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CS353 Term Project Proposal
CodeInt

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1   Introduction

Online Technical Interview Preparation and Coding Platform is used commonly by students and companies. Before the development of this platform, it was hard to test a candidate in technical aspects if the company and the candidate were distant apart. And when it comes to preparation for candidates, there were only books and websites with questions which weren't suitable for candidates to prepare for interviews and it was hard to track your progress. However, with the development of coding platforms online, users and companies became able to make trustworthy and fast transactions[1]. Over the years, many online technical interview preparation and coding platforms emerged with many different innovations in design. Some allow users and companies to have real-time interactions during the interview process like Pramp[2]. Also, the interviewee can be interviewer so that the interview experience is more relatable.

In these platforms, users can choose the most suitable programming language for them which creates a convenient platform for every programmer. There are also built-in compilers for each programming language and automated test cases so that the simple mistakes are easy to catch.

These online coding and interview platforms are very important tools for programmers so that they can see their mistakes and practice questions similar to interview processes. Users can prepare themselves for actual interviews and track their growth in technical aspects. These platforms enable users to access substantial information fast and work smartly. In this proposal, we will discuss the project definition, functional and non-functional requirements, limitations and the conceptual E/R diagram to the system that we will design.

2   Project Definition

This platform, CodeInt, has three main features which are coding challenges, coding questions and non-coding questions that are accessible by companies and users. These coding challenges, coding questions and non-coding questions are prepared by the editors of CodeInt.

Users can solve questions individually in order to practice and gain experience while companies use this platform in their interview process. It can be said that the platform creates communication between the company and the candidate when it comes to the technical process. In the recruitment process, companies choose questions from the site's question pools or prepare a series of coding questions to test the candidates. Challenges and questions have categories which makes it easier for user and companies to find questions for a particular subject.

Since there are many questions, contests and user data in the site which require to store in a structured and consistent manner, and we want to organize this information and return them quickly to multiple users without corrupting the data, they have to be kept in a database instead of the file system. In addition, users are permitted the see the questions but not the solutions hence relation between the editors, users, companies and questions will be different for every role in the system. The submissions for a particular interview will be transmitted to the company directly. In order to manage data and establish different relations between the entities, a database must be used.

3 Functional Requirements

In this section, we discuss the functional requirements of our project.

3.1 User Side

CodeInt shall allow the users to solve coding challenges and non-coding questions to prepare for technical job interviews. Users will be able to choose a programming language from the languages provided to solve the challenges. Also there will be categories of questions and challenges so that the user will be able to sort the type of questions that they want to solve. The system shall allow the users to see the submissions that they have made on the challenges as well as their obtained score for that submission. The system shall allow the users to participate in the available coding contests and the users will be able to see their ranking amongst other users who have completed the same contest. The system shall allow the users to receive interviews consisting of coding challenges and non-coding questions from companies and will be able to solve them. The system shall allow the users to see their total scores obtained by solving challenges and participating in contests on their profiles. Users will also be able to see their accuracy percentage on the submissions that they have made.

3.2 Editor Side

CodeInt shall allow the editors to be responsible for evaluating assigned coding challenges and non-coding questions. The editors will receive submissions made by the users and will be able to grade the submissions. The editors will be able to provide feedback to the submissions that they have evaluated. The system shall allow the editors to design and submit new coding challenges and non-coding questions. Editors will be able to choose a difficulty and a category for their newly submitted questions or challenges as well as adding new categories to the system. Editors will be able to provide a solution for the coding challenges that they submit. The system shall allow the editors to create coding contests and evaluate the coding

contest submissions made by the users. The system shall allow the editors to collaborate with each other to design collective challenges and contests.

3.3   Company Side

CodeInt shall allow the companies to create their own interviews by submitting new coding challenges and non-coding questions or adding existing challenges and questions from the system to their interviews. The companies will be able to send interviews to users through the system. The system shall allow the companies to receive the submissions made by the users on their interviews. The companies will be able to see the users' profiles and contact them for job opportunities.

4   Non-functional Requirements

In this section, we discuss the non-functional requirements of our project.

4.1   Usability

CodeInt will appeal to all ages. That is why it will have a simple and easy to understand user interface such that you do not need to search for things even in your first trial. Also, buttons, texts and charts will be distinguishable as well. Pages of the website will be easy to navigate (through screens). There will be a hyperlink for helper page at the bottom of the screen that can be accessible anytime and explains the basic features and roles of the website. If the user wants to sign up as an editor or a company, there will be a special page that guides them to understand special features.

4.2   Reliability

Users will have a username and password in order to make their data secure. If they lose their password, an email will be sent to their accounts in a few seconds and they will recover their password. The users' data, submissions and progress will be kept in the database. Our program's database will have a back-up in case there is a crash in

the program, and the data will be recovered within 3 seconds. If users have submitted or saved their text, submissions will be saved in the database. If not, progress will not be saved.

4.3   Performance

Since our program includes challenges and several features that require a timer, it should work smoothly to not put the user at a disadvantage. It will be implemented in a way that the user does not wait for more than 1 seconds to perform input and see the results. We will use several libraries to make the program as optimized as possible for all users.

4.4   Supportability

CodeInt will be a web-based application. Therefore, it will run in any operating system. Classes and methods will be coded in an organized manner so that future problems can be solved within a day.

4.5   Extensibility

CodeInt will be implemented in a way that features like new challenges, interviews and question can be easily added. Also, the source code of our program will be easily understandable for outside coders via good architecture and commenting for the future development of our program and to solve some problems.

5   Limitations

In this section, we discuss the limitations of our project.

Program:

- To enrol to the platform, at least a username, password and an applicable e-mail address are required.
- Username and email will be unique.

