

Design and Implementation of Student Management System Based on B/S

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Abstract: *In today's information age, student management is no longer satisfied with the traditional manual management stage, but develops towards informatization and networking. The system is developed in B / S mode. The data processing function and operation flow are realized by using web technology and B / S framework technology. Firstly, this paper introduces B / S technology and expounds the advantages of student management informatization. Then, the framework of student management system based on B / S is designed to test the performance of the student management system. Finally, the test results show that the running time and delay time of the system are very short, and the CPU occupation is maintained at about 3%. The system has basically achieved the expected functions.*

Keywords: *B/S Technology, Student Management, Management System, System Design*

1. Introduction

With the continuous development of computer science and technology and the improvement of people's quality of life, computer has gradually become an indispensable, irreplaceable, and necessary technical tool in human society, and has gradually entered thousands of households [1, 2]. In recent years, the school management has gradually changed from traditional mode to modern mode, and the student information management system has been continuously improved. In this process, it is necessary to have an operation platform which is efficient, safe, practical, rich in data, flexible in running programs and data. Student information management system is an indispensable part of school information management [3, 4].

Many scholars have done relevant research on student management systems. Foreign college student information management system has developed greatly and is in a leading position in many aspects. With the rapid progress of computer science and technology in China, computers and networks have been widely used in various fields. Now countries all over the world are constantly reforming, innovating, and improving the school educational administration system [5, 6]. The United States is the first country to realize remote control and online query of teachers' teaching situations. Japan has a high degree of educational informatization and has a large and stable information management system. Colleges and universities in Korea have also made good achievements in this regard and established a relatively complete and mature database of famous universities with advanced technology [7, 8]. In foreign countries, the student information management system of many schools has developed for a long time, and now it has been basically completely commercialized. However, from the current situation of colleges and universities in China, it cannot meet the requirements of efficiency and practicability. Therefore, this paper designs the student management system based on B / S.

The system is mainly designed and implemented in B / S mode. The student data is stored through the database, to query all relevant contents at any time. Combined with the specific demand analysis, a series of programs such as the corresponding function module diagram and detailed sequence block diagram are obtained, so that the administrator can operate and control the whole management system at a deeper level.

2. Discussion on Student Management System Based on B/S

2.1. Technical Introduction

2.1.1. B/S Framework

With the rapid development of Internet, Web2.0 technology has become a new information processing mode, which has changed people's traditional way of communication [9, 10]. B / S architecture is developed on the web. It uses a three-tier architecture. First, a physical model is established for the data access layer. Then operate the relationship and processing of all data in the software system. When users want to obtain the required information, they do not need to set any other module functions in this page to complete the workload of the whole project. At the same time, in order to enable administrators to better manage the details of students' basic information and view, school announcements, professional notices, and other messages. The main function of this framework is to make a reasonable match between student information, student achievement, and administrator identity authentication, to realize the effective management of the whole system.

2.1.2. SQL Server

With the continuous development of computer technology, the field of database has also made great progress. Now people use the network to communicate increasingly. In this environment, it has become a trend to develop a student management system. A system based on B / S (browser) is developed by using the mature and advanced computer language. Due to the large amount of student information, complex and changeable troublesome management, and high requirements for system performance, SQL Server makes it very simple, convenient, and low-cost for us to design and implement this program based on B / S mode. It can also greatly reduce the storage space, reduce the difficulty of use and the workload of later maintenance. The system takes the database management system as the core and runs the whole university information resource management information system through SQL server to realize the operation function modules such as data processing, analysis, and logic control, to carry out the business work such as data storage, automation and associated query. It is a new technology application-oriented program development mode. Like the characteristics of structural computer specialty, it adopts distributed network architecture technology [11, 12].

2.1.3. Service

With the advent of the information age, the network has become the most important channel for people to obtain the latest information, make decisions, and collect data. In this process, B / S mode is a very popular, efficient, and practical management technology. The student management system adopts the object-oriented method to design and develop a new system to meet the needs of efficient management of College Students' information. The main feature of B / S is that it integrates integration, structure and modularization, and uses it as a complete solution. In the student management system, the core is that all kinds of data information are stored in the database in a certain format. It sets different professional courses in each class of the school as a label library and then carries out unified management. In order to facilitate the information management, program developers to process the data. It can quickly and accurately complete the work tasks, orderly, meet the functional requirements of the school student management system, and improve the stability, reliability, and security of the system. In addition, you can add, delete, modify, check, or update relevant materials such as each curriculum, to realize the resource sharing between teachers and departments, teachers, and administrators, to make it more perfect and convenient to understand the situation of each student and deal with it accordingly [13-14].

