Design and Implementation of Employee Management Platform Based on Java Web

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Abstract: With the increasingly fierce social competition, all industries attach great importance to the work efficiency of employees. Among them, computer information visualization and office automation have greatly improved the operation efficiency of the company. Therefore, it is an inevitable choice to develop a set of employee management platform suitable for their own enterprises. On the basis of investigating the employee management platforms of many enterprises, considering that different employees have different permissions, it is an important task to accurately divide the roles of employees; The platform is developed with Java Web and MySQL database, and finally realizes the accurate collection of employee attendance data, task allocation and project allocation, so as to realize the office automation of the company's employee management platform. The results show that the transparent management of this platform is better than the traditional offline management.

Keywords: Java Web; employee management; MySQL database; office automation

1. Introduction

As society progresses with computer technology, the rapid development of network technology, data, and information technology has become the development trend in today's society [1]. How to improve the work efficiency of employees and improve the operation efficiency of the company is a problem faced by many enterprises. Employee management platform is a typical example. This platform solves a series of information that leaders manually input employees. Through the computer system office automation, the leader can conveniently and quickly query the employee's attendance and work tasks, and the employee can know the tasks assigned by the leader at the first time. By providing a better platform to deal with the bad habits related to employee record methods, he solved the limitations of the manual processing method of employee records [2]. At the same time, the tasks assigned by leaders are also quite transparent and standardized; The overall scheme of the system is described according to the system requirements analysis, system design ideas and system working framework, and the system function design is formed. The modular specific functions are realized according to the feasibility analysis. The effectiveness, accuracy and availability of the system are verified through later tests. An effective performance Employee platform enables organizations realize their goals as well as employees personal growth [3]. Therefore, it is very necessary to develop a high-quality and efficient employee management platform for the management of all walks of life.

2. Related Work

Before the development of the system, three systems were investigated, namely, the three systems of similar topics, namely, pan micro OA office management system, payroll office management system, and payroll staff internal staff management system, in order to carry out related project analysis. The following characteristics are summarized:

(1) B/S Architecture is Adopted

B/S structure is browser and server structure. With the rise of Internet technology, it is a change or improved structure of C/S structure. In this structure, the user work page is implemented through the WWW browser, and a few transaction logic is implemented in the browser, but the main transaction logic is implemented in the server. This greatly simplifies the load of the client computer, reduces the cost and workload of system maintenance and upgrading, and reduces the overall cost of users.

(2) Clear Division of Roles

It is divided into multiple roles, including ordinary employees, department managers, project managers, supervisors and system administrators. The division of labor is clear. Each role is assigned a corresponding menu and has different permissions.

(3) With Data Analysis Module

These three enterprise management systems, whether customized development or products, will have a data analysis module. This module mainly produces relevant histogram, broken line chart, pie chart, etc. according to relevant data for graphical and visual display, which is convenient for monitoring relevant data statistics and trend changes.

3. System Requirements Analysis

3.1 Feasibility Analysis

3.1.1 Technical feasibility analysis

The employee management platform adopts Java's springboot + springmvc + mybatis technology. Compared with the old Spring +Stratus2 +Hubitan framework, it has strong security and better SQL optimization support [4]. As the representative of static

object-oriented programming language, Java language perfectly realizes the object-oriented theory and allows programmers to program complex programs in an elegant way of thinking. Therefore, the platform using java language developed a friendly interface [5]. MySQL database is selected for this project. MySQL, as the world's largest open source relational database, is widely used in brands such as Tencent, Alibaba, and Tesla [6]. In terms of web application, MySQL is one of the best application software, which fully meets the needs of the market.

3.1.2 Economic feasibility analysis

Economic feasibility is an aspect of the estimation of project feasibility, the evaluation of its own investment capacity, system construction, operation and maintenance, and the estimation of the availability and economic benefits of the platform to the company.

The system adopts an employee management platform based on Java Web, which is simple and easy to develop, free and open source. Using eclipse as compilation software, you can download and use it for free without worrying about any cost, and the development cost is almost zero.

3.1.3 Operation feasibility analysis

This platform can achieve the following five points:
(1) It is easy to operate and will not waste manpower;
(2) The system administrator can easily manage the information of employees;
(3) Employees can know their work tasks accurately;
(4) Leaders can quickly query employees' attendance and work status;
(5) Safely and efficiently store all information of all employees of the company.

