IIT Madras
BS Degree

SOFTWARE ENGINEERING PROJECT
SMART SEEK PORTAL

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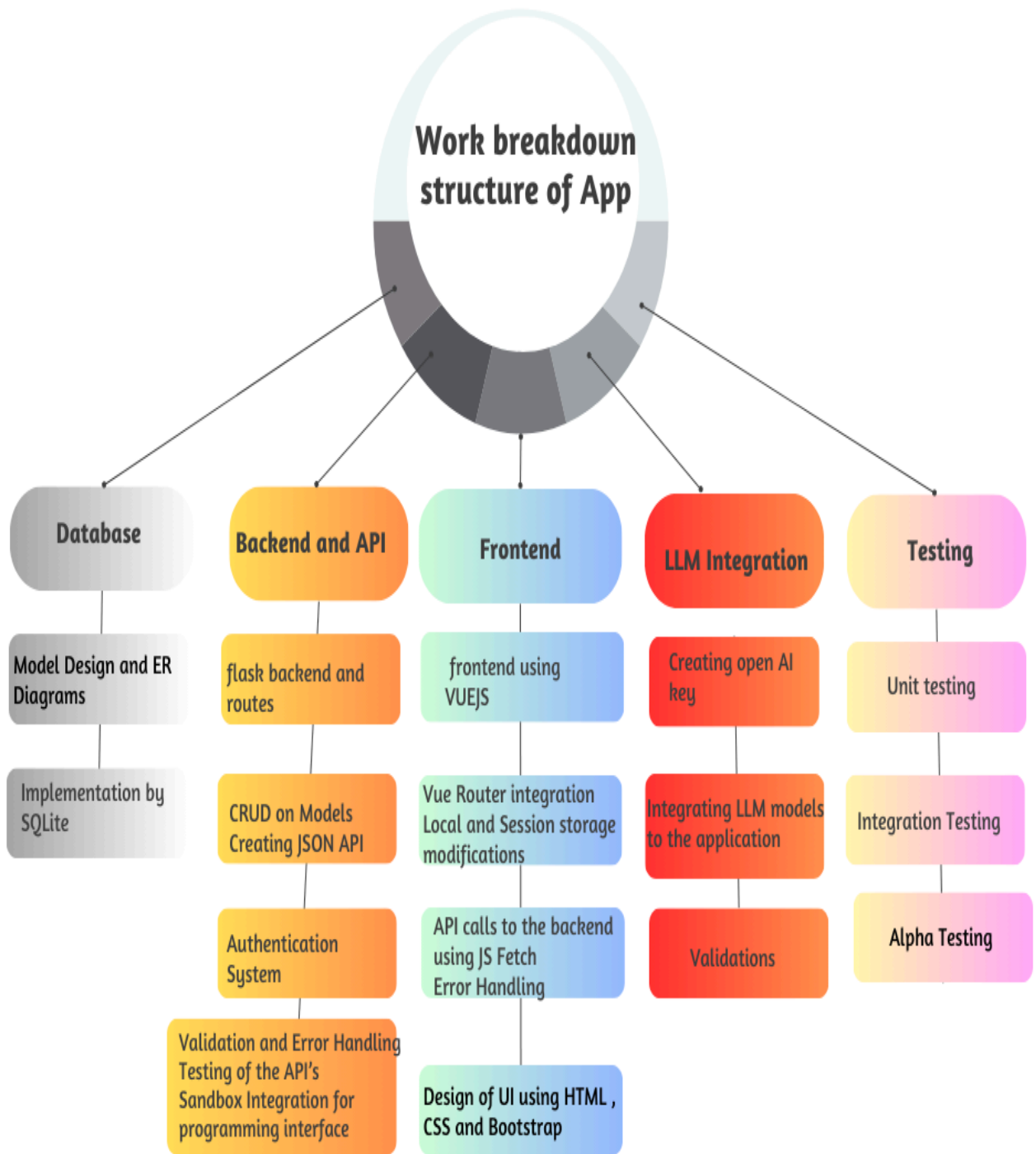**Sachin Kumar**
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Contents

