Information Management System

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1 Project description

1.1 Background

With the advent of the information age, information management system in life plays an increasingly important role, it can make enterprises in a more effective and convenient way to complete functional work, so that it can work more quickly is possible, so we believe that the application of this system is very large and adapt to the needs of the development of the times, so this system is interesting. Once the system is designed, we believe that many offices will use it for efficient office purposes. For example, some after-school tutoring organizations can use this site to facilitate teachers, students to evaluate and submit assignments more efficiently, and software development companies and others can use this site to quickly transfer tasks between project managers and engineers.

1.2 Purpose

Design an information management system with managers and developers that makes it easier for managers to publish tasks, assign people, and evaluate performance, while employees can learn more quickly about tasks and be much more efficient at starting and submitting tasks.

1.3 Functionalities

The functions of this information management system are primarily for managers and developers:

The first is the function for managers, managers can mainly do six jobs, namely,

to create projects, assign tasks, evaluate tasks, delete tasks, search, create developers.

Create a task: In our scenario, the manager can create a task by clicking a "Create" button.

a) Assign tasks: After the manager enters information about the project, such as the project name, project completion time, and the developer's ID, the task is assigned to complete, and the task status changes to "To be completed".

b) Evaluation tasks: After the developer completes the task, the manager can see that the task is complete, and then the task level (A, B, C, D) can be evaluated, and the task will show that it has been evaluated.

c) Delete tasks: Managers can delete tasks by using the Delete button.

d) Create a developer: Managers can add new developers to the company by pushing buttons and entering information about new developers.

For developers, the system can perform startup tasks, submit tasks, search and other functions.

e) Start a task: The developer can start a task by clicking on a "Start" button, and the task display is in progress.

f) Submit a task: Developers can submit a task by clicking the Submit button, and the submitted task can be evaluated by the manager.

Search: Developers can view some relevant information about a task by entering its ID.

2 Data

2.1 Data description

What our group wants to design is a company's information management system, involving a total of 16 forms, including manager, developer, employee, customer, project, task, Department, feedback, assign, pro_ task, service, evaluate, finish, developer_ works_ in, manager_ works_ Among them, the last eight tables are mainly used to describe the relationship between the first eight tables, so the first eight tables pay more attention to data collection, and the last eight tables pay more attention to data visualization.

2.2 Data collection

The first eight tables are mainly about data collection, and our data mainly come from three aspects:

a) Download the existing data sets: because our theme is the company's information management system, it is difficult for us to directly crawler, because no company is willing to publish its own information directly on the web page. Fortunately, among the members of the group, some of the students' families are business owners, so we directly use the data provided by it.

b) Crawler: even though we have obtained all kinds of data, considering the

company's privacy and personal privacy, we think that it is disrespectful to directly use the real company's real employee's name. Therefore, our group crawled 30 movies, obtained the actor's name, and used the actor's name instead of the employee's real name.

c) Data generation: since the average number of information records in each form is no less than 5000, and the company has so many employees, we randomly generate supplementary information based on the existing information.

2.3 Data pre-processing

First of all, when crawling, considering the simplicity, unity and beauty of the form, we skip the movies from China, Japan and South Korea, only the movies from Europe and America.

Secondly, in data cleaning, we deal with null value, duplicate value and data typesetting. At the same time, in order to keep the table clean, we only keep the actor's name, not the last name.

2.4 Data analysis and visualization

As the latter 16 tables reflect the internal relationship of the database, most of the data analyzed by our group are concentrated in the latter 8 tables, and we have done

data visualization processing for them respectively, so we have obtained the corresponding relationship between the number of the first 8 tables. In these tables, totally, we have 360014 records.

表	操作	行数	类型	排序规则	大小	多余
assi	浏览 结构 搜索 插入 清空 删除	~50,000	InnoDB	utf8mb4_general_ci	2.5 MB	-
creat	浏览 结构 搜索 插入 清空 删除	10,002	InnoDB	utf8mb4_general_ci	368.0 KB	-
customer	浏览 结构 搜索 插入 清空 删除	~50,000	InnoDB	latin1_swedish_ci	2.5 MB	-
department	浏览 结构 搜索 插入 清空 删除	10	InnoDB	utf8mb4_general_ci	16.0 KB	-
developer	浏览 结构 搜索 插入 清空 删除	10,000	InnoDB	utf8mb4_general_ci	1.5 MB	-
developer_works_in	浏览 结构 搜索 插入 清空 删除	10,000	InnoDB	utf8mb4_general_ci	336.0 KB	-
employee	浏览 结构 搜索 插入 清空 删除	20,000	InnoDB	utf8mb4_general_ci	2.5 MB	-
evaluate	浏览 结构 搜索 插入 清空 删除	10,000	InnoDB	utf8mb4_general_ci	432.0 KB	-
feedback	浏览 结构 搜索 插入 清空 删除	10,000	InnoDB	latin1_swedish_ci	320.0 KB	-
finish	浏览 结构 搜索 插入 清空 删除	~50,000	InnoDB	utf8mb4_general_ci	2.5 MB	-
manager	浏览 结构 搜索 插入 清空 删除	10,000	InnoDB	utf8mb4_general_ci	1.5 MB	-
manager_works_in	浏览 结构 搜索 插入 清空 删除	10,000	InnoDB	utf8mb4_general_ci	336.0 KB	-
project	浏览 结构 搜索 插入 清空 删除	10,001	InnoDB	latin1_swedish_ci	368.0 KB	-
pro_task	浏览 结构 搜索 插入 清空 删除	~50,000	InnoDB	utf8mb4_general_ci	2.5 MB	-
service	浏览 结构 搜索 插入 清空 删除	10,001	InnoDB	latin1_swedish_ci	384.0 KB	-
task	浏览 结构 搜索 插入 清空 删除	~50,000	InnoDB	latin1_swedish_ci	3.5 MB	-
16 张表	总计	~360,014	InnoDB	utf8mb4_general_ci	21.6 MB	0 字节

We used python to draw different diagrams to find out the relationship between each tables.

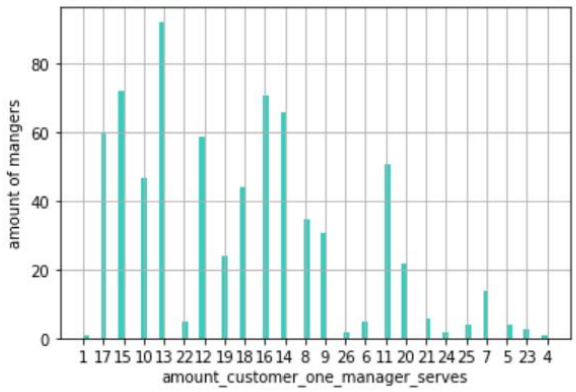

Fig1:Visualization for amount of managers and customers

The relationship between customer and manager is: one customer to one manger and one manger can serve for many customers.

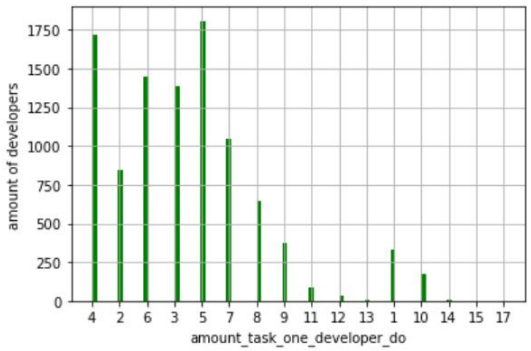

Fig2:Visualization for amount of tasks and developers

The relationship between developer and task is: one task is made by one developer, one developer can make different tasks.

