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Timetable Web-based System

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Report of Project

Timetable Web-based System

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Individual Contribution:

Yuan Yuan:

- Visit schools and get the requirement of administrative teachers
- Design System Function Modules
- Install Apache server and configure PHP
- Design Database and build Database system
- Connect Web and server with PHP

Abstract

Timetable generation system is a hot issue in education industry. Whether the system is efficient or not has an impact in the time of generation or the quality of results. Many open source existing timetable system settles the basic requirements of schools. However, drawbacks cannot be neglected because teachers may not tend to use the system if they are hard to learn and takes great effort. A good system meet the requirements of most schools.

The project focuses on three main aspects, user-friendly interface, good usability and efficient algorithm. To achieve these, advanced methods such as HTML5 and CSS3 are used in Web development, genetic algorithm idea and good evaluation function based on different constraints is applied in the implementation. The best result is produced after many times of iterations. The idea is advanced because it is flexible for future expansion.

With the advanced design of the system, generating a timetable that meets expect is quite fast and efficient. What is more, it has a desirable user experience in operating the system and managing data.

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1. Introduction

Arrangement of timetable takes place in every semester and in every school.

The burden of this job cannot be ignored because it takes great efforts of academic staff. In our interview with these school teachers, we get to know that they spend plenty of time in generating a non-conflicted and appropriate timetable. Most of the work is still done by human hands, without the help of Software or Web-based system.

A desired Web-based timetable system is aimed at helping teachers in school to arrange class timetable more easily. Teacher only need to input basic information, and both the teacher and student timetable will be generated.

Background research has been done to get deeper knowledge of timetable generation system on market. Some are not user-friendly, making it quite hard to spread out. Some operations are too difficult to understand, having to watch a long video to learn how to use this system. Some are not able to do manual adjustment. The one without all these drawbacks are quite expensive.

Thus, the meaning of this project is to develop a user-friendly, logic-friendly and efficient system to generate timetable. Besides, it should also allow user to do adjustment after the generation, which greatly enhances the performance and user experience.

Our three main goals are focused on how to develop a user-friendly interface, a rational structured database and an efficient and elegant algorithm.

The report is composed by seven parts. It first introduces the background research at the beginning of the project, which states the types of and existing timetable generation system in details. Then it comes the investigation approach. Two main approaches are adopted in this project, that is, interview and document analysis. What is more, the system structure and logic is clearly specified. Since the writer of the report is in responsible of database construction and php implementation, these two parts are focused in the fifth and sixth part.

Furthermore, due to the team size and time limit, there are some useful features that can be applied in the next version of this system, which is discussed in the conclusion at the end of the paper.

2. Background Research

To generate timetable, there are two layers of requirements, generally. First, there are no conflicts in the overall timetables, which indicates that, one class cannot have two courses in one time slot, and one teacher cannot give lectures in two class in one time slot. Another layer is more strict. It requires that the timetable is reasonable, the underlying definition of reasonable varies according to different academic arrangement. It is probably not a reasonable timetable if four Chinese courses are arranged in one day, with three other days no Chinese at all.

2.1 Three Types of Timetable Generation System

In general, there are three types of timetable generation system. First, manual arrangement, which asks the user to generate timetable by drag and drop. Even though it is flexible, extremely, but this kind of system leads the user to confusion because of conflict timetable relationship. One drag might cause multiple conflicts, and solving one conflict may cause another multiple conflicts. Another kind of arrangement is automatic generation. The advantage is fast speed, and avoiding conflicts intelligently. However, its disadvantage is also obvious. Even the user is not satisfied with the outcome, he cannot make any adjustments manually. Here comes the third kind of timetable generation system. It combines the the advantages of the first and second kind. After generating a non-conflict and acceptable timetable, it allows the user to do adjustment, if the user is not content with some of the arrangement. However, the difficulty is the highest among three kinds of timetable generation system due to its high level intelligence. [1]

2.2 Popular Timetable Generation Systems

2.2.1 Crystal Timetable Generation

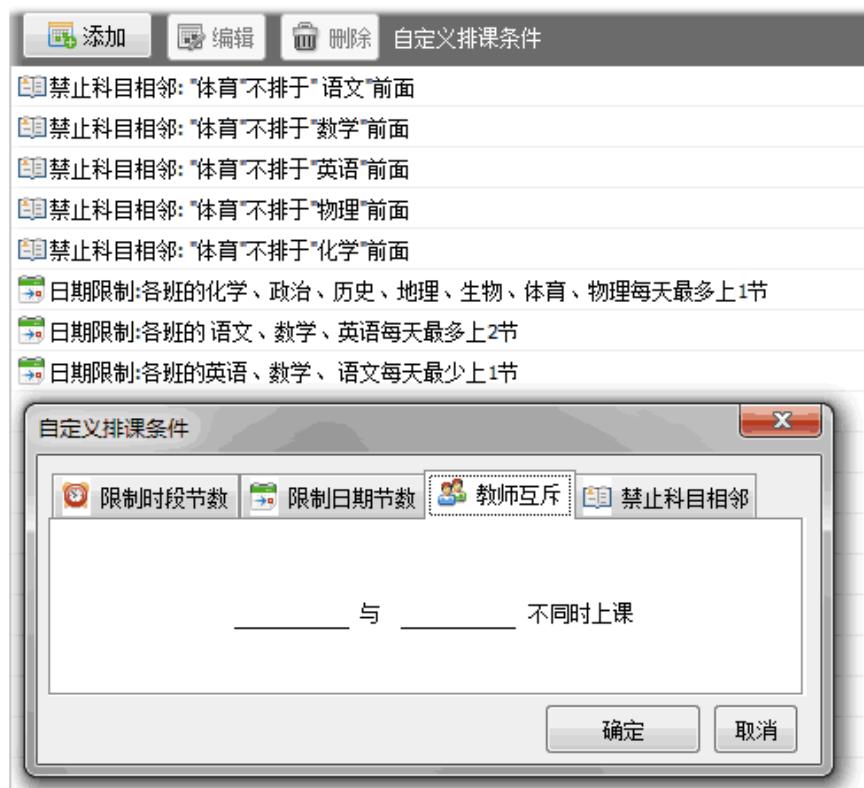


FIGURE 2-2-1-1 CRYSTAL TIMETABLE SAMPLE I



FIGURE 2-2-1-2 CRYSTAL TIMETABLE SAMPLE II

序号	科目全称	简称	三年	四年	五年	六年
1	思想品德	思	2	1	1	1
2	语文	语	5	6	5	5
3	作文	作	2	2	2	2
4	数学	数	4	6	6	6
	总计		13	16	14	14

FIGURE 2-2-1-3 CRYSTAL TIMETABLE SAMPLE III

Advantage: It supports both the manual input and excel import. This input diversity makes system more applicable and flexible. And it has some adorable constraints, to cater on school's detailed needs.

Disadvantage: The interface is rigid and not user friendly enough. The way of setting is complicated.

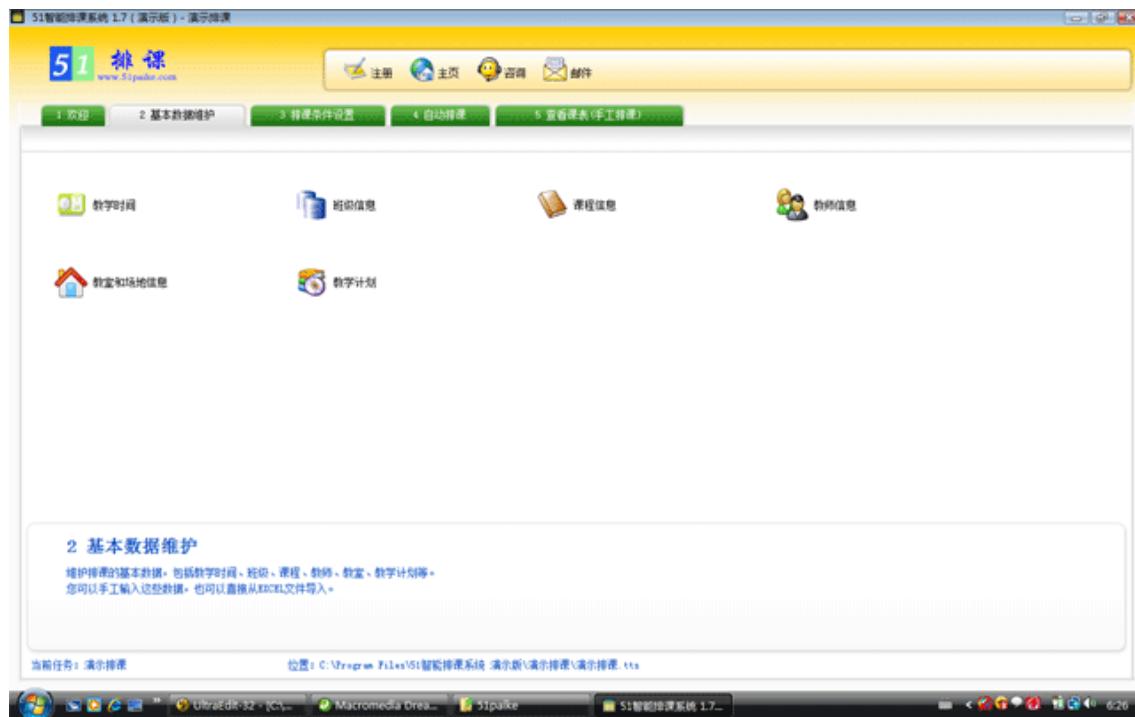


FIGURE 2-2-1-4 51PAIKE SAMPLE I



FIGURE 2-2-1-5 51 PAIKE SAMPLE II

Advantage: The information is very well structured. Rules and constraints are abundant. Disadvantage: The structure is quite complex and plenty of information need to be input.

