CS 353 Term Project

Proposal Report

Section 1
Group 35

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Topic: Online Language Learning Platform
Link: https://online-language-learning-platform.vercel.app
Link to ER Diagram:
https://github.com/ardaatahan/Online-Language-Learning-Platform/blob/main/diagrams/er_diagram.md

Project Description

General Description

In this project, we aim to implement a web-based online language learning platform. The system will be used by students who would like to learn a target foreign language, teachers who would like to teach classes in their language of expertise, and native speakers who would like to hold one-on-one speaking exercises in their native languages with the students. For the students, the system will first carry out a test in order to determine the students' current level on the target language and this information will be saved. In order to take a class offered by a teacher, the student will then need to send a request to the teacher for the respective class. On the other hand, teachers will make available information about the classs they offer including the level that they are going to be teaching at and their years of expertise in teaching. The students will leverage this information in order to send a request to a class they are going to take and the teachers will see the request sending students' current level at the corresponding language and eventually decide whether the student can take the class or not. The students will also have the ability to rate the performance of their teachers at the end of each class. Furthermore, the classs will have a certain capacity of students, which is not to be surpassed. For each lesson within a certain class, there will be an associated online meeting link and date-time information for the students to attend and follow the schedule of the lectures. The teachers will also be able to assign homework assignments over the system and the students will be able to upload their solutions to the system again. The homework assignments will have an associated upload area for the students, an assignment date-time information, and a due date-time information. The students will not be able to upload a homework assignment after the deadline, and the students will be given the flexibility to upload as many times as they want. The last upload will be taken into account by the teacher, which is to be determined by the upload date-time. The teacher will also be able to grade the assignments and the grades will be seen by the student on the system. Furthermore, language natives are going to be able to hold one-on-one online speaking exercises with students on request. The students will be able to see the year of expertise of the language native before sending a request. After students send an exercise request to the respective language native, the language native can either accept the request or reject it. If the language native accepts the request, he/she must provide an online meeting link, provide date-time information. After the exercise, the language native will be able to provide a grade to the student on the system. One extra addition to the system will be the inclusion of a forum. Any user of the system, student, teacher, or language native, will be able to post a topic on the forum and start a

discussion. Each forum topic is going to have relevant tags, status such as resolved, and date-time information. Other users are going to be able to post replies to the topic, and each reply can have multiples comments posted by other users.

Why Will a Database System Be Used?

The system needs a database system in order to manage the interactions between the students, teachers, and language natives. Each student should have persistent information about their enrollment to classs, grades, levels in languages, speaking exercises, and so on. Each teacher should also be able to see the students enrolled, set a capacity to the classs, provide links to students, provide date-time information, give and grade homework assignments, and etc. A similar scenario is also valid for the language natives. In order to support a forum functionality where users interact in text over forum posts, we also need a database system. Otherwise, the data would not be persistent, and the system would not work as intended. With the use of a relational database system, it is going to be extremely efficient to access, manage, persist, categorize, and filter data, which is going to make our application more powerful.

How a Database System Will Be Used?

As aforementioned, a relational schema is going to be utilized in order to keep track of the data to be used in our application. We have chosen to use PostgreSQL database management system. Therefore, with the use of primary keys, foreign keys, and tables we are going to be able to turn our entity-relationship model diagram into a fully functional online language learning systemE database.

Requirements

Functional Requirements

For all users (students, teachers, language natives)

- All users must be able to post a topic on the forum.
- All users must be able to reply to a forum post.
- All users must be able to comment on a reply.

For students

- Students must take an exam to determine their levels in a specific language.
- Students must be able to create online meeting requests from language natives for speaking exercises.

- Students must be able to see their grades in speaking exercises.
- Students must be able to rate the performance of language natives.
- Students must be able to take classes from teachers.
- Students must be able to rate the performance of teachers.
- Students must be able to see the description, assigned date, the due date of homework.
- Students must be able to upload their homework to the system.
- Students must be able to see the grades of their homework.

For teachers

- Teachers must be able to specify their years of experience.
- Teachers must be able to specify the languages they know.
- Teachers must be able to give classes.
- Teachers must be able to accept/reject students' attending requests.
- Teachers must be able to assign homework to specific students.
- Teachers must be able to grade homework.
- Teachers must be able to see how many students are taking their class and students' activities on student accounts.
- Teachers must be able to see their ratings.

For language natives

- Language natives must be able to specify the languages they speak.
- Language natives must be able to hold speaking exercises.
- Language natives must be able to accept/reject speaking-exercise requests.
- Language natives must be able to grade speaking exercises.
- Language natives must be able to see their ratings.

For admins

- Admin must be able to see how many people are learning a specific language from a teacher.
- Admin must be able to see the grade average of teachers.

Non-Functional Requirements

Reliability

- The database system must be designed in a way that there must not be any data loss during a system failure or malfunction.

- The database system must be designed in a way that there must be consistency during data modifications.

Performance

- SQL queries must be optimized in order to obtain a stronger system performance.
- Golang will be used for website's backend purposes to minimize performance issues.