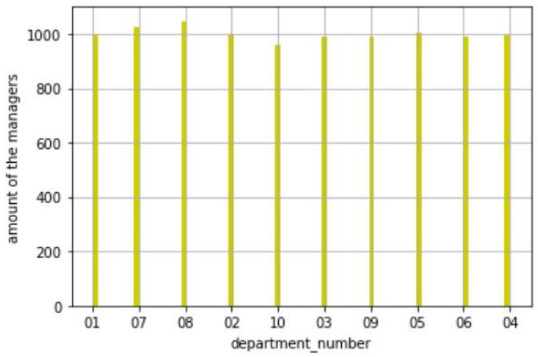

Fig3:Visualization for amount of managers and departments

The relationship between department and the manager is: one department can stay many mangers, one manger just live in one department.

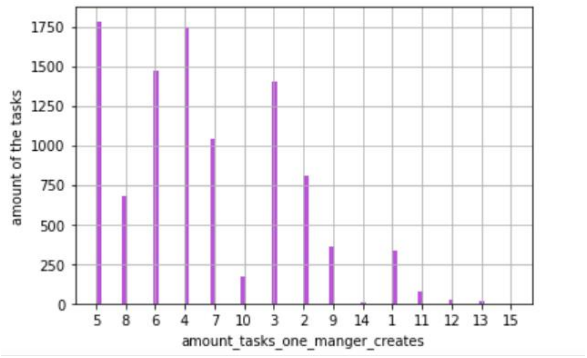

Fig4:Visualization for amount of managers and tasks

The relationship between manger and the task is: one task is built by one manager, one manger can build many tasks.

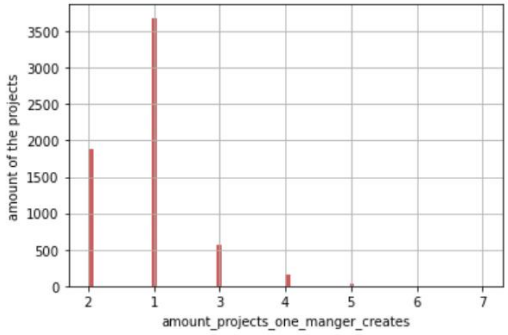

Fig5:Visualization for amount of managers and projects

The relationship between manager and project is: one manager can build many projects; one projects can be built by one manager.

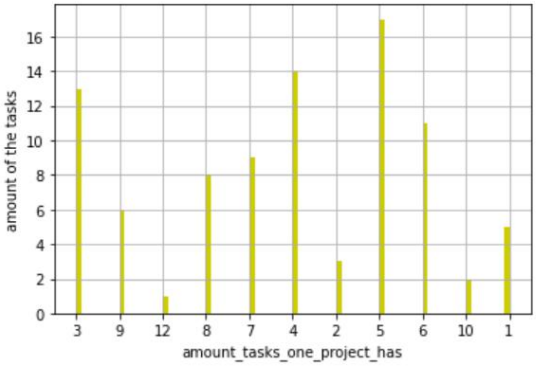

Fig6:Visualization for amount of tasks and projects

The relationship between task and project is: one task to one project, one project can run many tasks.

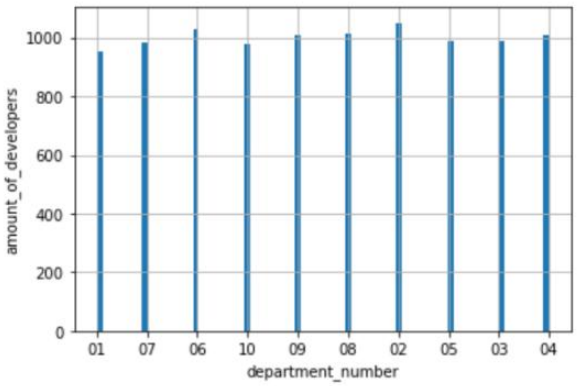

Fig7:Visualization for amount of departments and developers

The relationship between department and developer is: one developer just live in one department, one department can stay many developers.

3 ER diagram

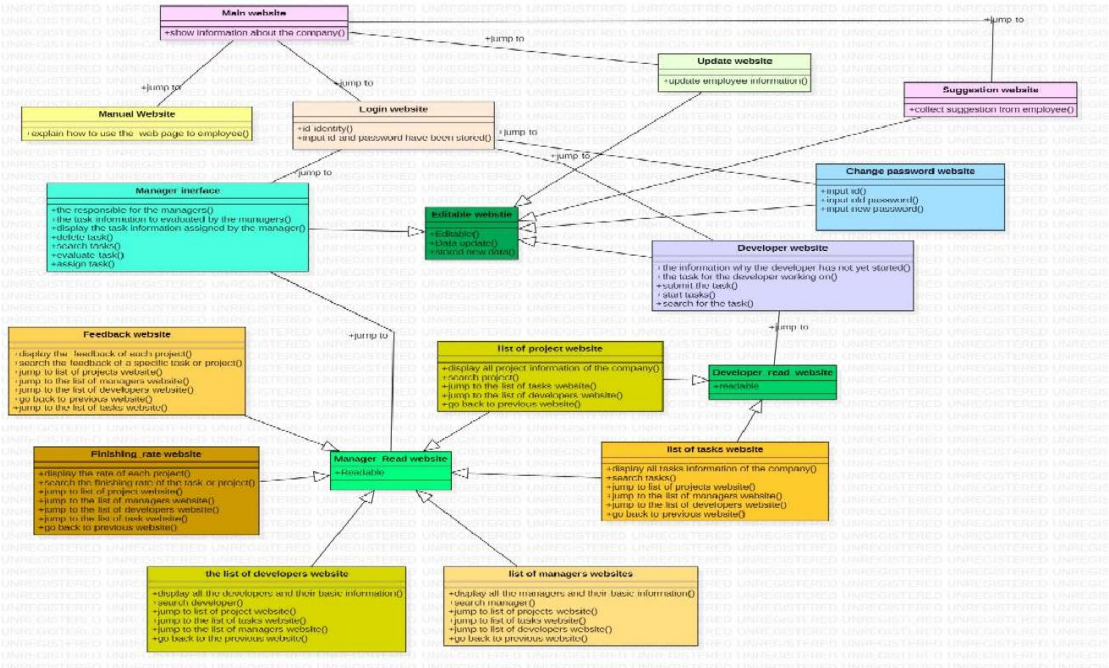

Fig8: ER-Diagram

First, there are four tables about manager, developer, employee and customer. In the manager form, we can record the ID of the employee managed by the manager, the manager's ID, login password, name, gender, telephone number and educational background; In developer's form, we record employee's ID, developer's ID, developer's login password, name, gender, telephone number, education background and position. In the employee form, we record the employee's ID, login password, name, gender and telephone number. In the customer form, we record the customer's ID and name.

Secondly, there are two forms of projects and tasks. In the project form, the ID and name of the project are recorded. The name, status, start time and end time of the task are recorded in the task table.

At the same time, there is a department table, which records the ID and name of the Department.

There is also a feedback form recording the ID and score of the feedback.

The remaining 8 tables can describe the relationship between the above tables.

The manager table is connected with the project table through the create table, in which the project ID and the manager ID are recorded; The manager table and the task table are connected through the assi table, in which the task ID and the manager ID are recorded; The task table and the project table are linked through pro_ Task form, pro_ The task table records the ID of the task and the ID of the project; The manager table and the customer table are connected through the service table, in which the ID of the manager and the ID of the customer are recorded; The manager table is connected with the feedback table through the evaluate table, which records the ID of the feedback, the ID of the manager and the ID of the developer; Developer table and task table are connected through finish table, which records the ID of task and developer; Department form and developer form_ works_ In form contact, developer_ works_ In table records developer's ID and department's ID; The department form and the manager form are linked through the manager_ works_ In form contact, manager_ works_ The ID of the manager and the ID of the Department are recorded in the in

table

There is also a quantitative correspondence between tables. One department corresponds to multiple managers and developers; One developer corresponds to multiple tasks. At the same time, there are multiple corresponding relationships between developer and manager. One project corresponds to multiple tasks; There are many corresponding relationships between project and manager; The relationship between manager and customer is multiple corresponding to multiple. The relationship between manager and feedback is multiple corresponding to multiple.