2.2. Advantages of Student Information Management

(1) The convenience of student information management. In the traditional teaching process, teachers need to register each batch of students and then fill in the corresponding data according to each student. The statistical results will be inaccurate. The student information management system can easily record all time periods in all classes. It not only saves human and material resources, but also improves efficiency, reduces error rates, and facilitates managers' queries and operations (including school announcement information).

(2) The operation of student information management is simple and convenient. Student information is a large and complex data set. A large number of redundant resources are needed in the system. The above objectives can be achieved through reasonable and effective planning and utilization

of information: first, save time, second, increase benefits and reduce costs, third, facilitate query operation and change functions, or increase or decrease programs according to different needs.

The development of student information management system is mainly to facilitate the management of all classes in the school, so the system interface can intuitively display the results of each student. At the same time, the administrator can also view each shift. When you find that you have poor grades or missed a new semester, you can add it to the record of the subject to find the reason, correct the error, and then put it into the warehouse again to find the submission document, which greatly reduces the error rate of manual operation. The development and use of student information management systems can make school management more convenient, improve work efficiency, and reduce human labor. Student management is a big project. The development of student management system is a system designed for the school to manage classes better and faster.

2.3. Data Processing Technology

Genetic algorithm (GA) is a random search optimization technology that simulates the process of natural evolution. It takes a series of problems such as a large number of acquisitions, selection, and intersections in nature as a whole to screen, find the optimal individual, and evenly distribute it through information filtering. Genetic algorithm is an optimization search method, which can simulate the survival of the fittest mechanism in the biological world. Through imitation and selection to find the optimal solution of the problem. The basic steps are as follows: (1) encode the population. (2) The fitness function calculates and judges whether it is suitable for the change of population number in the current environment and there is a certain relationship between evolutionary algebras. If it is not suitable for this transformation condition, it is necessary to change genes or we select qualified individuals, which is the most important and widely used selection operation method in genetic algorithms.

(1) Accuracy

$$E_2 = \sum_{i=1}^K \frac{C_i}{n} \quad (1)$$

E_2 represents the accuracy of an experiment, n represents the number of individuals, I represents the cluster number, and C represents the number of correct data division in the i th cluster.

The average accuracy is:

$$E_p = \sum_{i=1}^N \frac{E_{2i}}{N} \quad (2)$$

E_p represents the average accuracy of N experiments, n represents the number of experiments, I represents the number of experiments, and E_{2i} represents the accuracy of the i th experiment.

(2) Parallel computing cost t

$$T_t = T_n * n \quad (3)$$

T_n represents the average running time of a single node (that is, the time spent at the end of the system operation). N represents the number of cluster nodes, and T represents the total running time of cluster nodes. It can be seen that the end time of each machine in the cluster is not necessarily the same. Therefore, this involves the task scheduling strategy. The system efficiency is the highest when load balancing.

3. Experiment

3.1. Student Management System Architecture

System architecture is the overall design of the idea and technical system of the whole project to ensure the stability and reusability of the software development process. The system adopts B / S architecture. Because the software is modular and hierarchical, it is easy to realize different functions. As can be seen from Figure 1, the project management system is mainly divided into two parts: foreground user management and background administrator authority management. Each subsystem

can operate independently and be interconnected. The student information management system is mainly divided into six parts: registration and login management, password modification maintenance, and user permission viewing operation. Class information management includes adding new class records and querying course lists. The student information module shall provide true and valid identity documents when registering. The teacher password should be established completely, legally, and reasonably comply with relevant regulations, and can be successfully entered only after verification. The administrator has the highest authority to add, delete, modify, and query all data in the system. The learning materials and announcements show the contents that need to be published or searched in the current system, and mandatory measures are set to publicize these messages, to effectively protect data security and confidentiality.

