PHP MySQL CRUD Application

CRUD is an acronym for **C**reate, **R**ead, **U**pdate, and **D**elete. CRUD operations are basic data manipulation for database. We've already learned how to perform create (i.e. insert), read (i.e. select), update and delete operations in previous chapters. In this tutorial we'll create a simple PHP application to perform all these operations on a MySQL database table at one place.

Well, let's start by creating the table which we'll use in all of our example.

Creating the Database Table

Execute the following SQL query to create a table named *employees* inside your MySQL database. We will use this table for all of our future operations.

```
CREATE TABLE employees (

    id INT NOT NULL PRIMARY KEY AUTO_INCREMENT,
    name VARCHAR(100) NOT NULL,
    address VARCHAR(255) NOT NULL,
    salary INT(10) NOT NULL
);
```

Creating the Config File

After creating the table, we need create a PHP script in order to connect to the MySQL database server. Let's create a file named "config.php" and put the following code inside it.We'll later include this config file in other pages using the PHP require_once() function.

```php
<?php

/* Database credentials. Assuming you are running MySQL

server with default setting (user 'root' with no password) */
define('DB_SERVER', 'localhost');
define('DB_USERNAME', 'root');
define('DB_PASSWORD', '');
define('DB_NAME', 'demo');

/* Attempt to connect to MySQL database */
$link = mysqli_connect(DB_SERVER, DB_USERNAME, DB_PASSWORD, DB_NAME);

// Check connection
if($link === false){
    die("ERROR: Could not connect. " . mysqli_connect_error());
}
?>
```

Note: Replace the credentials according to your MySQL server setting before testing this code, for example, replace the database name 'demo' with your own database name, replace username 'root' with your own database username, specify database password if there's any.

Creating the Landing Page

First we will create a landing page for our CRUD application that contains a data grid showing the records from the *employees* database table. It also has action icons for each record displayed in the grid, that you may choose to view its details, update it, or delete it.

We'll also add a create button on the top of the data grid that can be used for creating new records in the *employees* table. Create a file named "index.php" and put the following code in it:

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <title>Dashboard</title>
    <link rel="stylesheet"
href="https://stackpath.bootstrapcdn.com/bootstrap/4.5.2/css/bootstrap.min.css">
    <link rel="stylesheet" href="https://maxcdn.bootstrapcdn.com/font-awesome/4.7.0/css/font-
awesome.min.css">
    <script src="https://code.jquery.com/jquery-3.5.1.min.js"></script>
    <script src="https://cdn.jsdelivr.net/npm/popper.js@1.16.1/dist/umd/popper.min.js"></script>
    <script
src="https://stackpath.bootstrapcdn.com/bootstrap/4.5.2/js/bootstrap.min.js"></script>
    <style>
        .wrapper{
            width: 600px;
            margin: 0 auto;
        }
        table tr td:last-child{
            width: 120px;
        }
    </style>
    <script>
        $(document).ready(function(){
            $('[data-toggle="tooltip"]').tooltip();
        });
    </script>
</head>
<body>
    <div class="wrapper">
        <div class="container-fluid">
            <div class="row">
                <div class="col-md-12">
                    <div class="mt-5 mb-3 clearfix">
                        <h2 class="pull-left">Employees Details</h2>
                        <a href="create.php" class="btn btn-success pull-right"><i class="fa fa-
plus"></i> Add New Employee</a>
                    </div>
                    <?php
                    // Include config file
                    require_once "config.php";

                    // Attempt select query execution
```

```php
$sql = "SELECT * FROM employees";
if($result = mysqli_query($link, $sql)){
    if(mysqli_num_rows($result) > 0){
        echo '<table class="table table-bordered table-striped">';
            echo "<thead>";
                echo "<tr>";
                    echo "<th>#</th>";
                    echo "<th>Name</th>";
                    echo "<th>Address</th>";
                    echo "<th>Salary</th>";
                    echo "<th>Action</th>";
                echo "</tr>";
            echo "</thead>";
            echo "<tbody>";
            while($row = mysqli_fetch_array($result)){
                echo "<tr>";
                    echo "<td>" . $row['id'] . "</td>";
                    echo "<td>" . $row['name'] . "</td>";
                    echo "<td>" . $row['address'] . "</td>";
                    echo "<td>" . $row['salary'] . "</td>";
                    echo "<td>";
                        echo '<a href="read.php?id='. $row['id'] .'"
class="mr-3" title="View Record" data-toggle="tooltip"><span class="fa fa-eye"></span></a>';
                        echo '<a href="update.php?id='. $row['id'] .'"
class="mr-3" title="Update Record" data-toggle="tooltip"><span class="fa fa-
pencil"></span></a>';
                        echo '<a href="delete.php?id='. $row['id'] .'"
title="Delete Record" data-toggle="tooltip"><span class="fa fa-trash"></span></a>';
                    echo "</td>";
                echo "</tr>";
            }
            echo "</tbody>";
        echo "</table>";
        // Free result set
        mysqli_free_result($result);
    } else{
        echo '<div class="alert alert-danger"><em>No records were
found.</em></div>';
    }
} else{
    echo "Oops! Something went wrong. Please try again later.";
}