2.3 System Feasibility Analysis

The Web-based Timetable Generation system uses MySQL, PHP, JavaScript, HTML and JSON technology.

The following is the introduction of these technology.

2.3.1 PHP

PHP is server side language, cross-platform and embedded scripting language. Server-side property indicates its flexibility in dynamic webpage. And, it is supported at several popular operation system, including Linux, UNIX and Windows. Furthermore, it is object-oriented programming language, which supports MySQL, Oracle, Sybase databases.[2]

Because of these advantages of PHP, it is adopted in our system development. The goal of the web-based system is to be applicable to many school users.

2.3.2 MySQL Database

MySQL is one of the most popular open source database. It is cross-platform, and has independent storage engine, advanced privilege setting, and high level of security property. What is more, it is high performance, multithreading, multi-users and client-server based.[3] Famous for its flexibility, usability, security and low cost, it is widely spread in commercial, education, science and engineering.

2.3.3 Javascript

As an interpreted scripting language, it is usually used as embedded language in HTML to enhance interactivity of webpage.[4] In the web-based system, it responses to the events in HTML, to better support database operation and webpage display.

2.3.4 HTML5

As a more advanced language than HTML, it is of privilege in terminals. Its new features include cross platform, multi-resolution supporting, and easy version management. These advantages make it is desirable in this age of embracing mobile internet.[5] Thus, it is anticipated that our application can be used in many kinds of feasibilities.

2.3.5 CSS3

CSS3 is an advanced version of CSS, which enhances modularisation. It decomposes a big module into smaller ones. It is professional in making the webpage more desirable and beautiful. Some of the realisation which is quite complicated in CSS is much easier using CSS3.[6]

2.3.6 JSON

Json, which is Javascript Object Notation, is a light-weighted language that enables better data exchange. One on hand, it is of better human-reading experience. On the other hand, it makes the machine-reading and processed easier. In this system, it is used in processing output of algorithm for the later step of checking and adjustment.

2.3.7 APACHE

Apache HTTP Server is the most popular Web server software around the world. It is famous for its fast speed, stability, cross-platform property and security.[7] Thus, it is most widely used. The market share of APACHE reaches 60% over the world.

3. Investigation Approach

3.1 Interview

Interview plays an important role in our system development. In order to make our system fulfils practical needs, it is significant to know the current situation in arranging class table, so that the users' requirements can be deducted.

Having paid visits to some middle school, we get basic understanding of how the timetable arrangement is done currently. Timetable for each class and each teacher are spread in front of man. Each time he fills in a time slot for a subject in a class timetable, he also fills in the corresponding time slot for the teacher timetable who is teaching this subject. Every time when he comes across conflicts, he tries the rest of slots. If conflicts come up again and again, this work makes little progress.

When the teacher's arrangement is taken into account, the teacher states that in most of cases, teachers have no saying in their timetable. Besides extreme case, they are supposed to accept the arrangement by the administrative office, even though they have dislike patterns in their timetable. This settles part of system's input design, because the special cases or pre-settings for teachers do not have to appear.

It is also pointed out that, there may be no arrangements on one of the mornings or afternoons, for students to get rest or develop personal interests. The plan varies in different schools, which indicates that people need to preset the time slots that are not supposed to arrange classes.

3.2 Document analysis

In our project, document analysis involves examining existing data, documentations and official data on websites of schools.

Data, such as time schedules and school basic information are collected from 2 primary schools (Kwok Man School and The Salvation Army Ann Wyllie Memorial School) and 3 secondary schools (Buddhist Mau Fung Memorial College, S.K.H. Li Ping Secondary School and QESOSA Tong Kwok Wah Secondary School) in Hong Kong and make some comparisons. The result is shown as follow:

Primary School:

School		Kwok Man School	The Salvation Army Ann Wyllie Memorial School
School Link		http://www.cckms.edu.hk/	http://www.annwyllie.edu.hk/
Course	Subject	Chinese(Lecture, Writing, Dictation, Reading, Phonics, idiom, tutoring); English (General English, Dictation, Phonics, Grammar, Listening and Speaking, Reading, Writing, tutoring) ; Math (TSA, tutoring); Common Sense; PE; Visualized Art; Music.	Chinese(Lecture, Writing); English (General English, Writing) ; Math; Common Sense; Mandarin; PE; Visualized Art; Music; Ethics and Religion; Life Education; Library; Tutorial.
	Special arrangement	Happy reading (Only for grade 1 & 2 students); Mandarin (Only for grade 5 & 6 students).	N/A
	Regular Class	Early Meeting (First Event of Everyday - 10 Mins) Head Teacher Class (Right after Early meeting - 15 Mins) Multiple Intelligences Lesson (Every Wednesday 5,6,7,8)	Early Meeting (First Event of Everyday - 10 Mins) Head Teacher Class (Right after Early meeting - 15 Mins) Extracurricular Activities (Every Friday 8,9)
Day		Mon. - Fri. 8:50 - 16:30	Mon. - Fri. 8:15 - 15:30
Class Distribution		Morning : 4 Afternoon : 5 Total : 9	Morning : 6 Afternoon : 3 Total : 9
Time Distribution		45 mins per class No. 1 - 4 30 mins per class No. 5 - 7 45 mins per class No. 9	35 mins per class No. 1 - 9
Respite		15 mins (Total 30 mins) once in morning and once in afternoon	25 mins Between the third and the fourth class in the morning
Lunch		40 + 20(rest) mins	60 + 10(meeting) mins

FIGURE 3-2-1 DOCUMENT ANALYSIS OF PRIMARY SCHOOL

Secondary School:

School		Buddhist Mau Fung Memorial College	S.K.H. Li Ping Secondary School	QESOSA Tong Kwok Wah Secondary School
School Link		http://www.bmf.edu.hk/	http://liping.edu.hk/	http://www.tkwss.qesosa.edu.hk/
Form 1,2,3	Subject	Chinese, Math, English, Science, Society, PE, Art, Buddhism, Visual Music, Mandarin, Compuert, Chinese History, Design and Technology / Housekeeping	Chinese, Chinese History, computer, Design and Technology, GAP. Housekeeping, IH, Math, Mandarin, Religion, Science	CHI,ENG,CL, MTH, HEC,GEO, PTH,H&C, VA,MUS,PE
	Special Arrangement	Business; Economy (Only for Form 3 students)	First Tem: Music Second: Visual & Art	N/A
	Regular Class	Early Meeting: 8:10-8:35 Synthetical Practical Activity Curriculum: Every Friday 7,8,9,10; Tutorial : 16:00-16:45; Head Teach Tutorial : 16:45-17:00.	Early Meeting: 8:10-8:45	Morning Assembly & Reading (every Mon. and Thu. BFC*+1), CT Period(every Tue., Wed., Fri. BFC), PSHE (every Wednesday 7, 8, 9) *BFC=before class
Form4 ,5,6	Subject	X1,X2; Common Sense; English; Chinese; Math; Buddhism; PE. X1,X2 include different subjects in different grade.	X1, X2; GAP, Chinese, Math, LIBS, PE, English. X1,X2 include different subjects in different grade.	X1, X2, nCHI,ENG, MTH, BAES, LS,PE. X1,X2 include different subjects in different class in different grade.
Week		Week A/B Different timetable for different week(A/B)	N/A	N/A
Day		Mon.- Fri. 8:10-17:00	Mon.-Fri. 8:10-15:45	Mon.-Fri. 8:00-16:30
Class Distribution		Morning : 6 Afternoon : 4 Total : 10	Morning : 4 Afternoon : 2 Total : 6	Morning : 6 Afternoon : 4 Total : 10
Time Distribution		35 mins/class	55 mins/class	40 mins per class No. 1 - 9 30 mins per class No. 10
Respite		One 15 mins break and two 5 mins break	One 20 break	One 30 mins break, and one 10 mins break both in the morning
Lunch		60 mins	70 mins	70 mins

FIGURE 3-2-2 DOCUMENT ANALYSIS OF SECONDARY SCHOOL

It is found out that, most of the schools in Hong Kong have their own time schedule and course structure, which is quite different from schools in China mainland. Students in different forms have different courses to take. And, forms have different course pattern. Some of the forms have elective class of personal interests. This happens in higher forms. Besides, each school has their regular class. For example, most of them have early meeting in every morning and

most of them have Multiple Intelligences Lesson, Extracurricular Activities or Synthetical Practical Activity Curriculum course during the week and it will be arranged at the same time in every week. What is more, time circle is different for each school. There may be 5-day, 6-day or two-week cycles.

