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School Vehicle Management System Based on JAVA Language

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Abstract: *The rapid growth of schools in multiple regions has brought about a general rise in the amount of vehicles in them, posing numerous difficulties to school management and challenging the traditional approach. To hasten the growth of universities and to attain systematic, scientific, and institutionalized vehicle information management is a pressing matter that cannot be sidestepped any longer. Exploring and designing the school vehicle information management system, based on JAVA language, is the topic of this discussion. This system can guarantee safe operation, save costs, and reduce them. Ultimately, it can enhance the information level and campus digital management efficiency of schools, while ensuring the safety of school vehicles and keeping track of their specific operation and status at all times.*

Keywords: *JAVA language; school; vehicle management; management; system; information*

1. Introduction

In order to adapt to the development of modern society, new management systems have emerged, with a very simple purpose of facilitating school management and addressing complexity and inaccuracy. After the system development, we can manage, query, and consult various requirements. If we implement this series of functions, we can improve the efficiency of managing school vehicles.

As the core of MIS, the development of automotive management systems mainly focuses on two areas: firstly, building and maintaining data in the background to ensure their accuracy, reliability, and scalability; Secondly, effective control and maintenance of APs are implemented in the front desk to ensure their reliability. This article focuses on exploring and utilizing three advanced front-end APs: SQL Server 2000, SQL language principles, and JAVA SWING to achieve better security and reliability.

With the vigorous development of China's national economic structure and the rapid improvement of the Socialist market economy system, all industries actively use modern means to continuously improve the quality and efficiency of the Internet platform. With the widespread popularization of education, the increase of vehicles on campus, and the emergence of outdated management systems and other issues, schools are facing severe challenges. With the rapid development of economy and technology, networks and computerization have become an inseparable part of people's lives. On e-commerce platforms, people can easily choose their favorite products and complete online payments; On the hospital's official website, patients can conveniently operate the appointment outpatient registration service and view the physical examination results online; In terms of government services, people can visit official websites to learn about their personal information or business transactions. The development of the Internet has brought great convenience to people's daily lives, and people have also gained a certain understanding of computer operation[1-3].

2. Systems Design

2.1. Overview of Java Language System

Java is an efficient, data-based language. Its structure, functionality, and scalability are superior to traditional C++languages. Its characteristic is that it can adjust the dataset according to needs and achieve multiple functions.

The Java platform is composed of a series of object-oriented programming interfaces (APIs) that can help developers create a variety of applications to meet different needs. In addition, Java can also be used

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to simulate various things in the real world, such as trains, animals, and so on. It forces us to reflect on what makes it easier for developers to write programs through them. Whether on the Windows platform or other platforms, Java compiled programs can run on other platforms to facilitate information exchange. By introducing a large number of built-in class libraries, the development load can be greatly reduced and the project completion cycle can be shortened. In addition, our webAP library, including applets, servlets, JSPs, Sockets, and RMI, can be used to integrate various APs to meet different needs.

2.1.1. Design functional modules

The design of the school vehicle information management system mainly includes an administrator module and an operator module.

(1) Administrator module. It forms the front-end part of this system, and its main functions include the operator's information management of school vehicles. In this module, the administrator can directly manage the school vehicle information, and carry out registration, search, modify, delete information and other operating steps, and provide the basis for the administrator to evaluate the work of the operator. This function ensures that administrators can still respond quickly and solve management problems on behalf of operators when they fail to implement management or encounter incorrect management due to certain reasons.

(2) Control module. This module is responsible for connecting the backend of the system with the database, achieving traffic flow on campus, collecting parking fees, sending user requests, and assisting engineers in handling daily traffic affairs. In addition, it is also responsible for collecting and integrating relevant information about all cars entering the college, including car numbers, categories, appearance, and arrival time. 'Vehicle outbound' means that after leaving the school, the operating company will record and maintain all information about the vehicle, such as license plate, category, appearance, destination, and arrival date. Parking fees "means that the company will record and maintain all car related services, such as service prices, usage dates, and other related services. This system consists of two key components, as detailed in Figure 1.