// Close connection
mysqli_close($link);
?>
            </div>
        </div>
    </div>
</div>
</body>
</html>
```

Once *employees* table is populated with some records the landing page i.e. the CRUD data grid may look something like the picture shown below:

Employees Details

+ Add New Employee

#	Name	Address	Salary	Action
1	Ronald Mendel	C/ Araquil, 67, Madrid	5000	👁 ✏ 🗑
2	Victoria Ashworth	35 King George, London	6500	👁 ✏ 🗑
3	Martin Blank	25, Rue Lauriston, Paris	8000	👁 ✏ 🗑

Creating the Create Page

In this section we'll build the **C**reate functionality of our CRUD application.

Let's create a file named "create.php" and put the following code inside it. It will generate a web form that can be used to insert records in the *employees* table.

```php
<?php
// Include config file
require_once "config.php";

// Define variables and initialize with empty values
$name = $address = $salary = "";
$name_err = $address_err = $salary_err = "";

// Processing form data when form is submitted
if($_SERVER["REQUEST_METHOD"] == "POST"){
    // Validate name
    $input_name = trim($_POST["name"]);
    if(empty($input_name)){
        $name_err = "Please enter a name.";
    } elseif(!filter_var($input_name, FILTER_VALIDATE_REGEXP,
array("options"=>array("regexp"=>"/^[a-zA-Z¥s]+$/")))){
        $name_err = "Please enter a valid name.";
    } else{
        $name = $input_name;
    }

    // Validate address
    $input_address = trim($_POST["address"]);
    if(empty($input_address)){
        $address_err = "Please enter an address.";
    } else{
        $address = $input_address;
    }

    // Validate salary
    $input_salary = trim($_POST["salary"]);
```

```php
        if(empty($input_salary)){
            $salary_err = "Please enter the salary amount.";
        } elseif(!ctype_digit($input_salary)){
            $salary_err = "Please enter a positive integer value.";
        } else{
            $salary = $input_salary;
        }

        // Check input errors before inserting in database
        if(empty($name_err) && empty($address_err) && empty($salary_err)){
            // Prepare an insert statement
            $sql = "INSERT INTO employees (name, address, salary) VALUES (?, ?, ?)";

            if($stmt = mysqli_prepare($link, $sql)){
                // Bind variables to the prepared statement as parameters
                mysqli_stmt_bind_param($stmt, "sss", $param_name, $param_address, $param_salary);

                // Set parameters
                $param_name = $name;
                $param_address = $address;
                $param_salary = $salary;

                // Attempt to execute the prepared statement
                if(mysqli_stmt_execute($stmt)){
                    // Records created successfully. Redirect to landing page
                    header("location: index.php");
                    exit();
                } else{
                    echo "Oops! Something went wrong. Please try again later.";
                }
            }

            // Close statement
            mysqli_stmt_close($stmt);
        }

        // Close connection
        mysqli_close($link);
}
?>

<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <title>Create Record</title>
    <link rel="stylesheet"
href="https://stackpath.bootstrapcdn.com/bootstrap/4.5.2/css/bootstrap.min.css">
    <style>
        .wrapper{
            width: 600px;
            margin: 0 auto;
        }
    </style>
</head>
<body>
```