3.2 Functional Requirements Analysis

3.2.1 Demand of ordinary employees

For ordinary employees, they can log in to the platform through their own account, password and verification code

Change the password to realize daily clock in and clock out, set the situation of being late and leaving early through the time, and each employee can view their own attendance. Employees can export their own attendance. When clock in, they need to submit today's work experience; In terms of asking for leave, there should be a start time and an end time. This time does not need to be entered automatically. The time plug-in should be set in the system and can be selected automatically; In addition, employees should submit their recent detailed tasks to their superiors. They need to report the date, working hours, work item type and task classification, which need to be verified by the manager. Employees of these tasks submitted by themselves have permission to view, edit, add and delete.

3.2.2 Requirements of department managers

For department managers, they can log in to the platform through their own account, password and verification code, and they can also change their password. There should be specific project management and task management. Employees select projects when filling in tasks, and assign them to employees after they are created. There should be project summary and screening on the page of department managers, including project cycle, project amount and consumed man hours, Progress summary shall be related to task management. These project managers have permissions to view, edit, add and delete. In addition, its punch in function is the same as that of ordinary employees. Realize daily clock in and clock out, set the situation of being late and leaving early by time, and view your attendance. The manager can export his attendance. When clock in, you need to submit today's work experience; In terms of asking for leave, there should be a start time and end time. This time does not need to be entered automatically. The time plug-in should be set in the system and can be selected automatically. Finally, the most important point is that managers need to have permission to view employee attendance and tasks to facilitate salary payment.

3.2.3 Lead user needs

For the leaders of the company, they can also change their password by logging in to the platform through their own account, password and verification code. The leaders only need to pay attention to the operation of the company's projects and display the company's projects through data visualization. These project leaders have the authority to view, edit, add and delete. In addition, leaders should observe the attendance of the company for one year, but the attendance view is not specific to each employee, but through data visualization to view the monthly attendance.

3.2.4 System administrator requirements

For the system administrator, you can create an employee ID, enter the basic information of the employee, give each employee their own account number, initial password, name, gender, contact information, Department, personnel category and whether the status is normal or not, and you can have the permission to delete, add and edit any employee.

4. System Design Outline

According to the analysis of functional requirements and the actual situation, the main functions of the platform are as follows:
(1) Employee clock in function: employees can log in to the system for daily work attendance and record personal attendance data.
(2) Employee clock in query function: ordinary employees can query personal attendance according to date, leaders can query everyone's attendance, or export attendance according to time period;
(3) Leave management function: employees submit personal leave to leaders for approval, you can also view the approval status of the fake leader; The leader shall approve after receiving the employee's leave.

(4) Log filling function: employees can fill in daily, weekly and monthly reports to record their work at a certain stage; Leaders can view the work report of employees at a certain stage and understand the work situation in time.

(5) Data visualization function: generate visual data report according to employees' personal attendance.

(6) Information management function: the administrator user maintains the employee's personal information.

(7) Project management function: the manager issues work tasks on the platform and associates them with employee tasks.

(8) Task management function: ordinary users and system administrators can view the tasks assigned by leaders and the work completed by themselves on the platform.

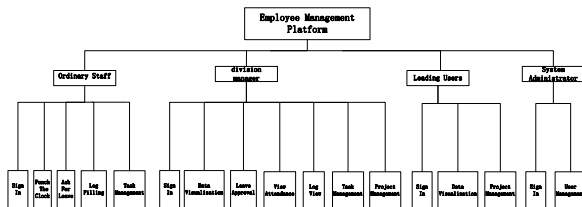The system function diagram is shown in Figure 1:

Figure 1. System function diagram

4.1 System Architecture Design

System architecture is to realize the framework and plan for the technology with determined requirements, and use complete sets of tools to complete the task in the planning steps. Abstractly speaking, it is a computer system structure, or computer architecture, which is the highest level concept of a system in its environment; It determines the connection between a computer's hardware and software. Specifically, computer architecture refers to the concept and architecture of computer system design, and describes the design principles of computer in practice. It determines the function of a computer designed component, the interface between components, and the computer architecture focuses on the operation action and memory access inside the CPU that "is responsible for the central function of the computer architecture: computing".

