

# Research on the Design of Teacher Workload Management System

Zihao Zhou

University of Science and Technology Beijing, Beijing, China

41623241@xs.ustb.edu.cn

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**Abstract:** Teaching management is the core of university management. Measuring the performance of teachers' teaching performance, its statistics and management is an important task of teaching management. In the process of deepening education and teaching reform, scientific and reasonable teacher workload statistics are an important basis for teaching reform and personnel and distribution system reform. According to the requirements, the system is determined to use JSP technology, JAVA as the programming language, and MySQL as the database. The entire system is easy to operate, easy to maintain, flexible and practical. Mainly realized the functions of teacher information management, course category management, course management, personal data, etc.

## 1. Introduction

With the continuous improvement of science and technology, computer science has become more and more mature, and its powerful functions have been deeply recognized. The teacher workload management system is an indispensable part of the school. Its content is for the school's decision makers and managers. It is vital that the teacher workload management system provides users with sufficient information and quick access to information. For colleges and universities, the use of computers to support teachers to efficiently manage the workload information, computer management can not match the advantages of rapid retrieval, easy to find, high reliability, large storage, good confidentiality, long life, low cost. These advantages can greatly improve the efficiency of teacher workload management, and are also an important condition for the scientific and formal management of colleges and universities and the integration with the world. Therefore, it is necessary to develop a workload management system suitable for school teachers.

## 2. Related technology

### 2.1 Introduction to JAVA language

Java was the result of a joint vision of James Gosling, Patrick Naughton, Chris Warth, Ed Frank, and Mike Sheridan of Sun Microsystems in 1991. The language was originally called "Oak" and was renamed "Java" in 1995. Too surprising, the initial motivation for designing Java was not from the Internet, but to develop a platform-independent language that could be used to create embedded devices (such as ovens, microwave ovens, and remote controls). Software). As you may have guessed, different types of CPUs can be used as remote controls. The trouble is that most computer languages at the time were designed for specific goals, such as C++.

### 2.2 JSP

JSP can be seen as an extension of Java Servlet. JSP must be compiled into a Servlet, which is a Java class, and then called. The Web page generated by the Servlet cannot be included in the HTML tag because it is away from it. Without the support of Java class files, users will experience many advantages of JSP as they learn more.

#### 2.2.1 Easy to develop

Editing in JSP is basically the same as writing HTML files. It is very convenient in processing

forms. For setting HTTP headers, JSP also provides a rich method, which makes JSP developers very convenient when writing common functions, thus spending more time. In business logic.

### **2.2.2 Cross-platform**

Java itself has cross-platform features, so JSP programs can be developed and run on a platform that supports Java. Obviously, this is extremely beneficial for platform porting. When the JSP is replacing the service platform, if the database or other related operations are not involved, the service platform migration can be completed without any change. When the Web server needs to be replaced, the JSP can also be compiled and run on the new Web server without modification or minor modifications.

### **2.2.3 High efficiency and high performance**

JSP can be an extension of Servlet, so the Java virtual machine creates a separate thread for each request, not a process, so the system can process the request very quickly, and the JSP will only be compiled once, that is, it needs to be compiled when it is first loaded. This will speed up the system's desired rate. When a request is processed, the Java class mapped by the relevant JSP is not deleted from memory, but is kept in memory. When the next request occurs, the system will provide faster response speed.

### **2.2.4 Low cost**

It is well known that Java is an open source development language. JSP is also a dynamic web technology developed based on Java's open source environment, so this eliminates the need for commercial paid projects. Furthermore, developers can choose a development tool that is suitable for their own development from a wide range of Java IDEs. Of course, they can also be written directly using a text editor, which is time consuming and error-prone. There are many commercial software available, but in general the total cost of development for JSP is lower than with other technologies.

## **3. Related work**

### **3.1 Restatement of the Problem**

The system implements a teacher workload management system, which is divided into two users: administrator and teacher. The specific functions are described as follows:

The administrator module includes:

1) Teacher information management: Administrators can add, view, modify or delete teacher information.

2) Course Category Management: Administrators can add, view, modify or delete course category information.

3) Course Management: Administrators can add, view, modify or delete course information.