```html
        <div class="wrapper">
            <div class="container-fluid">
                <div class="row">
                    <div class="col-md-12">
                        <h2 class="mt-5">Create Record</h2>
                        <p>Please fill this form and submit to add employee record to the
database.</p>
                        <form action="<?php echo htmlspecialchars($_SERVER["PHP_SELF"]); ?>"
method="post">
                            <div class="form-group">
                                <label>Name</label>
                                <input type="text" name="name" class="form-control <?php echo
(!empty($name_err)) ? 'is-invalid' : ''; ?>" value="<?php echo $name; ?>">
                                <span class="invalid-feedback"><?php echo $name_err;?></span>
                            </div>
                            <div class="form-group">
                                <label>Address</label>
                                <textarea name="address" class="form-control <?php echo
(!empty($address_err)) ? 'is-invalid' : ''; ?>"><?php echo $address; ?></textarea>
                                <span class="invalid-feedback"><?php echo $address_err;?></span>
                            </div>
                            <div class="form-group">
                                <label>Salary</label>
                                <input type="text" name="salary" class="form-control <?php echo
(!empty($salary_err)) ? 'is-invalid' : ''; ?>" value="<?php echo $salary; ?>">
                                <span class="invalid-feedback"><?php echo $salary_err;?></span>
                            </div>
                            <input type="submit" class="btn btn-primary" value="Submit">
                            <a href="index.php" class="btn btn-secondary ml-2">Cancel</a>
                        </form>
                    </div>
                </div>
            </div>
        </div>
</body>
</html>
```

The same "create.php" file will display the HTML form and process the submitted form data. It will also perform basic validation on user inputs (*line no-11 to 37*) before saving the data.

Creating the Read Page

Now it's time to build the **R**ead functionality of our CRUD application.

Let's create a file named "read.php" and put the following code inside it. It will simply retrieve the records from the *employees* table based the id attribute of the employee.

```php
<?php
// Check existence of id parameter before processing further
if(isset($_GET["id"]) && !empty(trim($_GET["id"]))){
    // Include config file
    require_once "config.php";

    // Prepare a select statement
    $sql = "SELECT * FROM employees WHERE id = ?";
```

```php
    if($stmt = mysqli_prepare($link, $sql)){
        // Bind variables to the prepared statement as parameters
        mysqli_stmt_bind_param($stmt, "i", $param_id);

        // Set parameters
        $param_id = trim($_GET["id"]);

        // Attempt to execute the prepared statement
        if(mysqli_stmt_execute($stmt)){
            $result = mysqli_stmt_get_result($stmt);

            if(mysqli_num_rows($result) == 1){
                /* Fetch result row as an associative array. Since the result set
                contains only one row, we don't need to use while loop */
                $row = mysqli_fetch_array($result, MYSQLI_ASSOC);

                // Retrieve individual field value
                $name = $row["name"];
                $address = $row["address"];
                $salary = $row["salary"];
            } else{
                // URL doesn't contain valid id parameter. Redirect to error page
                header("location: error.php");
                exit();
            }

        } else{
            echo "Oops! Something went wrong. Please try again later.";
        }
    }

    // Close statement
    mysqli_stmt_close($stmt);

    // Close connection
    mysqli_close($link);
} else{
    // URL doesn't contain id parameter. Redirect to error page
    header("location: error.php");
    exit();
}
?>

<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <title>View Record</title>
    <link rel="stylesheet"
href="https://stackpath.bootstrapcdn.com/bootstrap/4.5.2/css/bootstrap.min.css">
    <style>
        .wrapper{
            width: 600px;
            margin: 0 auto;
        }
    </style>
```

```html
</head>
<body>
    <div class="wrapper">
        <div class="container-fluid">
            <div class="row">
                <div class="col-md-12">
                    <h1 class="mt-5 mb-3">View Record</h1>
                    <div class="form-group">
                        <label>Name</label>
                        <p><b><?php echo $row["name"]; ?></b></p>
                    </div>
                    <div class="form-group">
                        <label>Address</label>
                        <p><b><?php echo $row["address"]; ?></b></p>
                    </div>
                    <div class="form-group">
                        <label>Salary</label>
                        <p><b><?php echo $row["salary"]; ?></b></p>
                    </div>
                    <p><a href="index.php" class="btn btn-primary">Back</a></p>
                </div>
            </div>
        </div>
    </div>
</body>
</html>
```

Creating the Update Page

Similarly, we can build the **U**pdate functionality of our CRUD application.Let's create a file named "update.php" and put the following code inside it. It will update the existing records in the *employees* table based the id attribute of the employee.