4 Assumptions

a) This information management system can be used normally under different roles such as managers, developers, employees, etc.

b) Successfully open web pages under normal network conditions (regardless of extreme cases);

c) All functions of the web page can be used normally.

d) Project, task name contains numbers, uppercase and lowercase letters.

e) The password contains numbers, uppercase and lowercase letters, and requires 16 bits.

f) The identity of employees can be determined by ID.

5 Functional dependencies

assi：task_id→Manager_id

creat: project_id→manager_id

customer: customer_Id→customer_name

department:

Department_ID→Department_Name, Department_Name→Department_ID

developer:Developer_id→Employee_id,Developer_password,Developer_name,Gender,PhoneNumber,Education,Position

employee:Employee_id→Employee_password,Employee_name,Gender,PhoneNumber,Education

developer_works_in:Developer_id→Department_id

evaluate:Feedback_id→Manager_id,Developer_id, Manager_id→Developer_id

feedback:Feedback_id→grade

finish :task_id→developer_id

manager:Employee_id→Manager_id,Manager_password,Manager_name,Gender,PhoneNumber,Education,Manager_id→Manager_password,Manager_name,Gender,PhoneNumber,Education

manager_works_in :Manager_id→Department_id

pro_task:Project_id→task_id

project:Project_id→ Project_name

task :task_id→task_name, task_state, start_time,end_time

6 Website design and feature implementation

6.1 Manager Website

6.1.1 Descriptions

Three parts: responsible for the project, ongoing tasks, and evaluated tasks.

1. Responsibility project: Displays the details of all projects that the manager is responsible for.

2. Tasks in the process: Displays detailed information about all tasks assigned to developers by the manager.

3. Unevaluated tasks: Displays detailed information about tasks that the developer has completed but the manager has not yet evaluated.

6.1.2 Function

a) Project creation: The manager can add the project, and the manager himself is the project owner. The manager clicks the "Create Project" button, enters the name of the added item in the pop-up window, and then clicks the Save button to complete the project addition.

b) Task assignment: Managers can assign tasks in a project to developers. The manager first clicks the button of “Assign Tasks” and enters the messages: ID of the project, the task name, the assigned developer ID, the start time of the task schedule, and the end time of the task plan in the pop-up window. When all the information is complete, click the “Save” button to display information about the task in the “In Process Task”, with the task status on “standing By”.

c) Task evaluation: Managers can evaluate tasks completed by developers. When a developer submits a completed task, information about the task appears in the “Unevaluated Tasks” section with the task status “Unevaluated”. Managers can enter the evaluation level (A, B, C, D) for the task in a pop-up window by clicking the “Evaluate” button, and then click the “Save” button, where the manager completes the assessment of the task, which changes to “Completed” in the “In Process Task” part.

d) Task deletion: Managers can delete assigned tasks. The manager deletes the task after clicking the “Delete” button after the task appears in the "In Process Task" section.

e) Search: Managers can search for information about the project or task they are responsible for. The manager can view the relevant information by clicking the “Search” button and entering the ID of the project or the ID of the task in the pop-up window.

f) Developer creation: Managers can add new developers to the company. The manager successfully adds the developer by clicking the “Create Developer” button, entering information about the developer in a pop-up window, and then clicking the “Save” button.

6.2 Developer Website

6.2.1 Descriptions

Two parts: tasks to be completed and tasks in progress.

a) Standby task: displays the task information assigned by the manager but not started by the developer.

b) In process task: display the information about the task that the developer is working on.

6.2.2 Functions

a) Task start: The developer can start the task assigned by the manager. The developer starts the task by clicking the "Start" button, and the task status will change from "Standing By" to "In Progress".

b) Task submission: The developers can submit completed tasks. By clicking the "Submit" button, the task is submitted, and the task status changes to "Unevaluated"

c) Search: The developers can search for information about tasks. The developer will input the ID of the task to be queried and click the "Search" button to view the relevant information of the task.

6.3 Page

6.3.1 Home page

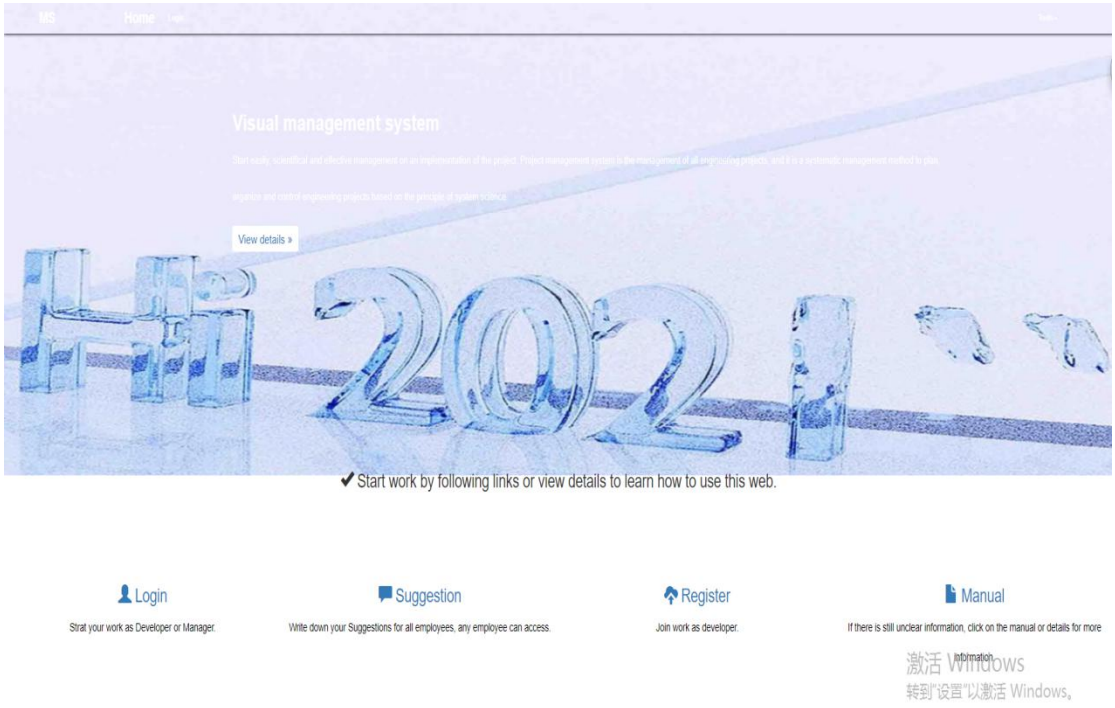

Fig9: Home page

Home page: for employees to log in, update information, make suggestions and view employee handbook.

Button:

Login: click and link to the login page.

Suggestion: Click and link to the suggestion page (only managers can access it).

Update: Click and link to the update page.

Manual: Click and link to the employee handbook page.

Bar:

3 buttons: Home (Click and link to home page), Login (Click and link to login page), Tools (Click and it has drop down list which can link to the page of suggestion, manual and update)

6.3.2 Login page

Fig10: Login page

Login page: for employees to login, the account number is employee ID (the length of ID and password should be between 8 and 16). After the correct input, let the user log in. The wrong input is invalid and needs to be reentered by the user. The user can also change the password.

Button:

Login: Click and link to the manager / developer page.

Change Password: Click and link to the change password page.

