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Online Platform for Coding Exams and Interviews

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ABSTRACT

In current times online technical interview websites have emerged such as Hacker rank Online Hiring, Interviewing.io and many more which allow users to evaluate dynamic code execution in the browser. These websites provide recruiters to hire programmers and rank them on their skills. Video conferencing applications are the new means of communication in today's world for attending interviews, classes, meetings, and gatherings. Coding evaluation platforms help to assess programming skills properly, and provide an authentic programming environment in which you can develop and test code. An automatic evaluation system gives a boundless relief for the examiners, and thus, it raises the objectivity, quality and speed of the assessment and gives the feedback to the students in time. The first automatic grading of programming submission was mentioned in the year 1965. Ultimately, the main goal of this project is for it to be a web application used in academic environments supporting different programming languages with the possibility of offering interviewers the ability to create evaluations and evaluate exams.

Keywords—Docker, CodingInterview, Onlineide, Code Evaluation

1.INTRODUCTION

Interviewers need to define certain parameters for a job role aligned to the business objectives for consistent and effective interviews. They are mostly required competencies for the job role for which the candidate is chosen. Online interviews are also substantially more realistic than a traditional pen and paper, whiteboard coding interview approach.

Our system is one such where all users will be able to evaluate code using an online ide and check their code.The system can compile code and test it against set of test cases. Thereafter, the submitted code is executed with constraints such as time limit, memory limit and security constraints. The output obtained is captured by the system in order to compare it with the expected output..

LITERATURESURVEY

We have surveyed the existing systems and have observed that they are well known for their variety of questions divided in numerous categories, a scalable judging system and good user interface along with discussion forums on each question.

Some of these systems support more than the common programming languages like C, C++,Java, Python. Some of these are modern systems like WorkAt Tech, Interview Bit,Code Wars and Hacker Rank.

We looked into many automated online coding platforms that assess code and give instantaneous results which was a difficult task to achieve.

1)Problem Management:

One of the main functionalities of the system are the exams attached to various programming languages for testing candidates coding skills before the interview.

2)Containers Management:

As the system will give access to users for submitting their code it becomes important that no code of two people maliciously affects the others. For this purpose, the containers are managed as such that they are isolated. Hence containerizing each candidate's run code is a critical part of the application.

DOCKER CONTAINER IN ONLINE JUDGE

Virtualization is a core technology of cloud computing. It is segregating of a single physical server into multiple virtual machines. Once the server is divided, each logical server works like a physical server and can run an operating system within it and applications individually.

Docker assists in building and deploying of containers inside of which one can bundle applications and services. These containers are lofted from images and can haveorchestration of activities. Images can be thought of as the building or packaged part of Docker and the containers as the runnable or execution aspect of Docker. A Docker container is: An execution environment which works on a set of commands. Docker uses the concept of the isolated shipping of containers, to transport software. Each of this container contains a software image. The image grantsa set of commands to be operated. For example, a container can be built, initialized, shut down, restarted, and demolished. Similar to a shipping crate, it is impetuous about the

constituents of the container when doing these tasks; for example, whether a container is a web   server like nginx, a database server like postgres, or any other serverwhich is why each and every container is loaded the same.[4]
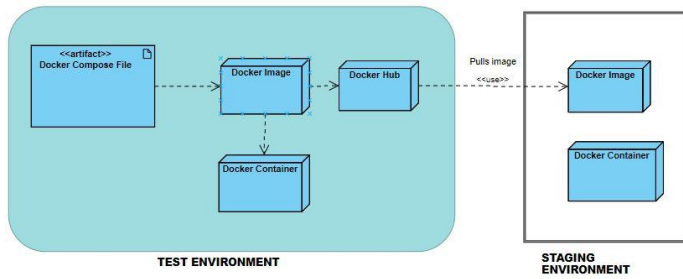
 As an insubstantial computerized automation, manyvirtualized runtime environments can be run on a particular system alongwith themodification of stacks. Then various execution environment for the language to be compiled and can be built in each of these solitary containers.

Thus, in the judging systems, the candidate'sprogram can be submitted to theanalogous Containers for testing in disparate environments. Additionally, the end result is recurred to the user immediately. Lastly, the container can be demolished after it has done the execution.[6]

PROPOSED SYSTEM

The proposed system should meet the following requirements:

1] Candidate Authentication: Candidate can login to their account to see their profile.