4.Design and Construction of Timetable Generation System

4.1 System Goal

- User-friendly Interface
- Clear and easy logic of input guide
- Efficient generation algorithm
- Satisfy both hard and soft constraints
- Easy and user-friendly adjustment
- Effective and comprehensible output display

4.2 Web-based System Structure

In the B/S system, user can make requests to the server. Most installation and computing is done in the server side. So, client side do not have to make complicated configuration.

It is composed of three layers.

First, Web browser assumes the job of presentation layer. It includes display logic of system. Its duty is to send requests to the server. Once its identity is validated, it can make operation calls to input, edit or delete data.

Second layer is function layer, which lies in server side. Its duty is to accept and process user's requests. It might need to get connection with database, and send request to operation on the database according to user's requests. Then it replies to the client side when the database responses.

The third layer is data layer. It lies in the database at server side. Its duty is to accept requests from the Web, and realise functions such as input new data, delete existed data, check existing data. [10]

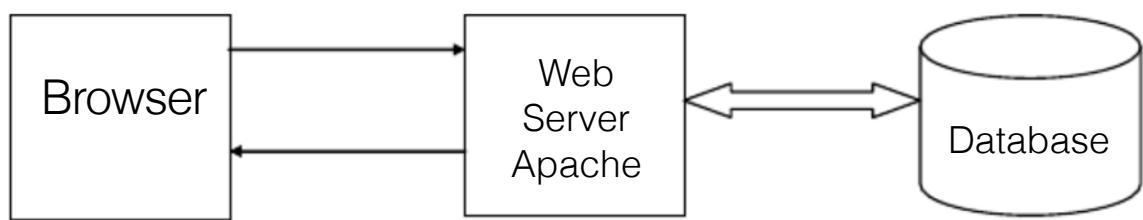


FIGURE 4-2 WEB-BASED SYSTEM STRUCTURE

4.2 System Operation Flow

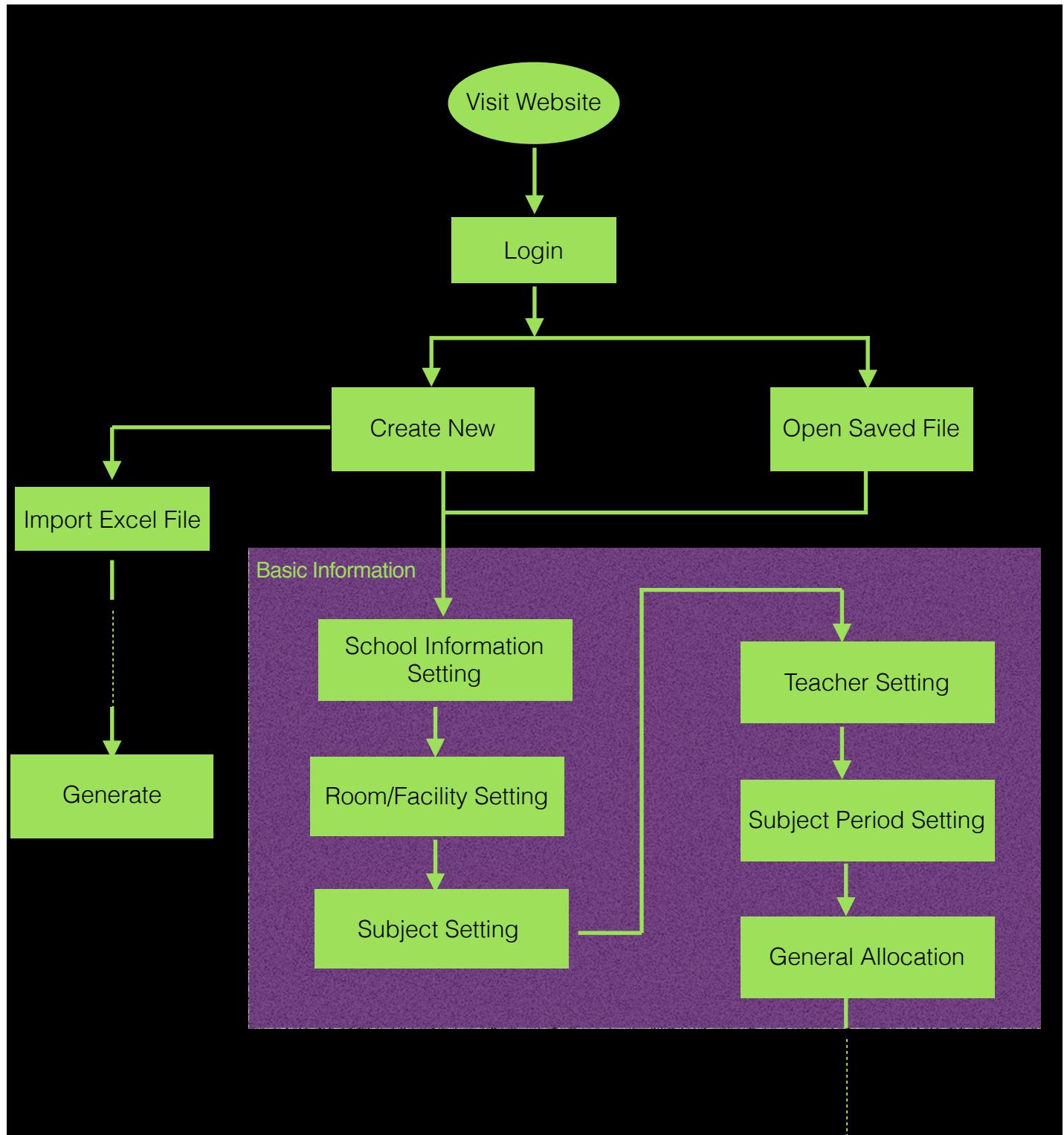