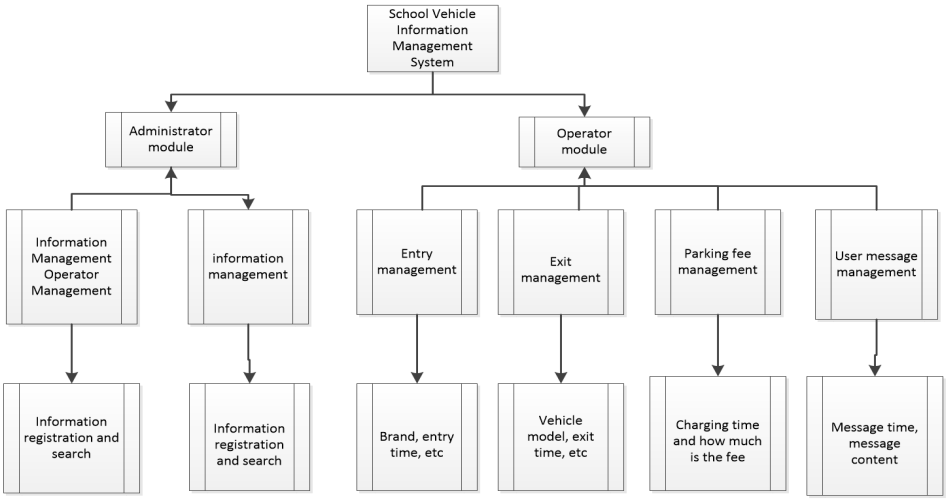

Figure 1: System design process

2.2. Database design

The information generated by the school's dedicated database storage system. Administrators and operators manage the system through a database, collecting, organizing, storing, and querying school vehicle information. Due to the different scales of different schools, regardless of the amount of information on school vehicles, comprehensive planning, analysis, conceptualization, logical construction, physical construction, data implementation, database management, and operations must be carried out before building a database. Analyze the roles involved in the system and obtain three basic units: firstly, the administrator; The second is the operator; The third is school vehicles. Administrators are the creators and supervisors of school vehicle information management. The administrator has their own account and password to log in to the system [4-6]. Previously, the operator was the school's vehicle manager. The system can add multiple operator information, including operator identity information (such as name, age, home address, work experience, work content), etc. Administrators can use the above

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conditions to query operators. Defined information such as vehicle entry time, residence time, departure time, and expenses incurred. The three most important tables in this model are the operator information table, the school vehicle entry and exit table, and the expense table. Planners receive relevant information from operators through questionnaires, personal interviews, and other forms, and develop information tables for operators. Generate school vehicle entry and exit forms through intelligent access control and video surveillance; Through WeChat QR code and Alipay QR code specially belonging to the school, users can pay online and generate the school vehicle fee table. Administrators have the highest authority to use the database. They can not only manage operator information tables, but also manage school vehicle tables and expense tables. The system database model is shown in Figure 2.

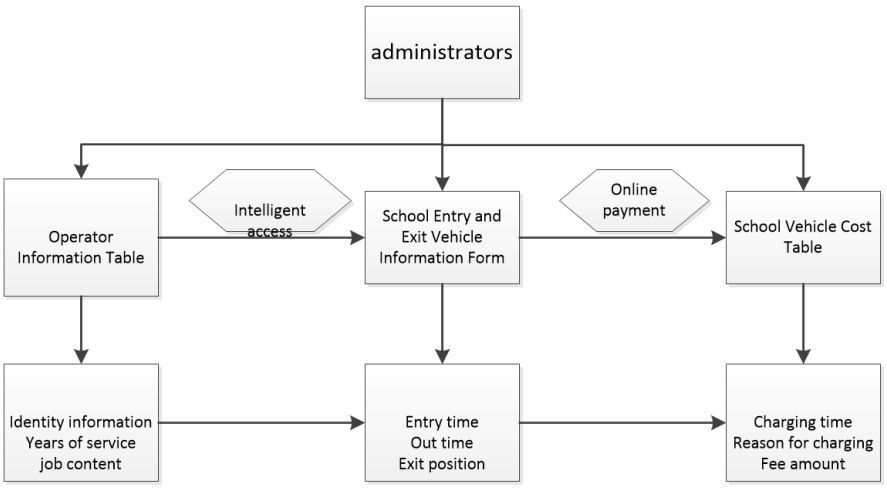

Figure 2: Vehicle entry and exit process

When building a database system, designers should pay special attention to four aspects: first, they should comprehensively consider the needs of school administrators and operators. To this end, designers should gain a deeper understanding of their expectations for the database and how they understand the use of data through on-site visits, individual interviews, and other means. To ensure the accuracy of the data, we have chosen SQL database as our structured database. Thirdly, it is necessary to ensure the standardization of the database. Due to the strong mobility of school transportation, especially during holidays, the amount of information required is enormous and very cumbersome. Therefore, in order to reduce data duplication and redundancy, designers should adopt a unified approach to categorize the vast amount of data into a more streamlined table for better management. All four aspects should be comprehensively examined to meet the persistence of the database. With the development of schools, there is increasing information about school vehicles. In order to ensure the efficient operation of the system, designers should pay attention to the scalability of the database based on the development trend of the school, to ensure that even if the number of school vehicles continues to increase, the database can withstand a large workload, and thus ensure the stable operation of the system [7-9].

2.3. Program flow and system framework design

This system adopts MVC (Model View Controller) architecture design for code management and maintenance. The system includes the following modules.

Model layer: This layer is responsible for reading and storing data, including adding, deleting, modifying, and querying vehicle information tables, maintenance and repair tables, and delivery vehicle tables.

View layer: This layer is responsible for user input and output, providing an operation interface for users to use.

Control layer controller: This layer is responsible for coordinating user input and interaction with the model layer, implementing various operational logic and error handling.

