Topic: Time Scheduling Webpages for School Events

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Contents

Summary

Design webpages that assist teachers to gather and summarize opinions about appropriate time for certain events. Use proper programming tools and languages, including MySQL for storing data, HTML for creating the webpages, and PHP for data transfer and operation, to write the source code. Make sure the webpages are user-friendly as well as good-looking. Gather feedbacks from real tests in school to consider possible improvements.

Background info

It has always been extremely inconvenient for teachers to arrange an event or test since there is no efficient tool to gather and summarize the opinions of all the students. As a result, a common way for a teacher is usually asking in the class, “What time do you guys prefer to take the physics quiz?”. However, this is not only time-consuming but also ineffective since different students always have different opinions, making it hard for the teacher to determine the best time-slot for most students.

Proposition

Design webpages that help teachers gather and summarize opinions about what time-interval should one certain event take place. Teachers only need to give essential information about the event, such as name, date, and duration.

Design Objectives

The webpages should be practical and good-looking. They should be convenient to use, with clear guidelines explaining what input information is needed from the user. Most importantly, the reliability of the system should be assured.

Outcomes

A prototype that is tested by teachers and students, and finally two completed webpages that meet all the goals by eliminating the bugs and improving the effectiveness according to feedbacks.

Above is a summary of my project. I hope this can give a brief insight into what I am doing. Setting up my goals and targets, I need to research what techniques I should use to build the webpages and implement the intended functions. Knowing absolutely nothing about designing webpages, I seek help from my teacher Chen.

Expert and Techniques

Chen is an expert in computer science. He teaches Computer Science: Mobile Development at school. After having several meetings with him, discussing the programming techniques and languages required to do my project. My project development path is designed as below.

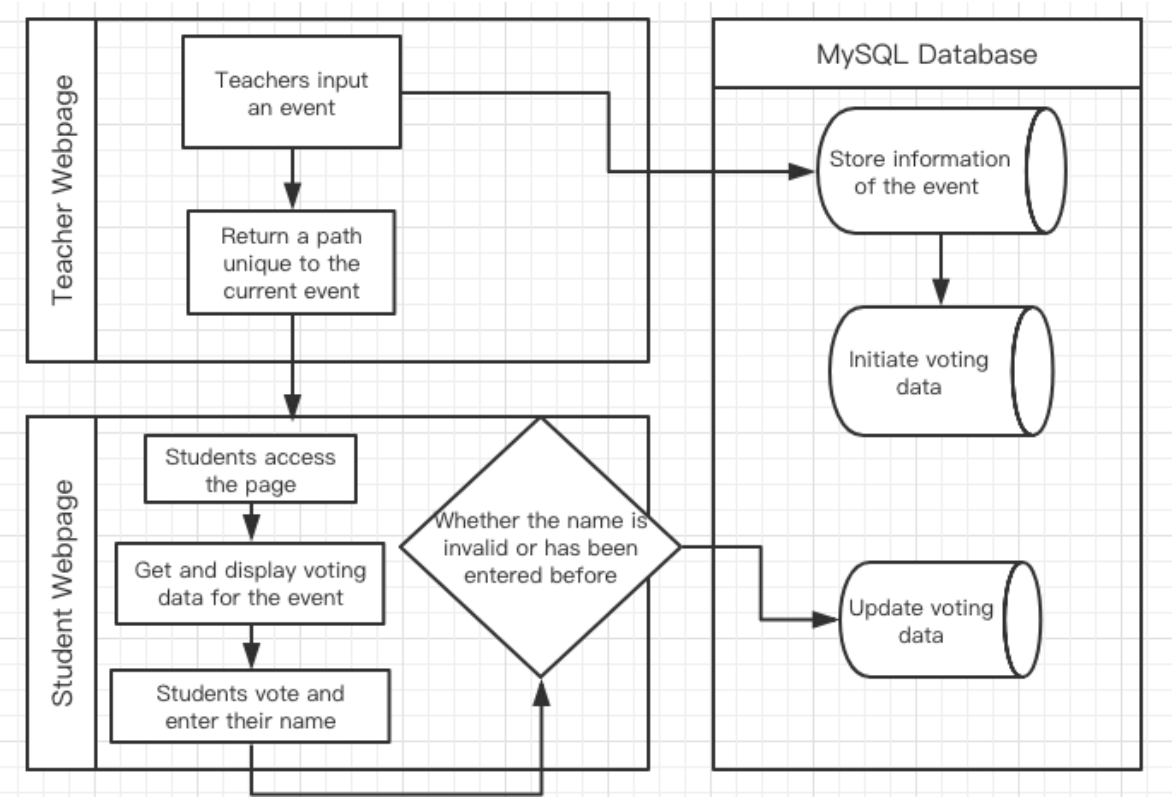
1. Firstly, I need to learn HTML coding skills to create the layout and contents in the webpages;
2. Secondly, I need to create a database to store information about the events as well as the votes of the students. By consulting with the advisor, I plan to use MySQL as it is designed and optimized for web applications;
3. Lastly, I should learn PHP, which can receive data from both webpage and database, and send data to each other. I will put the PHP files inside the web folder of Apache HTTP Server to run them on browser.