FIGURE 4-2-1 SYSTEM OPERATION FLOW I

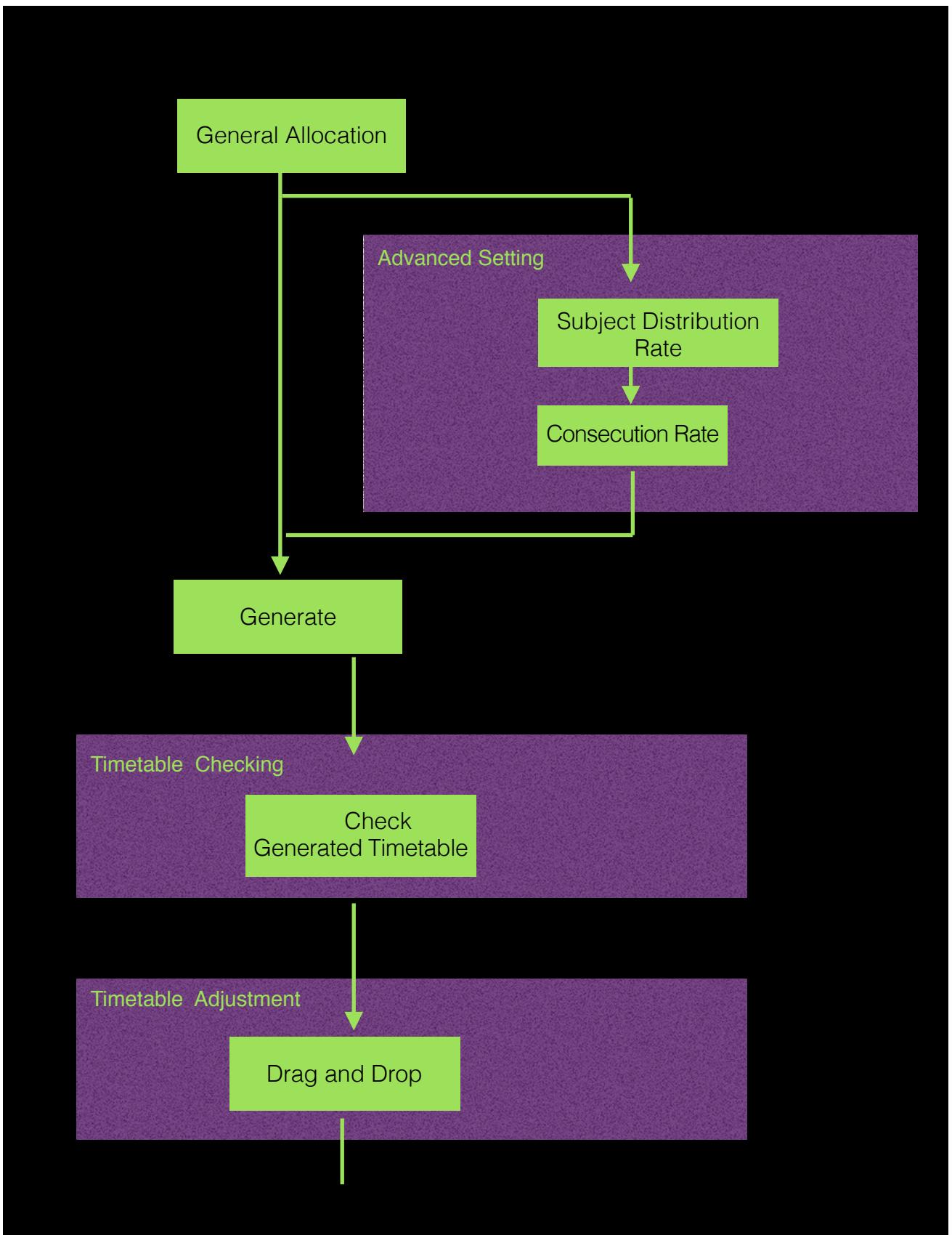


FIGURE 4-2-2 SYSTEM OPERATION FLOW II

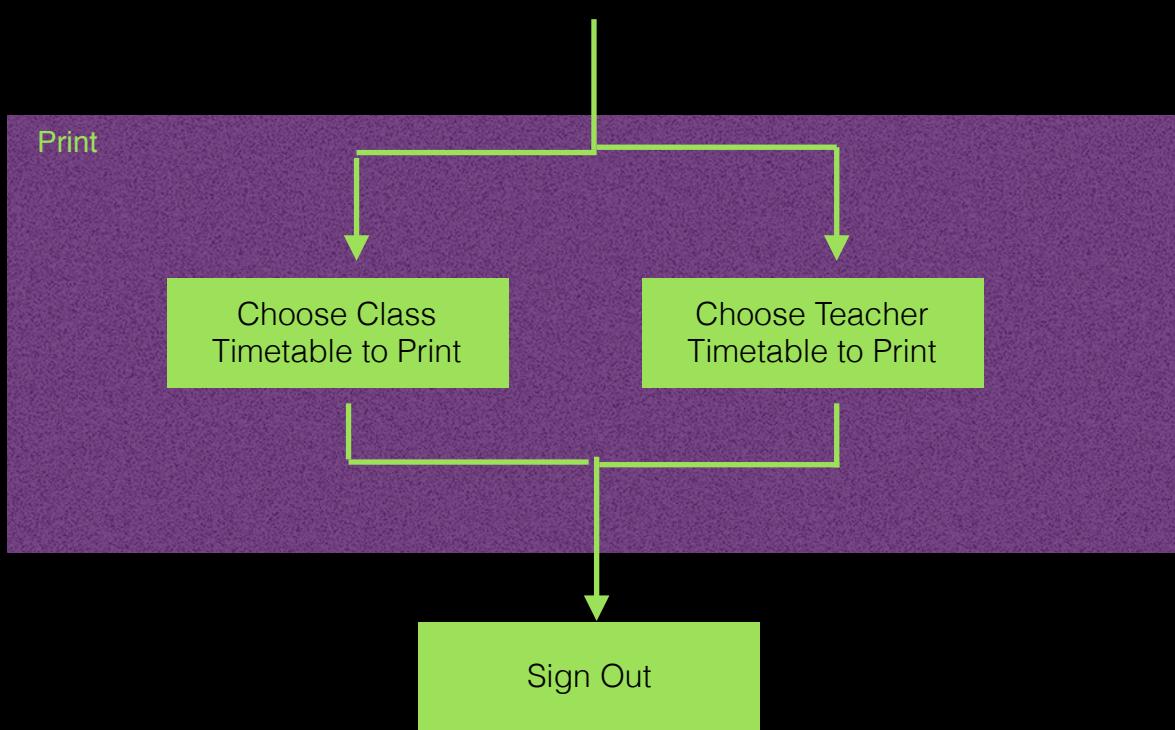


FIGURE 4-2-3 SYSTEM OPERATION FLOW III

4.3 System Function Modules

Timetable generation system is composed of five big modules.

Login Module: For users to login or register.

Input Module: For users to input school and academic information. For example, room/facilities resource, subject, and teacher and corresponding period duty.

Check Information Module: It allows users to check the generated timetable by class or by teacher.

Adjustment Module: It allows users to adjust the generated timetable by class, and the conflicts will be checked if there is any.

Output Module:

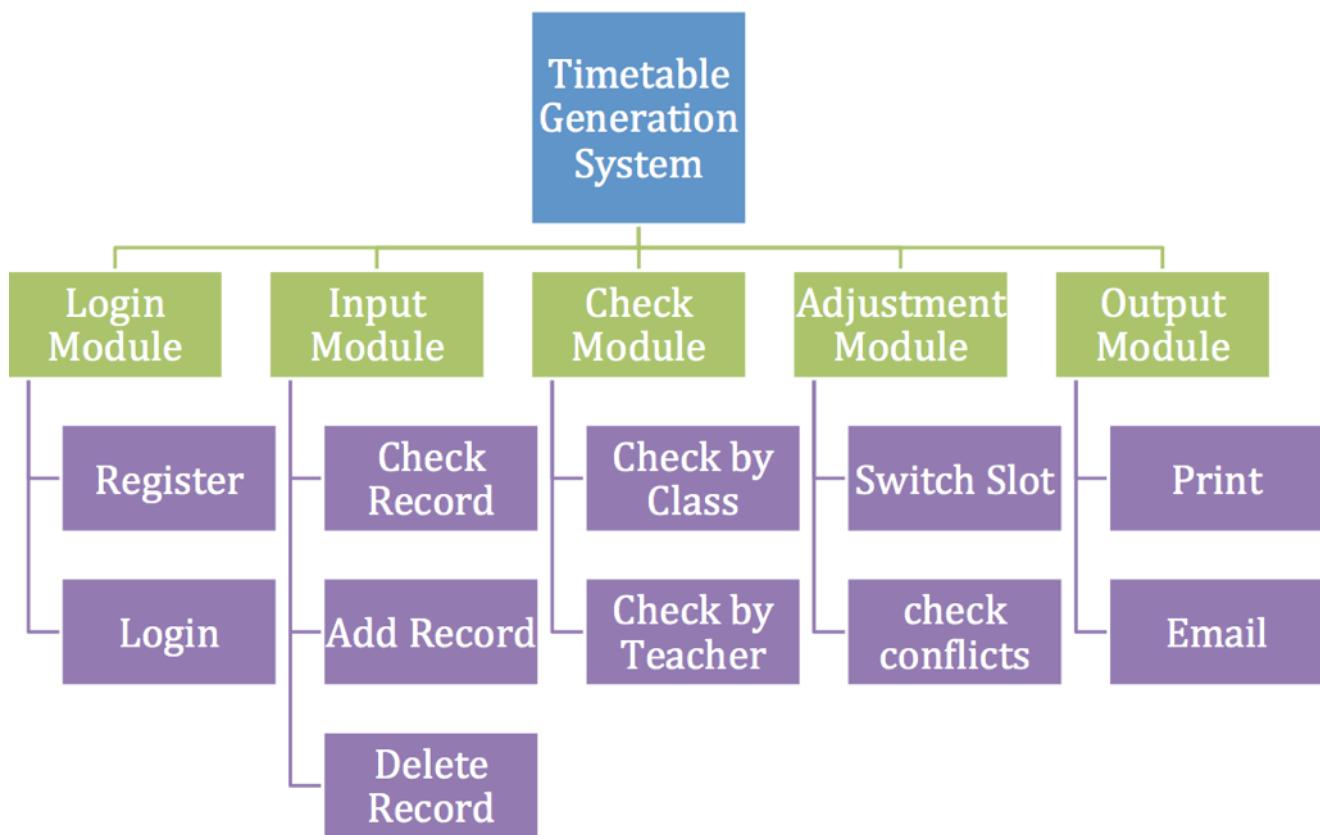


FIGURE 5-1-1 SCHOOL INFORMATION TABLE

5.Database Design

5.1 Table Design

5.1.1 School Information Table

School information Table is to store data that is corresponding to school basic information. Id is the unique key for each project. Project name is to store new project of timetable. Weekday number is to store the number of days in a week (in a cycle). Morning number is to store the number of class in the morning. Afternoon number is to store the number of class in the afternoon. Form number is to store the number of forms in school. Class number is to store the number of class in each form.