```php
<?php

// Include config file
require_once "config.php";

// Define variables and initialize with empty values
$name = $address = $salary = "";
$name_err = $address_err = $salary_err = "";

// Processing form data when form is submitted
if(isset($_POST["id"]) && !empty($_POST["id"])){
    // Get hidden input value
    $id = $_POST["id"];

    // Validate name
    $input_name = trim($_POST["name"]);
    if(empty($input_name)){
        $name_err = "Please enter a name.";
    } elseif(!filter_var($input_name, FILTER_VALIDATE_REGEXP,
array("options"=>array("regexp"=>"/^[a-zA-Z¥s]+$/")))){
        $name_err = "Please enter a valid name.";
```

```php
    } else{
        $name = $input_name;
    }

    // Validate address address
    $input_address = trim($_POST["address"]);
    if(empty($input_address)){
        $address_err = "Please enter an address.";
    } else{
        $address = $input_address;
    }

    // Validate salary
    $input_salary = trim($_POST["salary"]);
    if(empty($input_salary)){
        $salary_err = "Please enter the salary amount.";
    } elseif(!ctype_digit($input_salary)){
        $salary_err = "Please enter a positive integer value.";
    } else{
        $salary = $input_salary;
    }

    // Check input errors before inserting in database
    if(empty($name_err) && empty($address_err) && empty($salary_err)){
        // Prepare an update statement
        $sql = "UPDATE employees SET name=?, address=?, salary=? WHERE id=?";

        if($stmt = mysqli_prepare($link, $sql)){
            // Bind variables to the prepared statement as parameters
            mysqli_stmt_bind_param($stmt, "sssi", $param_name, $param_address, $param_salary,
$param_id);

            // Set parameters
            $param_name = $name;
            $param_address = $address;
            $param_salary = $salary;
            $param_id = $id;

            // Attempt to execute the prepared statement
            if(mysqli_stmt_execute($stmt)){
                // Records updated successfully. Redirect to landing page
                header("location: index.php");
                exit();
            } else{
                echo "Oops! Something went wrong. Please try again later.";
            }
        }

        // Close statement
        mysqli_stmt_close($stmt);
    }

    // Close connection
    mysqli_close($link);
} else{
    // Check existence of id parameter before processing further
```

```php
    if(isset($_GET["id"]) && !empty(trim($_GET["id"]))){
        // Get URL parameter
        $id =  trim($_GET["id"]);

        // Prepare a select statement
        $sql = "SELECT * FROM employees WHERE id = ?";
        if($stmt = mysqli_prepare($link, $sql)){
            // Bind variables to the prepared statement as parameters
            mysqli_stmt_bind_param($stmt, "i", $param_id);

            // Set parameters
            $param_id = $id;

            // Attempt to execute the prepared statement
            if(mysqli_stmt_execute($stmt)){
                $result = mysqli_stmt_get_result($stmt);

                if(mysqli_num_rows($result) == 1){
                    /* Fetch result row as an associative array. Since the result set
                    contains only one row, we don't need to use while loop */
                    $row = mysqli_fetch_array($result, MYSQLI_ASSOC);

                    // Retrieve individual field value
                    $name = $row["name"];
                    $address = $row["address"];
                    $salary = $row["salary"];
                } else{
                    // URL doesn't contain valid id. Redirect to error page
                    header("location: error.php");
                    exit();
                }

            } else{
                echo "Oops! Something went wrong. Please try again later.";
            }
        }

        // Close statement
        mysqli_stmt_close($stmt);

        // Close connection
        mysqli_close($link);
    } else{
        // URL doesn't contain id parameter. Redirect to error page
        header("location: error.php");
        exit();
    }
}
?>

<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <title>Update Record</title>
```

