System Design document

Code-Next

System Design Document

CSC301 - Introduction to software engineering

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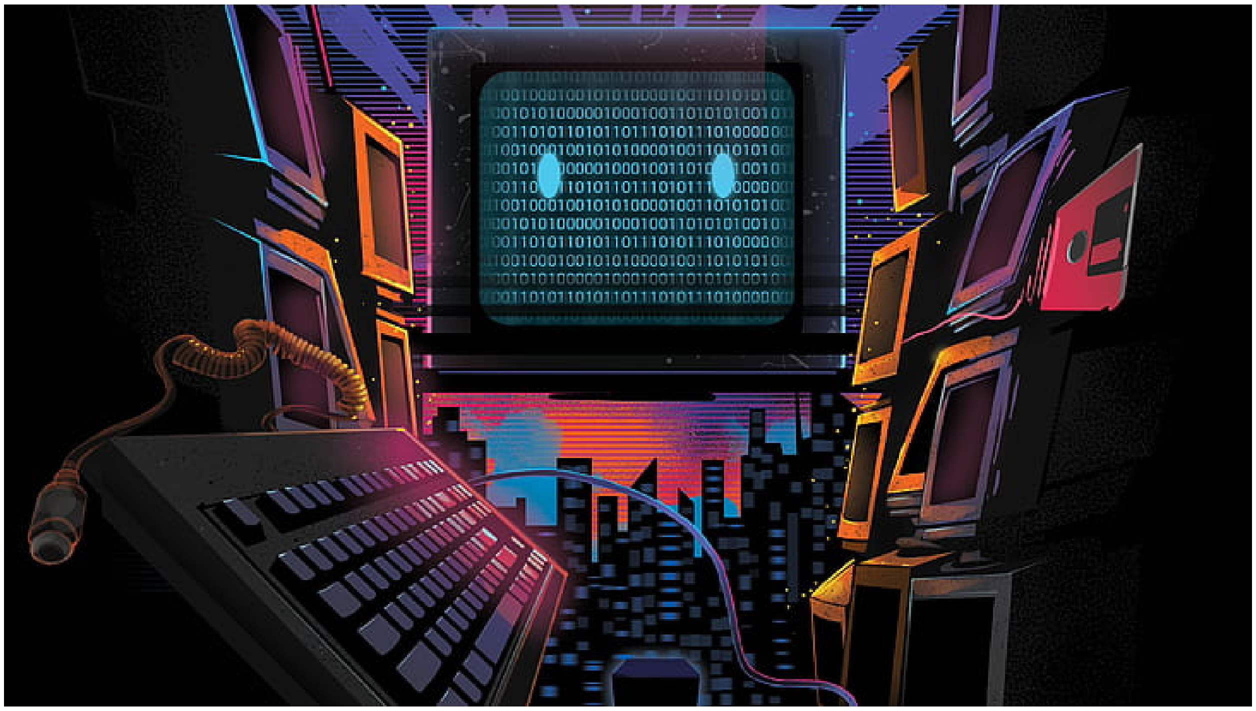

