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EF234301 Web Programming

Lecture #4a

PHP & MySQL

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PHP & MySQL (MariaDB)

- PHP: Hypertext Preprocessor
- MySQL → MariaDB
- XAMPP → PHP + MySQL

Redirection

- When the login data has been processed/validated then redirection can be used if the new webpage want to be visited
- `header("Location: URL");`

```
header("Location: http://31.31.198.216/web/main.php");
```

- Common techniques
  - Starting webpage = login webpage
  - Login webpage validates the user & set the cookies
  - Redirect to the new webpage
  - The new webpage uses the cookies' data to access the database information

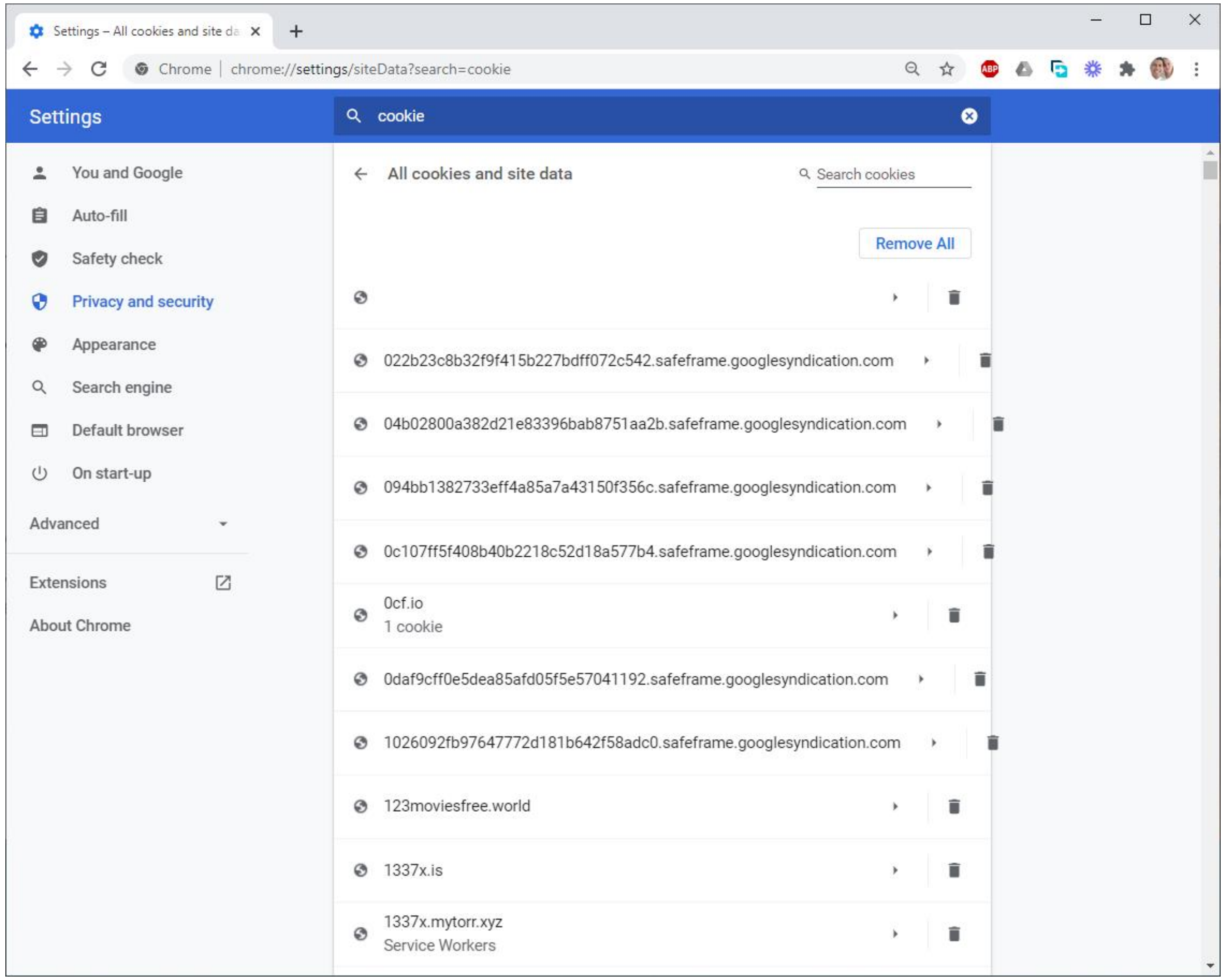
Maintaining state

- HTTP is the stateless protocol → each client/server transaction is the different entity
- Thus, webserver doesn’t have an automatic mechanism to remember the browser’s information about any website
- On the other hand, a lot of web-based application needs for maintaining the state. E.g., provide the state of a user in her/his “shopping cart” stage before continue to the “checkout” stage.