1. System architecture: presentation layer + business logic layer + persistence layer

2. Development environment: jdk1 8 + MySQL+Windows

3. Development Tool: Eclipse

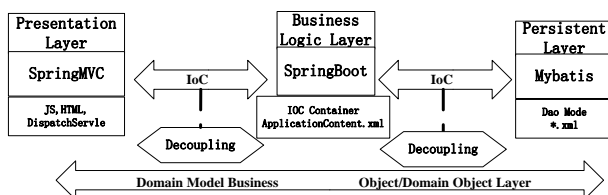The system architecture is shown in Figure 2:

Figure 2. System architecture

4.2 User Function Design

In order to better understand the permissions of different users, please refer to the use case diagram. The use case diagram is the simplest representation of the interaction between users and the system, showing the relationship between users and their related use cases. Through the use case diagram, people can know different types of users and use cases of the system. Use case diagrams are often used in conjunction with other diagrams. See Figure 3 for details:
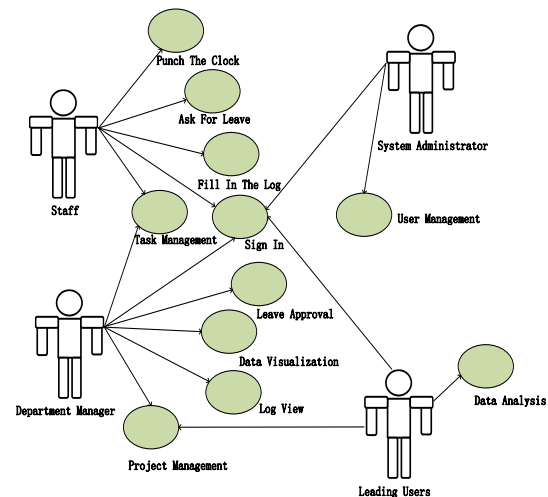

Figure 3. Use case diagram

4.3 Database Design

The database design needs to follow certain principles. First, data consistency and integrity. Data connection involves many inter table relationships, which actually increases the steps of data retrieval, resulting in the complexity of data matching process. Secondly, select the data type. There are many different attributes in the table. Design table is an important part of database. It must involve data types. When associating data tables, try not to use identify as the primary key. Third, database performance adjustment. According to the actual needs of the platform, pay attention to the access efficiency and number of connections, and reasonably carry out physical design and logical design. Fourth, the principle of standardization. Store the data correctly and use the correct data structure to ensure that the query program can run smoothly. In the data table design, taking the menu field table as an example, 12 data tables are shared, as shown in Table 1.

Table1. Menu information fields

Field name	data type	length	Primary key	describe
Id	int	11	True	Unique identification
SystemName	varchar	20	Fault	entry name
Name	varchar	20	Fault	menu bar
url	varchar	255	Fault	Menu bar connection
code	varchar	50	Fault	number
mark	varchar	50	Fault	identification
Fathercode	varchar	50	Fault	Superior number

inshow	int	11	Fault	Show or not
sort	int	11	Fault	sort
type	varchar	20	Fault	type
ico	varchar	20	Fault	Icon

4.4 E-R Diagram

E-R diagram, also known as entity relationship diagram, provides a method to represent entity types, attributes and relationships, which is used to describe the conceptual model of the real world. It is an effective method to describe the conceptual model of real-world relations. Is a way to represent conceptual relational models. The entity type is represented by "rectangular box", and the entity name is indicated in the rectangular box; Use "ellipse frame" or rounded rectangle to represent the attributes of the entity, and use "solid line segment" to connect it with the "entity type" of the corresponding relationship; Use "Diamond box" to indicate the cause of connection between entity types, write the contact name in the diamond box, and use "solid line segment" to connect with relevant entity types respectively. At the same time, mark the type of connection (1:1, 1: n or M: n) next to "solid line segment". As shown in Figure 4, this figure is the overall E-R diagram of the management platform.
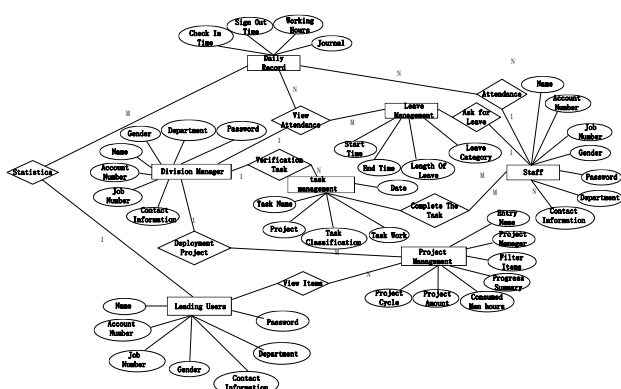

Figure 4. Overall E-R Diagram of management platform

5. Realization of Specific Functions

5.1 Login Interface

Open browser - enter http://localhost:8084/ You can access the employee management system, as shown in Figure 5. Different users will have different pages after logging in.
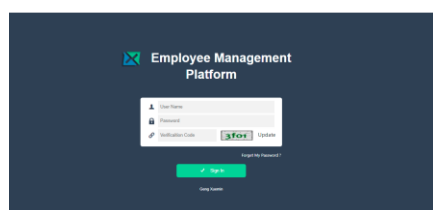