#	Name	Type	Collation	Attributes	Null	Default	Extra
1	<u>id</u>	int(11)		UNSIGNED	No	<i>None</i>	AUTO_INCREMENT
2	projectName	varchar(255)	utf8_general_ci		No		
3	weekdayNum	int(11)			Yes	5	
4	morningNum	int(11)			Yes	4	
5	afternoonNum	int(11)			Yes	4	
6	formNum	int(11)			Yes	0	
7	classNum	int(11)			No	<i>None</i>	

FIGURE 5-1-1 SCHOOL TABLE

5.1.2 Room Table

Room table is to store the facilities in school which are required by subject. Id is the unique key for each room type. Number is to store how many of this type of room are there. Max class is how many class a room can accommodate. For example, stadium may accommodate more than three or four classes at one time. In the input progress,

the room table is the first academic list because the records input here will be provided as options in the next subject table.

#	Name	Type	Collation	Attributes	Null	Default	Extra
1	id	int(11)		UNSIGNED	No	None	AUTO_INCREMENT
2	name	varchar(255)	utf8_general_ci		No		
3	num	int(11)			Yes	0	
4	max_class	int(11)			Yes	0	

FIGURE 5-1-2 ROOM TABLE

5.1.3 Subject Table

Subject Table is to store information about subjects. Id is the unique key for each subject. Name indicates subject name, for example, English writing, Chinese. Room Id is the facilities required for this subject. For example, P.E. may need playground or swimming pool. Record in subject table will be provided as options in teacher table.

#	Name	Type	Collation	Attributes	Null	Default	Extra
1	id	int(11)			No	None	AUTO_INCREMENT
2	name	varchar(255)	utf8_general_ci		No		
3	room_id	int(11)			No	0	

FIGURE 5-1-3 SUBJECT TABLE

5.1.4 Teacher Table

Teacher table is to store staff information. Id is the unique identity for each teacher. Name is the name of teacher. Subject id is the subject that the teacher is responsible for. For example, id=“1020”, name=“Chan Tai Man”, subject_id=“2” which 2 indicates

English in Subject table. Record in teacher table will be provided as options in general table.

#	Name	Type	Collation	Attributes	Null	Default	Extra
1	id	int(11)			No	None	AUTO_INCREMENT
2	name	varchar(255)	utf8_general_ci		No		
3	subject_id	int(11)			No	0	

FIGURE 5-1-4 TEACHER TABLE

5.1.5 Period Table

Period Table is to store the workload of each subject in each form. Id indicates the unique period record. Subject id is the representation of subject in subject table. Period represents the workload of a particular subject in this form. For example, id=“1”, subject_id=“3” (English e.g.) form=“2” period=“4”. This means that form 2 has English 4 times (slot) a week.

#	Name	Type	Collation	Attributes	Null	Default	Extra
1	id	int(11)		UNSIGNED	No	None	AUTO_INCREMENT
2	subject_id	int(11)			No	0	
3	form	int(11)			No	0	
4	period	int(11)			No	0	

FIGURE 5-1-5 PERIOD TABLE

5.1.6 General Table

General table is to store the detailed information. For example, form=“1” class=“1” subject_id=“3” (English e.g.) period=“4” teacher_id=“2” (Chan Tai Man) room_id=“3” (English Room e.g.)

It means form 1 class 1 has English class 4 times a week, taught by Chan Tai Man. And it requires English room.

	#	Name	Type	Collation	Attributes	Null	Default	Extra
	1	form	int(11)			No	0	
	2	class	int(11)			No	0	
	3	subject_id	int(11)			No	0	
	4	period	int(11)			No	0	
	5	teacher_id	int(11)			No	0	
	6	room_id	int(11)			No	0	

FIGURE 5-1-6 GENERAL TABLE

5.2 Relation Diagram

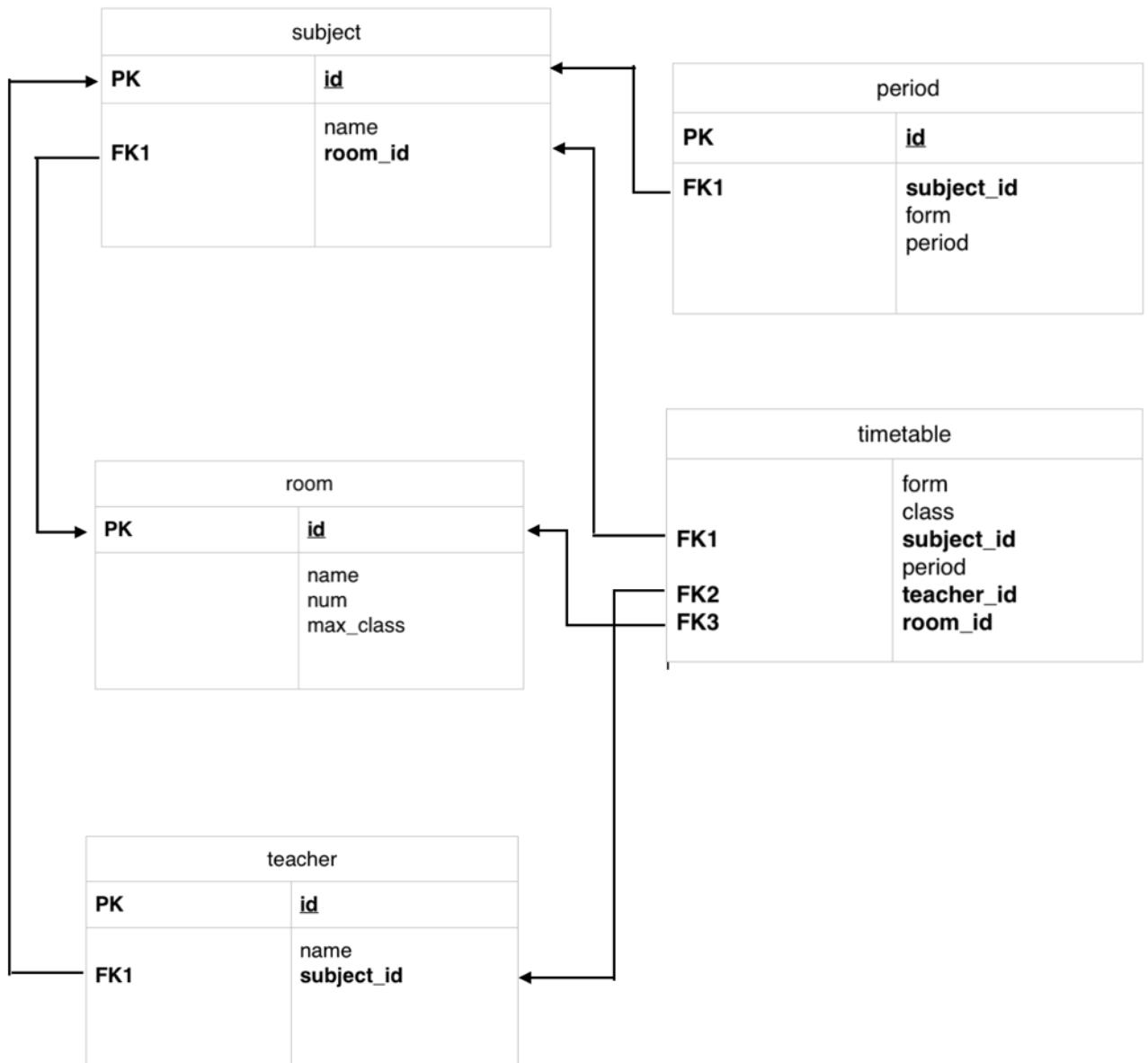
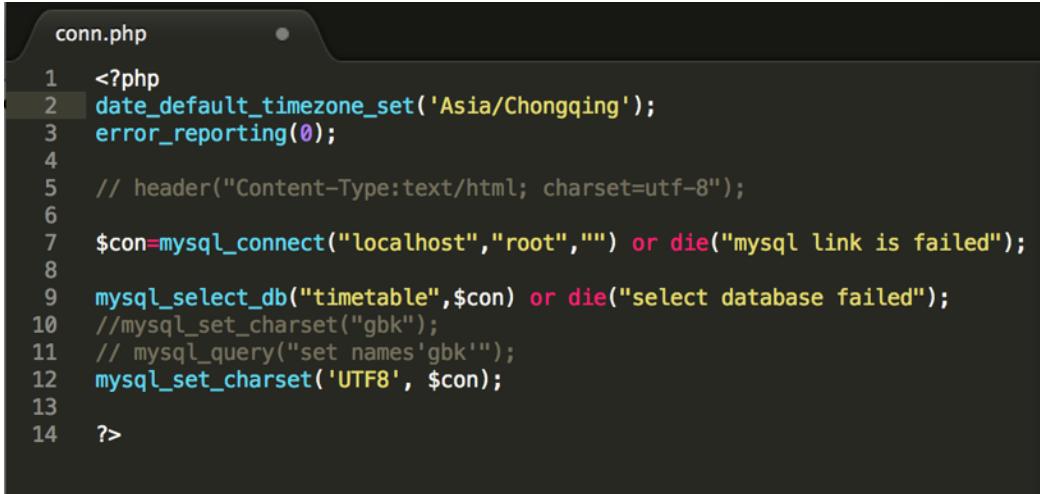