Cookies

- It’s used to overcome the “stateless” characteristic of web (HTTP protocol)
- Cookies stored in the client storage
- Actions to cookies
  - Create
  - Access
  - Delete

Cookies in the browser



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123moviesfree.world
1337x.is
1337x.mytorr.xyz
Service Workers

Cookies: creating

- setcookie(name, value, expiration);
  - `setcookie("hobby", "swimming", time()+3600);`
  - Cookie'name → `"hobby"`
  - Cookie's value → `"swimming"`
  - Will be deleted 3600 seconds = 60 minutes = 1 hour from the current time
- The cookie's value will be sent as a part of HTTP header

Cookies: accessing

- `$_COOKIE` → containing the value of the current active cookie
- E.g.,

```
<?
    foreach($_COOKIE as $name => $value) {
        echo "<br>$name => $value";
    }
?>
```

Cookies: deleting

- A cookie will be automatically deleted once the designated expiration time’s up, or
- Manually will be deleted by setting the given cookie with the time variable’s negative value

```
setcookie("username", "", time()-3600);
```

Cookies: the problems

- Cookies can be disabled → the user can set the browser not to run the cookies
- The cookies can be seen by other users
- Only can save 20 cookies → max 4 kB
- Some browsers show the correct cookies only if the options have been all set in `setcookie()`

Session

- Luckily, PHP provides a simple mechanism for maintaining the state information → session
- Session is the sequential HTTP requests from a given browser → the problem is how to recognise the first request & the second one are from the same browser
- E.g.,
  - A user can log in a given system. She has some activities on a given webpage (i.e., the first webpage)—the browser, of course, knows that the one who is doing activity is her, she just log in.
  - The browsing activities on the next webpages still recognise that the user who is doing activity is the same user as in the first webpage

Session: the setting

- Session in PHP can be set by a super global array `$_SESSION`
- A PHP script can create a variable in that array & this variable will be available for other scripts in the same session
- E.g.,
  - A script has successfully validated a user → this script can set a variable which save who is the user, then the other scripts can check whether that variable has already been set or not

Session: the initialisation

- A script which will use a session has to call `session_start()`
- Then, the script can write or read the array's content of `$_SESSION`
- That script can be put in the login webpage → validate the user's detail & set the session variable

```
<?php
    session_start();
    // validate the user’s detail on login
    $_SESSION['user_id'] = "admin@subakti.com";
?>
```

Session: the next

- The next scripts will check whether variable `$_SESSION` has already been set or not

```
<?php
     session_start();
     if (isset($_SESSION['user_id'])) {
       //we knew who is she & can customise page
     } else {
       //provide free content/redirect to login page
     }
?>
```

Session: how it works

- It works by using cookie. When the first session created, PHP will create a session id which will be sent to the browser as a cookie—the information saved in the browser
- Variable created in the array of `$_SESSION` saved in the server → in the area identified by session id
- For each next HTTP request, the browser automatically send back the cookie to the web server, then it saves the value to the array of `$_SESSION` so that it can be accessed by the new/next script

Session: how if it’s turned off

- If the browser has been set not to accept cookie sent by the web server, PHP automatically will send session id along with the URL
- E.g., if session id is 9876544210123456789 then PHP automatically will add up this value to every links in the webpage so that the link cart.php becomes cart.php?PHPSESID=9876544210123456789
- When the user clicked the next webpage, session id will be sent back to the server along with the URL

MySQL: introduction

- GNU (General Public License) free relational database (DB) server
- Open-source relational database management system (RDBMS)
- Multiplatform
- Server networking form → no GUI as MS Access

phpMyAdmin

- MySQL client written in PHP
- Web-based for managing
  - Database (DB)
  - MySQL users
  - Submit query
- Recommended for a newbie

