
Bilkent University

Department of Computer Engineering

# CS353

# Project Proposal Report

Online Language Learning Platform

Date: 28.02.2022

Section: 2

Group: 32

Ata Seren 21901575

Berkan Sivrikaya 21803052

Can Avşar 21902111

Osman Semih Tiryaki 21801994

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Website of our proposal: https://qlanduril.github.io/cs353/

# 1. Introduction

## 1.1 Overview

In this project, we are aiming to design and implement a database system that stores various types and sizes of data with hierarchical and connected structures for an online language learning platform. This proposal contains a brief description of the system, reasons and the way of using a database system, functional and non-functional requirements for the features of the system, limitations for the functionality of the system and conceptual design of the database by using an ER diagram.

## 1.2 Description

The online language learning platform will be a web-based application that provides education for different languages to students by teachers and/or native speakers of a language. There will be 4 types of users: students, teachers, native speakers and admins. To access the platform, every user must have a unique username and password. Students can choose languages and a teacher that gives the education of that language. During the education, students can access the related language's course materials. They can upload homework and take exams assigned by their teachers. Also, they can request classes or problem solving sessions from teachers or speaking exercises from natives. After completing the course, students can rate their teachers and apply to a proficiency exam to get their certificate. Teachers can give lessons and problem solving sessions upon requests, upload additional course materials and assign and grade homework and exams via links. They can see the statistics about their courses and their students' activities. In addition, a teacher can apply for a qualification test prepared by native speakers of a language to teach that language. Native speakers can also be teachers and have the same properties with them. However, if they are only native speakers and not teachers, they can arrange speaking exercises upon requests and grade them. Also, native speakers can approve teachers according to their teaching eligibility test mentioned above. Finally, admin users have total access to the database to see, add, change or delete data manually in case of a need. Also, they can see statistical value about students, teachers, natives and courses.

## 1.3 Why & How

### 1.3.1 Why a Database System Will Be Used?

First of all, we need a database system to keep the data that will be changed according to the actions of the users. Users' profile data, progresses in the learning schedule of prerecorded courses, assigned homework and grades, class requests from a teacher and meeting requests

with the natives, course materials, user schedules, natives' meeting schedules and grades must be stored and be able to be reflected to and changed by the user. Other than user data, statistical value in the system that can be and needs to be analyzed, such as the number of students learning a language or the usage amount of other features must be stored in the database. A database can provide us to store variously categorized data that needs to be manipulated constantly but also allows us to store large amounts of this data in an organized way. A file system alternative to the database system can't provide such abilities in terms of both the variety and large amounts. Therefore, implementing a database system is needed to create a functional and efficient online language learning platform.

#### 1.3.2 How Will a Database System Be Used?

Users such as students, teachers, natives and admins will have data specific to each user. For example, a student's progress on different languages, given homework, grades, schedules and such data or the schedules, course info, student lists and such data for teachers and natives must be stored according to a categorization for the different types of access by different users. For the storage and organization of this data, we will create user-type-specific entities and we will use several relationships to connect these entities to content and features of the online language learning platform. We will plan this organization by creating an ER diagram that can be found in this proposal and use it for the implementation on the SQL database. By using the database system, we will allow users to display, manage and manipulate the data.

# 2. Requirements

## 2.1 Functional Requirements

### 2.1.1 For Students

**i) Pick a language:** Students will be able to choose the language they want to learn.
**ii) Take a language level test:** Students can apply to take an exam to be able to pass and reach higher level course material.
**iii) Signup and login:** Students can sign up to the platform with a unique username and access their private information via login.
**iv) Request a class from the teacher:** Students will be able to request an online session from teachers for re-explanation of a particular subject
**v) Request online speaking exercise from natives:** Students will be able to request an online session from natives for speaking exercises.
**vi) Access course materials:** Students can access the additional course materials uploaded by their teachers.
**vii) Upload assigned homeworks:** Students can upload files as answers for their homeworks assigned by their teacher

**viii) Upload assigned exams:** Students can upload files as answers for their exams assigned by their teacher for a time interval
**ix) Apply for a certificate:** At the end of course, students will be able to take an exam for a proficiency certificate
**x) Check progress:** Students can see their progress on a particular language
**xi) Rate teacher:** Students will be able to rate teachers after completing the course.
**xii) See all certificates:** Students can see and download all of their certificates.