Bar:

2 buttons: Home (Click and link to home page), Login (Click and link to login page)

6.3.3 Suggestion box page

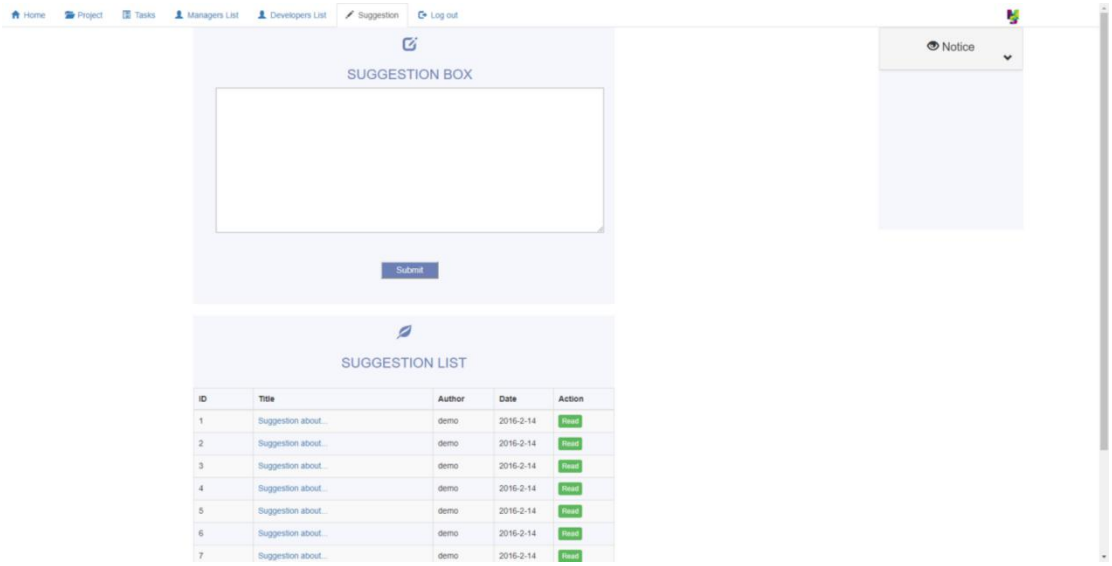

Fig11: Suggestion box page

Suggestion box page: for manager to add suggestions and get other suggestions.

Button:

Submit: add the suggestions to the list that all the managers can see.

Bar:

7 buttons: Home (Click and link to home page), Project (Click and link to project list page), Tasks (Click and link to task list page), Managers List (Click and link to manager list page), Developers List (Click and link to developer list page), Log out

(Click and link to login page)

Notice: Click and it has drop down list that show some notices.

6.3.4 Manual page

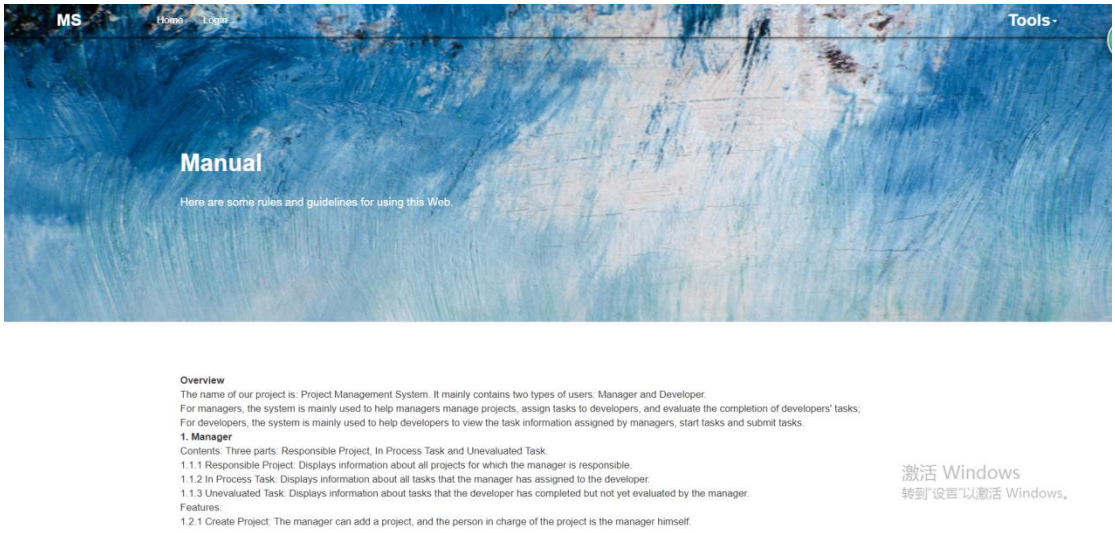

Fig12: Manual page

Manual page: show the details and the functions of web

Bar:

3 buttons: Home (Click and link to home page), Login (Click and link to login page), Tools (Click and it has drop down list which can link to the page of suggestion, manual and update)

6.3.5 Update page

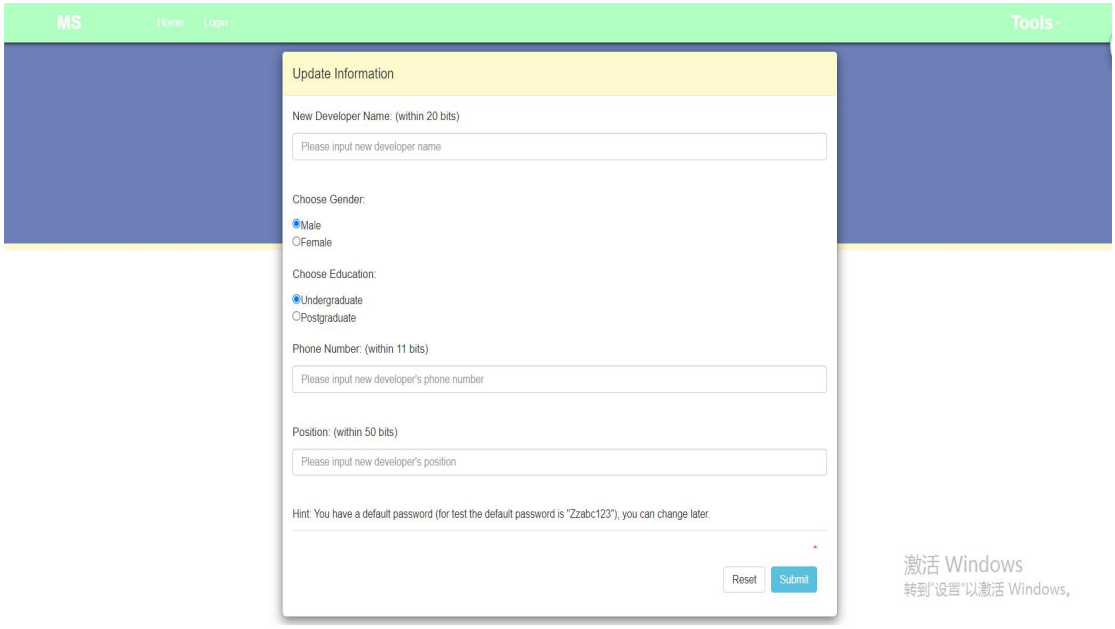

Fig13:Update page

Update page: the employee can update information, include employee ID, password, the new phone number. Then after chick submit the information will login automatically.

Button:

Reset: Click and reset the input.

Submit: The correct input will change the records in database and automatically log in. The wrong input will send an alter to the user, and user need to re-enter.

