

Online Judge

Problem Statement :-

A simple online judge which takes a solution of a specific problem from the user and gives verdict whether the solution is correct or not.

Overview :-

Designing a full stack online judge using MERN stack. Takes code from user and gives the verdict(accepted or not accepted)

Features :-

- **User Registration, Authentication and Authorization :-**
 - Users can register on the website(using details such as name, email and password)
 - Users can login later using the details, preventing any unauthorized use.
 - Divide the users based on their authority(the extent of resources available to a individual) namely administrator and normal user.
 - **Optional** and can be included in later phases.
- **Problem for practice :-**
 - List of problems should be available to user which allow users to improve their skills .
 - These problems should be divided into categories namely hard, medium and easy.
- **Solution Submission, Evaluation and Scoring :-**
 - The users should be able to submit the code either submitting it for a verdict or only for executing it and getting a output.
 - In case the user only wants to execute the code without submitting it, for this the platform should have a “Run” button

which provides this functionality along with a input and output column.

- In case the user submits the code, the platform should evaluate the code and provide a verdict to the user.
- Based on the verdict and the category of the problem, the platform should provide a score to the user which will further be used in the constructing the leader board.

- **Leader board :-**

- A overall leaderboard should be developed which accounts for all the questions solved **(optional)**

- **Profile Management :-**

- Users should be able to access their profile which shows all their details including personal details, questions solved, etc.
- Users should be able to access other users profile if that user has set their privacy to public.**(optional)**
- Users should be able to manage their profile privacy(public or private).**(optional)**

High Level Design :-

1. Database Design :-

- Collection 1 :- Problems
 - Problem Statement : string
 - Problem Name(Pname) : string
 - Problem id(Pid) : string
 - difficulty/category : string
- Collection 2 :- Solutions
 - Pid : reference problems document(foreign key)
 - Verdict : string
 - submitted_at : date and time(auto datetime field)

- Collection 3 : Test Cases
 - input : array
 - output : array
 - Pid : reference to problems document(foreign key)
- Collection 4 : User Details
 - User Id(Uid) : string
 - Password : string
 - Email : string
 - Full Name : string
 - Problems Solved : Integer

2. Web Server Designing : **Web Server Design**

3. Security : Make Custom isolation for the judge using docker. It should prevent the things such as changing code of verdict, tempering with test cases.

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