**Python Online Judge System**

**System Design Specification (SDS)**

**Version 1**

**2019-04-14**

**Michael Yuepeng LONG, 1730026075**

**Virgil Wenbo ZHAO, 1730026155**

**Jessice Jianxin LIU, 1730026069**

**Charm Qiaomu ZHANG, 1730026149**

**Computer Science and Technology Program**

**United International College**

1. Document Change Log

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| --- | --- | --- | --- |
| ***Change Date*** | ***Changed By*** | ***Version*** | ***Change Description*** |
| 2019-04-14 | Yuepeng LONG | 1.0 | Prepared Document |
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1. Design Overview

* The purpose of this system is to provide a platform for teachers and students in the Python programming class. Students can complete the Python programming problems set by the teacher. The system automatically evaluates pieces of code from students and help students correct them. At the same time, teachers can also use this system to arrange tasks with DDL and get each student's grades based on task statistics.

The system will interact with all users as web pages. The background is implemented using Flask and MariaDB, and the front end uses the Boostrap framework.

1. Tools and Standards

## Tools

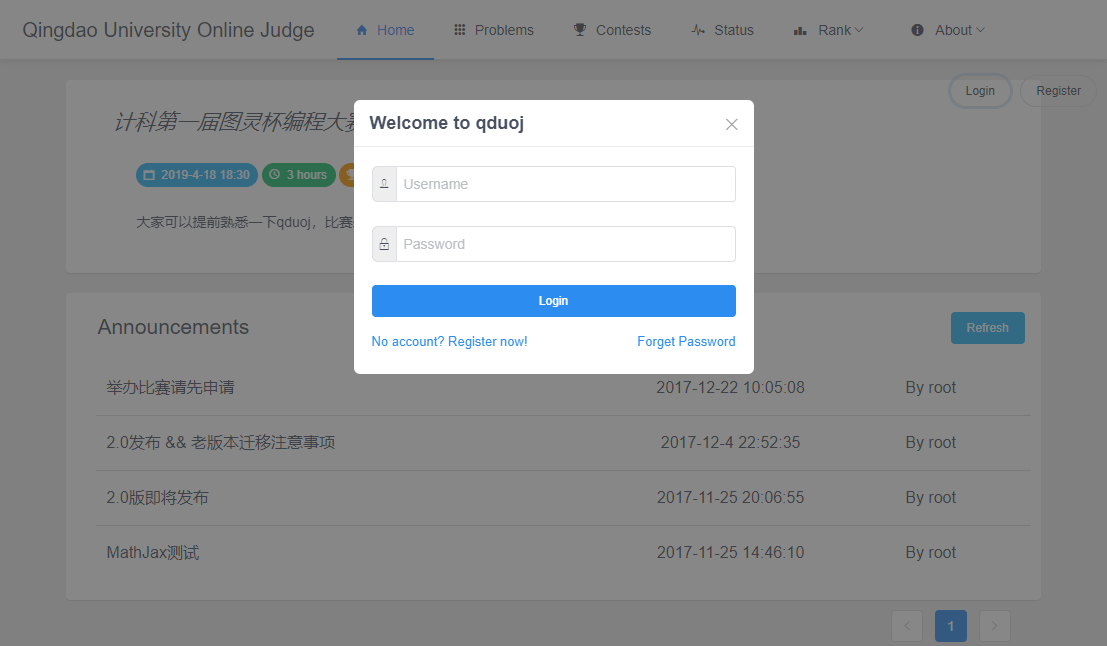
* HTML 5
* jQuery
* Boostrap v4
* Tabler
* Python 3.7
* Flask
* MariaDB

## Standards

* Testing on latest stable version of Google Chrome browser (66.0.3359.117 (64-bit) or later) and Mozilla Firefox browser (59.0.2 (64-bit) or later), no longer support IE 8 / IE 9.
* Using HTML5 standard.
* Using UTF-8 encoding standard.