### 2.1.2 For Teachers

**i) Give private lessons:** Teachers will be able to give lectures on Zoom and to provide links for course content.
**ii) Take attendance:** Teachers can save the attendance info of their private lessons.
**iii) Assign homework (to specific students):** Teachers will assign homework via pdf links to students taking their course.
**iv) Grade exams:** Teachers can grade exams which are assigned to their students by themselves.
**v) Grade homeworks:** Teachers will be able to grade homeworks they assigned
**vi) See all students (and student count) taking a particular class:** Teachers will be able to see all students who are taking a particular course from him and their count.
**vii) Check student activity:** From see all students menu, teachers will be able to see student profile and activity on the site.
**viii) Apply to teach a new language:** Teachers can apply for a qualification test prepared by natives to get eligibility to teach a new language.
**ix) Upload additional course materials:** Teachers will be able to upload additional material on the course page like pdfs, lecture notes etc.
**x) Assign exams:** Teachers can assign exams to the students for assessing their language improvements.
**xi) Sign up and log in:** Teachers will be able to sign up and log in as teachers with their unique username and password.

### 2.1.3 For Natives

**i) Arrange speaking exercise:** Natives can arrange online speaking exercises via scheduling a zoom meeting.
**ii) Grade speaking exercise:** Natives can also grade these speaking exercises.
**iii) Approve teacher:** Natives can approve teachers according to their teaching eligibility test.
**iv) Sign up and login:** Natives can sign up to the platform with a unique username and password and use them to access the platform.

### 2.1.4 For Admins

**i) Make analysis of the system:** Admins will be able to make analysis on the system such as:
- See student count learning a specific language
- See student count of a specific teacher
- See average grade of a section
- See teacher average rating

**ii) Has access to the database to change data manually:** Admins will also have admin authorizations like adding, removing users and content from the system.
**iii) Sign up and login:** Admins can log-in to the system with their unique usernames and passwords.

## 2.2 Non-Functional Requirements

### 2.2.1 User-Friendly Interface / Usability

The front-end user interface of the application will be designed and implemented to be user friendly. We will aim to achieve that all users can use our program in a very intuitive way.

### 2.2.2 Maintainability

Our program will be implemented to handle errors without damaging any other parts of the application. Also, the program should warn when an error occurs to have effortless and quick maintenance.

### 2.2.3 Reliability

The database system of the program should be designed and implemented to protect data when an error occurs. We will try to ensure no data is lost when the data is modified or added.

### 2.2.4 Performance

We can measure the performance by the response time of the system. Also, the system must have a response time of at most 5 seconds. To achieve that, we will try to optimize SQL queries to achieve increased performance.

### 2.2.5 Total Capacity

We will have a capacity of at least 8 GB of data, and our program must serve at least 100 users simultaneously.

# 3. Limitations

**Total capacity limitations:** In order to achieve promised performance on promised time total capacity must be determined.

**Every language has to have at least one teacher:** Languages without teachers are meaningless since the teachers give the homework and make assessments.