System decomposition

The initial step of the project is the detailed system design. I will create two webpages: the teacher webpage – where teachers give the information about the event, and the student webpage – where students vote for the time-intervals they prefer while knowing which event they are voting for. Here are the procedures.

1. Teachers input the information about the event on the teacher webpage;
2. The data are sent to both the database and the student webpage;
3. The teacher webpage returns a path unique to the current event that points to the student webpage;
4. Students access the student webpage through the unique path;
5. The student webpage gets and displays the voting data of each time-interval from the database;
6. Students vote for the time-intervals they prefer;
7. The voting data are sent to the database;
8. Teachers access the student webpage after voting has completed;
9. Teachers choose the time-interval that gets the most votes;

Here is a flow chart showing the procedures.



I will use HTML to create the webpages and use MySQL for data storage and access. In order to connect PHP with HTML and MySQL, I adapt the two built-in methods “get/post” in HTML that can send data to a certain PHP file. There is also a built-in method “mysql_connect” in PHP that allows a PHP file to access the database. Thus, we could achieve and update the stored data in the database and show them on the webpages.

Then the detailed development steps are:

1. Use HTML to create proper layouts for both the teacher webpage and the student webpage;
2. Set up my MySQL database and create the tables and columns that can be used to store the information of all the students and every created event;
3. Create a PHP file for data transfer between files;
4. Add codes to the HTML of the teacher webpage to send data to the PHP file;
5. Add codes to the PHP file to send the data from the teacher webpage to the database;
6. Add codes to the PHP file to receive the voting data from the database;
7. Add codes to the PHP file to send the voting data to the student webpage;
8. Add codes to the HTML of the student webpage to show the voting data;
9. Add codes to the HTML of the teacher webpage to return a path unique to the current event that points to the student webpage;
10. Test the webpages in school and receive feedbacks;
11. Debug and make any possible improvements;

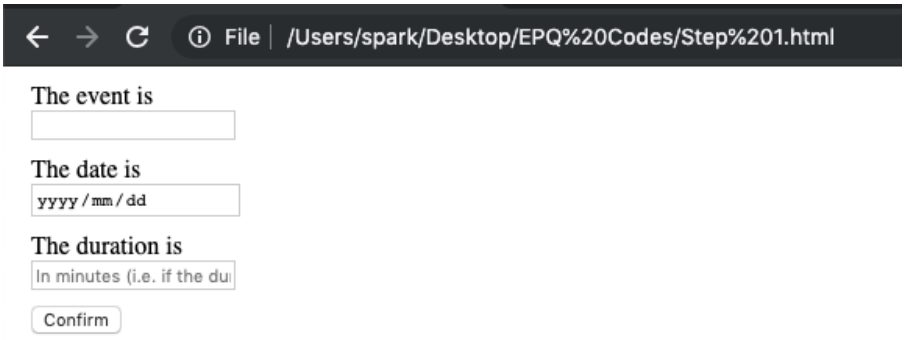
By breaking my project into smaller parts, I now have a clear understanding of my tasks ahead, and I can plan my time wisely.

Development process

I start implementing my project step by step, learning everything totally on my own. For each step, I spend lots of my time reading the official manual, tutorial of each programming languages, or guidance from reliable sites.