- There will be a time limit in coding contest and interview questions.
- All questions will be unique.
- There will be a complexity limit O(n^3) in coding and interview questions.
- Submissions will be available for evaluation after 1 hour.
- Emails will be accessible only for validated companies and editors.
- Since interviews and questions are designed for web-based applications for desktop, suitable environments will be more efficient for the process. Hence, tablets and phones will not be a good match for the environment.

Users:
- A user can submit an answer to a coding contest 5 times until the contest is over while coding challenge/non-coding question submissions are unlimited.
- A user cannot re-submit an answer when evaluation starts for a particular coding challenge question.
- A user cannot re-submit an answer when the time is up for a coding contest question.

Editors:
- Editors must evaluate the submissions that are ready for evaluation in 1 day.
- One editor must add at least 3 questions every week or there will be a penalty.
- Editors must check company bio for validation in 1 day.

Companies:
- Companies must add their web pages in their bio.
- Only validated companies can create interviews.
- Companies communicate with their candidates only through email, there are no extra features like messaging or calling on the website.

6   E/R Model

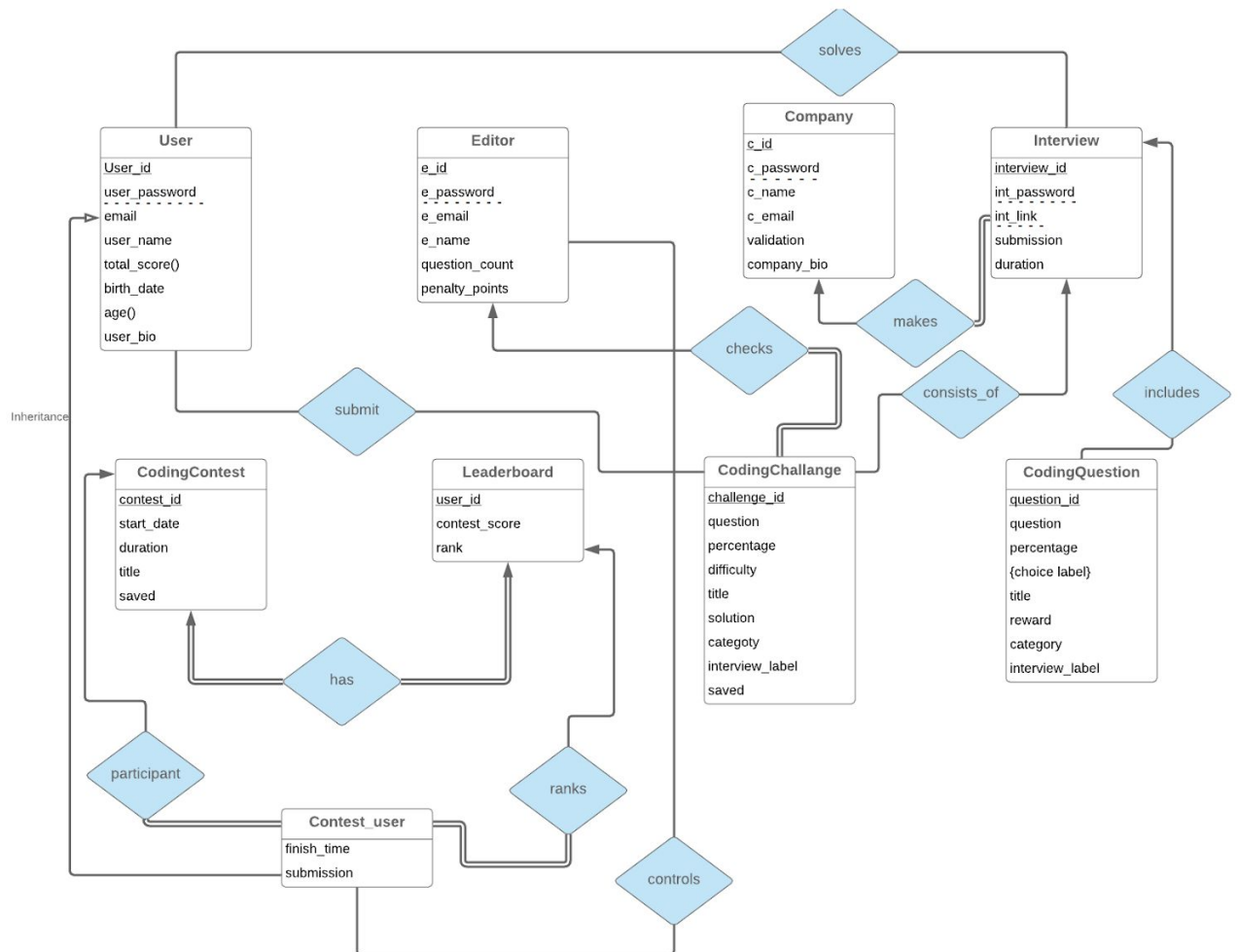In this section, we have included the E/R diagram of our project.

Figure 1 : E/R Diagram[3]

7   Website

Our project repository where reports and source code can be found:

https://github.com/pinarayaz/CS353-Database-Systems-Project

8   References

[1]LeetCode - The World's Leading Online Programming Learning Platform. [Online].
        Available: https://leetcode.com/subscription/. [Accessed: 04-Mar-2019].

[2]"Practice Live Job Interviews - For Free," Pramp. [Online]. Available:
        https://www.pramp.com/#/. [Accessed: 04-Mar-2019].

[3]"Online Diagram Software & Visual Solution," Lucidchart, 13-Nov-2018. [Online].
        Available: https://www.lucidchart.com/. [Accessed: 04-Mar-2019].