4) Personal Information: The administrator can modify his or her account number or password.

The teacher module includes:

1) Course selection management: Teachers can select courses or withdraw classes online, and can view their own courses.

2) Personal information: Teachers can modify their information.

### **3.2 Non-functional requirements analysis**

#### **3.2.1 System performance analysis**

The performance analysis of the system is mainly to analyze the throughput rate and response rate. The main reason is that detection and analysis will meet the requirements after the user group you specify is logged into the system at the same time. For example, if 200 students are online at the same time, the system load cannot be tolerated. System performance testing is very important. The performance indicators of the main test usually have indicators such as throughput and response time. The throughput rate and response time correspond to each other. In response time, the response time

of the enterprise billing management system needs to be limited to 2 seconds.

### 3.2.2 System scalability

The scalability of the system usually refers to the functions that the system can currently implement, whether it needs to add new functions, whether it has extended implementation functions, and the system that the system needs to consider in the analysis of subsequent system function requirements. The functionality that needs to be completed provides a system interface for the extension under this premise.

### 3.2.3 System security

The security of the system refers to whether the user's data usage is safe during the use of the system, whether the data files operated by the system are safe, and whether the speed and efficiency of the system are stable. System security is the first to meet system development. Conditions can be analyzed on the basis of meeting safety requirements.

### 3.2.4 The system is stable

The stability of the system mainly means that the system program needs to ensure the stability and security of the data file during the running process. The database to be backed up needs to run in sync with the existing database. The backup database basically does not participate in system data exchange, only backup. The synchronization between the database and the running database ensures the safe and stable operation of the data files.

## 4. Database Design

The main task of database design is conceptual design, which implements the sum of each user's needs, inductive classification and abstraction, making him a model independent of the DBMS concept. The design of the database is crucial. At design time, first, according to the system requirements, draw an E-R diagram reflecting each application's requirements, including determining the entity attributes and connection types. Second, a series of optimizations were performed on the initial E-R map to eliminate existing redundancy and possible contradictions. The conceptual model is designed to respond objectively to user needs without including specific software hardware. Therefore, here we need to focus on how to express the user's needs for the system, rather than considering the specific implementation issues.

### 4.1 Database physical structure design

From the previous data analysis, the following tables can be created. The detailed information of each table is as follows:

Table 1. Administrator table

Num		Type	Len		Identification	Key	Foreign key	NULL
1	id	int	11		Y	Y		N
2	username	varchar	20					Y
3	password	varchar	20					Y

Table 2. Class Table

Num		Type	Len		Identification	Key	Foreign key	NULL
1	id	int	11		Y	Y		N
2	name	varchar	20					Y
3	leibie	varchar	20					Y
4	xueshi	varchar	5					Y
5	shangjixueshi	varchar	5					N
6	shiy anxueshi	varchar	5					N
7	shejixueshi	varchar	5					N
8	renshu	varchar	10					Y
9	banji	varchar	20					Y
10	xishu	varchar	10					Y
11	username	varchar	20					Y
12	xuan	varchar	1					N

Table 3. Category table

Num		Type	Len		Identification	Key	Foreign key	NULL
1	id	int	11		Y	Y		N
2	name	varchar	20					Y
3	miaoshu	text						Y

Table 4. Teacher table

Num		Type	Len		Identification	Key	Foreign key	NULL
1	id	int	11		Y	Y		N
2	username	varchar	20					Y
3	password	varchar	20					Y
4	xingming	varchar	20					Y
5	sex	varchar	20					Y
6	age	varchar	20					Y
7	dianhua	varchar	20					Y

## **5. Detailed design and implementation of the system**

### **5.1 System Login Page**

This page implements the login of the system. Administrators and teachers must enter the correct username and password through this page before entering the system. If the username or password is incorrect, a corresponding prompt will pop up. If the username and password are correct, the user information will be User identity is stored in the Session.

### **5.2 Add teacher information page**

This page is an administrator function that adds teacher information. The added information includes: job number, name, gender, age, phone number, and password.

### **5.3 Manage teacher information page**

This page is an administrator function that implements the management of teacher information. It can be searched by job number and can modify or delete teacher information.