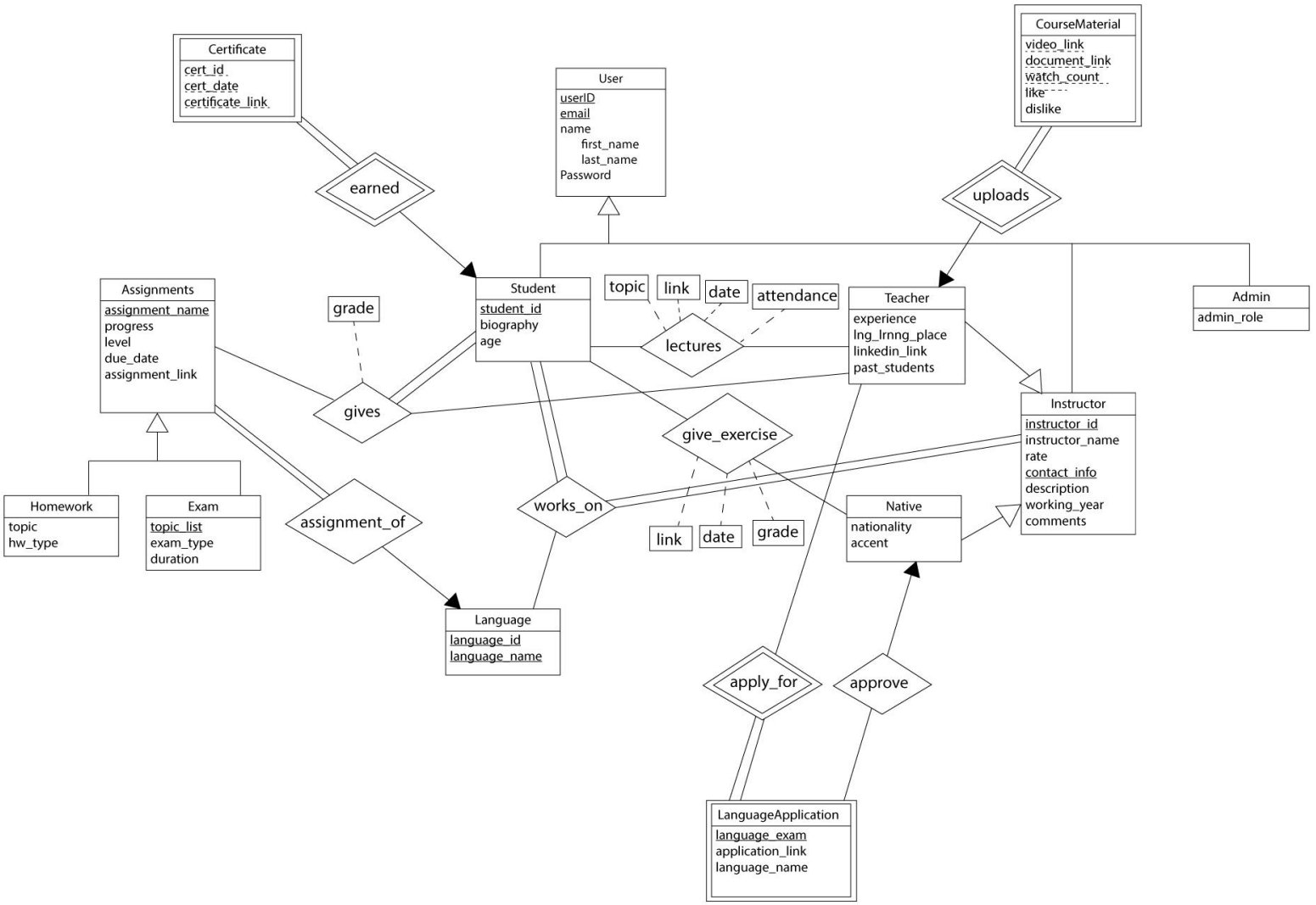
**Native speakers cannot access/give lessons:** There is no need for natives to access the lesson information since it is not their concern.

**Students cannot modify their grades:** It would be meaningless for students to assess themselves since this is the duty of teachers.

**Admins cannot see private data such as users' passwords:** Passwords are sensitive data and they can not be visible by anyone.

**Teachers cannot see their students' grades from other lessons:** Teachers can't access the data that they can modify.

# 4. E-R Diagram




Here is the link for the better resolution version for our diagram: Group 32 ER Diagram.png