Project Schedule

Task Distribution

Member Name	Component	Sprint	Tasks Assigned
AVIJEET PALIT	- Requirements Gathering - Storyboard - Development - Database	1 3	- Identify User Stories - Create ER Diagrams and Implement DB.
UROOSHA RAHAT	- Wireframes - Development - API	2 4	- Creating wireframes based on user stories. - Working on creating restful API's
SAYAN HRIK	- Task Distribution and Work Breakdown Struc - Component Design - Development - Frontend	3 4	- Distribute project tasks amongst members. - Create and integrate Vue Router and VueJS files to make frontend.
RAMESH KUMAR CHANDRAN	- Project Management / Scrum Master - Testing	4 6	- Create a SPRINT schedule using JIRA - Develop test cases for unit testing.
AYUSH SINGH RANA	- Wireframes - Development - UI Design	2 4	- Creating wireframes based on user stories. - Working on the UI Design using HTML CSS Bootstrap
BODHISATWA BHATTACHARYA	- Learner Journey Maps - Development - Backend	1 4	- Creating learning Journey maps based on use case scenarios. - Creating a flask app for backend.
SACHIN KUMAR	- Project Scheduling - Development - LLM Integration	3 5	- Creating and implementing project schedules on Jira - Integrating LLM's with the APP.
PREETAM MUKHERJEE	Testing Development - Authentication	6 4	- Testing the application (Unit Testing, Integration Testing etc.) - Adding authentication features to the app.

Work Breakdown Structure

Work breakdown structure of App

Database
- Model Design and ER Diagrams
- Implementation by SQLite

Backend and API
- flask backend and routes
- CRUD on Models Creating JSON API
- Authentication System
- Validation and Error Handling Testing of the API's Sandbox Integration for programming interface

Frontend
- frontend using VUEJS
- Vue Router integration Local and Session storage modifications
- API calls to the backend using JS Fetch Error Handling
- Design of UI using HTML , CSS and Bootstrap

LLM Integration
- Creating open AI key
- Integrating LLM models to the application
- Validations