Bar:

3 buttons: Home (Click and link to home page), Login (Click and link to login page), Tools (Click and it has drop down list which can link to the page of suggestion,

manual and update)

6.3.6 Change Password Page

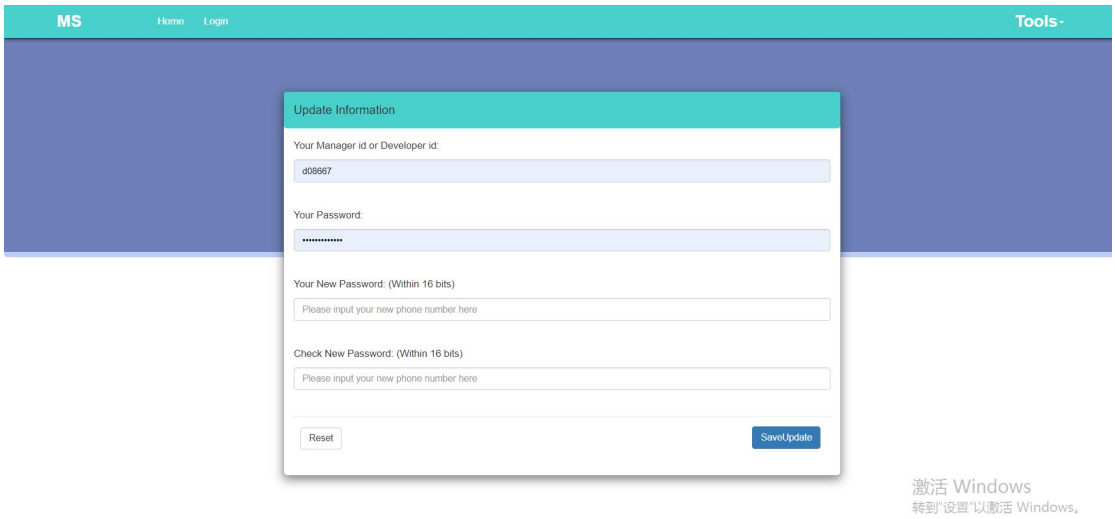

Fig14: Change password page

Change password page: The employee can change their password, include the messages: employee ID, password, new password and check. Then after chick submit the information will login automatically.

Button:

Reset: Click and reset the input.

Submit: The correct input will change the records in database and automatically log in. The wrong input will send an alter to the user, and user need to re-enter.

Bar:

3 buttons: Home (Click and link to home page), Login (Click and link to login page), Tools (Click and it has drop down list which can link to the page of suggestion,

manual and update)

6.3.7 Developer page

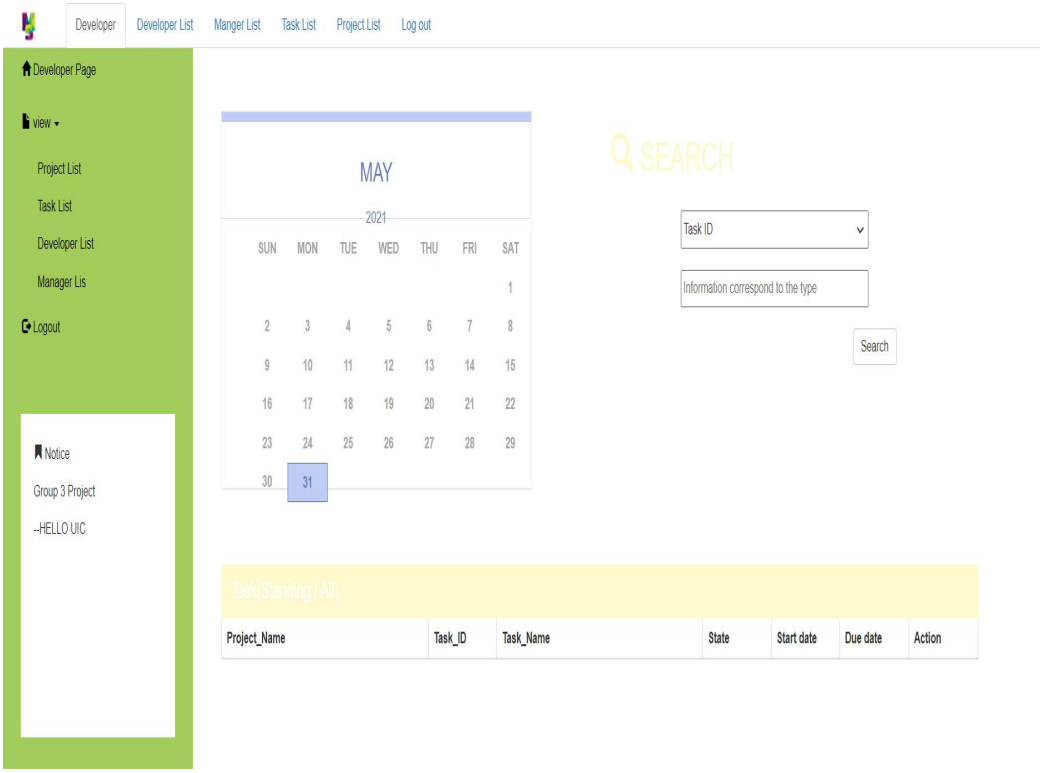

Fig15: Developer page

Developer page: For the developer, show the state of task that developer not start, in process and calendar.

Button:

Start: Click and change the state of task from standing by to in process.

Submit: Click and change the state of task and submit the task to manager.

Search: Click and get specific records in database.

Notice: show the messages of notice.

Bar:

6 buttons: Developer (Click and link to developer page), Project (Click and link to project list page), Tasks (Click and link to tasks list page), Developer (Click and link to developer list page), Manager (Click and link to manager list page), log out (Click and link to login page).

6.3.8 Search Pop-up page

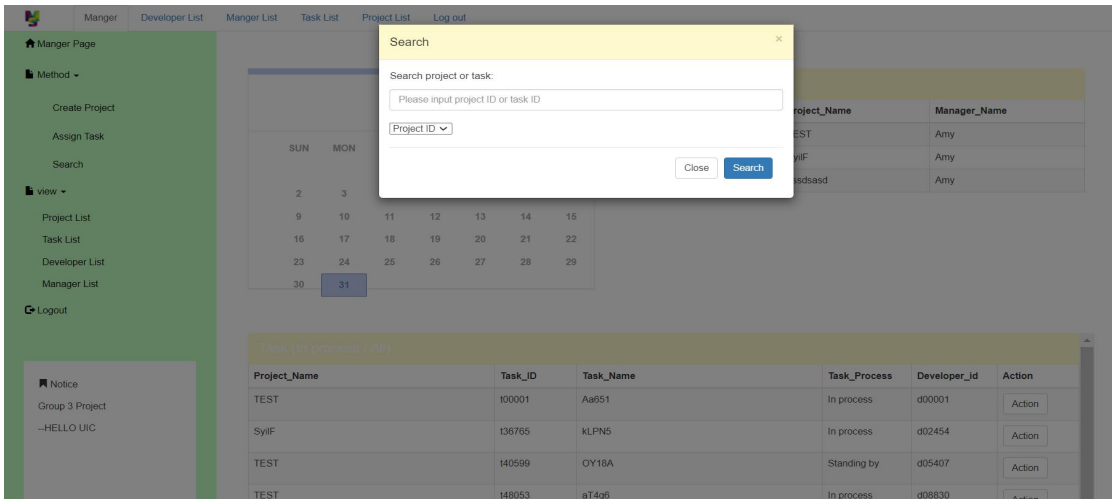

Fig16:Search Pop-pop page

Search Pop-up page: Provide services for various types of ID (project ID / task ID) to obtain all information about the corresponding ID

Button:

Search: Click to search the information.

Close: Click and back to home page.

