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IF184504 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

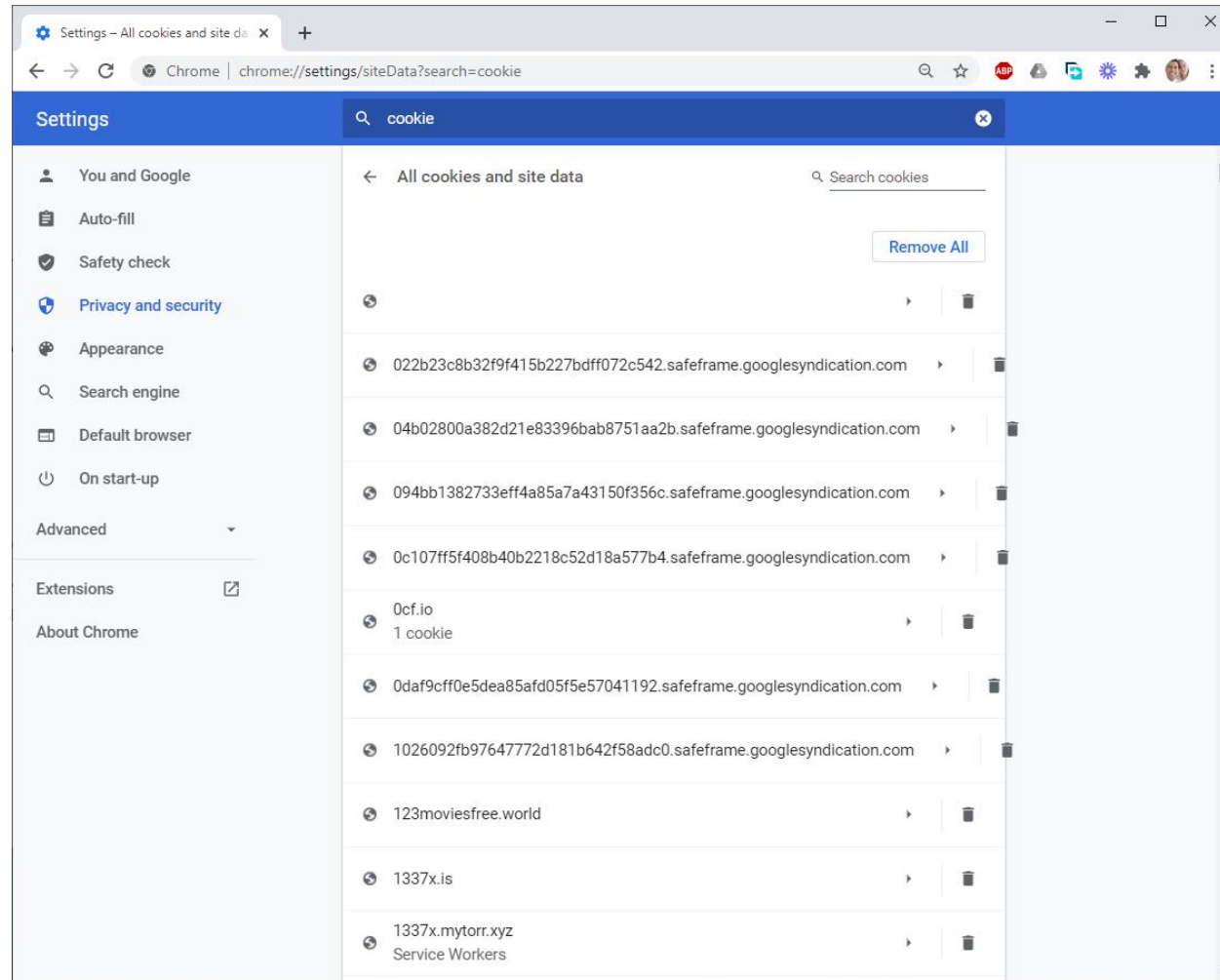
Maintaining state

- 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



Cookies: creating

- `setcookie(name, value, expiration);`
 - `setcookie("hobby", "swimming", time()+3600);`
 - Cookie's 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?PHPSESSID=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 ($row = mysqli_fetch_array($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

```
ConnectionTest.php x MySQLDB.php MySQLDBOps.php MySQLDBOpsTest.php
1 <?php
2     $host = "localhost";
3     $username = "rahayu";
4     $password = "dewi";
5     $database = "webprodb";
6     $conn = mysqli_connect($host, $username, $password);
7     if (!$conn) {
8         die("Connection failed: " . mysqli_connect_error());
9     } else {
10        echo "Connection success!<BR>";
11    }
12    $db_selected = mysqli_select_db($conn, $database);
13    if (!$db_selected) {
14        die("Unable to select database " . mysqli_error($this -> conn));
15    } else {
16        echo "Database selection success!<BR>";
17    }
18    // Continue your code in here
19    // ...
20    //
21    mysqli_close($conn);
22 ?>
```