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2.4. Introduction to Main Module Programming

2.4.1. Create link

This section of code is mainly used to create a connection between the system backend and the SQL database, including setting the URL path, filling in the database name and code, etc.

```
Public static Connection getConnection()throws SQLExceotion {
String url = “jdbc:mysql://localhost/school?usr=root&password=
123456”;
Connection connection = DriverMangager.getConnection(url);
Return conn;
}
```

2.4.2. Add vehicle information

```
public static void addCar(Car car) {
    try {
        Connection conn = getConnection();
        String sql = "insert into car values(?,?,?,?,?,?,)”,
            PreparedStatement ps = conn.prepareStatement(sql);
        ps.setString(1, car.getId());
        ps.setString(2, car.getBrand());
        ps.setString(3, car.getModel());
        ps.setString(4, car.getPlateNumber());
        ps.setString(5, car.getBorrower());
          ps.setString(6, car.getDepartment());
        ps.setString(7, car.getDriver());
        ps.executeUpdate();
        ps.close();
        conn.close();
        System.out.println("Successfully added vehicle information！ ");
    } catch (SQLException e) {
        e.printStackTrace();
            }
     };
```

2.4.3. Delete vehicle information

```
public static void deleteCar(String id) {
    try {
        Connection conn = getConnection();
        String sql = "delete from car where id=?";
        PreparedStatement ps = conn.prepareStatement(sql);
        ps.setString(1, id);
          ps.executeUpdate();
        ps.close();
```

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```
            conn.close();
            System.out.println("Successfully deleted vehicle information！");
        } catch (SQLException e) {
            e.printStackTrace();
        }
}
```

2.4.4. Modifying Vehicle Information

```
public static void updateCar(Car car) {
    try {
        Connection conn = getConnection();
            String sql;
            sql="update car set brand=?,model=?,plateNumber=?,"+
"borrower=?,department=?,driver=? where id=?";
        PreparedStatement ps = conn.prepareStatement(sql);
        ps.setString(1, car.getBrand());
            ps.setString(2, car.getModel());
        ps.setString(3, car.getPlateNumber());
        ps.setString(4, car.getBorrower());
        ps.setString(5, car.getDepartment());
        ps.setString(6, car.getDriver());
        ps.setString(7, car.getId());
            ps.executeUpdate();
        ps.close();
        conn.close();
        System.out.println("Successfully modified vehicle information!");
    } catch (SQLException e) {
        e.printStackTrace();
    }
}
```

2.5. System Design Operations and Pages

The system has two roles: administrator and operator. With a specific account password, the administrator can access, update, store and manage the relevant information of school vehicles, including the operator's personal data, boarding and alighting records, fees, etc. In addition, it can also achieve real-time monitoring of school vehicle costs, identify problems in a timely manner, and take corresponding measures. There is not much difference between the manager and operator of the login interface. The background image of the login interface is the school interface [10], which can improve the system's recognition and enhance the cultural experience of operators. “The interface of the "School Vehicle Information Management System" should be in Song or regular script to maintain a concise and clear appearance. In addition, HTML language elements such as div, input, and option can also be used to build front-end information input frameworks. Then use cascading style sheet (CSS) technology to highlight the layout effect. When logging into the system, the function menu is located on the left side of the user interface. According to the user's identity, the system will set different user experiences based on their identity. When the user identity is "operator information", "school vehicle access information", or "school vehicle cost information", the system will provide a high-end user experience of "school vehicle access

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information", "school vehicle cost information", or "basic information". Press the shortcut button on the first layer, and you can see the corresponding detailed information. For the convenience of information retrieval, there is a "-" mark on the left above the function menu of the first level, and the second level menus included in each menu of the first level are expanded by default. All auxiliary menus will be automatically integrated into the main menu. Click the ">" button to view the initial versions of all auxiliary menus.

3. Conclusions

Due to the continuous development of information and intelligent technology, vehicle information systems can develop management mechanisms based on the specific requirements of universities. This system can improve the efficiency of school vehicle management faster. In the process of vehicle management in universities, real-time understanding of vehicle operation and driver information, natural conditions, usage status, insurance and maintenance records, fuel consumption, etc. can be achieved. We have strengthened the management of school vehicles and improved the efficiency and quality of school vehicle management. While supervising, the online information management platform can not only view the operation status of school vehicles, but also avoid situations where the actual information is different from the staff and faculty applying for school vehicles. In addition, for vehicles used for faculty and staff commuting, faculty and staff can quickly and real-time understand the operating status of university vehicles. They can better capture commuting time, provide good travel comfort, and to some extent improve the efficiency of using university vehicles.

In short, there are still some shortcomings in the current situation of school vehicle management in China, mainly related to the imperfect vehicle management system and unreasonable planning of campus parking spaces. This has had a negative impact on the efficiency of vehicle management in universities. Therefore, in order to truly improve the efficiency of university vehicle management, it is necessary to establish a comprehensive vehicle management mechanism, reasonably plan campus parking spaces, etc., combine university bus management with the information age, fundamentally improve the operational efficiency of university vehicles, and enable lecturers and employees to use vehicles more comfortably on campus.

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