6.3.9 Manage page

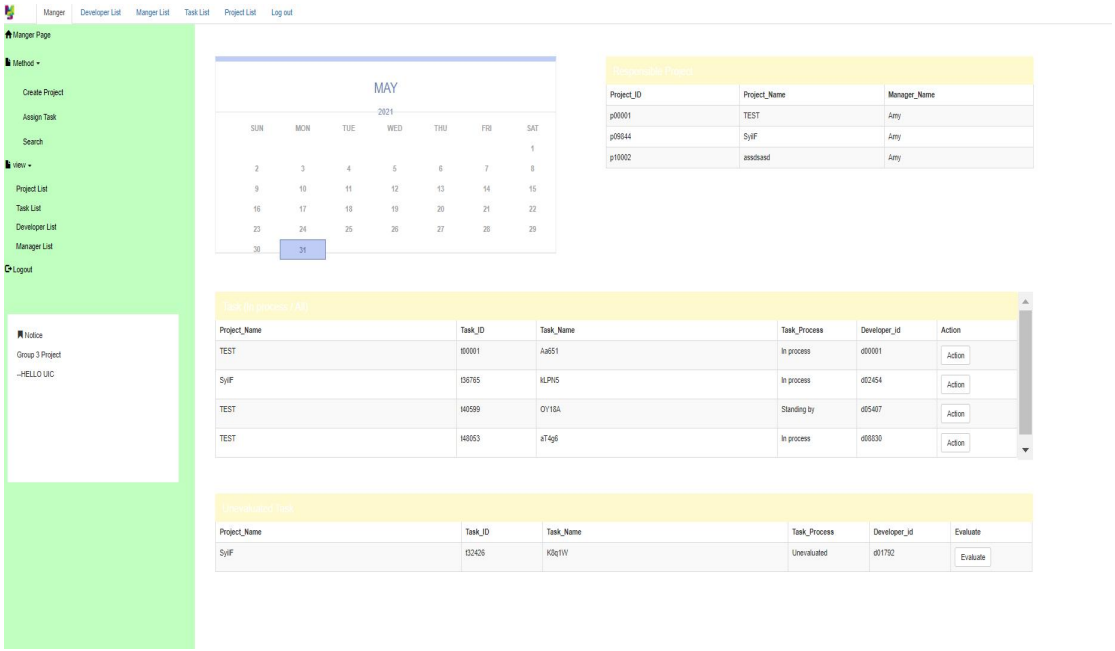

Fig17:Manager page

Manager page: For the manager, show the state of project that in process, unevaluated and calendar.

Button:

Delete: Click and delete the task.

Evaluate: Click to evaluate finished list.

Link: Click and link to the Developer, Project, Suggestions and the database list.

Search: Click and get specific records in database.

Create Project: Click then create new project.

Assign Task: Click then assign task to developer.

Create developer: Click then create developer.

6.3.10 Create project pop-up page

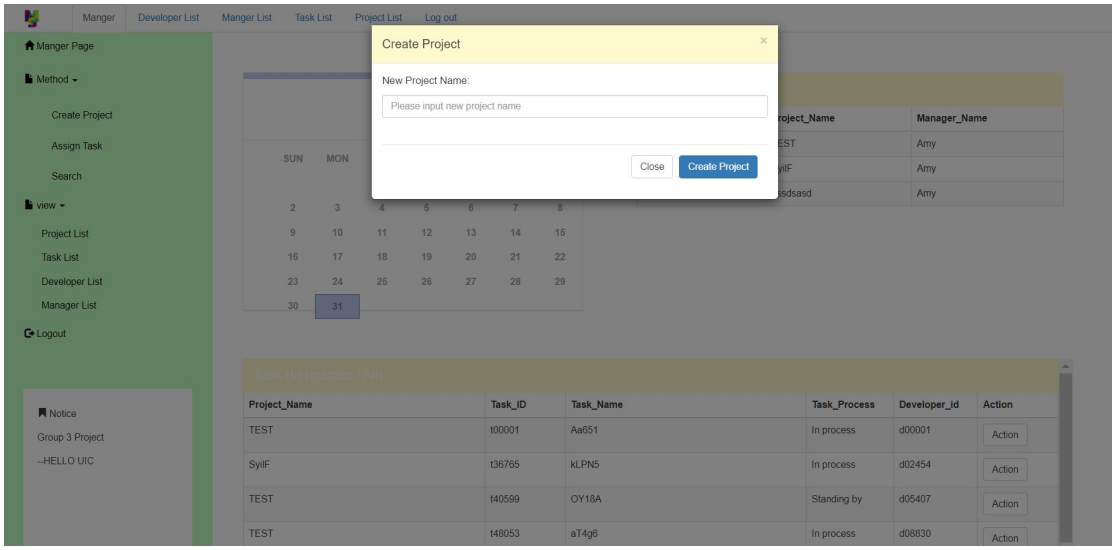

Fig18: Create project pop-up page

Create project pop-up page: For the manager to create a new project

Button:

Save: The correct input will change the records in database and automatically log in. The wrong input will send an alter to the user, and user need to re-enter.

Close: Click and back to the home page.

6.3.11 Evaluate pop-up page

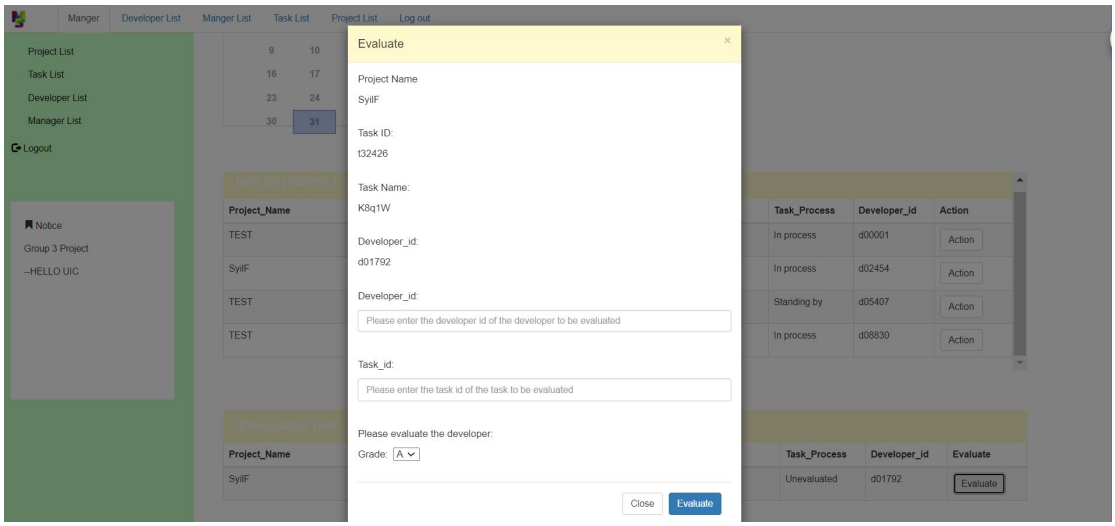

Fig19: Evaluate pop-up page

Evaluate pop-up page: For manager to create a new developer.

Button:

Save: The correct input will change the records in database and automatically log in. The wrong input will send an alter to the user, and user need to re-enter.

Reset: Click and reset the input.