1. User Interface Design

## Login

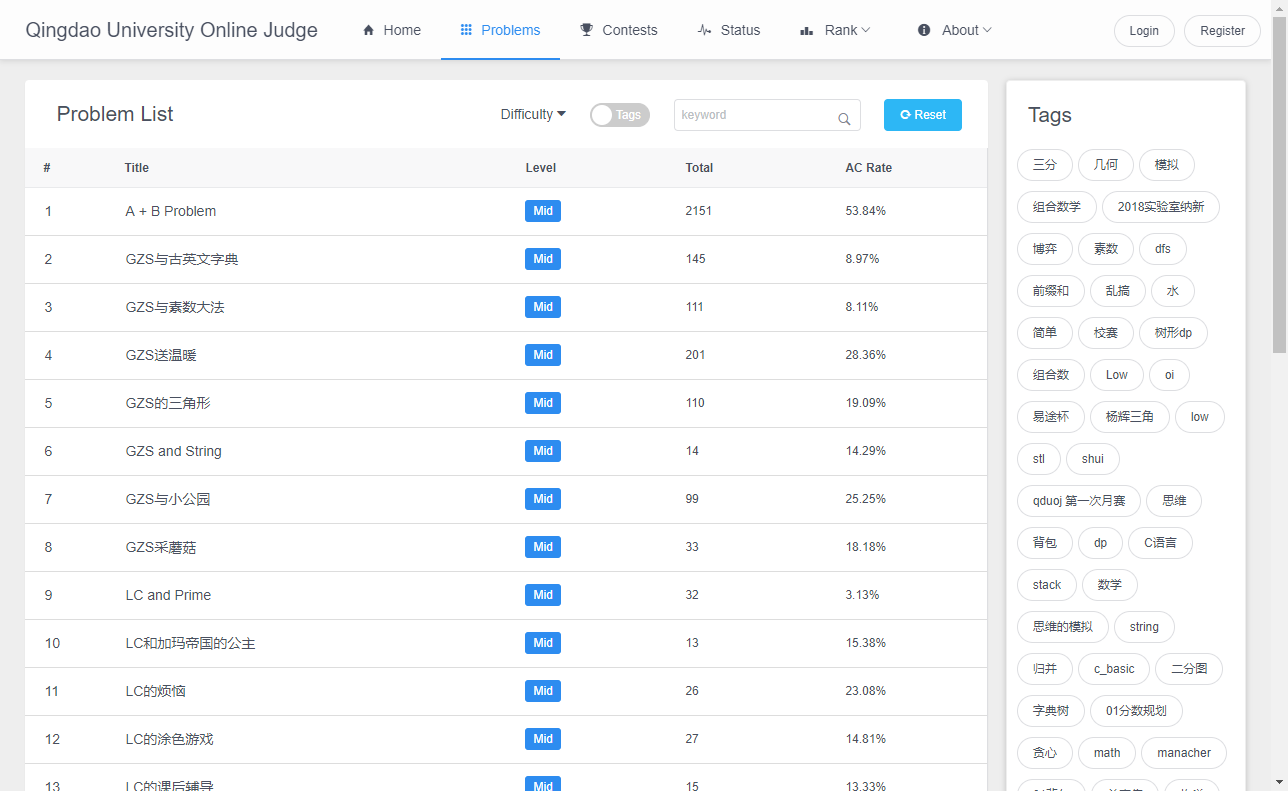


*Figure 1 Login page*

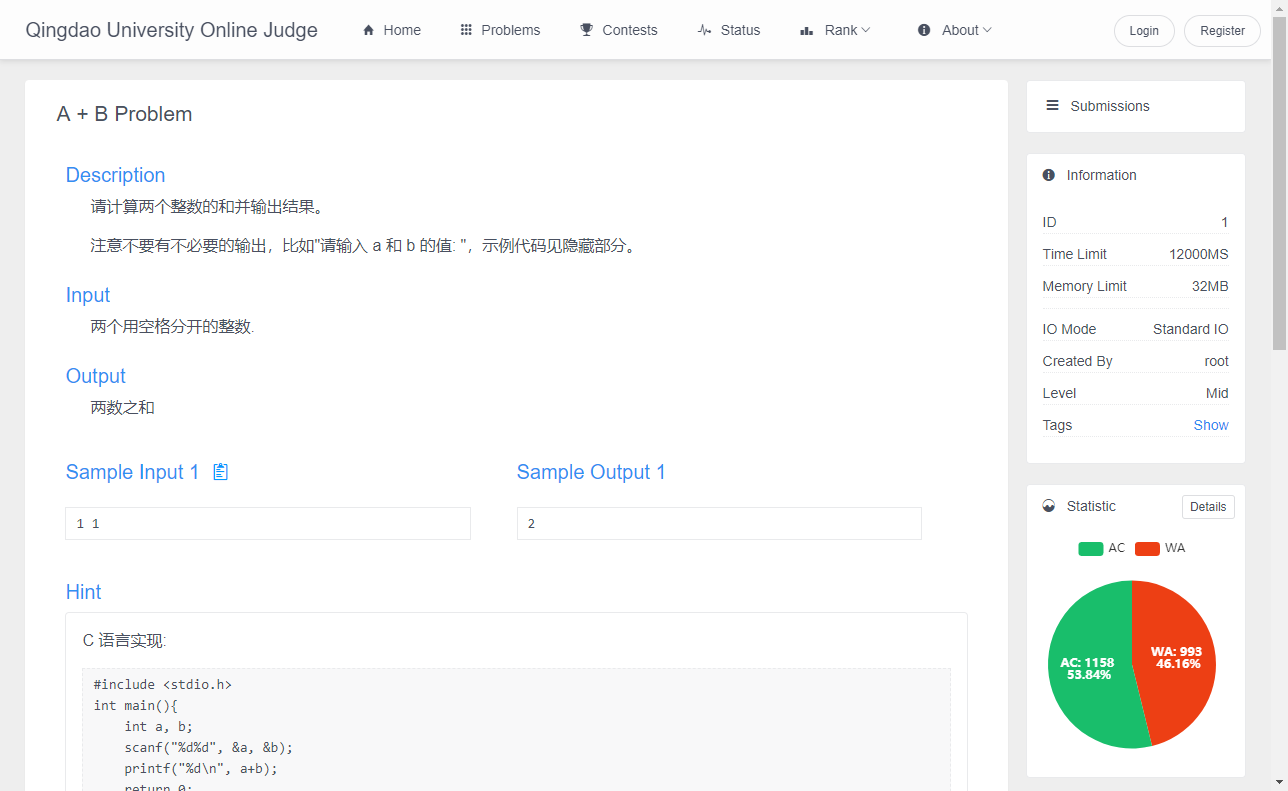
This page is a login page. A form with a username input box, password input box, and a submit button will be displayed on the page. The password entry area will use "\*" instead of the raw input.

Users are not allowed to register by themselves. Accounts are registered by administrators only (See Section 5.5).