Figure 5. Platform login initial interface

5.2 Main Function Interface

5.2.1 General employee interface

The main interface is the main function interface of the whole employee management platform. For ordinary users, some menu bar icons are different from those of leaders, because they do not have permission, and some are the responsibility of managers and leaders. Therefore, different users have different permissions and different operations will be considered during development. As shown in Figure 6, the interface for ordinary employees after logging in.
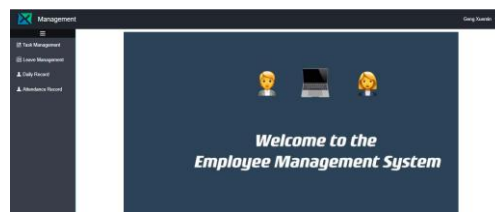

Figure 6. Login main interface of ordinary employees

In the task management module, through system call, employees can report to their superiors in the system according to their recently completed work tasks. Click Add to trigger an event. They can select their own project, task name, task type, date, man hour, task description and other specific information in the new page. After editing, click save.@RequestMapping ("/toadd")public Stringtoadd(){return"taskmsg/add";}Jump to the new page, as shown in Figure 7.
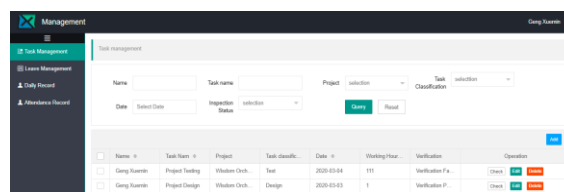

Figure 7. Task management interface

In the leave management interface, if an employee asks for leave, he / she needs to click the Add button to trigger an event, and enter his / her name, leave date, start time, end time, cumulative time, leave length, leave type, and his / her department. Then click save. As shown in Figure 8.
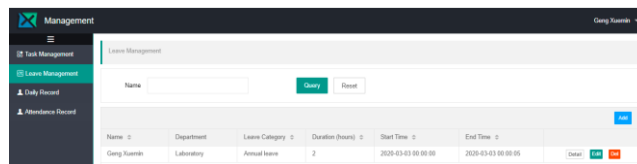

Figure 8. Leave management interface

Bind multiple lay ('. Date') at the same time each(function(){ laydate.render({ elem: this, type:'time' ,trigger: 'click' }); }); Generate time plug-in. As shown in Figure 9.

Figure 9. Enter leave page

5.2.2 Department manager interface

In the project management module, the Department Manager triggers an event by clicking Add to release the latest project situation. Figure 10 shows the main interface of project management.

Figure 10. Project management interface

The deployed project needs to fill in the following contents: project name, project type, project manager, project cycle, project amount, project member, project description and other information. After filling in all, click Save to upload successfully. Realize data echo through th: value = "${tproject. Projectmoney", as shown in Figure 11.

Figure 11. New item interface

In the attendance record module, managers can view the attendance of recent employees. If the manager wants to view the attendance of an employee, he can enter the employee's name through the filtering function. If he wants to check the specific date, he only needs to select the date to view it. This method can load the date: $(". Date") Each (function() {laydate. Render ({elem: this, range: true})}). If the manager wants to see the attendance records more clearly, he can also export and view them, and obtain the $. To be exported through this request Post ("... / attendance / getdatalist", as shown in Figure 12.

Figure 12. Export attendance interface

5.2.3 Leadership user interface

There are two functions for leading users: project management function and data visualization function, as shown in Figure 13.
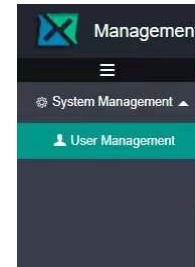

Figure 13. Leading users to log in to the main function interface

In the project management module, the function interface of leaders and department managers is the same. Click Add to trigger events, which are used to publish and view the latest project situation. Figure 14 shows the main interface of project management.

Figure 14. Project management interface

In the data analysis module, it mainly includes project type statistics and late number statistics, pie chart for project type statistics, bar chart for late number visualization, and month division. In terms of project type view, the pie chart can intuitively see the proportion of each part in the whole, and define two areas:

< div id = "main" style = "width: 500px; height: 400px; float: left;" ></ div>

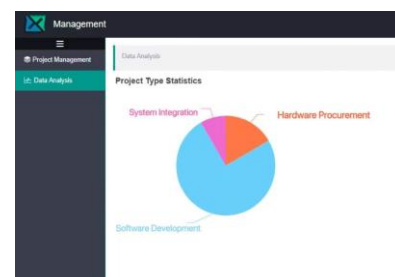<div id="main2" style="width: 600px; height:400px; float: right;" ></ Div >, as shown in Figure 15.