Testing
- Unit testing
- Integration Testing
- Alpha Testing

Gantt Chart and Scrum Board

Jira Link : click here
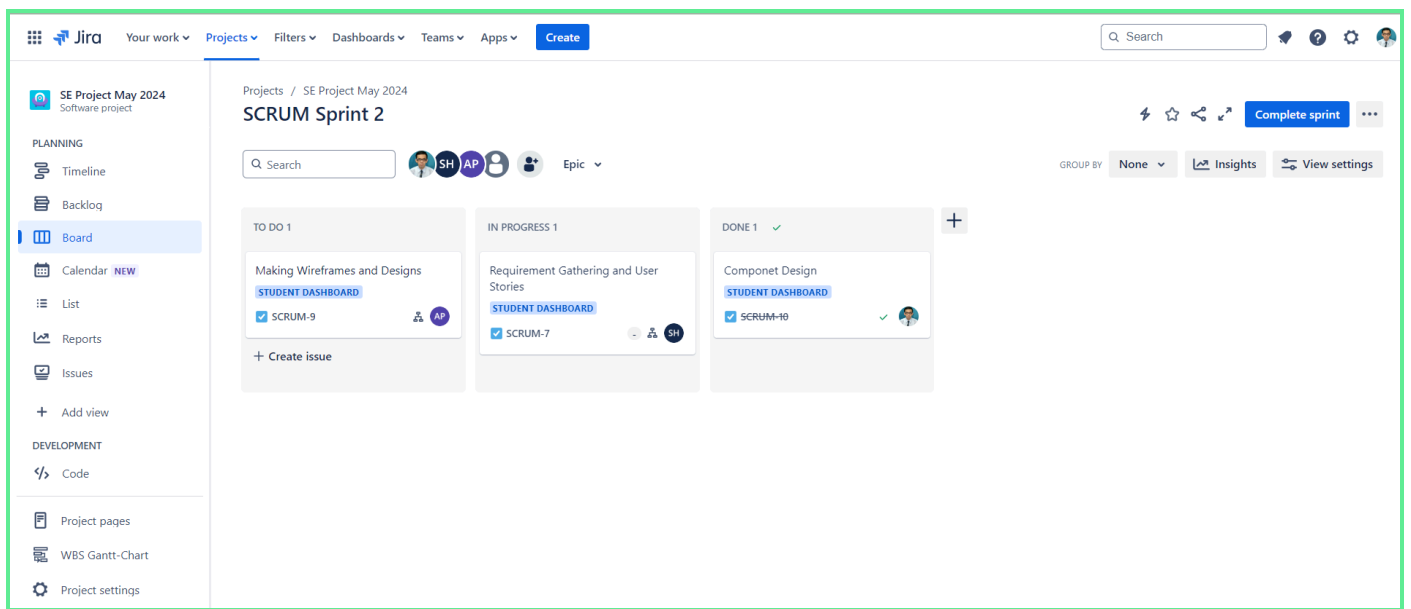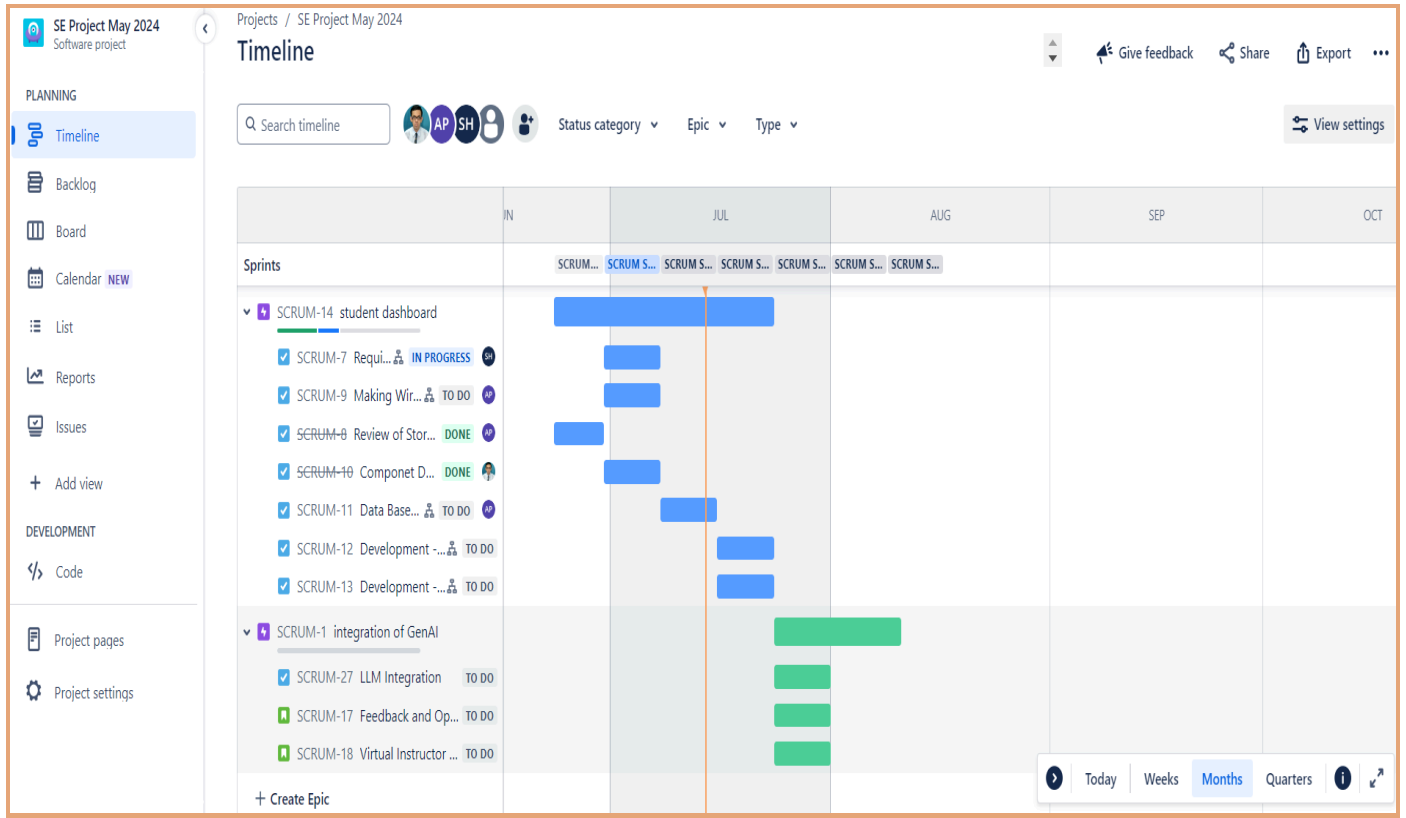
Components of the Application