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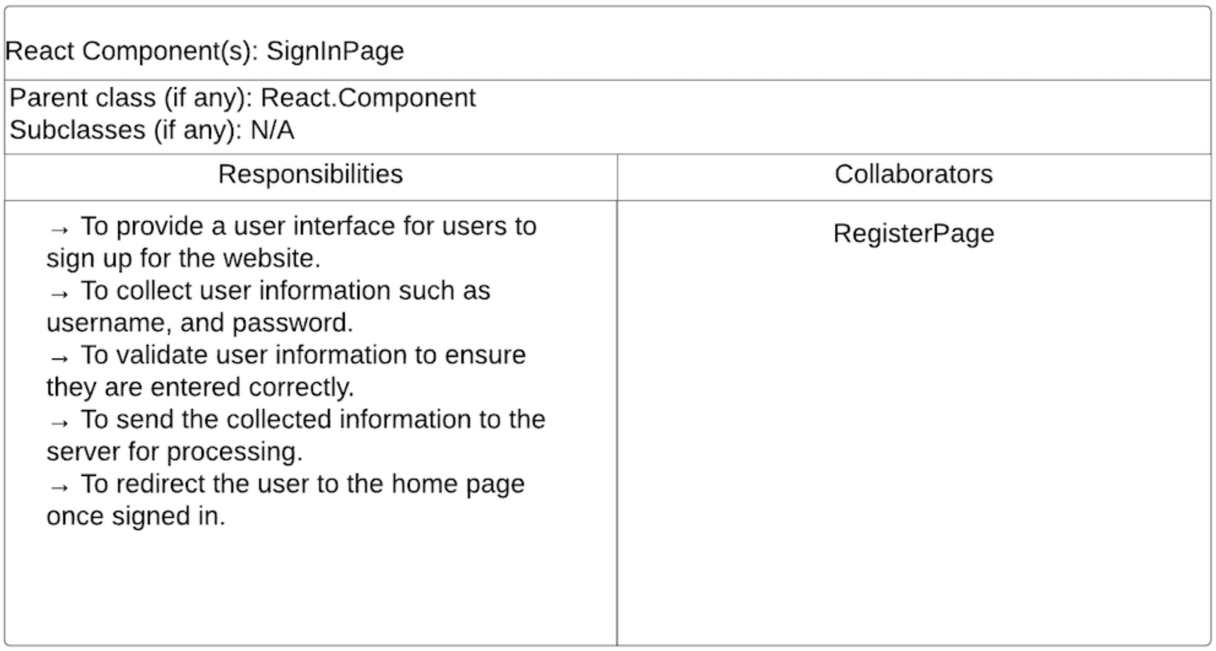
Front-end CRC models

SignInPage

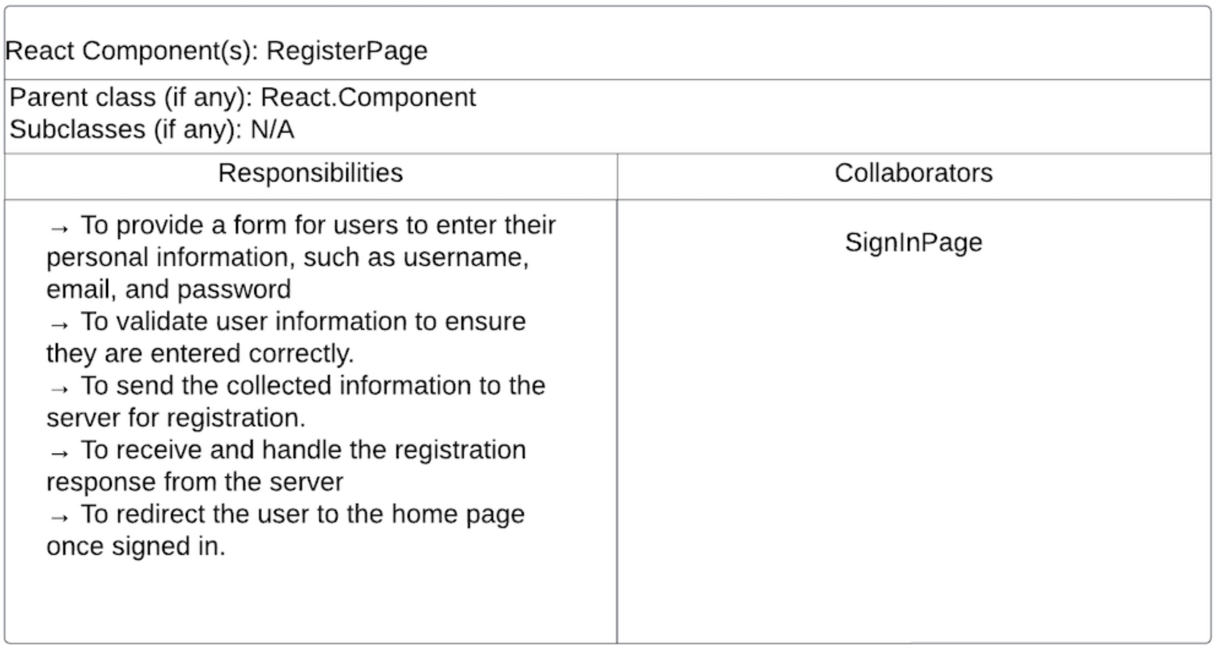


React Component(s): SignInPage

Parent class (if any): React.Component
Subclasses (if any): N/A

Responsibilities	Collaborators
→ To provide a user interface for users to sign up for the website. → To collect user information such as username, and password. → To validate user information to ensure they are entered correctly. → To send the collected information to the server for processing. → To redirect the user to the home page once signed in.	RegisterPage