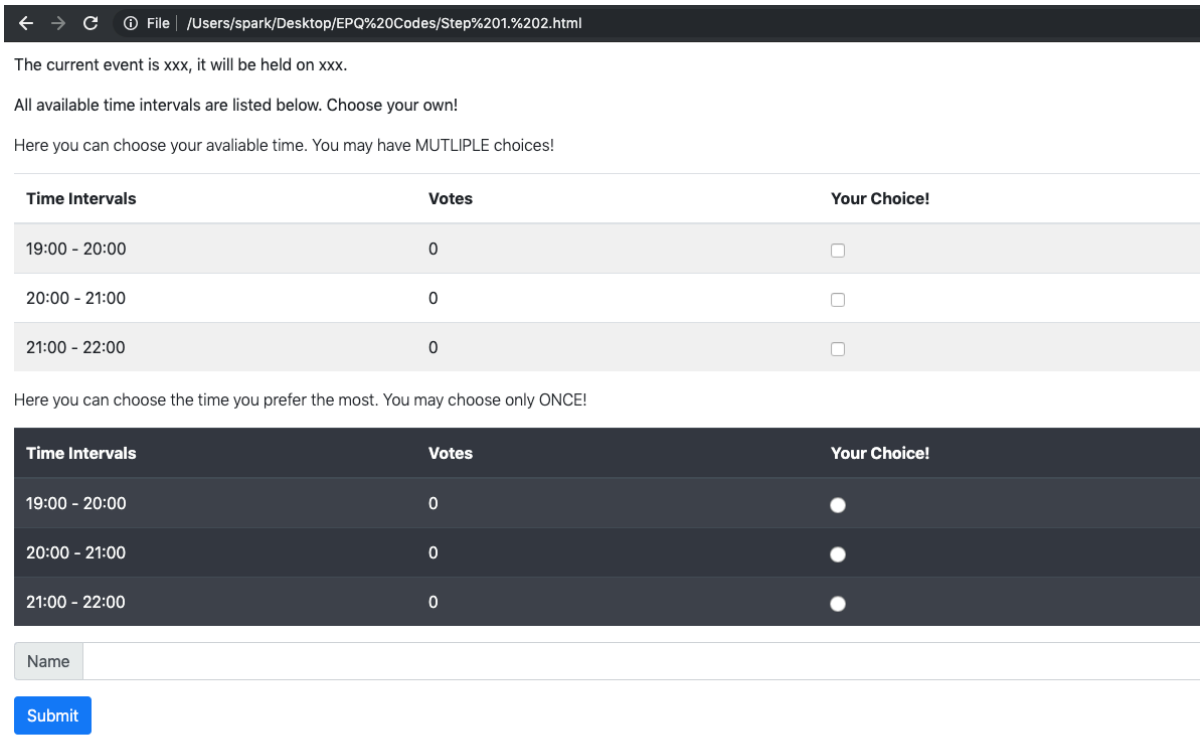
Step 1

For step 1, I need to decide the layout of my webpages. For the teacher webpage, I create three frames where teachers can input the name, the date, and the duration of the event and, plus one confirm button. Learning the structure of HTML, and basic input groups in HTML, I write my very first HTML codes. After adjusting the style, width, and height of my input groups, I create my first webpage as shown below.



Although everything works fine, the webpage is not good-looking and is different from any other webpages I have browsed. After discussion with Advisor Chen, I include CSS into my codes, which sets how HTML elements are displayed in the browser. Since my project does not require many HTML elements, I just use an existing CSS framework template. After that, the webpage becomes more visually pleasing as shown below.

Then I go on to create the student webpage, which includes two tables, one input group, one submit button, and several texts. Similar to the teacher's webpage, I use HTML and CSS, and the final webpage is like below.



Successfully creating two webpages, I have a great beginning, and I am ready to face the challenge of MySQL and PHP.

Step 2

For step 2, I connect to my MySQL database through the Apache HTTP Server and create the tables and columns as intended. I make two tables: “students”, and “time_intervals”. The “students” table initially has one column named “student_name”, where I will put the name of all the students in the school. The table “time_intervals” has three columns: “time_interval”, “event_name”, “chosen_times”. Each time a new event is created, a new column will be added to the “students” table, recording whether the student has voted or not. Also, each available time interval will be added to the “time_intervals” table, with corresponding values for each column. For example, if an event “Mock_Test” of duration “60 minutes” is created, the database should look like this:

student_name ▲ 1	Mock_Test
Bing Yang	0
Shao Jin	0
Yu Shen	0

(table “students”)

time_interval ▲ 1	event_name	chosen_times
18:30–19:30	Mock_Test	0
19:00–20:00	Mock_Test	0
19:30–20:30	Mock_Test	0
20:00–21:00	Mock_Test	0
20:30–21:30	Mock_Test	0
21:00–22:00	Mock_Test	0

(table “time_intervals”)

I have also created a user account in MySQL with username and password for the connection between PHP and MySQL in the following steps.

