>
<?php
$server = "";
$username = "root";
$password = "";
$connect_mysql = mysql_connect($server, $username, $password);
if($connect_mysql)
echo "Connection established";
$mysql_db = mysql_select_db("USER");
if($mysql_db)
 echo "<BR><BR>Connected to the database<BR><BR>";
echo "<TABLE BORDER BGCOLOR="WHITE">";
```

```
echo "<TR><TH>USER_ID<TH><TH>USER_NAME<TH><TH>USER_EMAIL_ID </TH>";

echo "<DBQUERY q> select * FROM USER_CONTACT";

echo "<DBROW><TR><TD><? q.USER_ID></TD><TD><? q.USER_NAME></TD><TD><?

q.USER_EMAIL_ID></TD></TR>";

echo "</DBQUERY>";

echo "</TR>";

echo "</TABLE>";

?>

</BODY>

</HTML>
```

Displays the following output:



Displays the records of the **`user_contact`** table on the Web browser in a tabular format.

Summary

- Database APIs enable developers to write applications that are movable or easily accessible between the database products
- The common database APIs are Native-Interface, ODBC, JDBC, and CORBA
- PHP is connected to MySQL using three arguments: the MySQL server host name, the MySQL user name, and the MySQL user password
- The connection with the server is established with the help of mysql_connect() function
- The basic PHP functions that are used with respect to the database are: mysql_list_dbs(), mysql_select_db(), mysql_list_tables(), and mysql_num_rows()

Summary

- The mysql_close() function closes the connection with the MySQL server
- The data access functions used in PHP are: mysql_query() , mysql_fetch_array(),mysql_fetch_row(), mysql_fetch_field(), mysql_field_len(), and mysql_num_fields()