6.3.12 Assign task pop-up page

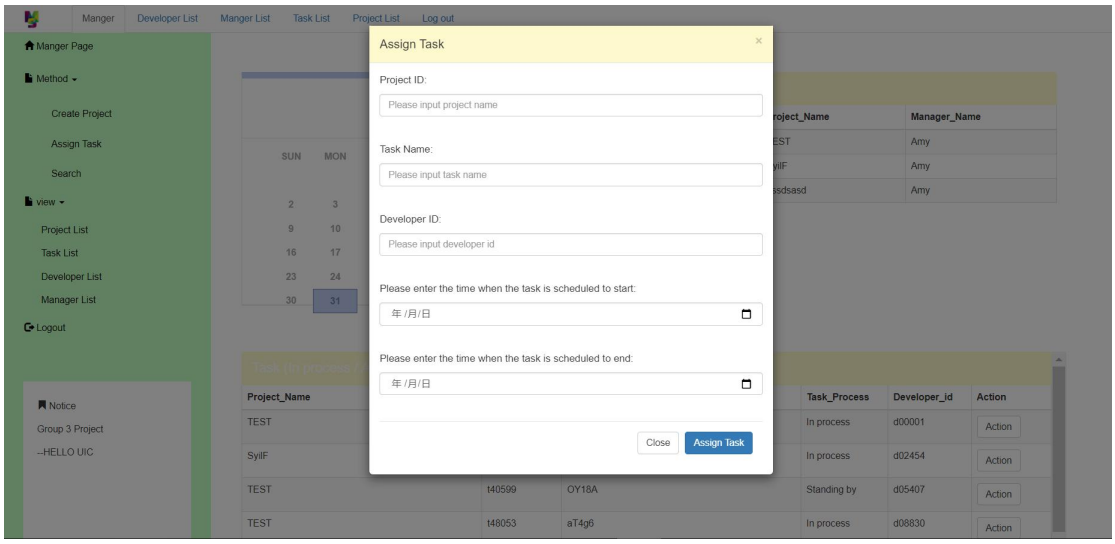

Fig20:Assign task pop-up page

Assign task pop-up page: For manager to assign the task that the developer. The information: project ID, task number, developer ID, developer name, the date of the task is scheduled to start, the date of the task is scheduled to end.

Button:

Save: The correct input will change the records in database and automatically log in. The wrong input will send an alter to the user, and user need to re-enter.

Reset: Click and reset the input.

6.3.13 Developer list page

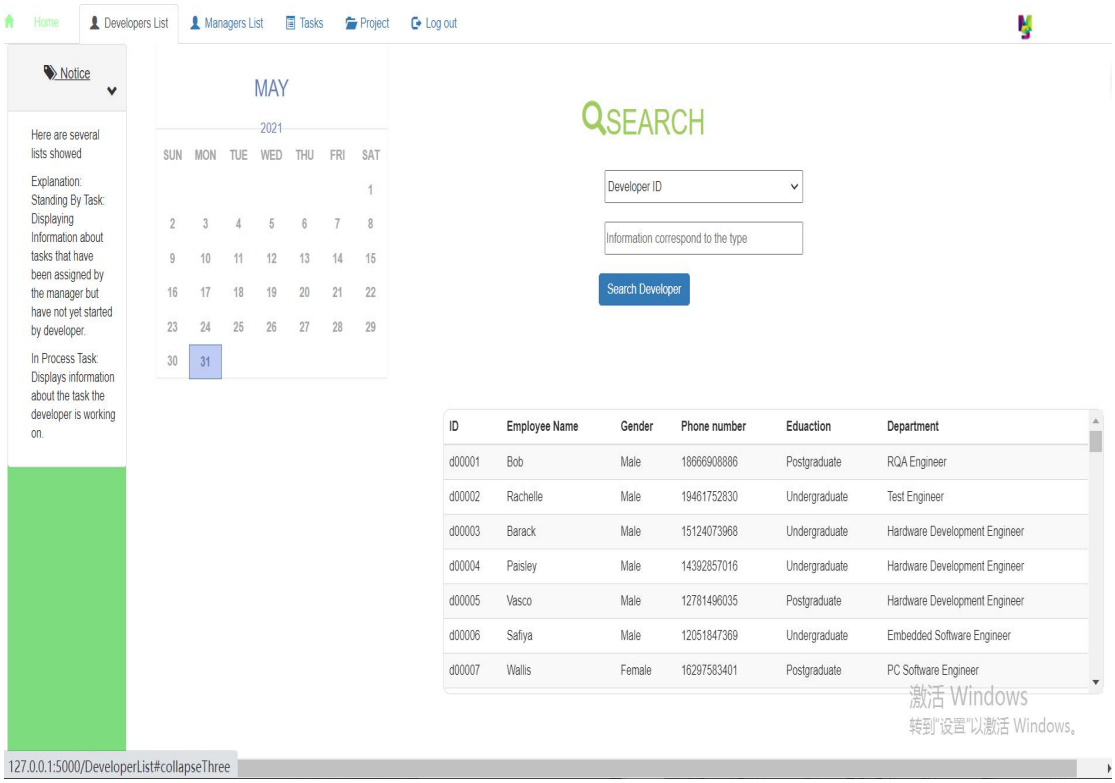

Fig21: Developer list page

Developer list page: list the information about developers and show the calendar.

Button:

View: click it and a list can link developer or manager list.

Notice: click it and a list can show notice.

Bar:

7 buttons: Home (Click and link to home page depends on type of employee), project (Click and link to project list page), tasks (Click and link to tasks list page), developer (Click and link to developer list page), manager (Click and link to manager list page), suggestion (Click and link to suggestion list page), logout (Click and link to login

page).

6.3.13 Manager list page

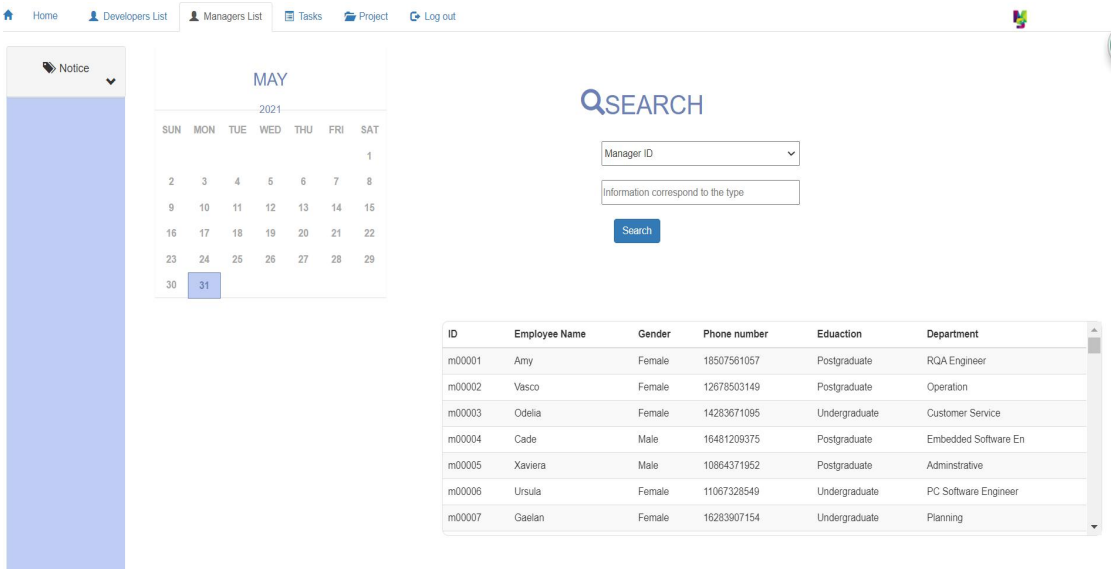

Fig22:Manager list page

Manager list page: list the information about managers and show the calendar.

Button:

View: click it and a list can link developer or manager list.

Notice: click it and a list can show notice.

Bar:

7 buttons: Home (Click and link to home page depends on type of employee), Project (Click and link to project list page), Tasks (Click and link to tasks list page), Developer (Click and link to developer list page), Manager (Click and link to manager

list page), Suggestion (Click and link to suggestion list page), Logout (Click and link to login page).

