System Design Document

Group - 2

CSCE 361 - Spring 2017

CourseNebula

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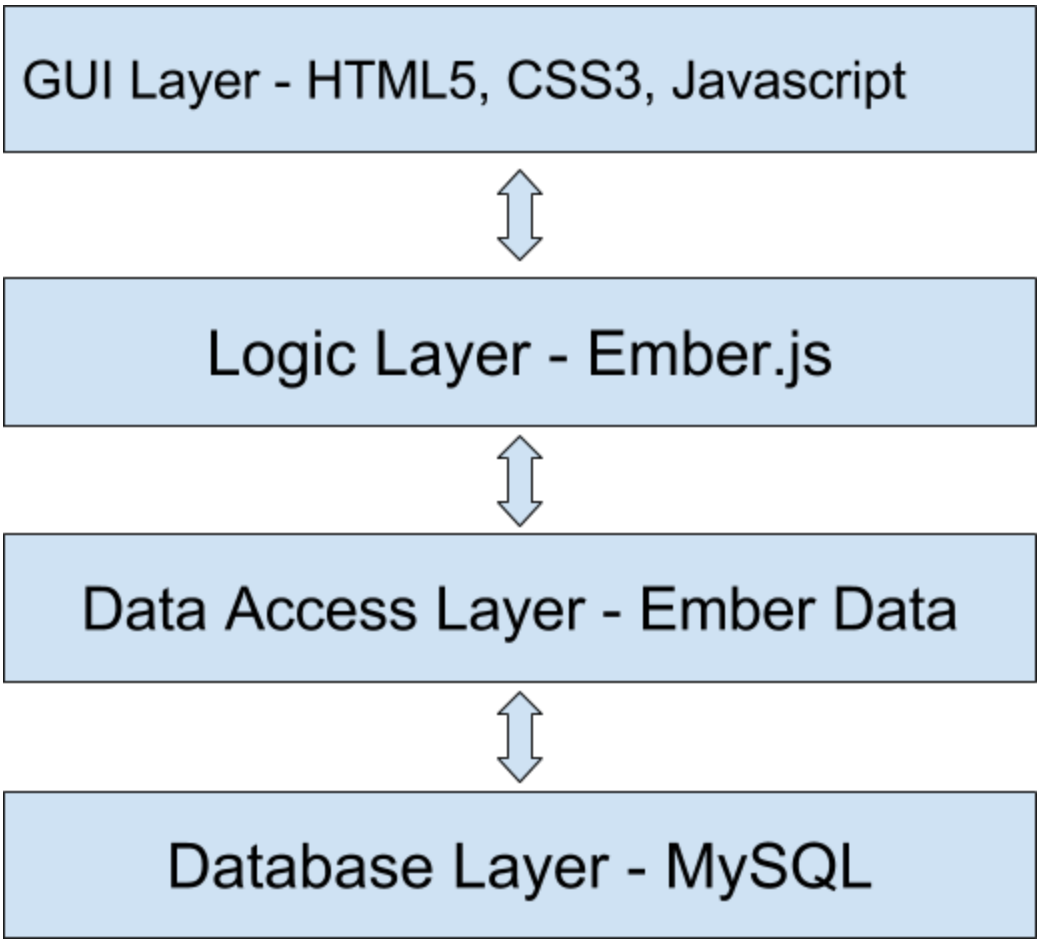
1. Introduction

The purpose of this design is to demonstrate the high level architecture for the CourseNebula webapp. This document will include architecture and entity relation diagrams showing the relationship between different parts of the system, as well as the relationships between tables in the database. The audience of this document will be the designers who will be maintaining the webapp.

2. Architecture

2.1. Introduction



CourseNebula will run on a strictly hierarchical layered model. At the very bottom there is a MySQL database for storing information. A level up is the Ember Data layer for reading from and writing to the database. The third layer will use

Ember.js to perform logical operations on the information from the layers above and below it. The fourth layer will use HTML5, CSS3, and JavaScript to display information to the user and retrieves data from their interactions with the web service.

2.2. Modules

2.2.1. Database Layer

The Database Layer is responsible for keeping all of the data necessary for the CourseNebula's operation. The project will be using a MySQL database which can be accessed through Ember Data. More details can be found in Section 3.

2.2.2. Data Access Layer

The Data Access Layer is the system CourseNebula will use to draw information from the database and convert it into a form that the website can perform logical operations on. This layer will also be able to write to the database. All this functionality will be implemented through Ember.

2.2.3. Logic Layer

The Logic Layer is the system CourseNebula will use to perform all logic necessary to populate the GUI Layer and write to the database. The Logic Layer will accept as input the classes from the Data Access Layer and perform logical operations on them. It will then pass information up to the GUI layer for display. At this point it will also pass information back down to the Data Access Layer to write into the database.