Step 3

For step 3, I create a PHP file name “project.php”, where the data from two webpages are received and operated. In order to transfer the data between HTML and PHP, I must put the

HTML codes inside a PHP file. Therefore, I create two PHP files: “teacher.php”, “student.php” and paste the HTML codes of the teacher webpage and the student webpage to it.

Step 4 to Step 8

For step 4 to step 8, it is basically all about the data transfer. With the “get/post” method in HTML and “sessions” in PHP, data from both webpages are transferred to “project.php”. Then using “mysql_connect” and MySQL language, data can be stored and updated in the database.

Here are the codes in “project.php” for getting and handling data from “teacher.php” and “student.php”, which are the two webpages. I spend much time researching and implementing the part where all the available time-intervals are calculated according to the duration and recorded in the correct format. I have also made sure that the name entered in the student webpage must be one of the student names in school, and every name can only vote once by storing every valid student name as well as each name's submitted times in the database.

```php
// Data From Teacher.php
$event = $_GET['event'];
$date = $_GET['date'];
$time = $_GET['time'];

// Add current event
$sql = "ALTER TABLE students ADD " . $event . " INT(5) NOT NULL";
mysqli_query($conn, $sql);

// Add current event's time_intervals
$cur_time = new DateTime('18:30');
$end_time = new DateTime('22:00');
$cur_start_time = $cur_time->format('H:i');
$cur_time->modify("+" . $time . " minutes");
$cur_end_time = $cur_time->format('H:i');
while ($cur_time <= $end_time){
    $sql = "INSERT INTO time_intervals (time_interval, event_name) VALUES ('" . $cur_start_time . "-" .
$cur_end_time . "','" . $event . "')";
    mysqli_query($conn, $sql);
    $cur_time = new DateTime($cur_start_time);
    $cur_time->modify("+30 minutes");
    $cur_start_time = $cur_time->format('H:i');
    $cur_time->modify("+" . $time . " minutes");
    $cur_end_time = $cur_time->format('H:i');
```

```php
// Data From student.php
$chosen_time_interval = $_GET['chosen_time_interval'];
$prefer_time = $_GET['prefer_time'];
$name = $_GET['name'];
$event = ""

// Check whether the name entered is in the student_name and whether the name has been entered before
$valid_name = False;
$not_entered_before = False;

$sql = "SELECT student_name FROM students";
$result = mysqli_query($conn, $sql);
while ($row = $result->fetch_assoc()) {
    if ($row['student_name'] == $name){
        $valid_name = True;
        $sql = "SELECT " . $event . " FROM students WHERE student_name = '" . $name . "'";
        $result= mysqli_query($conn, $sql);
        if ($result->fetch_assoc()[$event] == '0'){
            $not_entered_before = True;
        }
    }
}

if ($valid_name == False){
    echo "You didn't enter a valid name.";
}
else if ($not_entered_before == False){
    echo "The name has been entered before.";
}
// Update current student's appear time
else {
    $sql = "UPDATE students SET " . $event . " = 1 WHERE student_name = '" . $name . "'";
    mysqli_query($conn, $sql);

    // Update current time interval's chosen_times from multiple chosen_time_interval
    foreach ($chosen_time_interval as $one_interval){
        $sql = "SELECT chosen_times FROM time_intervals WHERE event_name = '" . $event . "' AND time_interval =
'" . $one_interval . "'";
        $result = mysqli_query($conn, $sql);
        $new_chosen_time = strval($result->fetch_assoc()['chosen_times'] + 1);
        $sql = "UPDATE time_intervals SET chosen_times = " . $new_chosen_time . " WHERE event_name = '" .
$event . "' AND time_interval = '" . $one_interval . "'";
        mysqli_query($conn, $sql);
    }

    // Update current time interval's chosen_times from the only prefer_time
    $sql = "SELECT chosen_times FROM time_intervals WHERE event_name = '" . $event . "' AND time_interval = '"
. $prefer_time . "'";
    $result = mysqli_query($conn, $sql);
    $new_chosen_time = strval($result->fetch_assoc()['chosen_times'] + 2);
    $sql = "UPDATE time_intervals SET chosen_times = " . $new_chosen_time . " WHERE event_name = '" . $event .
"' AND time_interval = '" . $prefer_time . "'";
    mysqli_query($conn, $sql);

    echo "The data has been updated successfully! Thank you!";
}
```