## Problem Set

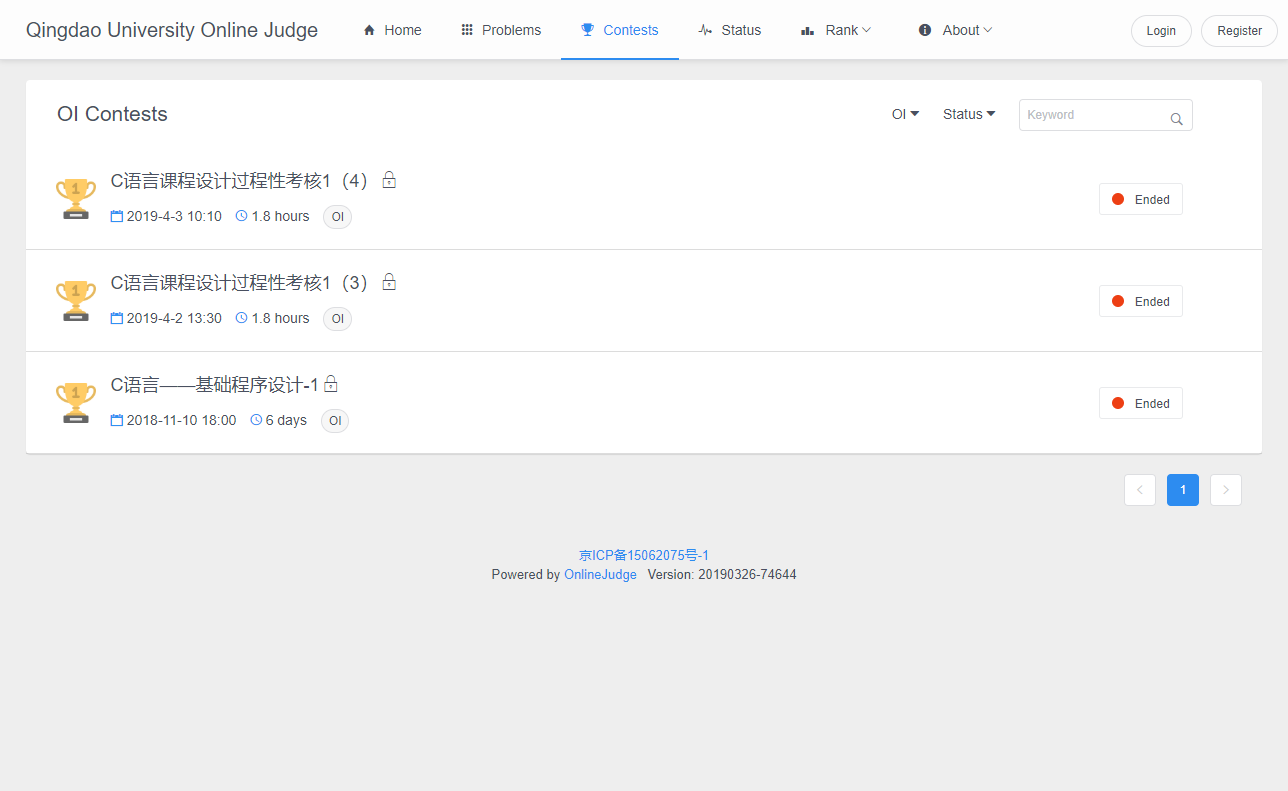


After login, users can browse problem set. Problems have their own tags for users to filter. Users not only can click the tags in the right to get all the corresponding problems, but also can input the keyword in the search blanket to look for specific problems.