Security

- Passwords of users must be kept as encrypted in the database.
- After a certain number of login attempts, the system shall lock the account to protect users from potential hackers.
- Only necessary information of students will be shared with teachers.

Maintainability

- Object oriented programming patterns shall be used to make the application more maintainable.
- SQL queries shall be encapsulated to improve scalability of the system.

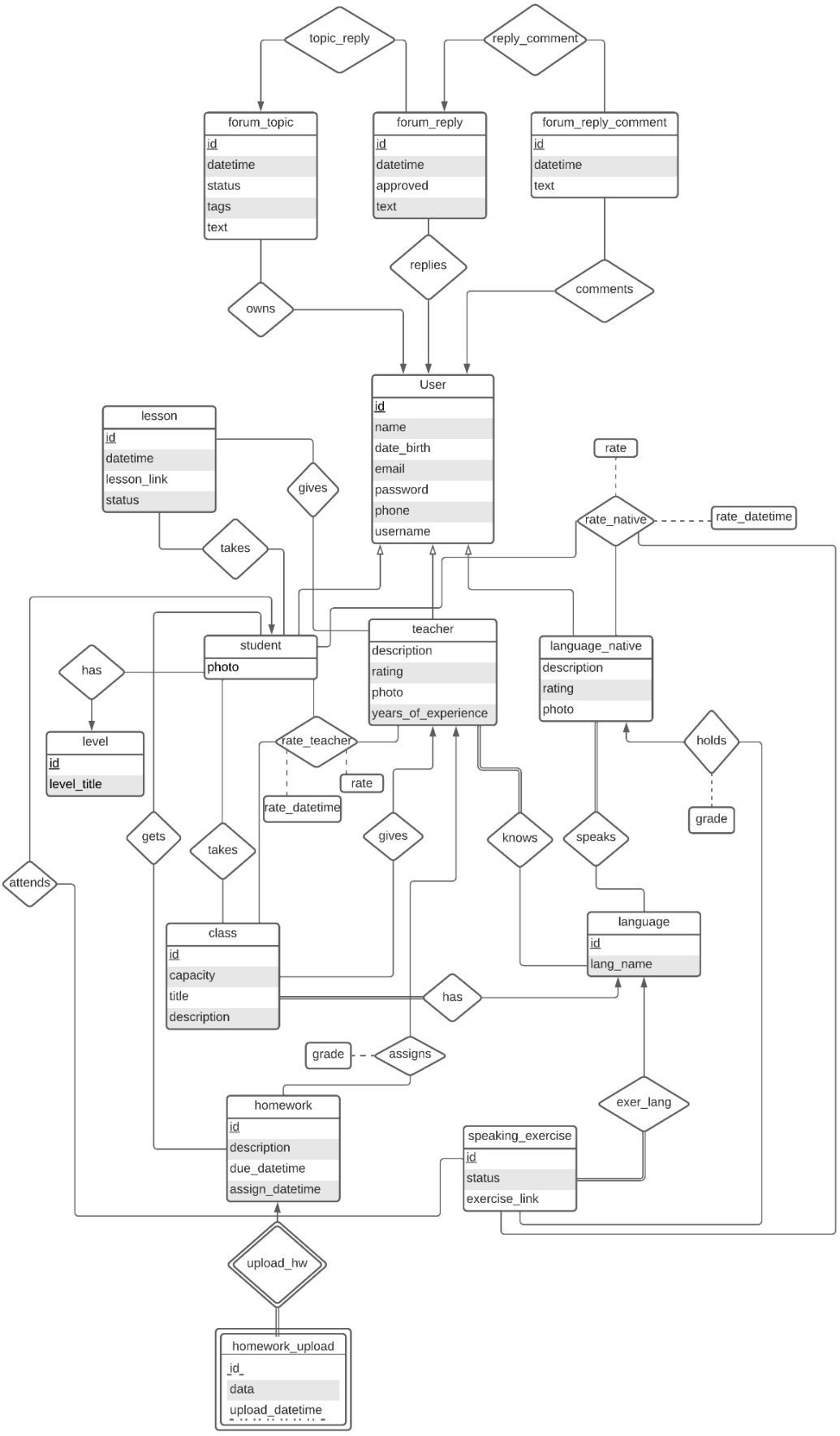
Pseudo Requirements

- The system will be a web-based application
- Golang will be used as the main language while implementing the back-end of the web application.
- PostgreSQL will be used as the database management system.
- Javascript's React framework will be used for the front-end of the web application.

Limitations

- There cannot be more than one user with the same email address.
- Passwords must be longer than six characters, and include at least one number.
- Language natives cannot give classes unless they are also teachers.
- A class must have only one teacher.
- Homework must be given by only one teacher.
- Every teacher and language native must know and specify at least one language.
- Students cannot modify their grades given by teachers or language natives.
- Students cannot upload homework assignments after the deadline.
- Teachers or language natives cannot modify their ratings.
- At most one language can be taught in each class.

ER Diagram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