```html
    <link rel="stylesheet"
href="https://stackpath.bootstrapcdn.com/bootstrap/4.5.2/css/bootstrap.min.css">
    <style>
        .wrapper{
            width: 600px;
            margin: 0 auto;
        }
    </style>
</head>
<body>
    <div class="wrapper">
        <div class="container-fluid">
            <div class="row">
                <div class="col-md-12">
                    <h2 class="mt-5">Update Record</h2>
                    <p>Please edit the input values and submit to update the employee
record.</p>
                    <form action="<?php echo
htmlspecialchars(basename($_SERVER['REQUEST_URI'])); ?>" method="post">
                        <div class="form-group">
                            <label>Name</label>
                            <input type="text" name="name" class="form-control <?php echo
(!empty($name_err)) ? 'is-invalid' : ''; ?>" value="<?php echo $name; ?>">
                            <span class="invalid-feedback"><?php echo $name_err;?></span>
                        </div>
                        <div class="form-group">
                            <label>Address</label>
                            <textarea name="address" class="form-control <?php echo
(!empty($address_err)) ? 'is-invalid' : ''; ?>"><?php echo $address; ?></textarea>
                            <span class="invalid-feedback"><?php echo $address_err;?></span>
                        </div>
                        <div class="form-group">
                            <label>Salary</label>
                            <input type="text" name="salary" class="form-control <?php echo
(!empty($salary_err)) ? 'is-invalid' : ''; ?>" value="<?php echo $salary; ?>">
                            <span class="invalid-feedback"><?php echo $salary_err;?></span>
                        </div>
                        <input type="hidden" name="id" value="<?php echo $id; ?>"/>
                        <input type="submit" class="btn btn-primary" value="Submit">
                        <a href="index.php" class="btn btn-secondary ml-2">Cancel</a>
                    </form>
                </div>
            </div>
        </div>
    </div>
</body>
</html>
```

Creating the Delete Page

Finally, we will build the **D**elete functionality of our CRUD application.Let's create a file named "delete.php" and put the following code inside it. It will delete the existing records from the *employees* table based the id attribute of the employee.

```php
<?php

// Process delete operation after confirmation
if(isset($_POST["id"]) && !empty($_POST["id"])){
    // Include config file
    require_once "config.php";

    // Prepare a delete statement
    $sql = "DELETE FROM employees WHERE id = ?";

    if($stmt = mysqli_prepare($link, $sql)){
        // Bind variables to the prepared statement as parameters
        mysqli_stmt_bind_param($stmt, "i", $param_id);

        // Set parameters
        $param_id = trim($_POST["id"]);

        // Attempt to execute the prepared statement
        if(mysqli_stmt_execute($stmt)){
            // Records deleted successfully. Redirect to landing page
            header("location: index.php");
            exit();
        } else{
            echo "Oops! Something went wrong. Please try again later.";
        }
    }

    // Close statement
    mysqli_stmt_close($stmt);

    // Close connection
    mysqli_close($link);
} else{
    // Check existence of id parameter
    if(empty(trim($_GET["id"]))){
        // URL doesn't contain id parameter. Redirect to error page
        header("location: error.php");
        exit();
    }
}
?>

<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <title>Delete Record</title>
    <link rel="stylesheet"
href="https://stackpath.bootstrapcdn.com/bootstrap/4.5.2/css/bootstrap.min.css">
    <style>
        .wrapper{
            width: 600px;
            margin: 0 auto;
        }
    </style>
```

```
    </head>
<body>
    <div class="wrapper">
        <div class="container-fluid">
            <div class="row">
                <div class="col-md-12">
                    <h2 class="mt-5 mb-3">Delete Record</h2>
                    <form action="<?php echo htmlspecialchars($_SERVER["PHP_SELF"]); ?>"
method="post">
                        <div class="alert alert-danger">
                            <input type="hidden" name="id" value="<?php echo
trim($_GET["id"]); ?>"/>
                            <p>Are you sure you want to delete this employee record?</p>
                            <p>
                                <input type="submit" value="Yes" class="btn btn-danger">
                                <a href="index.php" class="btn btn-secondary">No</a>
                            </p>
                        </div>
                    </form>
                </div>
            </div>
        </div>
    </div>
</body>
</html>
```

Creating the Error Page

At the end, let's create one more file "error.php". This page will be displayed if request is invalid i.e. if id parameter is missing from the URL query string or it is not valid.

```
<!DOCTYPE html>

<html lang="en">
<head>
    <meta charset="UTF-8">
    <title>Error</title>
    <link rel="stylesheet"
href="https://stackpath.bootstrapcdn.com/bootstrap/4.5.2/css/bootstrap.min.css">
    <style>
        .wrapper{
            width: 600px;
            margin: 0 auto;
        }
    </style>
</head>
<body>
    <div class="wrapper">
        <div class="container-fluid">
            <div class="row">
                <div class="col-md-12">
                    <h2 class="mt-5 mb-3">Invalid Request</h2>
                    <div class="alert alert-danger">Sorry, you've made an invalid request.
Please <a href="index.php" class="alert-link">go back</a> and try again.</div>
                </div>
```

```html
            </div>
        </div>
    </div>
</body>
</html>
```