MySQL: basic commands

- Create database, drop database
- Create table, alter table, drop table
- Lock tables, unlock tables
- Select, delete, insert into, describe, update

Database connection

- PHP supports database connection in various ways
- One of them is direct connection to MySQL DB via functions
  - `mysqli_connect()`, `mysqli_select_db()`, etc.

```
$host = "localhost"; $username = "rahayu";
$password = "dewi"; $database = "webprodb";
$conn = mysqli_connect($host, $username, $password);
if (!$conn) {
      die("Connection failed: " . mysqli_connect_error());
} else { echo "Connection success!<BR>"; }
$db_selected = mysqli_select_db($conn, $database);
if (!$db_selected) {
      die("Unable to select database " . mysqli_error($this -> $conn));
} else { echo "Database selection success!<BR>"; }
```

Query: submit to DB

```
$query = "SELECT userID FROM users WHERE username =
'rahayu'";
$result = mysqli_query($conn, $query);
if (!$result) {
    die("Database access failed " . mysqli_error($conn));
} else {
    echo "Executing query success!<BR>";
}
```

Query: processing the result

- If there is no error then `$result` refers to the result's object
- This object is like a cursor wherein there's `fetch_row()` which will fetch current row (in array) and then move to the next row

```
while ($row = $result -> fetch_row()) {
    // do something in here
}
```

- `fetch_row()` returns `NULL` if there's no more row can be fetched, so that by using a `while` loop each row can be processed

Query: processing the result (continued)

- Alternatively, there is `mysqli_fetch_array`

```
while ($row = mysql_fetch_array($result,
     MYSQLI_ASSOC)) {
     // do something in here
}
```

Query: showing the result

- Showing the data from each row

```
while ($row = $result -> fetch_row()) {
     echo "<p>$row[0] has a population of $row[1]<p>";
}
```

- Each row is an array whose 2 elements by the index `$row[0]` and `$row[1]`

Query: clean-up

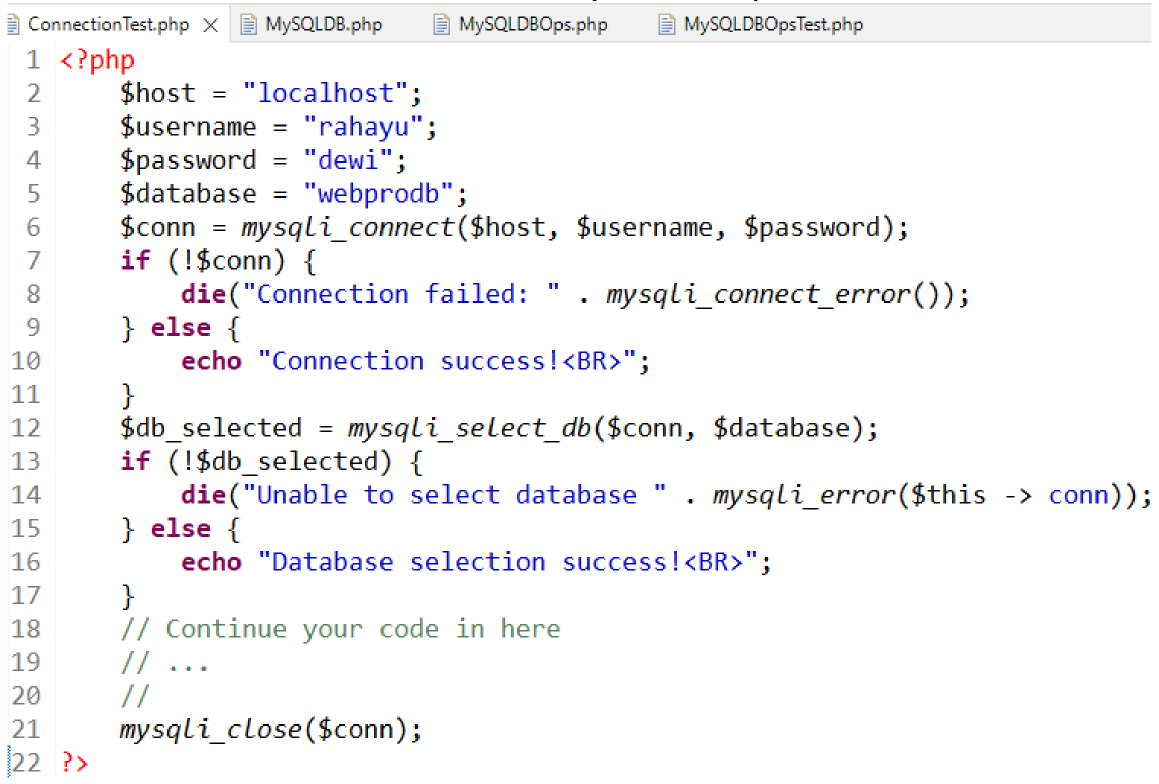
- Finally, the script will release all of the current resources used

```
$result -> free();
mysqli_close($conn);
```