RegisterPage



React Component(s): RegisterPage

Parent class (if any): React.Component
Subclasses (if any): N/A

Responsibilities	Collaborators
→ To provide a form for users to enter their personal information, such as username, email, and password → To validate user information to ensure they are entered correctly. → To send the collected information to the server for registration. → To receive and handle the registration response from the server → To redirect the user to the home page once signed in.	SignInPage

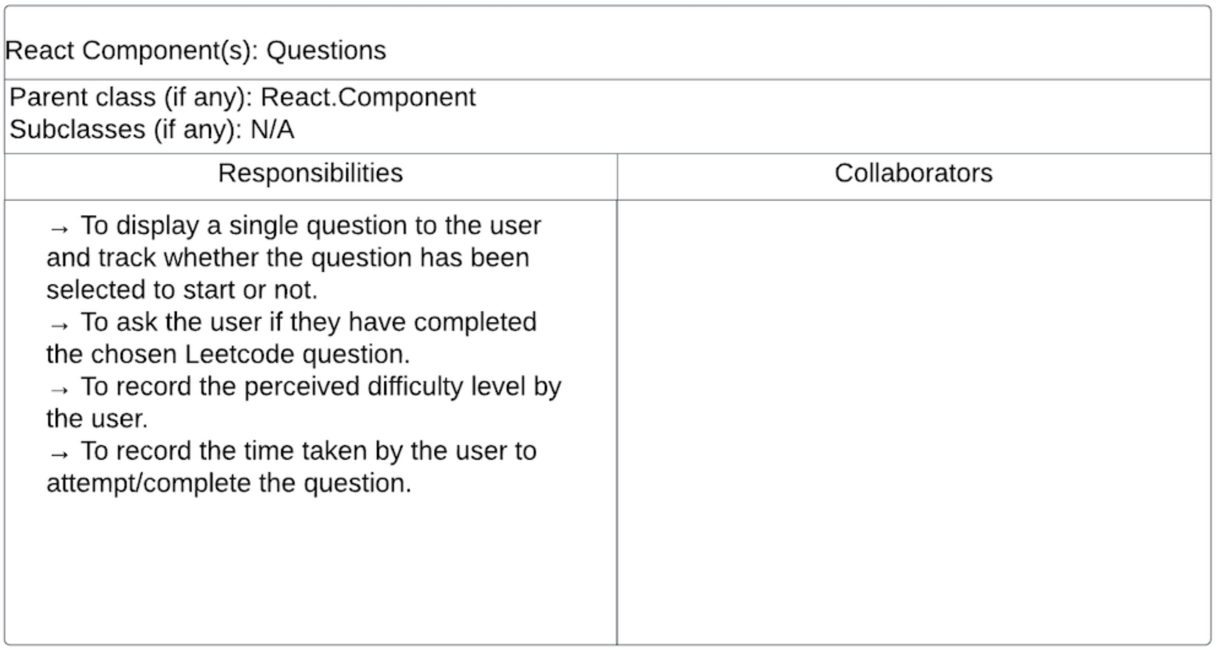
NavBar

React Component(s): NavBar	
Parent class (if any): React.Component Subclasses (if any): N/A	
Responsibilities	Collaborators
→ To display navigation links → To handle user interactions with navigation links (e.g. redirects to specific page)	

Dashboard questions and the individual Leet-code question

React Component(s): Dashboard, LeetQuestion	
Parent class (if any): React.Component Subclasses (if any): LeetQuestion	
Responsibilities	Collaborators
→ The component receives props from its parents component (Dashboard) and renders the data appropriately. → Uses a container to store all the questions displayed for the user, and renders the questions in the UI → Uses the CodeNow button to trigger the navigation to the next page when clicked.	Questions

Leetcode questionnaire form



React Component(s): Questions	
Parent class (if any): React.Component Subclasses (if any): N/A	
Responsibilities	Collaborators
→ To display a single question to the user and track whether the question has been selected to start or not. → To ask the user if they have completed the chosen Leetcode question. → To record the perceived difficulty level by the user. → To record the time taken by the user to attempt/complete the question.	

