

Assignment 3 – Form, CGI, PHP, and MySQL

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Deadline: 11:59 pm, May 6, 2021

ATTENTION: You can freely use any PHP libraries and packages. However, you must implement all the functions required by this homework. If you fail to do that, you will get penalties.

1. Task Description

In this assignment, you will learn:

- How to manipulate data (text and image) by accessing MySQL and get more familiar with SQL statements.
- How to use PHP, perform form processing, and connect to a MySQL database.
- How to manipulate sessions and prevent SQL injection in PHP.
- Get experiences using JSON parsers in PHP and API.

2. Before you start

Before you start with this assignment, you need to install **Apache**, **PHP**, and **MySQL**. Therefore, you must use the **CGI scripts** for this assignment.

3. MySQL (10%)

- (1) Your MySQL account has been created on www2021.csie.io:3306. The account name and the password are set to your student ID initially. You should change your password first to prevent malicious users from breaking your environment. You need to change your password from home→General settings→Change password.
- (2) You can access phpMyAdmin on <http://www2021.csie.io:8080/> to design your database schema and create tables. Please connect to the MySQL server on www2021.csie.io:3306.
- (3) A database has been created for each student and the database name is set to your student ID. You are granted a privilege to create tables in your database.
- (4) Use PHP to connect to MySQL. Here is an example of how to use PHP to connect to MySQL.

```
<?php

$host = "www2021.csie.io";
$user = "Your student id";
$passwd = "";
$database = "Your student id"; //db name
$port="3306";

// Create connection
$connect = new mysqli($host, $user, $passwd, $database , $port);
// Check connection
if ($connect->connect_error) {
    die("Connection Failed: " . $connect->connect_error);
}
echo "Connected";

//close connection
$conn->close();
?>
```

- (5) You can connect to and manipulate databases using PHP. For your reference, the PHP-MySQL example and function documentation can be found at the following website:

https://www.w3schools.com/php/php_mysql_intro.asp.

4. My Weather Implementation (90%)

Please implement a weather website on which **registered users** can **search the weather** information and **browse their search history**. Every register has his or her own search history. Additionally, the website must provide an interface to create an account. The functions in the website are described in the following sections.

4.1 Login page

First, users sign in through this sign-in page. You must use a **cookie** to automatically fill in the name of the user who has ever signed in before. To protect your website from being abused via SQL injections, you should **set all SQL queries** that can be correctly executed. If a user fails to sign in, please show an error page; otherwise, direct the page to your weather page (see Figure 3). If a user clicks the “Register” link, he/she will be re-directed to the register page (see Figure 2). An example of a sign-in page is shown below in Figure 1. If you enter an incorrect username and/or password, you receive an error alert message “Login failed” as illustrated in Figure 1-1.