Student Components

Authentication (For all Users)

- A login and register form with fields like Email, password for student , instructor and admin login.
- JWT tokens will be used for authentication and RBAC will be used for authorisation.
- Post login each user will be redirected to their specific dashboard.
- A user model will be created to specify roles of each user as Student , Instructor and Admin

Courses Page

- A course page will show the courses the student is taking in the current term.
- Assignment marks for each course will also be shown in the respective course box.

A Course

- Each course will contain its week's modules.
- Each module will contain lectures , notes and assignments.
- Assignments will include theory and programming assignments.

Programming Assignments

- Programming assignments will contain a text editor where students can write code.
- It will have an additional help button along with a submit button which will provide a detailed description of the code written and suggest better / alternative code using Gen AI.

Virtual Instructor

- There will be a separate virtual instructor section in the portal.

- Students can enter a prompt as a doubt and the virtual GEN AI instructor will instantly give detailed explanations.

Resource and Career Planner

Instructor Components

Content Planner

- This section will have a GEN AI planner template where the instructor will enter the course outline and topics and he will get an extensive list of resources for the course materials.
- He will also receive a list of questions he can use for assignments in the course.
- The difficulty level of the questions can be adjusted by the instructor using Gen AI.

Instructor Dashboard

- The instructor will have an extensive dashboard where he can course statistics.
- The stats will include total students enrolled , average marks in assignments and also the total modules currently in the course.

Update Course

- The instructor will be able to update course materials using Gen AI recommendations.
- They will be able to add modules , delete and edit them (CRUD Operations). They will also be able to do the same operations on assignments and notes.

Admin Components

Authentication
- A login and register form with fields like Email, password for admin login.
- JWT tokens will be used for authentication and RBAC will be used for authorisation.
- Post login admin will be redirected to his/her specific dashboard.
- A user model will be created to specify roles of each user as Student , Instructor and Admin.

Add course

- Admin will be able to add the specific course so that the instructor can upload the course contents.
- Admin will be able to perform crud operations on the course details.