FIGURE 5-2 RELATION DIAGRAM

6.Implementation

6.1 Database Connection

- **conn.php** is responsible for getting connection with database. First check whether the address of database, user name and password are correct or not. If connected, go and get connected with timetable database. If not succeed, hints will come up.



```
conn.php
1 <?php
2 date_default_timezone_set('Asia/Chongqing');
3 error_reporting(0);
4
5 // header("Content-Type:text/html; charset=utf-8");
6
7 $con=mysql_connect("localhost","root","");
8 if(!$con) die("mysql link is failed");
9 mysql_select_db("timetable",$con) or die("select database failed");
10 //mysql_set_charset("gbk");
11 // mysql_query("set names'gbk'");
12 mysql_set_charset('UTF8', $con);
13
14 ?>
```

FIGURE 6-1 DATABASE CONNECTION

6.2 Add School Information

- **addschool.php** is responsible to insert new record into school info table. One record is added and return to the original page. It gets connection with database by ‘include(“conn.php”).’

```

addschool.php

1 <?php
2     include("conn.php");
3
4     if(!empty($_GET['timetablename'])){
5
6         $sqldelete="delete from info";
7         $query=mysql_query($sqldelete);
8
9         $timetable=$_GET['timetablename'];
10        $schoolday=$_GET['numberofschoolday'];
11        $morningclass=$_GET['numberofclassmorning'];
12        $afternoonclass=$_GET['numberofclassafternoon'];
13        $form=$_GET['numberofform'];
14        $class=$_GET['numberofclass'];
15
16        $sql="insert into info (id,name,weekday,morning,afternoon,grade,class)
values ('null','$timetable','$schoolday','$morningclass','$afternoonclass','$form','$class')";
17        mysql_query($sql);
18
19        $url=("../basic-info-room.php";
20        echo "<script LANGUAGE='Javascript'>";
21        echo "location.href='$url';";
22        echo "</script>";
23        echo "success";
24    }
25
26    mysql_close();
27
28 ?>

```

FIGURE 6-2 ADD SCHOOL INFORMATION

6.3 Add Room Information

- **addrroom.php** is responsible to insert new record into room table. One record is added and return to the original page. It gets connection with database by ‘include(“conn.php”).

```

addrroom.php

1 <?php
2     include("conn.php");
3
4     if(!empty($_GET['name'])){
5
6         $name=$_GET['name'];
7         $amount=$_GET['amount'];
8         $max=$_GET['max'];
9         $sql="insert into room (id,name,num,max_class) values ('null','$name','$amount','$max')";
10        mysql_query($sql);
11
12
13        $url=("../basic-info-room.php";
14        echo "<script LANGUAGE='Javascript'>";
15        echo "location.href='$url';";
16        echo "</script>";
17    }
18
19
20    else{
21        echo "Failed";
22    }
23    mysql_close();
24
25 ?>

```

FIGURE 6-3 ADD ROOM INFORMATION

6.4 Add Subject Information

- **addsubject.php** is responsible to insert new record into subject table. One record is added and return to the original page. It gets connection with database by ‘include(“conn.php”).



```

addsubject.php

1 <?php
2     include("conn.php");
3
4     if(!empty($_GET['name'])){
5
6         $name=$_GET['name'];
7         $roomid=$_GET['roomid'];
8
9         $sql="insert into subject (id,name,room_id) values ('null','$name','$roomid')";
10        mysql_query($sql);
11
12        $url=("../basic-info-subject.php";
13        echo "<script LANGUAGE='Javascript'>";
14        echo "location.href='$url'";
15        echo "</script>";
16        echo "success";
17    }
18
19    mysql_close();
20
21 ?>

```

FIGURE 6-4 ADD SUBJECT INFORMATION

6.5 Add Teacher Information

- **addteacher.php** is responsible to insert new record into teacher table. One record is added and return to the original page. It gets connection with database by ‘include(“conn.php”).



```

addteacher.php

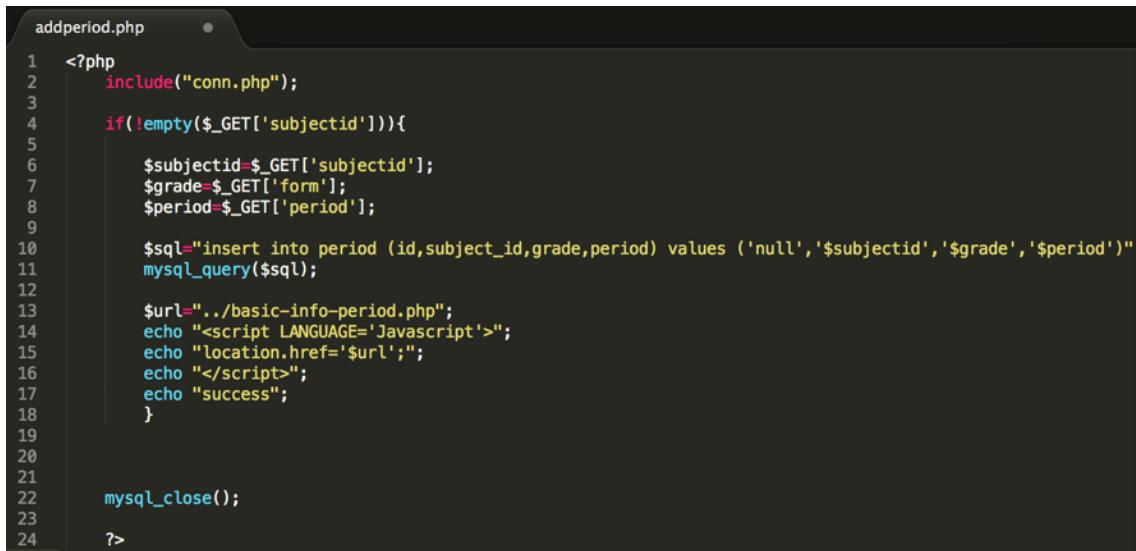
1 <?php
2     include("conn.php");
3
4     if(!empty($_GET['name'])){
5
6         $name=$_GET['name'];
7         $subjectid=$_GET['subjectid'];
8
9         $sql="insert into teacher (id,name,subject_id) values ('null','$name','$subjectid')";
10        mysql_query($sql);
11
12        $url=("../basic-info-teacher.php";
13        echo "<script LANGUAGE='Javascript'>";
14        echo "location.href='$url'";
15        echo "</script>";
16        echo "success";
17    }
18
19    mysql_close();
20
21 ?>

```

FIGURE 6-5 ADD TEACHER

6.6 Add Period Information

- **addperiod.php** is responsible to insert new record into period table. One record is added and return to the original page. It gets connection with database by ‘include(“conn.php”).



```
addperiod.php
1 <?php
2     include("conn.php");
3
4     if(!empty($_GET['subjectid'])){
5
6         $subjectid=$_GET['subjectid'];
7         $grade=$_GET['form'];
8         $period=$_GET['period'];
9
10        $sql="insert into period (id,subject_id,grade,period) values ('null','$subjectid','$grade','$period')";
11        mysql_query($sql);
12
13        $url=("../basic-info-period.php";
14        echo "<script LANGUAGE='Javascript'>";
15        echo "location.href='$url'";
16        echo "</script>";
17        echo "success";
18    }
19
20
21
22    mysql_close();
23
24 ?>
```