6.3.14 Project list page

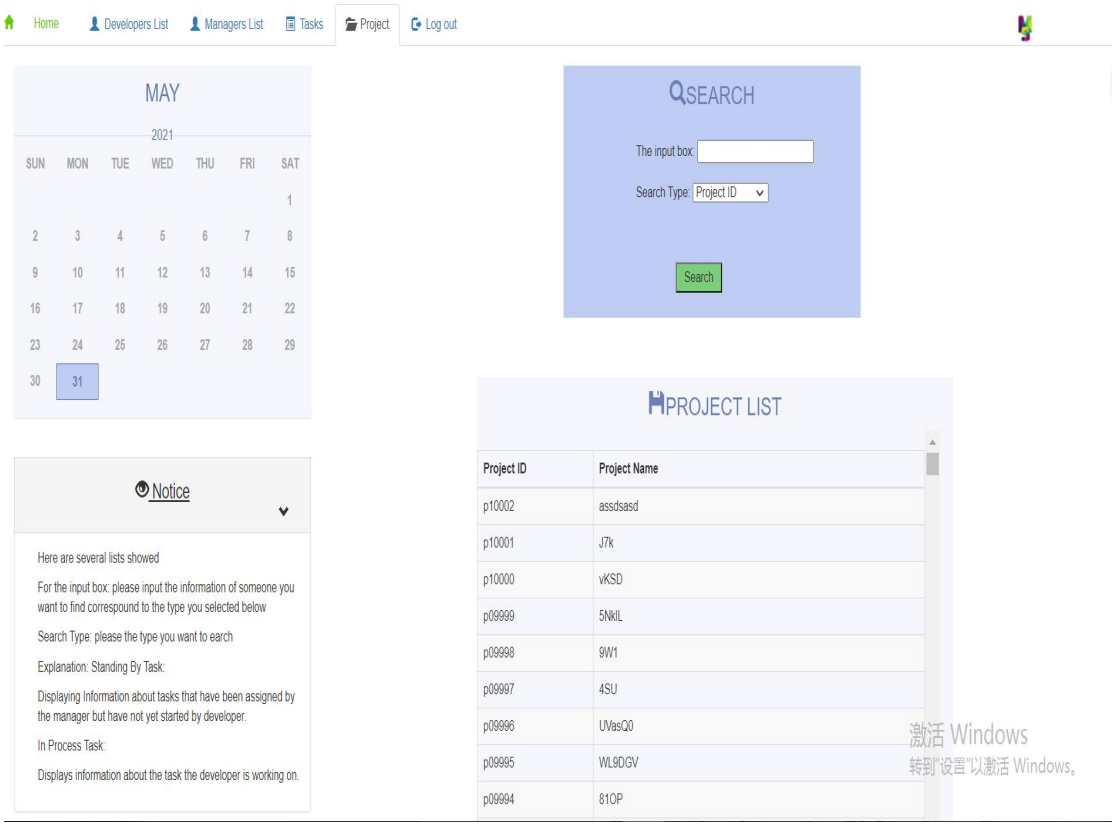

Fig23: Project list page

Project list page: list the information about project and show the calendar.

Button:

Search: click it and a pop-up can show records in database.

Notice: click it and a list can show notice.

Bar:

7 buttons: Home (Click and link to home page), Project (Click and link to project list page), Tasks (Click and link to tasks list page), Developer (Click and link to developer list page), Manager (Click and link to manager list page), suggestion (Click and link to suggestion list page), Logout (Click and link to login page).

6.3.15 Task list page

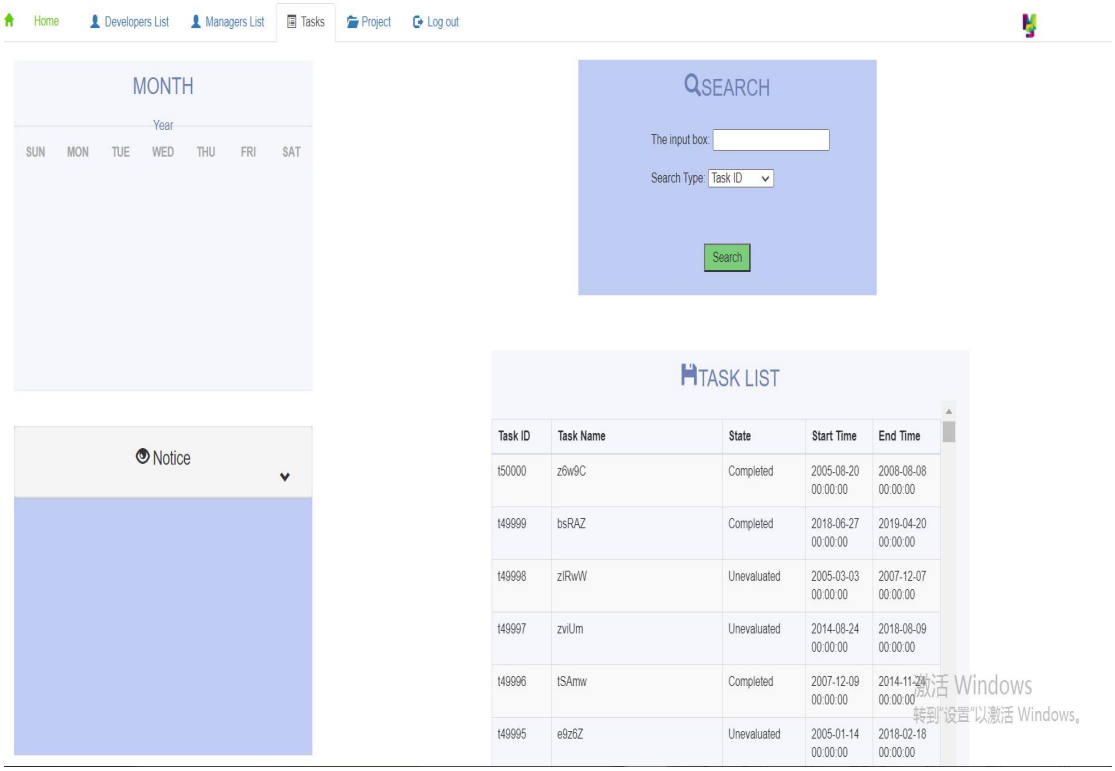

Fig24: Task list page

Task list page: list the information about task and show the calendar.

Button:

Search: click it and a pop-up can show records in database.

Notice: click it and a list can show notice.

Bar:

8 buttons: Home (Click and link to home page), Project (Click and link to project list page), Manager List (Click and link to manager list page), Developer (Click and link to developer list page), Suggestion (Click and link to suggestion page), Logout (Click and link to login page), View (Click and link to view).

7 Difficulties and solutions

7.1Difficulties

a) In the initial design of information management system, we didn't know which tables should be included in the database and the relationship between them.

b) HTML writing experience is insufficient, there is no writing ideas.

c) Many of the functions in design have not been learned in class.

7.2 Solutions

a) After watching many similar web pages, we first summarize the service objects of these web pages, then summarize the relevant functions, draw ER diagram, and finally establish the content of the database.

b) Access to relevant information and look at the HTML of Baidu and other web pages, summed up the need for the page.

c) Find related tutorials, search to learn about the code knowledge.

8 Bonus

① We design trigger to abandon users of inserting invalid data and display the error message to the user by a method. For instance, someone cannot access to the suggestion page if he is neither a manager nor a developer. Only the manager can register a new developer. If the input information is incorrect, a warning will warn you to input again until the information is correct.

② We have a jump time and button response time of about 0.7 seconds per page.

③ We can see the time and date in each page.

④ Also the page can display the time when the developers start to do the project and submit the project. Also each task also have the time when the task has been tested.

⑤ we used python to do the visualization, and analyze the relationship between the tables

⑥ If the developers or the managers input the wrong information ,so the buttons can reset, and they input again.

⑦ The manager and developers can see the progress on completion all the time.

⑧ Everything we do on the web page is directly related to the database. For example, when we register a new developer, his information will appear in the database. We delete the task, the database will also delete the task related information.

⑨ Each page's footer has the copyright sentences for Group 3, so we can know that this page is belong to Group 3.