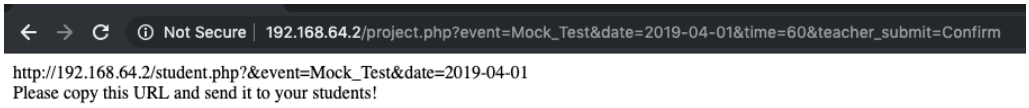
Now, as the information of an event is submitted from the teacher webpage, the corresponding columns and values will be created in the database. Also, students can vote in the student webpage with a proper name or the webpage will show, “You didn’t enter a valid name.” If the

name of the student has been entered before, the webpage will show, “The name has been entered before”, avoiding multiple votes from the same student.

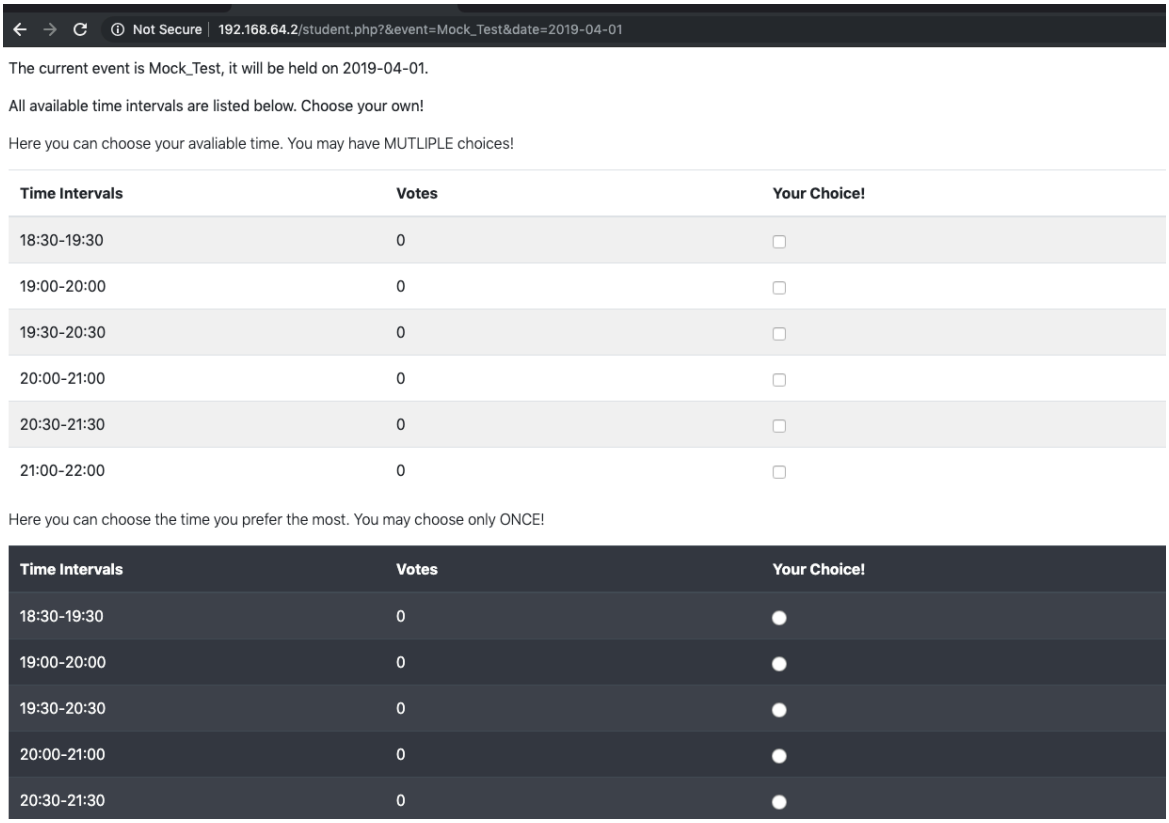
However, the student webpage still cannot automatically recognize and show which event the student is voting for. I have to assign the event name in the PHP file manually. Hopefully, this will be completed in the next step.