2.2.4. GUI Layer

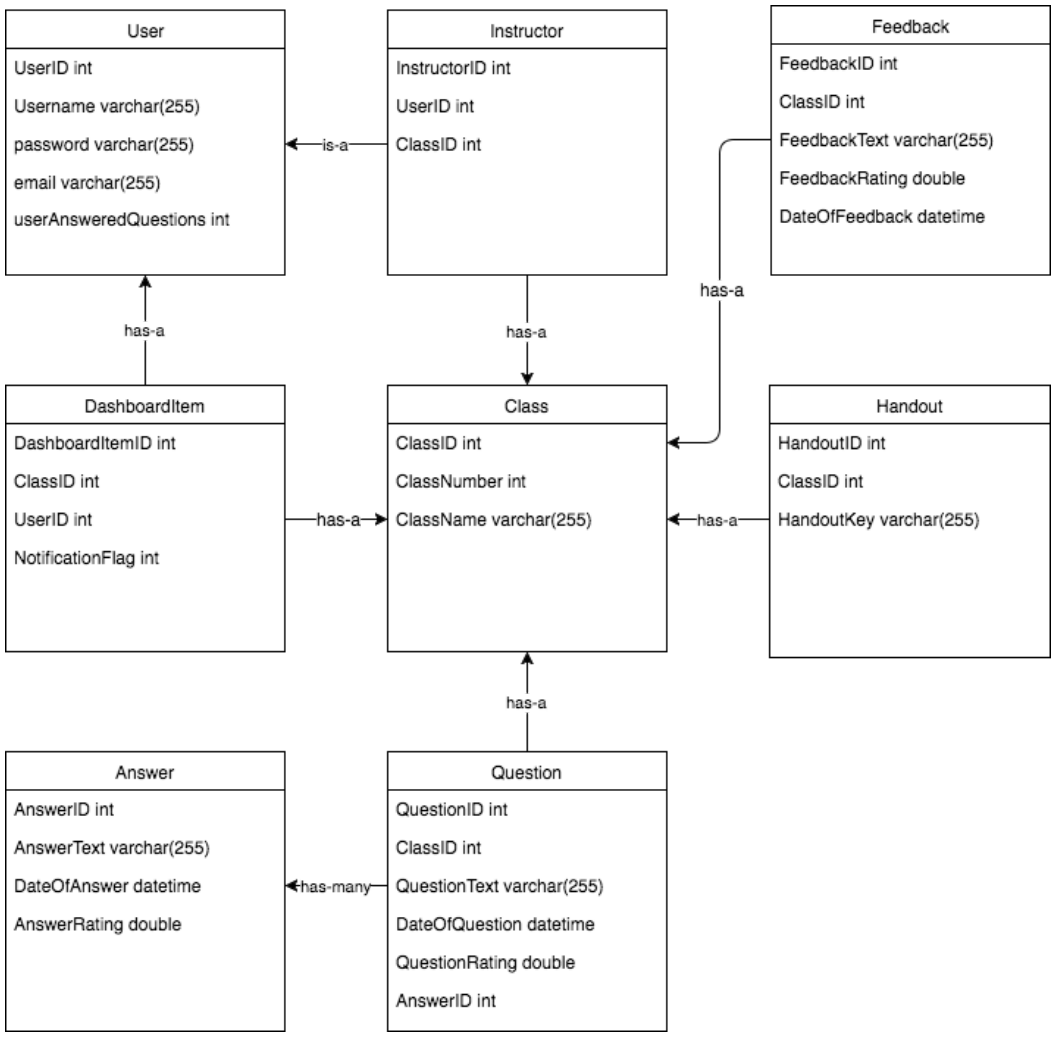
The GUI Layer is the system CourseNebula will display information to the user. This layer will take in data from the Logic Layer to populate pages on the user's request. User input will be passed down to the Logic Layer for processing.

The GUI Layer will use a combination of HTML5, CSS3, and Javascript. It will be entirely visual in nature and all calculations will be performed by the Logic Layer. This allows us to switch platforms (i.e. from desktop to mobile) by simply rewriting the GUI layer and keeping the other four layers intact.

3. Class Diagrams

3.1. Data Table Classes

3.1.1. Schema



3.1.2. Schema Information

- **User**: This table holds the User's account information such as username, password, email, and questions answered. Each User has a username, a password, and an email.

- **DashboardItem:** This table holds a Class that a user has pinned to their dashboard. Each DashboardItem is tied to both a Class and a User.

- **Class:** This table holds all the information regarding the Classes that users will be able to ask questions about and leave feedback on. Each Class has a name and a number.

- **Handout:** This table contains the key for a document that a professor wishes to be available to students viewing their class, such as a syllabus. It is tied to a Class.

- **Question:** This table contains all of the questions that have been asked by students. Each question has a body of text, the date it was asked, and the rating given to it by other students. Each question is associated with a User, a Class, and an Answer

- **Answer:** This table contains all of the answers that have been given to questions. Each answer has a body of text, the date it was posted, and the rating given to it by other students. Each answer is associated with a User, a Class, and a Question.

- **Feedback:** This table contains all the comments left by students about classes they have taken which were not prompted by a prior question. It contains a body of text, the date it was posted, and the rating given to it by other students. Each Feedback is associated with a User and a Class.

- **Instructor:** An instructor is a user which has been given special privileges on a class page. They are associated with a User and a Class.

3.2. Class Information

CourseNebula will use Ember Data to retrieve information from the database. Once the data is retrieved, it will be used to populate the classes in JavaScript using the variables outlined in the section above. Once created, these classes will be used in any necessary calculations and then sent upward to the GUI layer to be displayed.

3.3. GUI Layer

The top layer of the system will consist of a few pages. The home page will have links to the login and registration pages. From there, they will be redirected to their own dashboard with classes they have selected. There will also be a class index page to find other classes.

The class page will consist of several components. There will be a section to upload/download course material, such as handouts and the syllabus. There will be another section for asking and answering questions from peers and instructors. Students will also be able to leave feedback and comments about the course and instructor.

There will also be a section for basic course information, such as credit hours, ACE credits, etc. The professor may also add more information about the class, such as office hours and TA availability.