- Actually, when this script ends, the resources will be freed automatically. However, if there’s a long script where there are a lot of DB connections → the resources needs to be released explicitly once they’re finished

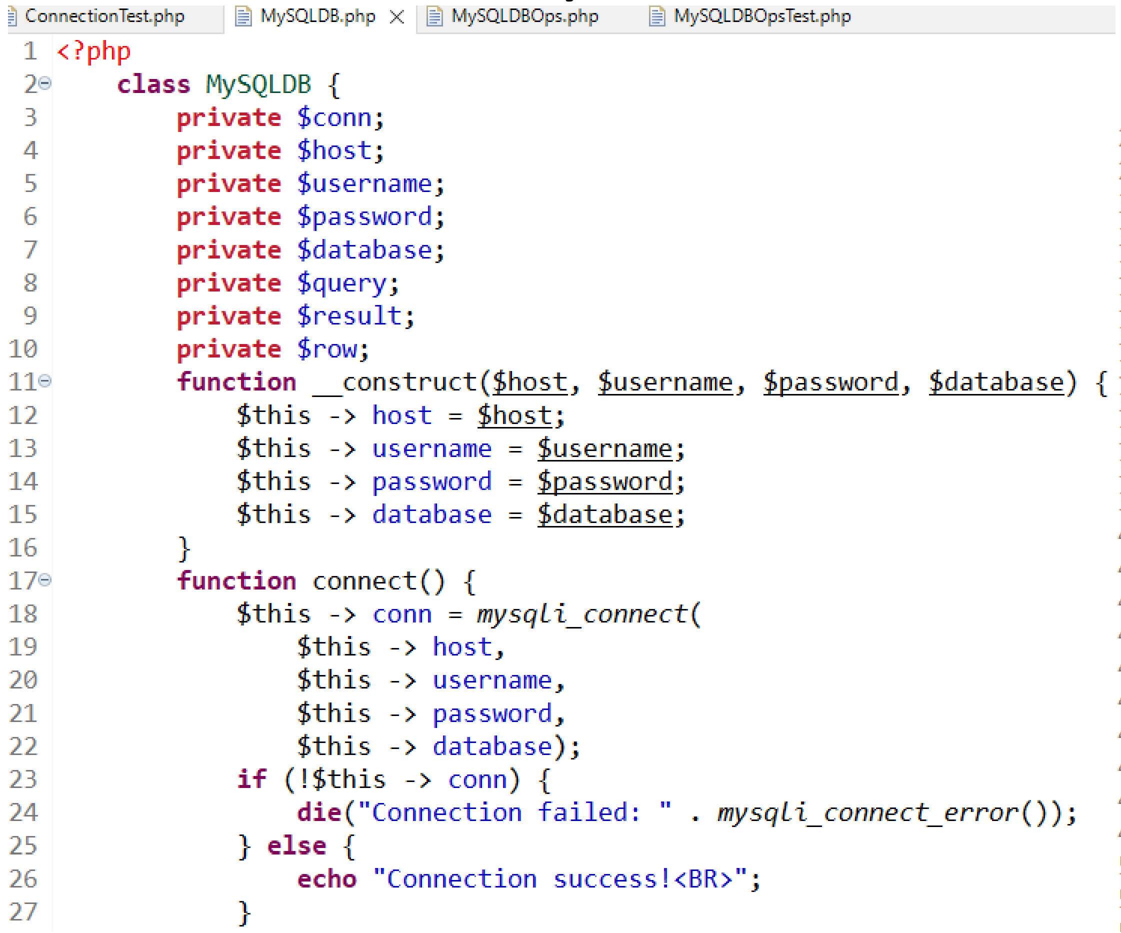
PHP + MySQL with OOP

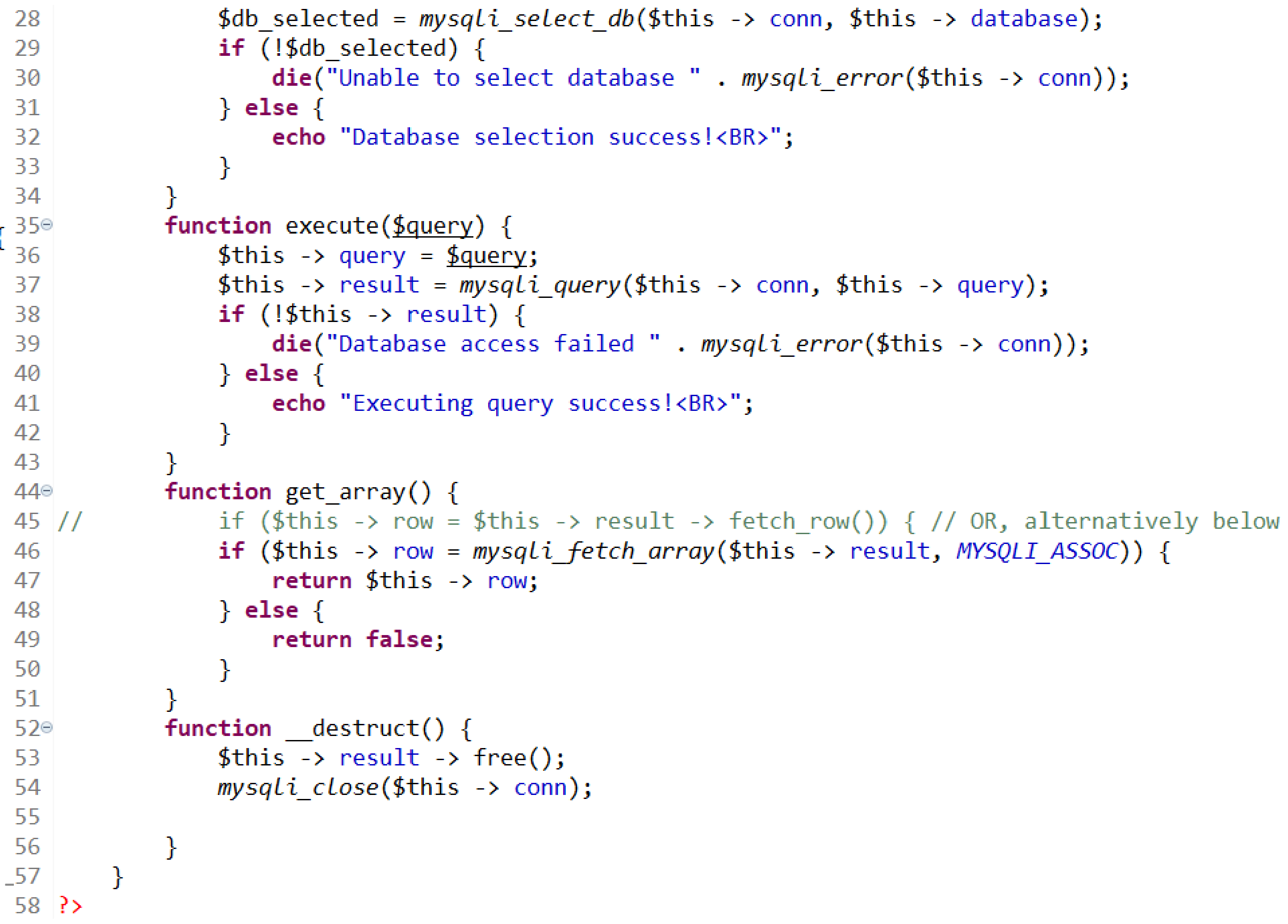
- ConnectionTest.php → Test the connection to MySQL/MariaDB
- MySQLDB → Base Class
    - MySQLDBOps → Extension Class from MySQLDB
        - MySQLDBOpsTest → Test the functionalities of MySQLDBOps



```php
<?php
    $host = "localhost";
    $username = "rahayu";
    $password = "dewi";
    $database = "webprodb";
    $conn = mysqli_connect($host, $username, $password);
    if (!$conn) {
        die("Connection failed: " . mysqli_connect_error());
    } else {
        echo "Connection success!<BR>";
    }
    $db_selected = mysqli_select_db($conn, $database);
    if (!$db_selected) {
        die("Unable to select database " . mysqli_error($this -> conn));
    } else {
        echo "Database selection success!<BR>";
    }
    // Continue your code in here
    // ...
    //
    mysqli_close($conn);
?>
```