About

React Component(s): About	
Parent class (if any): React.Component Subclasses (if any): N/A	
Responsibilities	Collaborators
→ To display information about spaced repetition. → To provide users with an understanding of the benefits of spaced repetition. → To provide users with information about how the platform will utilize spaced repetition to avoid the forgetting curve. → To present the information in a visually appealing and organized way.	NavBar

Pre-quiz

React Component(s): PreQuiz	
Parent class (if any): React.Component Subclasses (if any): N/A	
Responsibilities	Collaborators
→ To analyze users strengths and weaknesses. → To generate questions based on the users skill level. → To help users get started with their LeetCode journey.	Dashboard LeetQuestion

Behavioural

React Component(s): BehavioralQuestionPage, Behavioural Question Card	
Parent class (if any): React.Component Subclasses (if any): N/A	
Responsibilities	Collaborators
→ To allow the user to practice Behavioural questions for their interview preparation. → To allow the user to learn the STAR method so that they excel in the real world interview setting.	

MCQ Questions for
Assessment

React Component(s): PreQuiz, Model cards	
Parent class (if any): React.Component Subclasses (if any): N/A	
Responsibilities	Collaborators
→ An easy to follow MCQ styled quiz for the users to interact with. → To allow CodeNext to have a pre assessment where they capture the users current skillset. → To display questions the user is weak in.	Dashboard LeetQuestion

Back-end CRC models

React Component(s): Attempts	
Parent class (if any): models.Model Subclasses (if any): N/A	
Responsibilities	Collaborators
→ This class represents the database model that will store the user-submitted feedback after a problem is attempted. → To track which problems have been attempted → To track when those attempts occurred and to store a brief survey on the user's thoughts of the question.	

React Component(s): AttemptView	
Parent class (if any): APIView Subclasses (if any): N/A	
Responsibilities	Collaborators
→ This class handles the http get and post endpoint `/problems/attempt` and will create a new attempt record in the database when posted to. → When a get request is received, if the problem_id parameter is provided, then it will return all of a user's attempts at that particular problem. → If a problem ID is not provided, all of the user's attempts will be returned.	Attempts class for the database model.

React Component(s): Categories	
Parent class (if any): models.Model Subclasses (if any): N/A	
Responsibilities	Collaborators
→ This class represents the database model that will store the categories that questions on CodeNow will be grouped into. → Instead of categorizing questions on our own, Codenow like Coursera, will survey users after completing a question to determine which category a question should be in.	

React Component(s): CategoryView	
Parent class (if any): APIView Subclasses (if any): N/A	
Responsibilities	Collaborators
→ This class handles the http get request for `/problem/categories` and will return a Json object containing a list of all problem category names, descriptions and ids.	Categories class for the database model

React Component(s): Problem	
Parent class (if any): models.Model Subclasses (if any): N/A	
Responsibilities	Collaborators
→ This class represents the database model that will store problems. → The problems themselves are hosted on leetcode, this database model stores a link to that problem along with necessary problem metadata such as the problem name, category and id.	

React Component(s): ProblemsView	
Parent class (if any): APIView Subclasses (if any): N/A	
Responsibilities	Collaborators
→ This class handles HTTP get and post requests for our `problem` endpoint. → Get requests will retrieve a list of all available questions and relevant metadata such as name, description and category. → A post request to this endpoint will add a new question to our database. → All requests and responses will be done in JSON.	Problem class for the database model.

React Component(s): LoginView	
Parent class (if any): APIView Subclasses (if any): N/A	
Responsibilities	Collaborators
→ This class handles the authentication token when logging into an account through the HTTP endpoint login. → The data is grabbed from the fields in the serializer and a token is generated through the information taken. → Once the token is generated, it is returned as an HTTP response.	