2] Candidate Profile Management:A candidate can also view the exams given and exam scores.

3] Coding Examination: Candidate gives the exam and submits the exam. The code of the candidate will be written in a database that will be processed by docker platform.

4] Join Interview: Candidate can join interview only if he/she passes all set test cases by the Examiner.

INTERVIEWER(EXAMINER)

5]Examiner Authentication: Examiner is authenticated and then can view the homepage. Examiner can add/delete exams

6] Test Case Evaluation: Test Cases will be run in docker containers which will be the runnable instances of the image. Examiner can also view the score of each candidate.

7] Create Room: Examiner will create room for candidate and candidate will login using username.This is possible using WebRTC that is a culmination of standards, protocols, and JavaScript APIs, the whole of whichmakes peer-to-peer audio, video, and data sharing between browsers possible.

We have proposed a system which will judge submitted code using and allow interviewers to conduct interviews for only those who pass the coding exam. The system consists of two users, namely an interviewer, and a candidate who appears for the exam.

Once the candidate passes all test cases of an exam the interviewer can see the submitted code and be able to invite the candidate. The interviewer can call the candidate from their profile using their name and connect with ease.
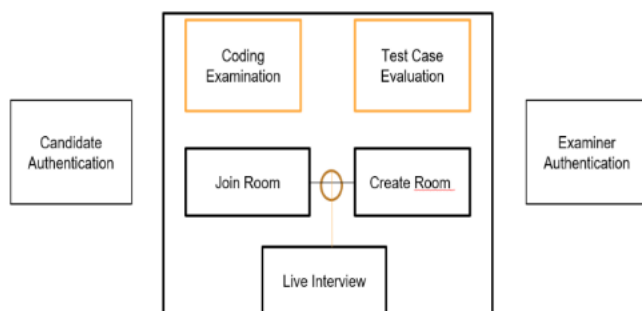

Fig 2. Block diagram of the system

The following will further describe the functionalities of the prototype system developed:

A.Candidate's profile

The system allows students to create an account on the platform. After registration, the candidate can login to the system using his password. After logging in, candidates will see the exams page with a list of exams to choose from. The candidate can move to the code submission page and submit the program's solutionusing the compiler for evaluation. The results of the same will be visible to the candidate through their profile. The candidate can also edit their profile.

B. Interviewer's Profile

The interviewer has to create an account first through signup, and then they can login to the interviewer's profile. Interviewers can add the questions along with a solution for the question. Interviewer can view the submissions done by the candidate. Also, they can invite those candidates who passed the question with all test cases.

C. Coding Examination
The coding platform consists of questions based on the difficulty level that the candidate can attempt. A candidate can take any number of exams.
D. Test Case Evaluation
The Interviewer will add one or more test cases to the exam. Each test case will have weightage and if the candidate passes specified test cases, then the score will be calculated.

METHODOLOGY

The application has been built using Laravel framework, which is a popular PHP web development framework with versatile features like pagination and fast routing.
For storing exam questions,submissions and test cases MySQL database has been used.
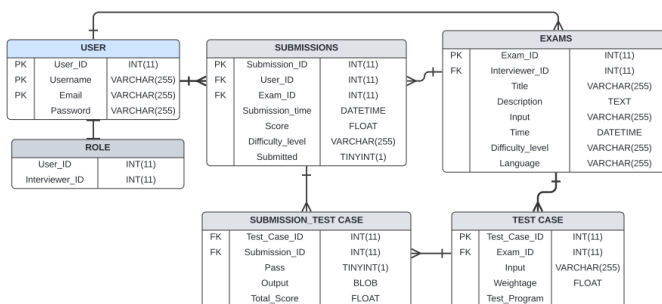

Fig 3. Data Model
The submission is evaluated against test cases added by the interviewer and are subsequently stored in the Submissiontest case table for calculating the score of the number of test cases passed. Each test case has a weightage on which the total score gets calculated.
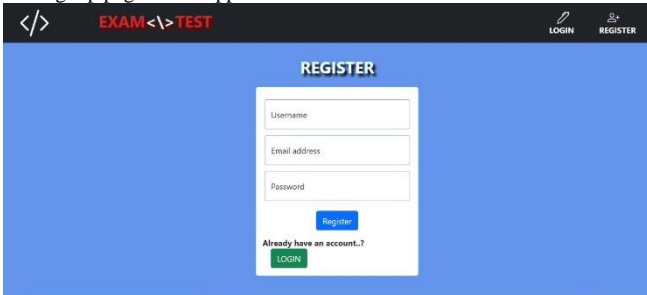
I.   RESULTS