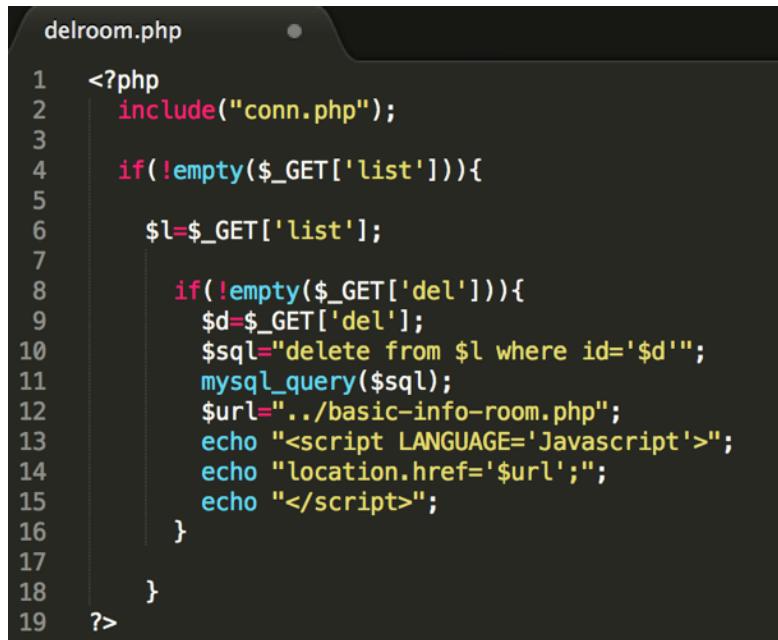
FIGURE 6-6 ADD PERIOD INFORMATION

6.7 Add General Information

The general information is organised by php in the middle layer and is appended in the appendices.

6.8 Delete Room Information

- **delroom.php** is responsible to delete room record from room table. One record is deleted and return to the original page. It gets connection with database by ‘include(“conn.php”).



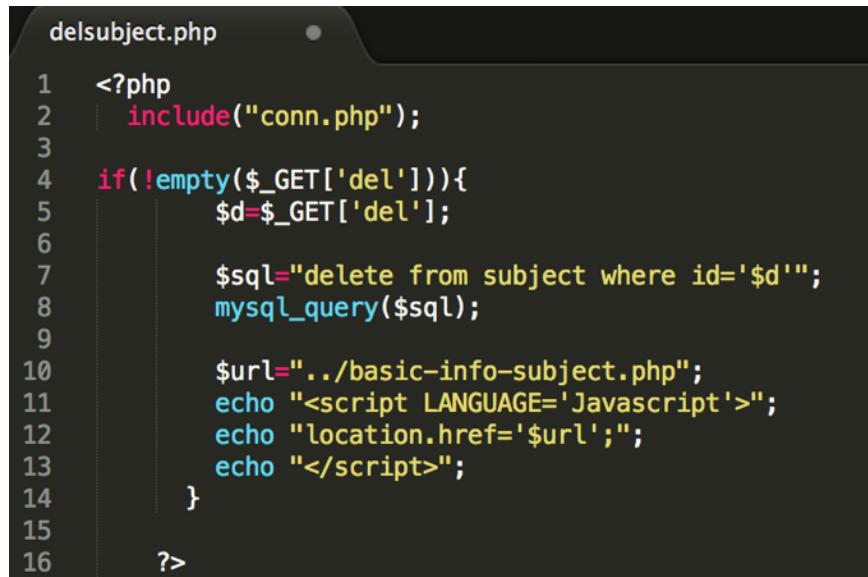
The screenshot shows a code editor window with a dark theme. The title bar says "delroom.php". The code is written in PHP and performs the following tasks:

- Includes "conn.php" at the top.
- Checks if the "list" parameter is not empty via `if(!empty($_GET['list']))`.
- If "list" is not empty, it sets \$l to `$_GET['list']`.
- If the "del" parameter is also present (`if(!empty($_GET['del']))`), it sets \$d to `$_GET['del']`.
- Creates an SQL delete query: `$sql="delete from $l where id='$d'"`.
- Executes the query with `mysql_query($sql)`.
- Creates a URL for redirection: `$url="..../basic-info-room.php";`
- Outputs JavaScript code to redirect the user: `echo "<script LANGUAGE='Javascript'>"; echo "location.href='$url';"; echo "</script>";`
- Closes the if block for "del" and the main if block for "list".
- Ends the PHP script with `?>`.

FIGURE 6-8 DELETE ROOM INFORMATION

6.9 Delete Subject Information

- **delsubject.php** is responsible to delete subject record from subject table. One record is deleted and return to the original page. It gets connection with database by ‘include(“conn.php”).

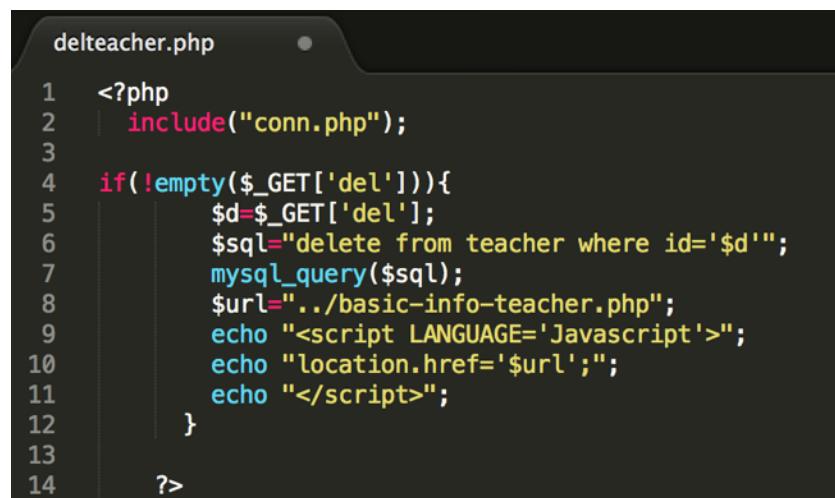


```
1 <?php
2 | include("conn.php");
3 |
4 if(!empty($_GET['del'])){
5     $d=$_GET['del'];
6 |
7     $sql="delete from subject where id='$d'";
8     mysql_query($sql);
9 |
10    $url="../basic-info-subject.php";
11    echo "<script LANGUAGE='Javascript'>";
12    echo "location.href='$url';";
13    echo "</script>";
14 }
15
16 ?>
```

FIGURE 6-9 DELETE SUBJECT INFORMATION

6.10 Delete Teacher Information

- **delteacher.php** is responsible to delete teacher record from teacher table. One record is deleted and return to the original page. It gets connection with database by ‘include(“conn.php”).’

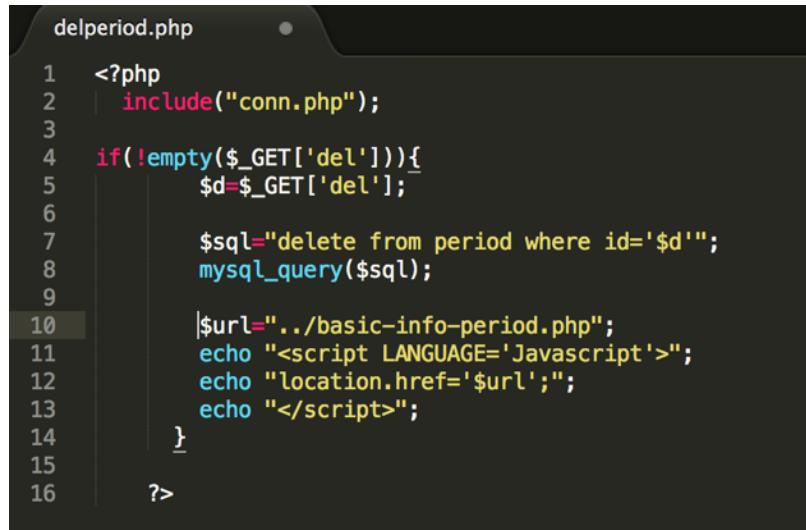


```
1 <?php
2 | include("conn.php");
3 |
4 if(!empty($_GET['del'])){
5     $d=$_GET['del'];
6     $sql="delete from teacher where id='$d'";
7     mysql_query($sql);
8     $url="../basic-info-teacher.php";
9     echo "<script LANGUAGE='Javascript'>";
10    echo "location.href='$url';";
11    echo "</script>";
12 }
13
14 ?>
```

FIGURE 6-10 DELETE TEACHER INFORMATION

6.11 Delete Period Information

- **delperiod.php** is responsible to delete period record from period table. One record is deleted and return to the original page. It gets connection with database by ‘include(“conn.php”).