### **5.4 Add course category information page**

This page is an administrator function that adds course category information. The added information includes: category name, category description.

### **5.5 Manage course category information page**

This page is an administrator function that manages course category information, can be searched by category name, and can modify or delete course category information.

### **5.6 Add course information page**

This page is an administrator function that adds course information. The added information includes: name. Category, class hours, computer time, experimental hours, design hours, number of people, class, coefficient.

### **5.7 Manage course information page**

This page is an administrator function that manages course information, can be searched by name, and can modify or delete course information.

### **5.8 Modify account password page**

This page is an administrator function that modifies the administrator account and password.

### **5.9 Course selection page**

This page is a teacher function and teachers can take courses online.

### **5.10 My class page**

This page is a teacher function, teachers can find by name, you can view your own class.

### **5.11 Teacher information modification page**

This page is a teacher function that implements the modification of teacher information. The modification information includes: job number, name, gender, age, phone number, password.

## **6. System test**

Software testing is a top priority in software development. Nothing can be sloppy. In the project management process, it is important to emphasize that each step of each process must be tested to ensure that the system is controlled at each stage. Because the issues considered in software testing are basically issues that need to be considered in project management. Specifically, software testing is transactional, project management is strategic, and certain strategic issues must be implemented in

certain transactions.

## **6.1 Basic concepts of testing**

### **6.1.1 Testing purposes**

The purpose of software testing is to find as many errors and defects as possible in a software product (mainly a program).

Defining the purpose of the test is very important because there are many vague or erroneous views on the test work in the real world, which seriously affects the smooth progress of the test.

Some people think that the test is to prove that the program is correct, that is, the program no longer has errors, and the results prove to be unrealistic. Because it is necessary to test all errors in the program to exclude all possible input data, check to see if they produce the correct results. For example, the program requires three 16-bit word length integer input data. The total combination of input data is approximately  $3 \times 10^{14}$ . If the test time for each set of data is 1 millisecond, then even for 365 days a year, it takes about 10,000 years per day. It takes only one hour to complete the test.

### **6.1.2 Test case**

To test, in addition to the test data (or input data), the output of the test data should be given, which we call the expected result. Compare the actual output to the expected results during the test. If it is different, it means that an error has been found. Therefore, test cases include test data and expected results.

In order to detect errors in the program, efforts should be made to design tests that may expose errors. A good test case is a test case, and you may find errors that have not been discovered so far. A successful test is to find tests that have not yet been discovered.

### **6.1.3 White box test and black box test**

(1) Black box testing, also known as functional testing, treats software as a black box and tests the external features of the software, regardless of the internal structure and characteristics of the program. Design test cases according to the software specification, and test whether the set function is satisfied according to the input and output characteristics of the program.

(2) White box test: Also known as structural test, the software is considered a transparent white box. Test cases are selected based on the internal structure of the program and processing logic to test and design the logical paths and processes of the test software. Whether it matches.

## **6.2 Test Procedure**

The main steps in software testing are unit testing, integration testing, and verification testing.

### **6.2.1 Unit test**

Unit testing is also known as module testing. Typically, unit tests can be placed in the coding phase. After writing the module, the programmer always tests the module he wrote to check if it implements the module functions and algorithms specified in the detailed design specification. Unit testing primarily found errors in coding and detailed design, usually in white-box testing.

### **6.2.2 Integration test**

Integration testing (also known as assembly testing) tests the program assembled from the module to check the interface and communication between the modules. Integration testing primarily finds errors during the design phase, usually using black box testing.

### **6.2.3 Verification test**

The task of the verification test is to check whether the software's functionality, performance, and other features are consistent with the user's needs. It is based on the requirements specification (ie the requirements specification). Confirmation tests are usually tested in a black box.

Verify that the tests generated by the test meet the requirements listed in the requirements specification and then check the software configuration, especially if the documentation is complete

and all aspects are of the same quality. If the software is customized for the customer, the customer will eventually perform an acceptance test so that the customer can confirm that the software is what he needs. If many customers use a piece of software as a product, they cannot perform an acceptance test on each customer. Most software manufacturers use alpha and beta testing processes to expose errors that end users can only detect.

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