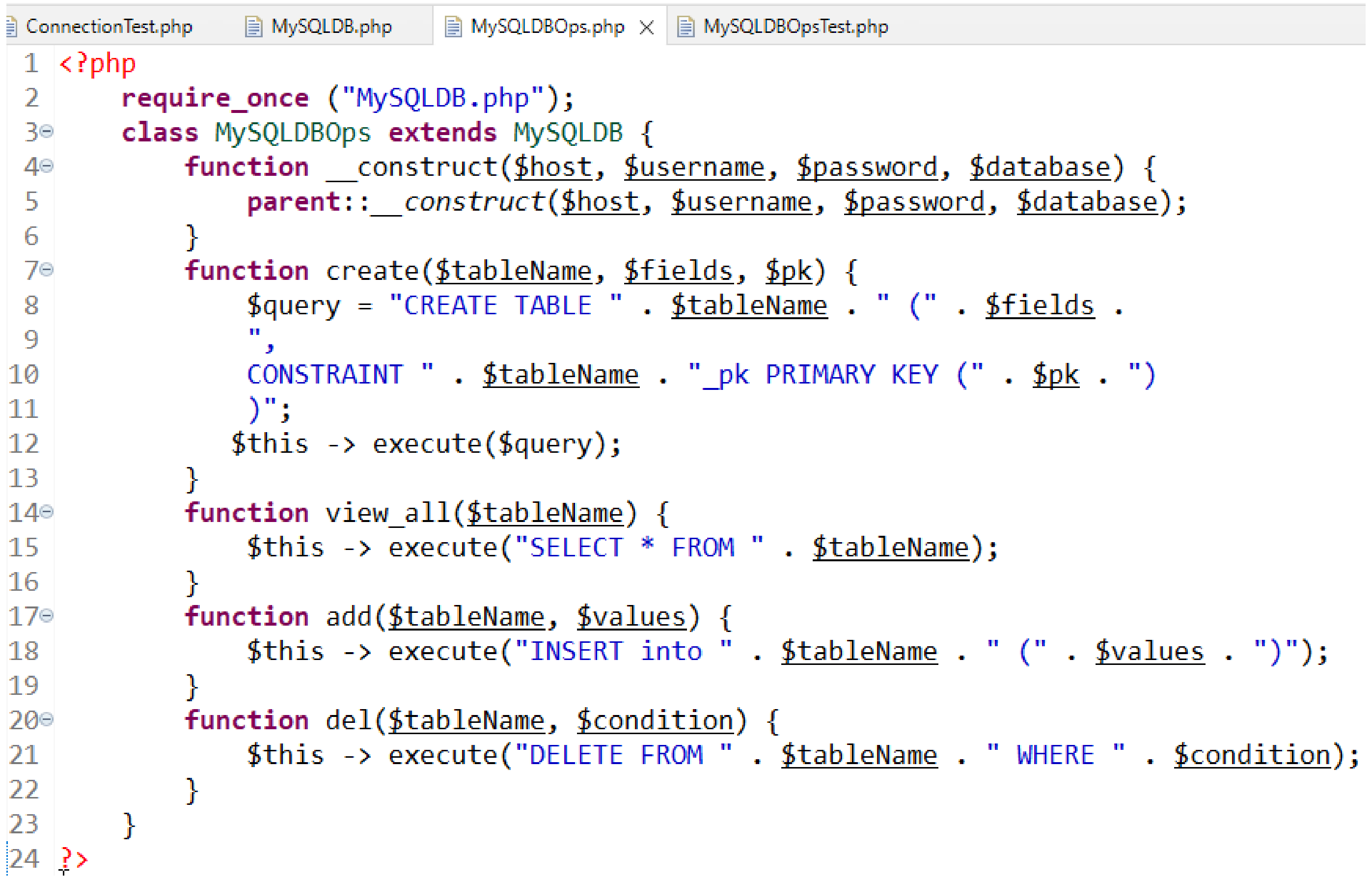
Class MySQLDB





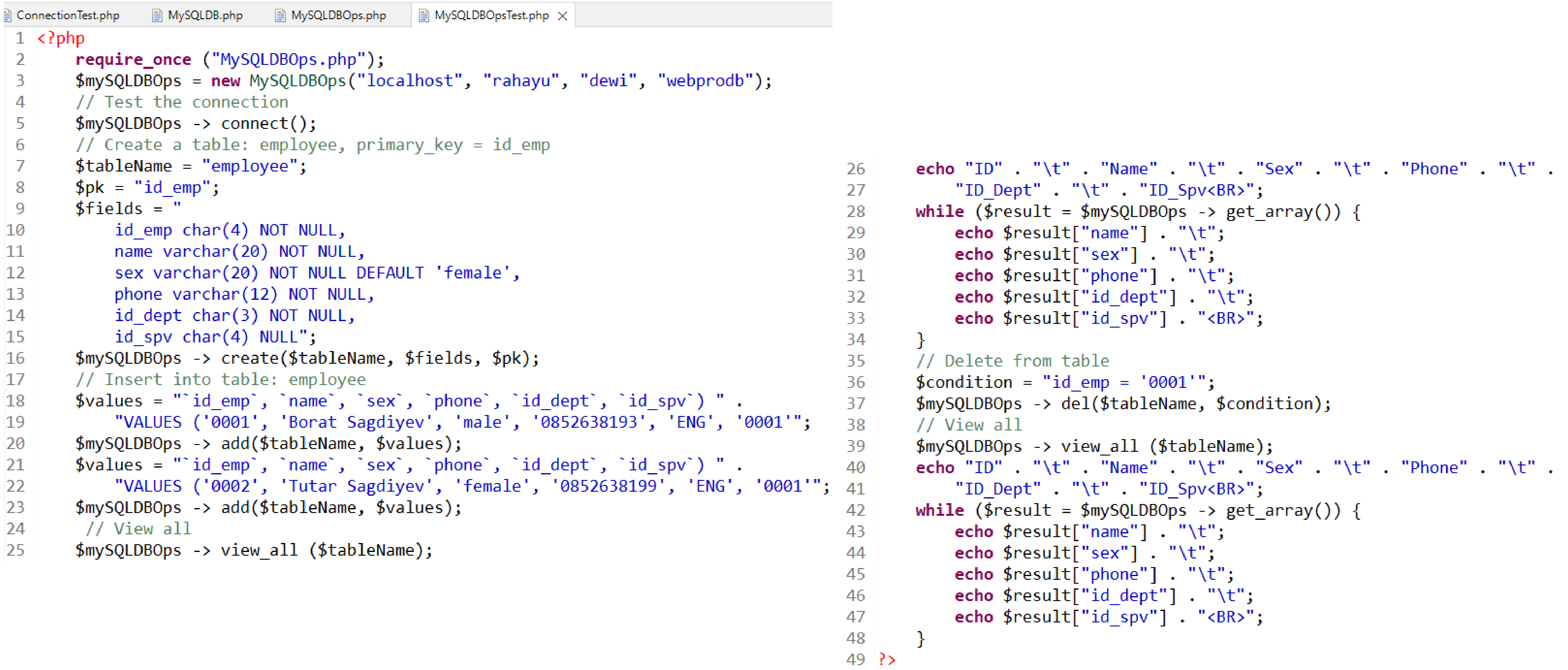
```php
<?php
    class MySQLDB {
        private $conn;
        private $host;
        private $username;
        private $password;
        private $database;
        private $query;
        private $result;
        private $row;
        function __construct($host, $username, $password, $database) {
            $this -> host = $host;
            $this -> username = $username;
            $this -> password = $password;
            $this -> database = $database;
        }
        function connect() {
            $this -> conn = mysqli_connect(
                $this -> host,
                $this -> username,
                $this -> password,
                $this -> database);
            if (!$this -> conn) {
                die("Connection failed: " . mysqli_connect_error());
            } else {
                echo "Connection success!<BR>";
            }
            $db_selected = mysqli_select_db($this -> conn, $this -> database);
            if (!$db_selected) {
                die("Unable to select database " . mysqli_error($this -> conn));
            } else {
                echo "Database selection success!<BR>";
            }
        }
        function execute($query) {
            $this -> query = $query;
            $this -> result = mysqli_query($this -> conn, $this -> query);
            if (!$this -> result) {
                die("Database access failed " . mysqli_error($this -> conn));
            } else {
                echo "Executing query success!<BR>";
            }
        }
        function get_array() {
//          if ($this -> row = $this -> result -> fetch_row()) { // OR, alternatively below
            if ($this -> row = mysqli_fetch_array($this -> result, MYSQLI_ASSOC)) {
                return $this -> row;
            } else {
                return false;
            }
        }
        function __destruct() {
            $this -> result -> free();
            mysqli_close($this -> conn);

        }
    }
?>
```