Figure 15. Pie chart of project type

In terms of attendance, the bar chart used in statistics shows that the abscissa is the month and the ordinate is the number of people. Through the bar chart, you can clearly see the change of the number of people who are late, which reflects that the number of people who are late is decreasing or increasing, as shown in Figure 16.
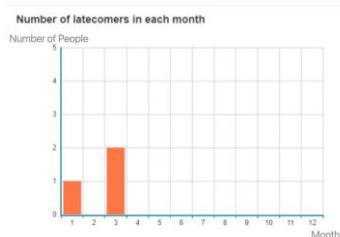
Figure 16. Bar chart of the number of people who are late

5.2.4 System administrator interface

In the system management module, only one function has been developed at present, that is, user management, which is a user who edits employee information in the background. If a new employee joins, the administrator needs to add the new employee's information to the platform, so as to facilitate users to log in to the platform in the future. If an employee leaves, the system administrator can delete his user record. As shown in Figure 17, it is the interface of user management.
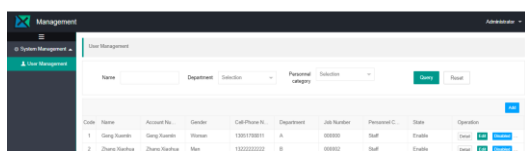

Figure 17. User management page

6. System Test

System test refers to the combination of confirmed software, computer hardware, network, peripherals and other elements, and then the assembly test and confirmation test of the system. The purpose is to compare with the requirements of the system, so as to find out whether the developed system is inconsistent with or even contradictory to the needs of users, so as to put forward a more perfect scheme. After completing the preparation of the program, the next step is to test the software. The software here refers not only to the program. Like development, testing is also a highly technical work with many skills. Its task is to find out the errors in the program as thoroughly as possible and improve the reliability of the software system. Software testing is one of the main activities of software quality assurance. In this management platform, the interface, login and function are tested respectively. Therefore, the quality of testing directly affects the quality of software system.

In this chapter, the system is tested and analyzed in detail. The purpose of the test is to further test the usability of the system, avoid bugs and bring bad experience to users. As can be seen from the following contents, the test is normal and the platform can be used. Due to space constraints, this paper only lists the test results of three typical operations.

6.1 Attendance Function Test

In the management platform, ordinary employees and department managers need to clock in and record attendance every day. The system setting clock in before

9 a.m. from Monday to Friday is normal, and clock out after 18 a.m. is normal. The test cases are shown in table 2 below:

Table 2. Attendance function test table

ID	Pedagogical Operation	Expected Results
1	Punch in after 9:00 am (sign in at 9:01)	You are late
2	Punch in after 18:00 PM (sign out at 18:01)	Sign out succeeded
3	Punch in before 9:00 am (sign in at 9:00)	Sign in succeeded
4	Punch in after 18:00 PM (sign out at 18:00)	Sign out succeeded

6.2. Login Test

Login test is mainly used to detect whether the system administrator has byte omissions or systematic problems when entering employee information, so as to avoid the situation that employees cannot enter their own system. The test cases are shown in table 3 below:

Table 3. Login test form.

ID	Pedagogical Operation	Expected Results
1	Enter the correct user name, wrong password and correct verification code	Login failure: verification code error
2	Enter the correct user name, correct password and wrong verification code	Login failure: wrong password
3	Enter the wrong user name, correct password and correct verification code	Login failure: account does not exist
4	Enter the correct user name, correct password and correct verification code	Log in successfully and enter the main function interface

7. Application and Prospect

The employee management platform was successfully completed within 2 months. At present, it has been applied in the pilot company. The employees of the company run the system through the computer client, with convenient operation, stable system performance, good feedback on project approval, attendance management and task management. The employee management platform can reflect and track the work situation of each employee in real time, and timely report the work items, tasks the attendance data is fed back to the project manager and leaders to facilitate the timely processing of relevant staff. This platform not only strengthens the management of employees by the company's leaders, improves employees' work efficiency, reduces salary differences, better understands employees' work conditions, but also contributes to the information construction.

At present, the human-computer interaction interface of the platform is still relatively single. In the future, more elements will be added to enrich the

human-computer interaction interface according to the actual needs. For example, it is necessary to add employee personal performance assessment module, process approval function, project annual report information and so on. In addition, the project manager can only directly view the employee's attendance data information online through the management platform in a single way, and can not effectively analyze the employee's classroom attendance (clock in) data. Therefore, in the future work, it is necessary to design a special mobile app or wechat applet to facilitate the user to log in to the system directly on the mobile phone.

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