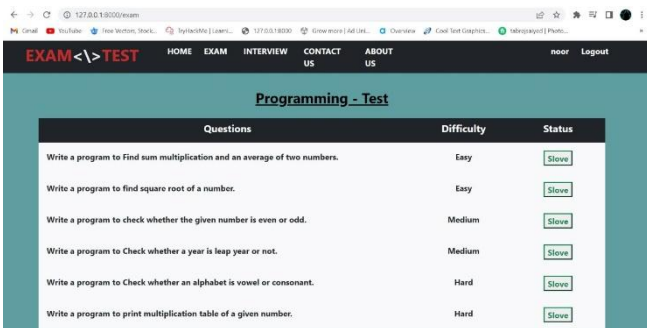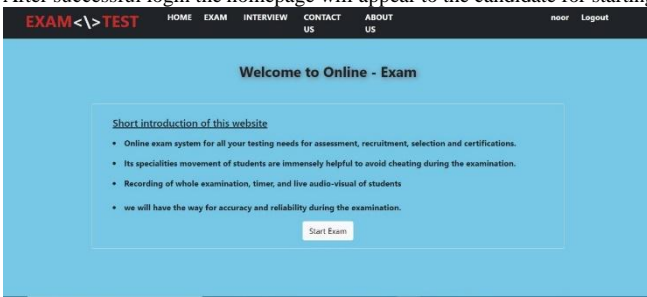The following are the screenshots of implementation
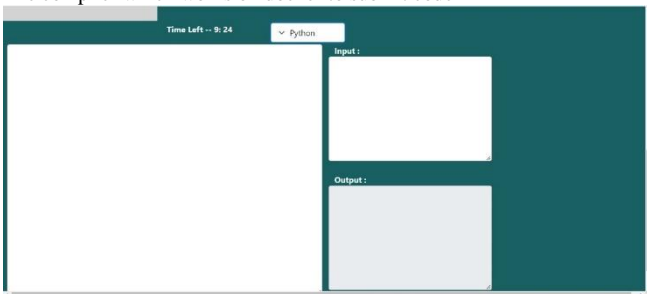

The login page of our application
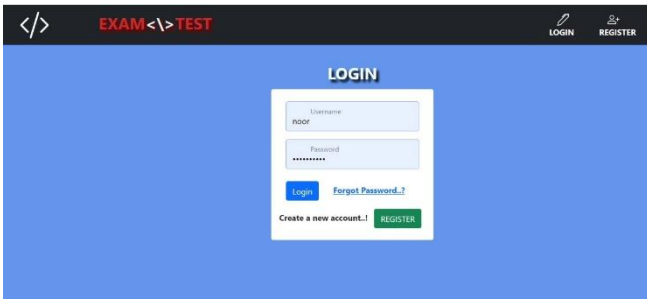
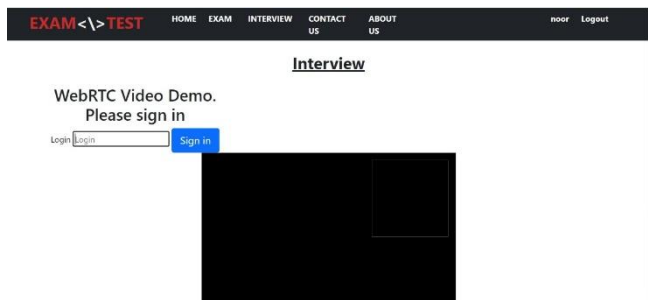The signup page of our application

After successful login the homepage will appear to the candidate for starting the exam

The compiler which works on docker to submit code

Video meeting where the candidate is interviewed

FUTURE SCOPE

We can improve this application by adding more languages,also providing some sample exams like multiple choice questions, pseudocode and some other functionalities like screen sharing in the interview section.

CONCLUSION

Our application provides an automated testing and evaluation environment for all Candidates appearing for the interview. We have successfully developed all the required functionalities for authentication, administration and video interviewing of candidates.The scoring of code submission is automated which helps interviewers effectively hire candidates based on their coding skills.

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