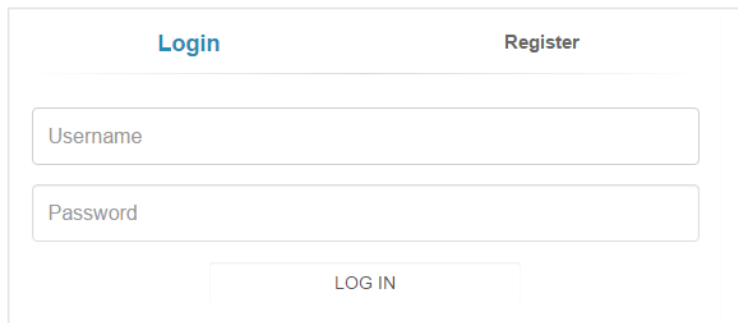


Figure 1: An example of a login page

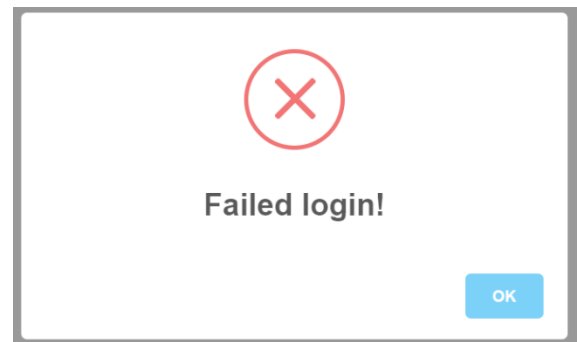


Figure 1-1: Login failed

4.2 Register page

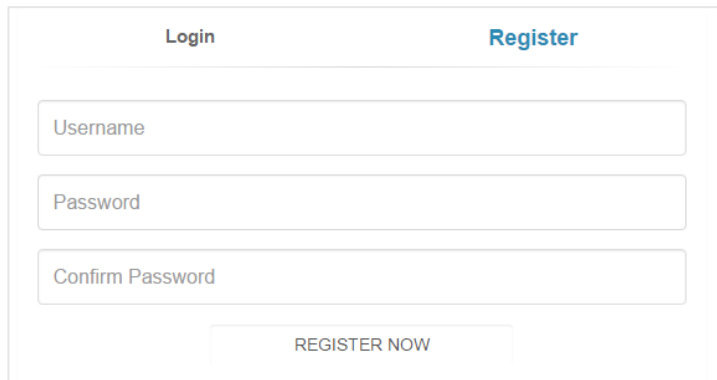
On this page, a user can register by entering a **name**, a **password**, and a **confirm password**. An example is shown below in Figure 2. You must show an error alert, when (1) the user account already exists (see Figure 2-1), (2) the confirm password is not matched with the password (see Figure 2-2), and (3) any fields are left black (see Figure 2-3).

Hint: The password in the database must be **encrypted**. Be aware of this when designing the database table schema.

4.3 Weather page

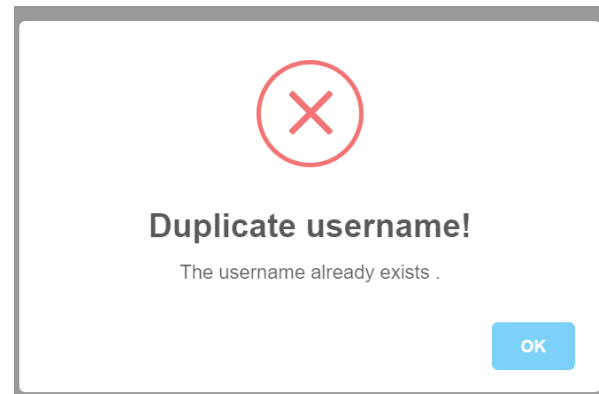
The layout of the weather page is shown in Figure 3. In the header of the weather page, there are three

links on the left. One links to the weather page; one links to the logout page; one links to the history page to browse the search history. You must implement a top navigation bar in the header for these three links. When any navigation link is clicked, the navigation link is highlighted in a different color. You have to show the text “Hello, *username*” on the right, where *username* is the user name of the login user. When the link to the weather page is clicked, a search bar is shown. **A user can search the weather information of a county (city) for the current and the forecast weather data.**



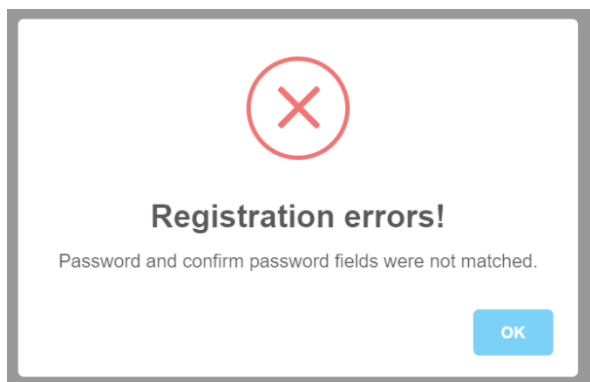
The register page features a header with 'Login' and 'Register' links. The 'Register' link is highlighted in blue. Below the header, there are three input fields: 'Username', 'Password', and 'Confirm Password'. A 'REGISTER NOW' button is positioned at the bottom right of the form.

Figure 2: An example of a register page



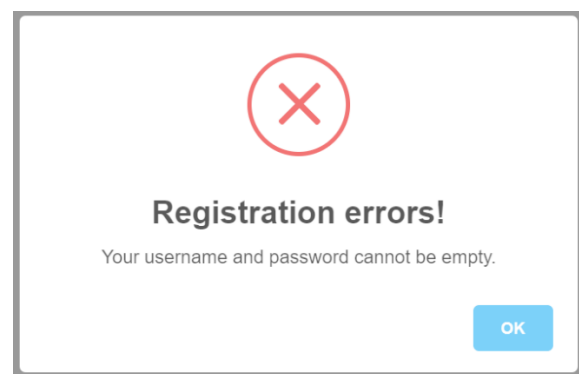
The error message displays a red 'X' icon in a circle. The text reads 'Duplicate username!' followed by 'The username already exists .'. An 'OK' button is located at the bottom right.