Student details

- Admin will be able to add and monitor the details of all the students and courses allotted to them.
- Admin can also revoke the access of the particular course from the student dashboard.
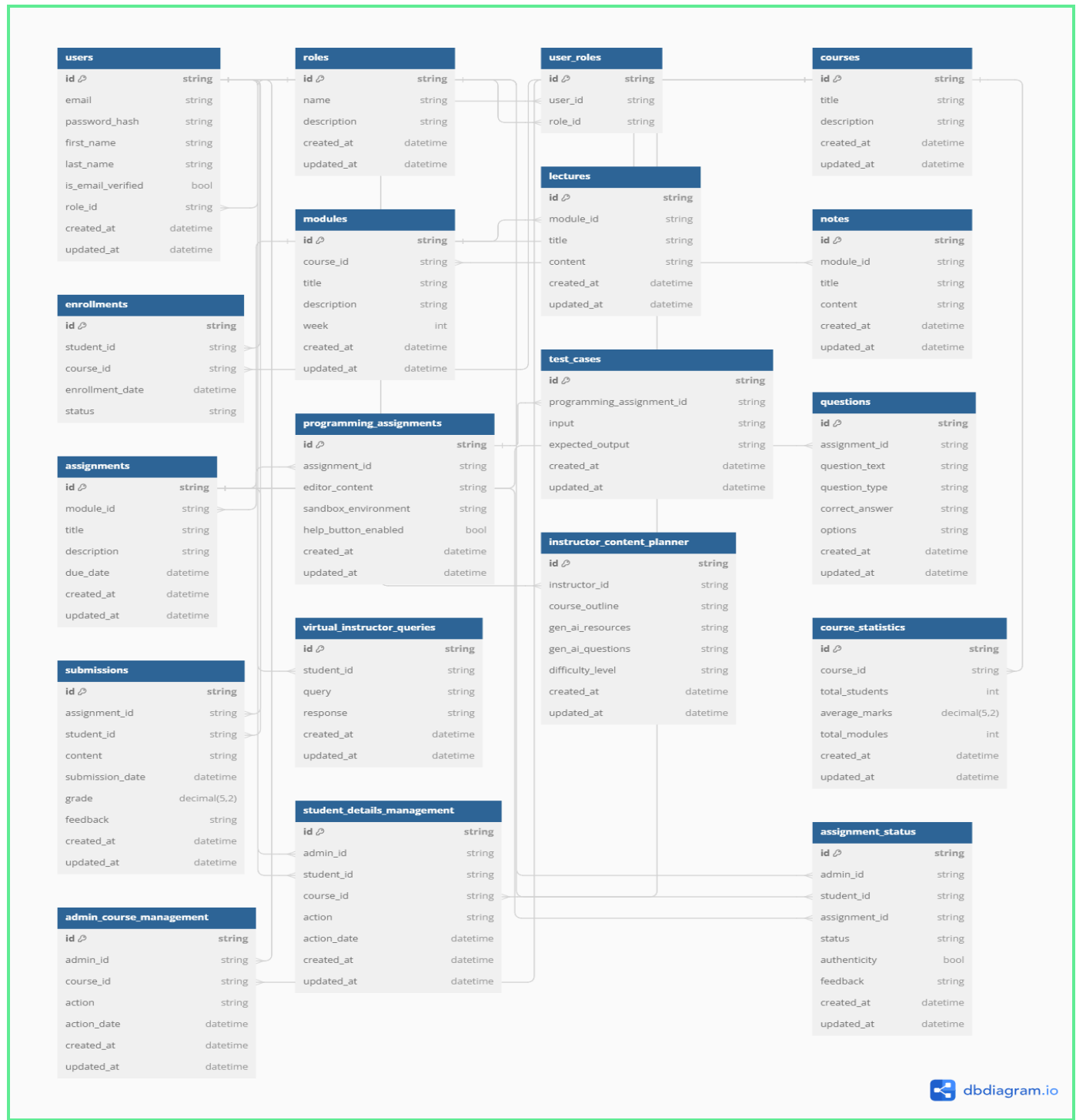- Admin can perform crud operations on the students details.

Application Statistics

- Admin will be able to see the assignment status of the students , total students enrolled , average CGPA etc using statistical charts.