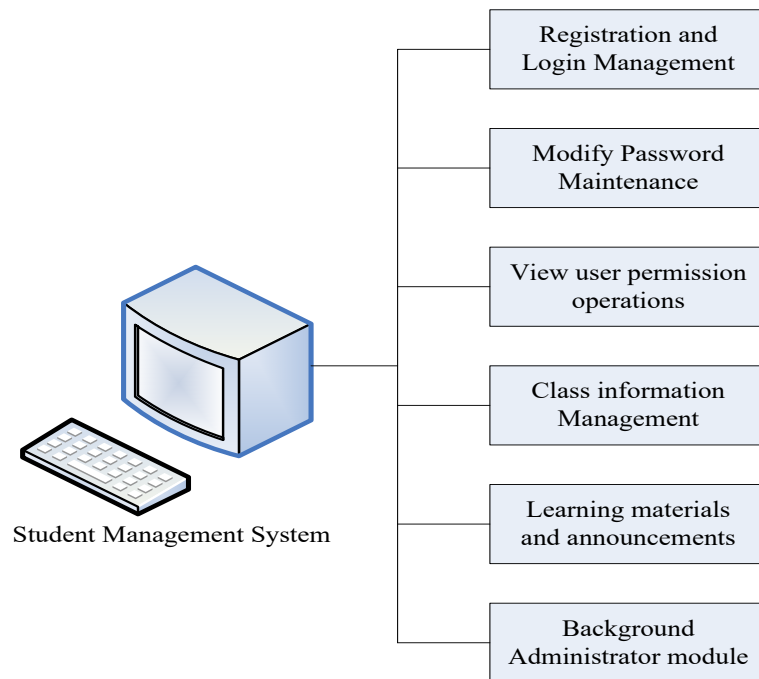


Figure 1: Student management system architecture

3.2. System Performance Test Steps

The purpose of the system test is to verify whether the function and performance of the program meet the requirements specified in the requirements analysis, to check the possible design or coding problems between the data structure realized by the software and the programming objectives, and repair the defect according to the actual situation. First, we need to confirm whether the software can run normally, and constantly detect and maintain it throughout the process. The second is to determine whether the development platform can support the performance indicators of this research and whether the corresponding functional modules are correct. The last step is to integrate all data and save it to the database system for reference when modifying the data in the future.

4. Discussion

4.1. System Performance Test

Table 1 shows the system performance test data.

Table 1: Performance test data

| Number of tests | Performance period (s) | Delay time (s) | CPU occupancy rate (%) | Memory account(k) |
|-----------------|------------------------|----------------|------------------------|-------------------|
| 1 | 2 | 1 | 2 | 3534 |
| 2 | 5 | 2 | 3 | 3214 |
| 3 | 4 | 1 | 1 | 3341 |
| 4 | 3 | 2 | 2 | 3452 |
| 5 | 4 | 1 | 3 | 3157 |

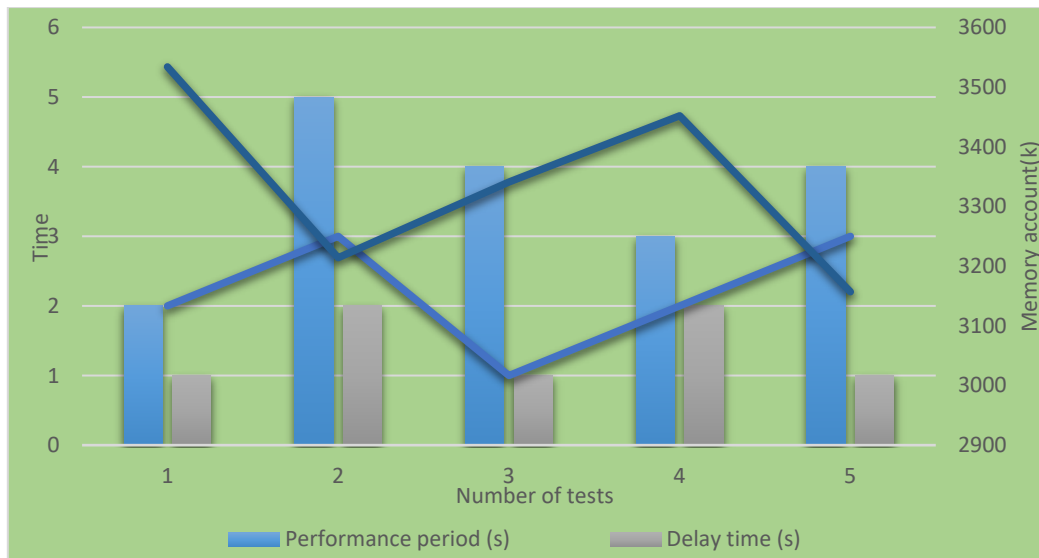


Figure 2: Comparison of the system performance data

As can be seen from Figure 2, the running time and delay time of the system are very short, and the CPU occupation is maintained at about 3%. According to the test results, the system has basically achieved the expected functions, but we also need to pay attention to some details. In the user management module, all operators strictly control student information and student scores. Only the administrator has the authority to modify, delete, and back up the data. At the same time, when adding a new course, you can check whether the teacher's notice and student query are correct and update the detailed application form submitted by yourself in time.

5. Conclusion

With the rapid development of modern society, student information management system has become an essential and indispensable part of a school. The system is mainly designed and implemented in B / S mode. It integrates and operates the existing resources of colleges and universities by using functional modules such as students' own registration and login, college and department management and professional query. Through web technology, it publishes announcements on the Internet and views relevant materials and information to complete the employment guidance of college students. At the same time, the administrator can add new users to add contacts, modify personal information, and position dynamics.

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