Figure 2-1: Duplicate username error



The error message displays a red 'X' icon in a circle. The text reads 'Registration errors!' followed by 'Password and confirm password fields were not matched.'. An 'OK' button is located at the bottom right.

Figure 2-2: Unmatched password error



The error message displays a red 'X' icon in a circle. The text reads 'Registration errors!' followed by 'Your username and password cannot be empty.'. An 'OK' button is located at the bottom right.

Figure 2-3: Empty field error



The navigation bar has a dark background. It contains four links: 'Weather Page' (highlighted in grey), 'Logout', 'History', and 'Hello, TestUser !'.

The Weather Now In Your City

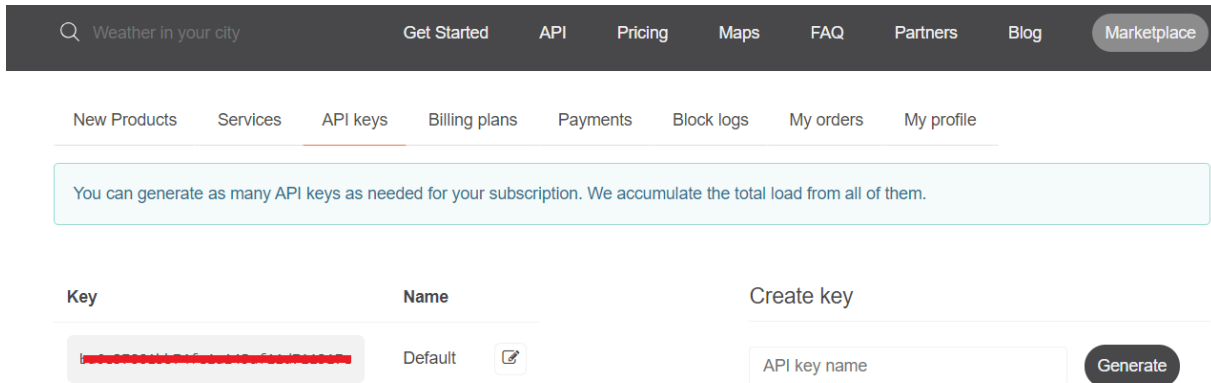
Enter the name of a city.

Search

Figure 3: An example of a weather page

The weather information can be obtained from the following site. You are required to access the weather open data in JSON format by PHP. You can see the sample weather data in JSON format at OpenWeatherMap (<https://openweathermap.org/api>). The implementation details are described as follows.

- (1) To get the API key, you need to register on OpenWeatherMap. After signing up, there is a top menu containing several tabs. Click the API keys tab and copy the API key. This will be used later to request APIs for the weather forecasts.



- (2) Get current weather data: (See more detail at <https://openweathermap.org/current>)

```
http://api.openweathermap.org/data/2.5/weather?q=[city name],&appid=[your key]&units=metric
```

- (3) Get 5-day/3-hour weather forecast data: (See more detail at <https://openweathermap.org/forecast5>)

Users can check the search button to search the current and forecast weather data as shown in Figure 4.

```
http://api.openweathermap.org/data/2.5/forecast?q=[city name],&appid=[your key]&units=metric
```

4.3.1 Parse JSON-formatted data in PHP

In PHP, you can parse JSON-formatted data using the “json_decode” function. For more information, please go to <http://php.net/manual/en/function.json-decode.php>.

4.3.2 Read and save contents in PHP

To read the contents of a JSON-formatted object, you can use the “file_get_contents” function. For more information, please go to <https://www.php.net/manual/en/function.file-get-contents.php>

```
file_get_contents(http://api.openweathermap.org/data/2.5/forecast?q=[city name],&appid=[your key]&units=metric)
```

The Weather Now In Your City

Enter the name of a city.

The weather in Chiayi,Minxiong is currently 'clear sky'.
The temperature is 22.22°C.
Humidity 93.
Wind speed 2mph.