Step 9

After further discussion with advisor Chen, I realize that using the event name as a URL parameter of the student webpage can solve this problem perfectly. The URL of my student webpage has been http://localhost/student.php. For instance, if I have an event named “Mock_Test”, I can then change the URL to http://localhost/student.php?&event=Mock_Test. Then inside the “student.php” I can use the HTML “get” method to access the event name “Mock_Test”, thus the webpage can then get and handle the corresponding information about “Mock_Test” from the database. I have also decided to add the date as an URL parameter so that I can show it in the student webpage. Here is the result after implementation. After entering “Mock_Test”, “2019-04-01”, “60” in the teacher webpage, the URL of the student webpage with “Mock_Test” and “2019-04-01” as a parameter is shown automatically.



When students open this URL on their browser,



the information about “Mock_Test” would be listed as shown in the figure. Now, the system prototype has been completed, and the next step would be collection of feedbacks from students and teachers.

Testing

In this step, I publish my webpages to all teachers and students in school. Advisor Chen offers me his domain so that everyone can access my webpage. After putting into practice for two weeks and making sure that every teacher has used my webpages to arrange at least one event and every student has used them to vote, I receive excellent feedbacks. Teachers say that my webpages really save them a lot of time, relieving them from their busy day. More specifically,

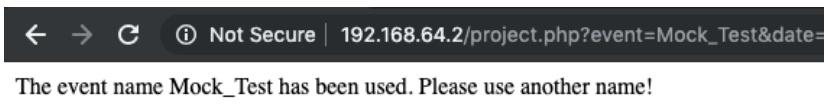
using my system, it takes teachers at most 2 minutes to arrange an event, which is a significant improvement as it takes them at least 15 minutes going class by class gathering opinions before. Students, surprisingly, also claim that my webpages have solved a problem that has bothered them for a long time. Usually, when a teacher comes to arrange an event in a class, not every student is present, and few of them speak out. Therefore, the results are always biased by the few. However, with my webpages, everyone has a fair chance to present his/her opinion and can always get a result that most of the students are satisfied with.

Except for the positive feedbacks, I also receive some improvement suggestions:

1. The event name should not be allowed to be the same with a former one; otherwise, the votes will be confusing;
2. If the event name contains space, the webpages will not work properly due to the restriction in MySQL database;
3. If the date of one event has passed, it should be deleted by the database automatically since it is useless.

Improvements

I fix the problems listed above. Each time when a new event is created, the program will check whether the same name is present in the database or not. If so, the following error message will display:

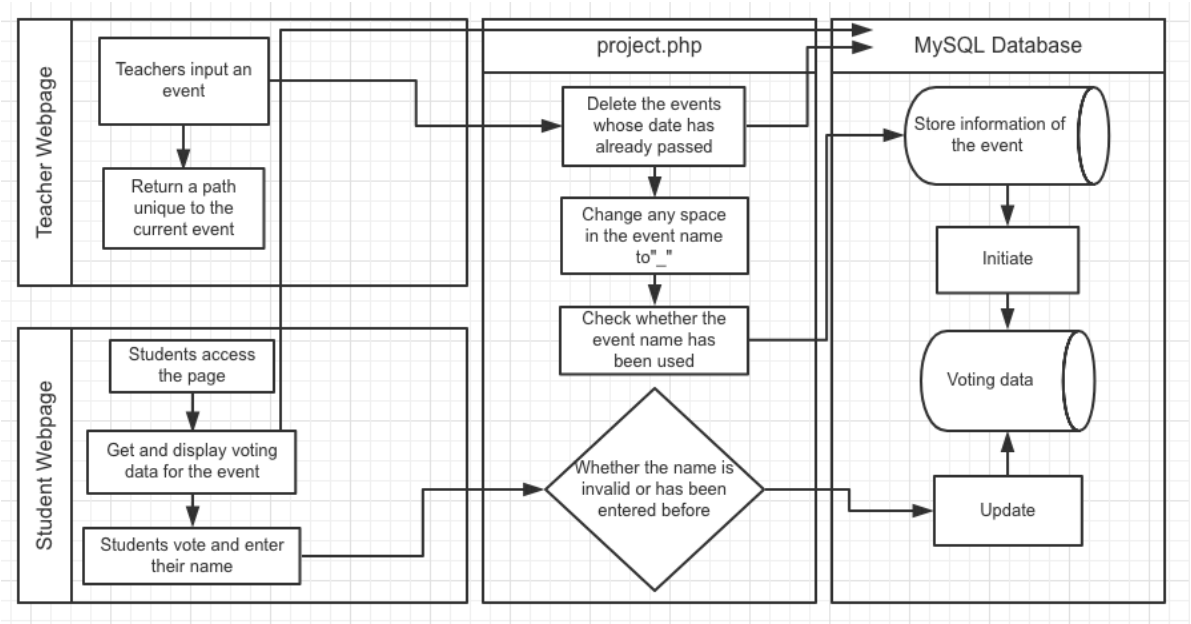


Also, whenever a name with space is entered, the program will automatically convert the space to "_" by methods of string in PHP.

For the final improvement, each time when a new event is created, the program will first check all of the events in the database. If the date of a certain event has already passed, all the information about this event will be deleted. Here is the implementation.

```php
// Delete the events whose date has already passed
$sql = "SELECT event_name, date FROM time_intervals";
$result = mysqli_query($conn, $sql);
while ($row = $result->fetch_assoc()) {
    $event_name = $row['event_name'];
    $event_date_str = $row['date'];
    $event_date = new DateTime($event_date_str);
    $date_default_timezone_set('Etc/GMT-8'); // set to the timezone in China
    $cur_date_str = date('Y-m-d', time());
    $cur_date = new DateTime($cur_date_str);
    if ($event_date < $cur_date){
        $sql = "DELETE FROM time_intervals WHERE date='" . $event_date_str . "'";
        mysqli_query($conn, $sql);
        $sql = "ALTER TABLE students DROP `" . $event_name . "`";
        mysqli_query($conn, $sql);
    }
}
```

Here is a flow chart for the final procedures.



Evaluation

It has been a very interesting and meaningful process producing my project. I have learned much from it, including planning and organizing a whole project, recording my progress each week, researching for relevant techniques, and learning to write an essay.