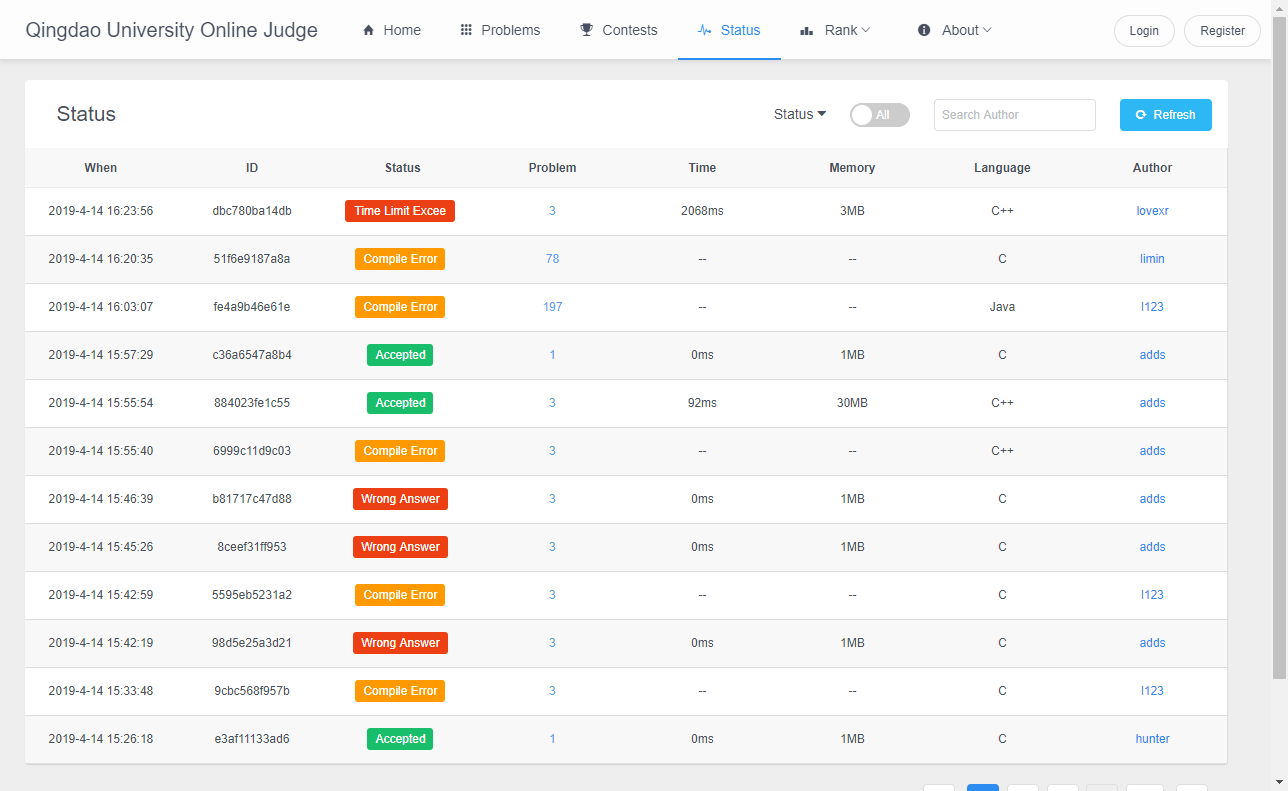
For each problem, there will be a title and a description (no sample input or output). To the right part of this page, there are information, such as tags, level and problem id. User can submit their own solution many times for one problem. After submission, system will run the test code for the submitted code and give a score back. Teachers and administrators can also change the description and the official solution of problems and adjust the test code for a problem (It will be mentioned in 5.5). Problems may be included in a task for a group of users to finish (It will be mentioned in 5.3).

## Task



This page is a Task page. There is a form for the students to get all the tasks that they need to finish. And students can click into one of the tasks get the details, including all problems related to the task. Then student can solve the problems in the task. There will be DDL for each task, and each student is required to submit the answer to each question in the task before DDL. If the submission is submitted after DDL, the score will be zero. Students of each group can only see the tasks assigned to their group (See 5.5 for the definition of group).

## Submissions & Status



This is submissions and status page. Users can submit their code through our website, this process can be repeated many times, but must be before the deadline, if the deadline is exceeded, the submission window will not be related to the task, and administrator will get the scores of every student after deadline.

We will use the test code corresponding to the question to evaluate the user's code, our system will automatically according to the passing of the test code rating. Each time a user submits a submission, if the problem is in one of the ongoing task, the score of that submission is hidden and the user can view it after the deadline.

## Admin Panel

The admin panel allows teachers and administrators to modify the system.