The Weather Forecast

	City	Date	Temperature	FeelsLike	Humidity	Description	Wind
●	Chiayi,Minxiong.	2021-03-27	22.52°C.	24.97°C.	79.	clear sky	0.92 m/s
●	Chiayi,Minxiong.	2021-03-28	23.15°C.	25.15°C.	70.	clear sky	0.76 m/s
●	Chiayi,Minxiong.	2021-03-29	23.82°C.	25.04°C.	60.	clear sky	0.87 m/s
●	Chiayi,Minxiong.	2021-03-30	23.67°C.	25.94°C.	75.	clear sky	1.35 m/s
☁	Chiayi,Minxiong.	2021-03-31	23.3°C.	24.42°C.	70.	overcast clouds	2.1 m/s

Figure 4: An example of a weather page with the search result

4.3.3 Weather search

After searching the weather data, the PHP script should display the weather information in a tabular format below the search bar. A sample output is shown in Figure 4. **The middle part with a green background shows the current weather data. The bottom part is the weather forecast for the next five days.** Note that the API returns a set of 5-day forecast weather data and there are eight 3-hour forecasts for each day. Show only the first 3-hour forecast of each day in a summary table including the information of a weather icon, city, date, temperature, feelslike, humidity, description, and wind per day. The weather icons are required to store in MySQL first and accessed from MySQL later when posting the weather summary. You can download icons from ecourse2 or the homework document site at <http://www2021.csie.io:82/>. Furthermore, you must **save the weather forecast data as the search history into MySQL. No duplicate weather forecast data in Mysql.**

Hint: In the json file from OpenWeatherMap, you can use the field "icon" for displaying the weather icon (see Figure 5), where in this example an icon named 01n.jpg for a clear weather should be displayed.

4.4 The history page

On the history page, **all search histories of weather forecast data are shown. Users can browse the search history.** The layout of the message page is shown in Figure 6. **The newest search is shown on the top.** Furthermore, users can search the history by city and a sample output is shown in Figure 7. The maximum

number of records can be shown in a page is 7.

```
{
  "dt": 1617807600,
  "main": {
    "temp": 21.18,
    "feels_like": 21.05,
    "temp_min": 21.05,
    "temp_max": 21.18,
    "pressure": 1015,
    "sea_level": 1015,
    "grnd_level": 1011,
    "humidity": 65,
    "temp_kf": 0.13
  },
  "weather": [
    {
      "id": 800,
      "main": "Clear",
      "description": "clear sky",
      "icon": "01n"
    }
  ],
  "clouds": {
    "all": 7
  },
  "wind": {
    "speed": 4.3,
    "deg": 49
  },
  "visibility": 10000,
  "pop": 0,
  "sys": {
    "pod": "n"
  },
  "dt_txt": "2021-04-07 15:00:00"
}
```

Figure 5: The returned json file.

The Weather History

Search

#	Date	City	Temperature	FeelsLike	Humidity	Wind
1	2021-03-31	hsinchu,taiwan	19.96°C	19.28°C	92	5 m/s
2	2021-03-31	Chiayi,Minxiong	23.3°C	24.42°C	70	2 m/s
3	2021-03-31	Tokyo	13.59°C	11.1°C	53	2 m/s
4	2021-03-30	Chiayi,Minxiong	23.67°C	25.94°C	75	1 m/s
5	2021-03-30	hsinchu,taiwan	21.4°C	23.03°C	90	3 m/s
6	2021-03-30	Tokyo	13.12°C	9.7°C	60	3 m/s
7	2021-03-29	Tokyo	15.43°C	13.76°C	69	2 m/s

previous123next

15 results on page 1 of 3

Figure 6: The history page with pagination.

Weather PageLogoutHistoryHello,TestUser !

The Wearther History

Chiayi,Minxiong

Search

#	Date	City	Temperature	FeelsLike	Humidity	Wind
1	2021-03-31	Chiayi,Minxiong	23.3°C	24.42°C	70	2 m/s
2	2021-03-30	Chiayi,Minxiong	23.67°C	25.94°C	75	1 m/s
3	2021-03-29	Chiayi,Minxiong	23.82°C	25.04°C	60	1 m/s
4	2021-03-28	Chiayi,Minxiong	23.15°C	25.15°C	70	1 m/s
5	2021-03-27	Chiayi,Minxiong	22.52°C	24.97°C	79	1 m/s

previous1next

5 resultaten page 1 of 1

Figure 7: An example of a history page with the search result by city.