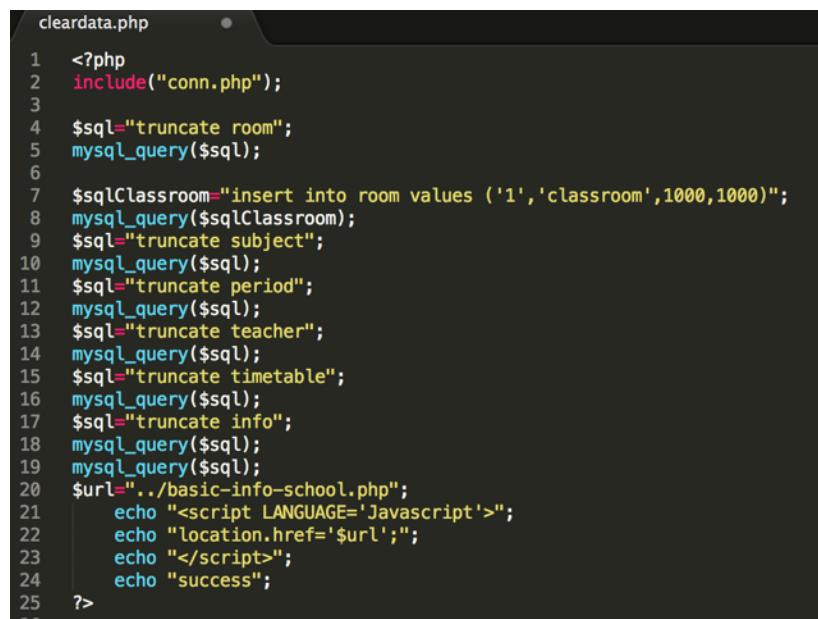


```
delperiod.php
1 <?php
2 | include("conn.php");
3 |
4 | if(!empty($_GET['del'])){
5 |     $d=$_GET['del'];
6 |
7 |     $sql="delete from period where id='$d'";
8 |     mysql_query($sql);
9 |
10 |    $url=("../basic-info-period.php";
11 |    echo "<script LANGUAGE='Javascript'>";
12 |    echo "location.href='$url';";
13 |    echo "</script>";
14 |
15 |
16 ?>
```

FIGURE 6-11 DELETE PERIOD INFORMATION

6.12 Clear Project Data

cleardata.php is responsible to clear the whole project data from database.



```
cleardata.php
1 <?php
2 | include("conn.php");
3 |
4 | $sql="truncate room";
5 | mysql_query($sql);
6 |
7 | $sqlClassroom="insert into room values ('1','classroom',1000,1000)";
8 | mysql_query($sqlClassroom);
9 | $sql="truncate subject";
10 | mysql_query($sql);
11 | $sql="truncate period";
12 | mysql_query($sql);
13 | $sql="truncate teacher";
14 | mysql_query($sql);
15 | $sql="truncate timetable";
16 | mysql_query($sql);
17 | $sql="truncate info";
18 | mysql_query($sql);
19 | mysql_query($sql);
20 | $url=("../basic-info-school.php";
21 | echo "<script LANGUAGE='Javascript'>";
22 | echo "location.href='$url';";
23 | echo "</script>";
24 | echo "success";
25 ?>
```

FIGURE 6-12 CLEAR PROJECT DATA

Conclusion

With efficient background research and frequent contact with school teachers, the project is accomplished in expected outcome. With advanced techniques such as HTML5, CSS3, Javascript, JSON, PHP and MySQL, the project successfully adjusts issues in interface design, operation design and algorithm. The input flow of data is efficient and adorable, which greatly reduces the burden of the academic staff and makes the system fascinating. Genetic algorithm idea is applied in generation process and receives a desirable result.

Looking into the future, some amendments can be done to realise a better completed and expandable system. First, the system can be expanded for various users. For student or teacher, they can login to check their own timetable. Secondly, email module can be developed, sending email to teacher or student to notice their new timetable. Furthermore, a better data structure can be designed to meet higher requirements in constraints.

Appendices

```
<table class="table table-hover table-condensed text-center" id="teacherTable">
<thead>
<tr>
<th class="first-col-15">
Form</th>

<th class="first-col-15">Class</th>

<th class="first-col-15">Subject</th>

<th class="first-col-15">Period</th>

<th class="first-col-15">Room</th>

<th class="first-col-15">Teacher</th>
</tr></thead><!--get data from tables -->

<tbody><?php include("operation/conn.php");

if(isset($_GET['excel'])) {
echo isset($_GET['excel']);
// if there is data in the table-> excel input

$sql="select * from timetable";
$query=mysql_query($sql);

while($result=mysql_fetch_array($query)){ ?>

<tr>

<td><?php echo $result['grade']?></td>

<td><?php echo $result['class']?></td>

<td><?php

$subjectid=$result['subject_id'];


```

```

        $sqlSubject="select * from subject where
id='$subjectid'";
        $querySubject=mysql_query($sqlSubject);

$resultSubject=mysql_fetch_array($querySubject);
        echo $resultSubject['name'];

?></td>

<td><?php echo $result['period']?></td>
<td><?php
        $roomid=$result['room_id'];
        $sqlRoom="select * from room where
id='$roomid'";
        $queryRoom=mysql_query($sqlRoom);

$resultRoom=mysql_fetch_array($queryRoom);
        echo $resultRoom['name'];
?></td>

<td><?php
        $teacherid=$result['teacher_id'];
        $sqlTeacher="select * from teacher where
id='$teacherid'";
        $queryTeacher=mysql_query($sqlTeacher);

$resultTeacher=mysql_fetch_array($queryTeacher);
        echo $resultTeacher['name'];

```

```

?></
td></tr>

<?php    }

}

else{  include("operation/conn.php");//button

$sqlGrade="select * from info";

$queryGrade=mysql_query($sqlGrade);

$resultGrade=mysql_fetch_array($queryGrade);

//loop for class

$grade=$resultGrade['grade']; //variable grade 1

for($g=1;$g<=$grade;$g++){// Loop for Grade 1,2,3

$class = $resultGrade['class'];

for($c=1;$c<=$class;$c++){

$sqlPeriodGrade="select * from period where
grade='$g'"; // for the later according subject to grade
in period table

$queryPeriodGrade=mysql_query($sqlPeriodGrade);

while($resultPeriodGrade=mysql_fetch_array($queryPeriodGrad
e)){  //取出每个grade 1对应的所有period

```

```
$subjectID=$resultPeriodGrade['subject_id']; //获取每个period中的subject_id

$sqlSubject="select * from subject where id='$subjectID'";

$querySubject=mysql_query($sqlSubject);

$resultSubject=mysql_fetch_array($querySubject);

$subjectName=$resultSubject['name']; //获取subject name

$subjectid=$resultSubject['id'];

$subjectRoom=$resultSubject['room_id'];



$sqlPeriod="select * from period where subject_id='$subjectID' and grade='$g'";

$queryPeriod=mysql_query($sqlPeriod);

$resultPeriod=mysql_fetch_array($queryPeriod);

$period=$resultPeriod['period'];




$sqlRoom="select * from room where id ='$subjectRoom'";

$queryRoom=mysql_query($sqlRoom);

$resultRoom=mysql_fetch_array($queryRoom);

$room=$resultRoom['name'];

$roomid=$resultRoom['id'];
```

```

$sqlTeacher="select * from teacher where
subject_id='$subjectID'";

$queryTeacher=mysql_query($sqlTeacher);?>

<tr>
<td>
<?php echo $g ?>
</td>
<td>
<?php echo $c ?>
</td>
<td>
<?php echo $subjectName ?>
</td>
<td>
<?php echo $period ?>
</td>
<td>
<?php echo $room ?>
</td>
<td>
<select class="select">

<?php
while($resultTeacher=mysql_fetch_array($queryTeacher)){
$teacher=$resultTeacher['name'];
$teacherid=$resultTeacher['id']; ?>

<option value ="<?php echo $teacherid ?>"><?php echo
$teacher ?></option> <?php }?>

</select></td>

</tr><?php

$sql="insert into timetable
(grade,class,subject_id,period,teacher_id,room_id) values
('$g','$c','$subjectid','$period','$teacherid','$roomid')"
;

mysql_query($sql); ?>

```

```
<?php } ?><!-- 1 Subject is finished -->
<?php } ?> <!-- 1 class is finished : that is, one line is
finished -->

<?php } ?> <!-- 1 Grade is finished-->
<?php } ?>
</table>
```

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