Class MySQLDB

```
ConnectionTest.php MySQLDB.php x MySQLDBOps.php MySQLDBOpsTest.php
1 <?php
2 class MySQLDB {
3     private $conn;
4     private $host;
5     private $username;
6     private $password;
7     private $database;
8     private $query;
9     private $result;
10    private $row;
11    function __construct($host, $username, $password, $database) {
12        $this -> host = $host;
13        $this -> username = $username;
14        $this -> password = $password;
15        $this -> database = $database;
16    }
17    function connect() {
18        $this -> conn = mysqli_connect(
19            $this -> host,
20            $this -> username,
21            $this -> password,
22            $this -> database);
23        if (!$this -> conn) {
24            die("Connection failed: " . mysqli_connect_error());
25        } else {
26            echo "Connection success!<BR>";
27        }
28
29        $db_selected = mysqli_select_db($this -> conn, $this -> database);
30        if (!$db_selected) {
31            die("Unable to select database " . mysqli_error($this -> conn));
32        } else {
33            echo "Database selection success!<BR>";
34        }
35    }
36    function execute($query) {
37        $this -> query = $query;
38        $this -> result = mysqli_query($this -> conn, $this -> query);
39        if (!$this -> result) {
40            die("Database access failed " . mysqli_error($this -> conn));
41        } else {
42            echo "Executing query success!<BR>";
43        }
44    }
45    function get_array() {
46        if ($this -> row = $this -> result -> fetch_row()) { // OR, alternatively below
47            if ($this -> row = mysqli_fetch_array($this -> result, MYSQLI_ASSOC)) {
48                return $this -> row;
49            } else {
50                return false;
51            }
52        }
53    }
54    function __destruct() {
55        $this -> result -> free();
56        mysqli_close($this -> conn);
57    }
58 }
?>
```

Class MySQLDBOps

```
ConnectionTest.php  MySQLDB.php  MySQLDBOps.php x  MySQLDBOpsTest.php
1  <?php
2      require_once ("MySQLDB.php");
3  class MySQLDBOps extends MySQLDB {
4      function __construct($host, $username, $password, $database) {
5          parent::__construct($host, $username, $password, $database);
6      }
7      function create($tableName, $fields, $pk) {
8          $query = "CREATE TABLE " . $tableName . " (" . $fields .
9              ",
10             CONSTRAINT " . $tableName . "_pk PRIMARY KEY (" . $pk . ")
11             )";
12             $this -> execute($query);
13         }
14         function view_all($tableName) {
15             $this -> execute("SELECT * FROM " . $tableName);
16         }
17         function add($tableName, $values) {
18             $this -> execute("INSERT into " . $tableName . " (" . $values . ")");
19         }
20         function del($tableName, $condition) {
21             $this -> execute("DELETE FROM " . $tableName . " WHERE " . $condition);
22         }
23     }
24  ?>
```

Objects: Class MySQLDBOpsTest

```
ConnectionTest.php MySQLDB.php MySQLDBOps.php MySQLDBOpsTest.php x
1 <?php
2 require_once ("MySQLDBOps.php");
3 $mySQLDBOps = new MySQLDBOps("localhost", "rahayu", "dewi", "webprodb");
4 // Test the connection
5 $mySQLDBOps -> connect();
6 // Create a table: employee, primary_key = id_emp
7 $tableName = "employee";
8 $pk = "id_emp";
9 $fields = "
10     id_emp char(4) NOT NULL,
11     name varchar(20) NOT NULL,
12     sex varchar(20) NOT NULL DEFAULT 'female',
13     phone varchar(12) NOT NULL,
14     id_dept char(3) NOT NULL,
15     id_spv char(4) NULL";
16 $mySQLDBOps -> create($tableName, $fields, $pk);
17 // Insert into table: employee
18 $values = "`id_emp`, `name`, `sex`, `phone`, `id_dept`, `id_spv`" .
19     "VALUES ('0001', 'Borat Sagdiyev', 'male', '0852638193', 'ENG', '0001'";
20 $mySQLDBOps -> add($tableName, $values);
21 $values = "`id_emp`, `name`, `sex`, `phone`, `id_dept`, `id_spv`" .
22     "VALUES ('0002', 'Tutar Sagdiyev', 'female', '0852638199', 'ENG', '0001'";
23 $mySQLDBOps -> add($tableName, $values);
24 // View all
25 $mySQLDBOps -> view_all ($tableName);
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35 // Delete from table
36 $condition = "id_emp = '0001'";
37 $mySQLDBOps -> del($tableName, $condition);
38 // View all
39 $mySQLDBOps -> view_all ($tableName);
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