4.5 The logout page

After clicking the logout link, the page should direct to the login page after five seconds. A sample page is shown in Figure 8.

You will be signed out after five seconds.
If you are not successfully logged out, please click here.

Figure 8: An example of a logout page after clicking the logout link.

4.6 Session

Without login, the user cannot access the weather page directly. If the user is not logged in and tries to access the weather pages, the user receives the error message as shown in Figure 9.

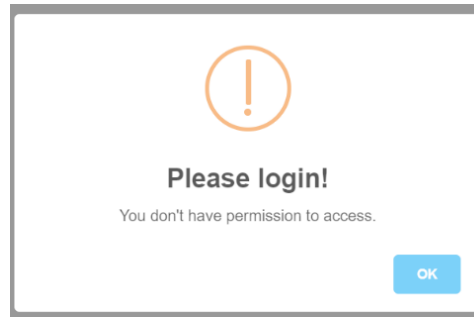
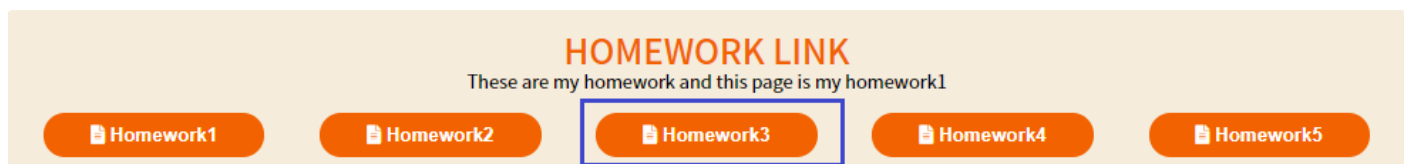


Figure 9: An example of a sign-in request alert.

4.7 The homework link

You should link your homework3 button on the page you completed for assignment 1 to this assignment. **If your homework3 button could not link to this assignment, this assignment will NOT be graded.**



5. Hints and useful resources

- Bootstrap <http://getbootstrap.com/getting-started/>
- PHP Tutorial <https://www.w3schools.com/php/default.asp>.
- About the message alert, SweetAlert can offer you. (<https://sweetalert2.github.io>.)

6. What and how to submit

(1) How to submit your assignment:

The procedure of submitting your assignment can be found at our document website (<http://www2021.csie.io:82/homework/submit>).

(2) What should be submitted:

You should **hand in your code and sql file to the GitLab** and deploy your website on your server. You should record a demo video to show each function of your assignments and show your MySQL database. Your demo video should upload to YouTube and paste your link into eCourse2. **Your assignment will not be graded without a demo video.**

7. Grading (for TA)

Graders will test your homework only on **Google Chrome in 1920*1080**. **Homework submitted late will be accepted for up to 7 days after the due date, and will receive an automatic 30% penalty. Homework submitted more than 7 days after the due date will not be accepted. Only one final submission (either one on-time or one late submission) is accepted. Your assignment will not be graded without a demo video.** The TA(s) will mark and give points according to the following grading policy:

MySQL	Create a database successfully. Your password must be encrypted in MySQL. You must save the weather icons into MySQL. The information stored on MySQL includes the followings:	10%
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	(1) Accounts (2) Icons (3) Search history of the weather forecast data	
Login page	The login page should work correctly and show a page for errors when necessary. You must handle the following tasks. (1) Session/cookie (2) SQL injection	15%
Register page	The register page should work correctly and show a page for errors when necessary as shown in Figure 3. You must handle the following tasks. (1) Duplicate username (2) Unmatched password (3) Any empty fields	15%
Weather page	A weather page that allows searching the weather for registered users. The weather page must display the weather information. (1) Search field (2) Current weather information. (3) Weather forecast for the next five days.	20%
History page	A web page that allows searching the history for registered users. Users can browse or search the history of the weather forecast data. The newest search is shown on the top. There are 7 records of the weather data on a page.	25%
Logout page	A logout page that allows jumping to the login page.	5%
Layout	(1) Page layout. (2) The header is shown on the weather page and the history page.	5%
Session	Without login, the user cannot access any pages and an alert message is shown.	5%