Teachers are allowed to:

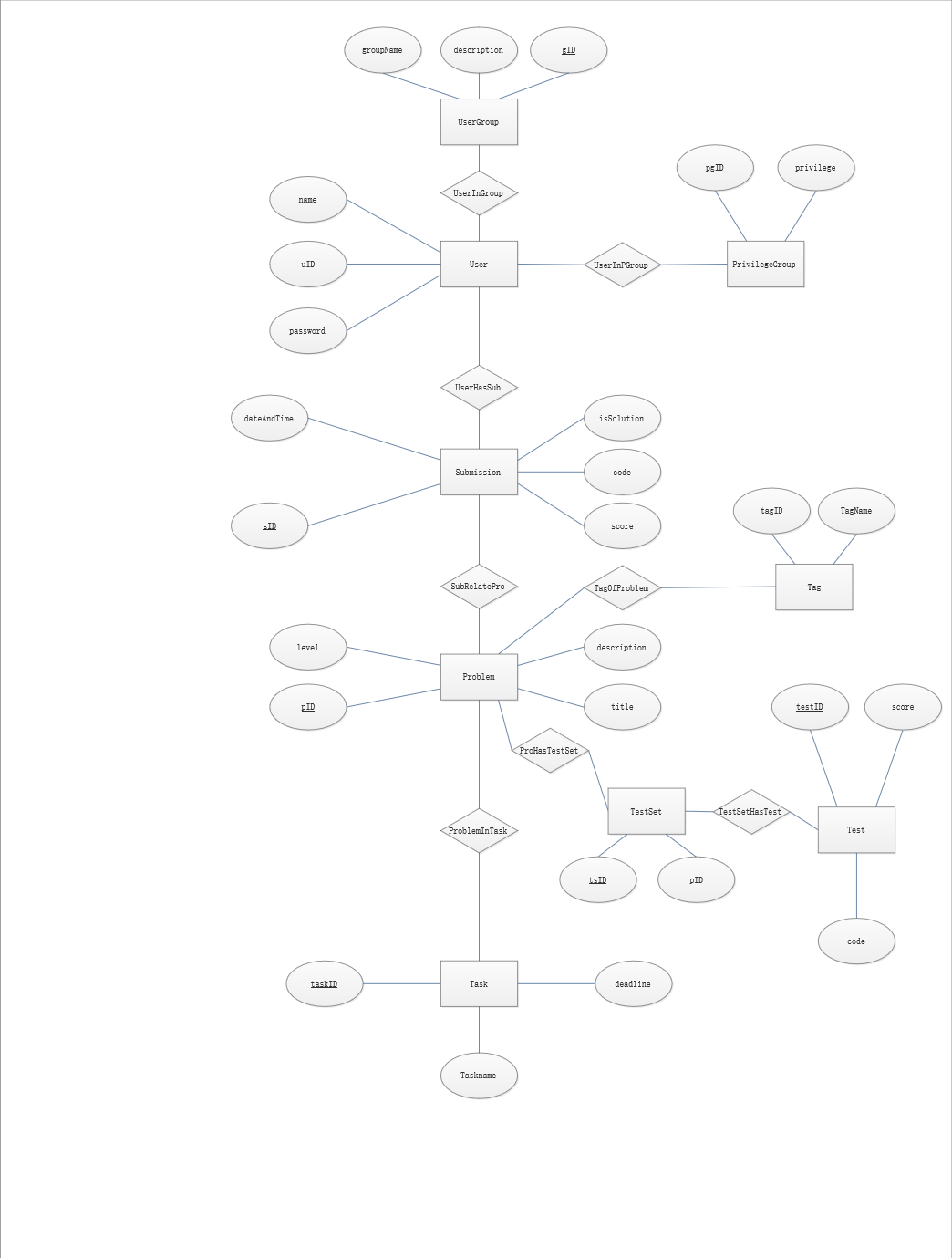
* Add, modify and delete problems
* Set submissions as the solution for a problem
* Modify test set for a problem (by adding or deleting tests from the test set)
* Create new task and set DDL for a group of students
* Manage group members

Administrators are allowed to do anything that teachers are allowed to. Besides, they are also allowed to:

* Batch registering users
* Manage activation of the accounts
* Delete accounts
* All configurations of the system

1. Database Design

The E-R diagram is shown below.



1. Diagrams

The class diagram is shown below.