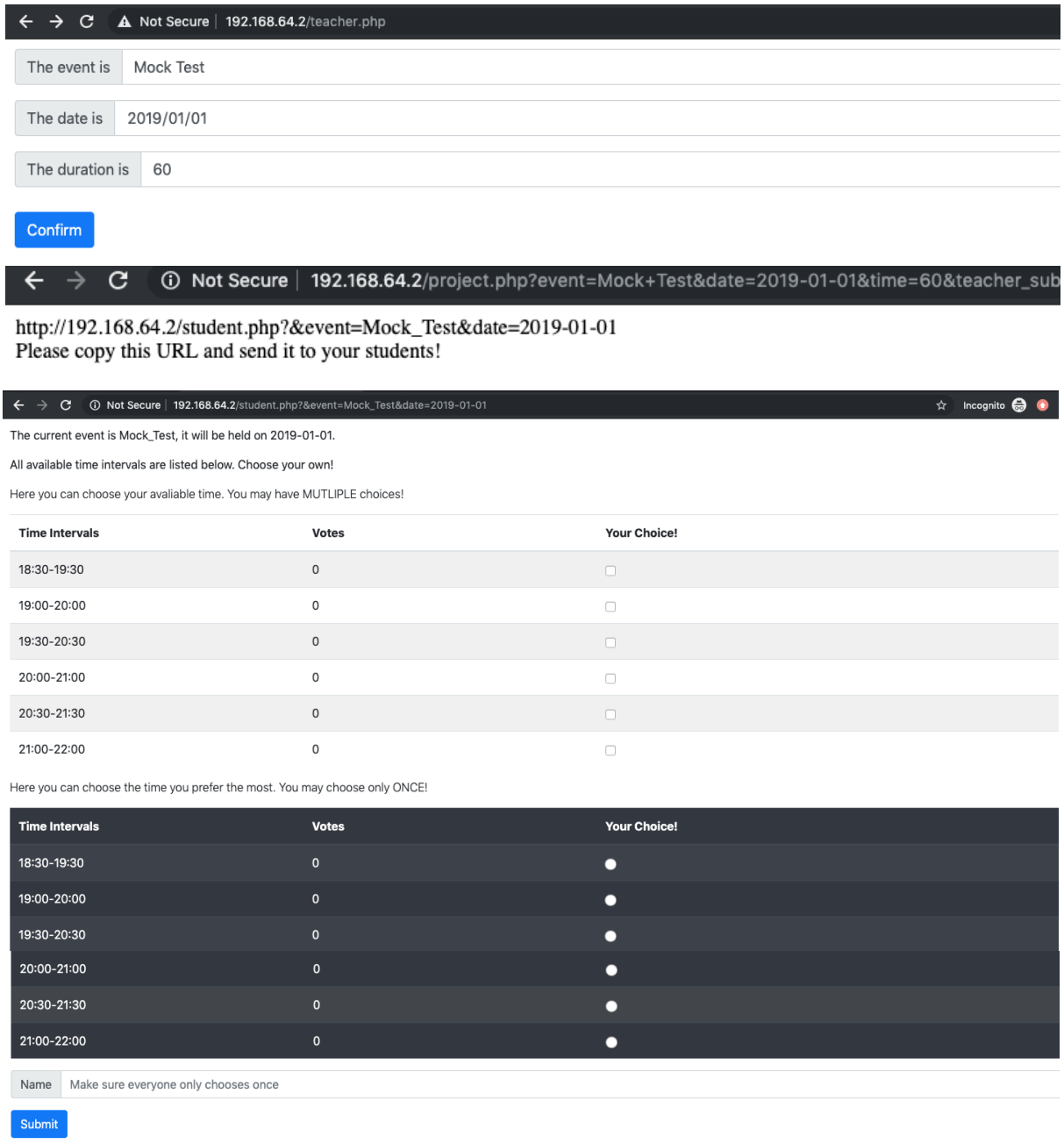
I have also considered some possible future developments. As I realized how useful my product is to the whole school, I am considering that this can be a good start of my future web application system. Many projects that will contribute to the teachers and students can be achieved by the similar techniques I have learned this time, such as:

1. Checking class attendance;
2. Scheduling meetings during office hours;
3. Auto grading and ranking students' answers from tests;
4. A webpage presenting school curriculums and campus to others;
5. A course scheduling system;
6. An online GPA calculating and summarizing system.

I hope that I can implement and combine all of these projects into a website and put it into use. To this end, I must keep learning related programming techniques in the following months. I am planning to spend at least 3 hours on my future project each week. I am sure that every single teacher and student in my school can benefit from it!

Final Product

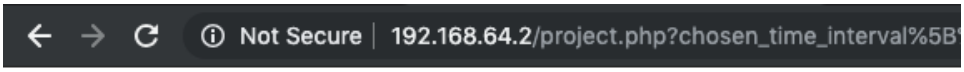
http://jinsoft.eicp.net:8081/teacher.php



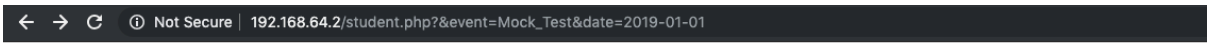
18:30-19:30	0	☑
19:00-20:00	0	☐
19:30-20:30	0	☑
20:00-21:00	0	☑
20:30-21:30	0	☐
21:00-22:00	0	☐

Here you can choose the time you prefer the most. You may choose only ONCE!

Time Intervals	Votes	Your Choice!
18:30-19:30	0	○
19:00-20:00	0	◉
19:30-20:30	0	○



The data has been updated successfully! Thank you!



The current event is Mock_Test, it will be held on 2019-01-01.

All available time intervals are listed below. Choose your own!

Here you can choose your avaliable time. You may have MUTLIPLE choices!

Time Intervals	Votes	Your Choice!
18:30-19:30	1	☐
19:00-20:00	2	☐
19:30-20:30	1	☐
20:00-21:00	1	☐
20:30-21:30	0	☐
21:00-22:00	0	☐

Here you can choose the time you prefer the most. You may choose only ONCE!

Time Intervals	Votes	Your Choice!
18:30-19:30	1	○
19:00-20:00	2	○
19:30-20:30	1	○
20:00-21:00	1	○
20:30-21:30	0	○

References

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