React Component(s): PrequizProblemsView	
Parent class (if any): APIView Subclasses (if any): N/A	
Responsibilities	Collaborators
→ This class handles GET'ing the required prequiz problems for the prequiz and POST'ing the data once the form is filled on the frontend. → Three random problems are grabbed from the database on GET → Their properties perceived_difficulty and completion time are updated on POST.	

React Component(s): AddProblemView	
Parent class (if any): APIView Subclasses (if any): N/A	
Responsibilities	Collaborators
→ This class handles only adding problems to the database. → Populates the rows with their question id, problem name, difficulty and url.	

React Component(s): Confidence	
Parent class (if any): models.Model Subclasses (if any): N/A	
Responsibilities	Collaborators
→ This class represents the database model that will store our users confidence level in each of our categories.	

React Component(s): ConfidenceUpdateView	
Parent class (if any): APIView Subclasses (if any): N/A	
Responsibilities	Collaborators
→ This class represents the database model that will store our users confidence level in each of our categories.	→ Confidence class database model, user model, category mode

React Component(s): BehaviorProblem	
Parent class (if any): models.Model Subclasses (if any): N/A	
Responsibilities	Collaborators
→ This class represents the database model that will store our behavioral questions.	

React Component(s): BehavioralProblemsView	
Parent class (if any): APIView Subclasses (if any): N/A	
Responsibilities	Collaborators
→ Accepts get request and retrieves behavioral problem from the database to present the user, additionally this class will accept post requests	→ BehaviorProblem class database model

Software Architecture Diagram

This project adheres to a Three Tier architecture with React, Django, and SQLite.

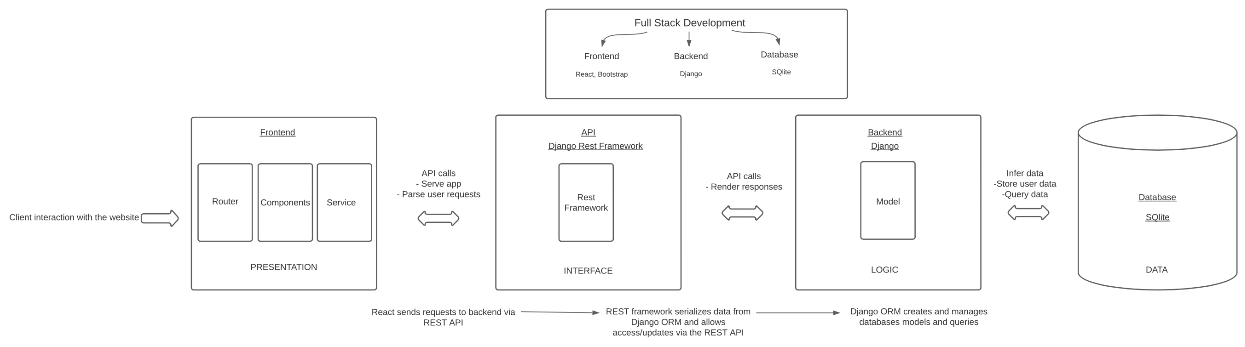
The architecture diagram for using React, Django, and SQLite for a web application typically looks something like this:

1. Front-end: React is used to build the user interface of the web application. It is a JavaScript library for building user interfaces, and it will allow us for building reusable UI components and managing the state of the application.
2. Back-end: Django is used as the back-end framework for the web application. It provides an easy way to handle HTTP requests and responses, manage the database, and implement the business logic of the application.
3. Database: SQLite is used as the database management system for the web application. It is a serverless, file-based database that provides reliable and efficient data storage and retrieval capabilities.

These three technologies, when combined, offer a powerful and efficient solution for developing this website, making it a great choice for the project.

References (linked below):

- Reference 1
- Reference 2


Full Stack Development
Frontend
React, Bootstrap
Backend
Django
Database
SQlite
Client interaction with the website
Frontend
Router
Components
Service
PRESENTATION
API calls
- Serve app
- Parse user requests
API
Django Rest Framework
Rest Framework
INTERFACE
API calls
- Render responses
Backend
Django
Model
LOGIC
Infer data
-Store user data
-Query data
Database
SQlite
DATA
React sends requests to backend via REST API
REST framework serializes data from Django ORM and allows access/updates via the REST API
Django ORM creates and manages databases models and queries