Class MySQLDBOps



```php
<?php
    require_once ("MySQLDB.php");
    class MySQLDBOps extends MySQLDB {
        function __construct($host, $username, $password, $database) {
            parent::__construct($host, $username, $password, $database);
        }
        function create($tableName, $fields, $pk) {
            $query = "CREATE TABLE " . $tableName . " (" . $fields .
            ",
            CONSTRAINT " . $tableName . "_pk PRIMARY KEY (" . $pk . ")
            )";
           $this -> execute($query);
        }
        function view_all($tableName) {
            $this -> execute("SELECT * FROM " . $tableName);
        }
        function add($tableName, $values) {
            $this -> execute("INSERT into " . $tableName . " (" . $values . ")");
        }
        function del($tableName, $condition) {
            $this -> execute("DELETE FROM " . $tableName . " WHERE " . $condition);
        }
    }
?>
```

Objects: Class MySQLDBOpsTest



```php
<?php
    require_once ("MySQLDBOps.php");
    $mySQLDBOps = new MySQLDBOps("localhost", "rahayu", "dewi", "webprodb");
    // Test the connection
    $mySQLDBOps -> connect();
    // Create a table: employee, primary_key = id_emp
    $tableName = "employee";
    $pk = "id_emp";
    $fields = "
        id_emp char(4) NOT NULL,
        name varchar(20) NOT NULL,
        sex varchar(20) NOT NULL DEFAULT 'female',
        phone varchar(12) NOT NULL,
        id_dept char(3) NOT NULL,
        id_spv char(4) NULL";
    $mySQLDBOps -> create($tableName, $fields, $pk);
    // Insert into table: employee
    $values = "`id_emp`, `name`, `sex`, `phone`, `id_dept`, `id_spv`) " .
        "VALUES ('0001', 'Borat Sagdiyev', 'male', '0852638193', 'ENG', '0001'";
    $mySQLDBOps -> add($tableName, $values);
    $values = "`id_emp`, `name`, `sex`, `phone`, `id_dept`, `id_spv`) " .
        "VALUES ('0002', 'Tutar Sagdiyev', 'female', '0852638199', 'ENG', '0001'";
    $mySQLDBOps -> add($tableName, $values);
     // View all
    $mySQLDBOps -> view_all ($tableName);
    echo "ID" . "\t" . "Name" . "\t" . "Sex" . "\t" . "Phone" . "\t" .
        "ID_Dept" . "\t" . "ID_Spv<BR>";
    while ($result = $mySQLDBOps -> get_array()) {
        echo $result["name"] . "\t";
        echo $result["sex"] . "\t";
        echo $result["phone"] . "\t";
        echo $result["id_dept"] . "\t";
        echo $result["id_spv"] . "<BR>";
    }
    // Delete from table
    $condition = "id_emp = '0001'";
    $mySQLDBOps -> del($tableName, $condition);
    // View all
    $mySQLDBOps -> view_all ($tableName);
    echo "ID" . "\t" . "Name" . "\t" . "Sex" . "\t" . "Phone" . "\t" .
        "ID_Dept" . "\t" . "ID_Spv<BR>";
    while ($result = $mySQLDBOps -> get_array()) {
        echo $result["name"] . "\t";
        echo $result["sex"] . "\t";
        echo $result["phone"] . "\t";
        echo $result["id_dept"] . "\t";
        echo $result["id_spv"] . "<BR>";
    }
?>
```