- Admin can also track the legibility and authenticity of the submitted assignments and can take help of GenAI to provide the feedback.
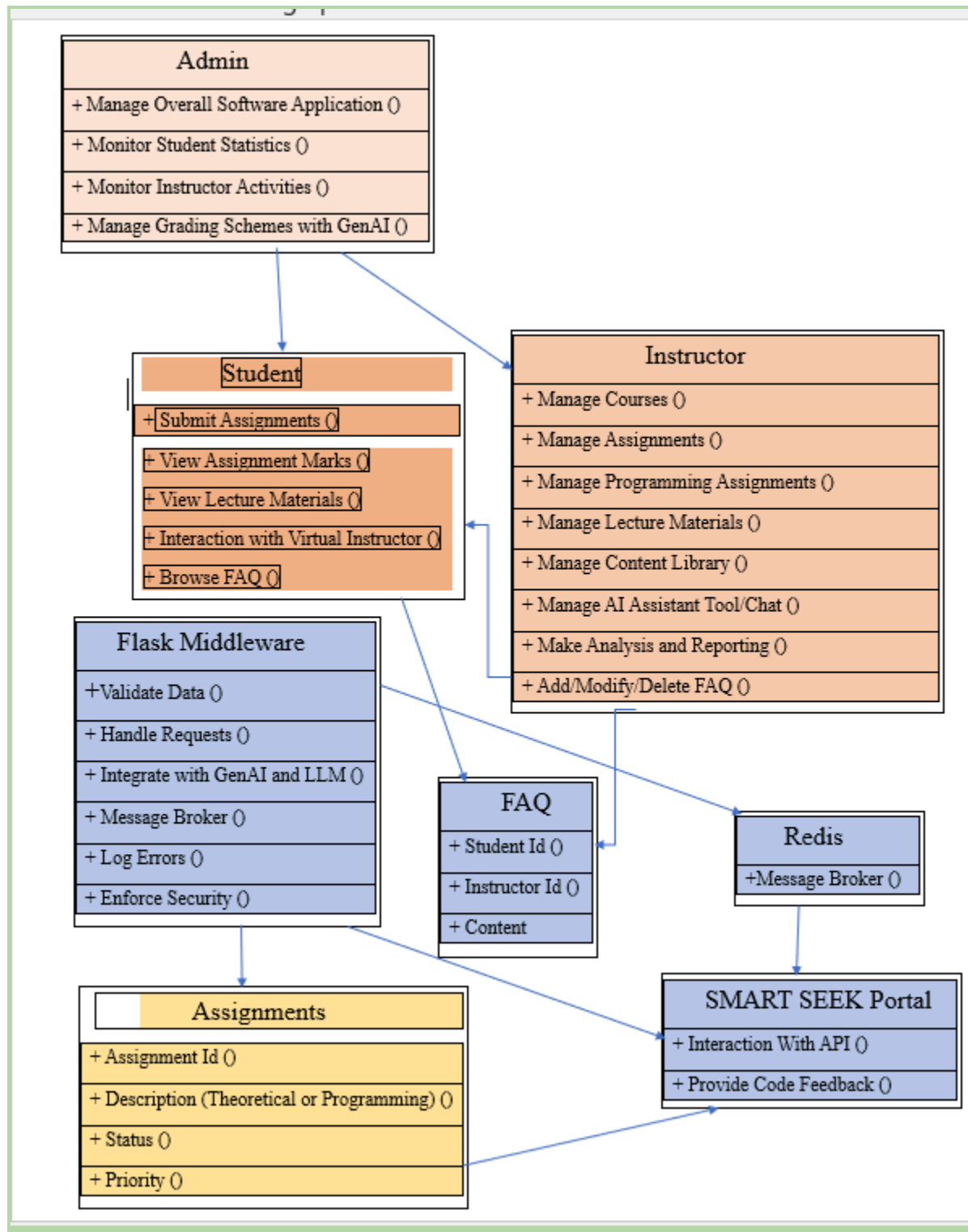
Large Language Models

- LLMs will be used to add Gen AI features to the application.

- Open AI's existing models will be integrated using API calls from the backend.

Database Structure and Class Diagrams

Link : https://dbdiagram.io/d/se-project-66936d509939893daedd79ce

Class Diagram

Admin

+ Manage Overall Software Application ()

+ Monitor Student Statistics ()

+ Monitor Instructor Activities ()

+ Manage Grading Schemes with GenAI ()

Student

+ Submit Assignments ()

+ View Assignment Marks ()

+ View Lecture Materials ()

+ Interaction with Virtual Instructor ()

+ Browse FAQ ()

Instructor

+ Manage Courses ()

+ Manage Assignments ()

+ Manage Programming Assignments ()

+ Manage Lecture Materials ()

+ Manage Content Library ()

+ Manage AI Assistant Tool/Chat ()

+ Make Analysis and Reporting ()

+ Add/Modify/Delete FAQ ()

Flask Middleware

+ Validate Data ()

+ Handle Requests ()

+ Integrate with GenAI and LLM ()

+ Message Broker ()

+ Log Errors ()

+ Enforce Security ()

FAQ

+ Student Id ()

+ Instructor Id ()

+ Content

Redis

+ Message Broker ()

Assignments

+ Assignment Id ()

+ Description (Theoretical or Programming) ()

+ Status ()

+ Priority ()

SMART SEEK Portal

+ Interaction With API ()

+ Provide Code Feedback ()

Minutes of the Meetings (MOM) of few Scrum Meetings

Meeting - 1

Date: July 14, 2024

Time: 1:00 PM - 2:45 PM

Attendees:
- Uroosha
- Avijeet
- Sayan
- Preetam
- Sachin
- Ayush
- Ramesh

Agenda:

1. **Project Schedule**

   Discuss overall project schedule based on user stories from previous milestones.

   Schedule sprints, iterations, and scrum meetings.

2. **Project Scheduling Tools**

   Selection and use of tools like Trello, Jira for project management.

3. **Design of Components**

   Description of system components based on previous user stories.

4. **Software Design**

   Creation of basic class diagrams for the proposed system.

5. **Scrum Meetings**

   Documenting the minutes of previous scrum meetings.

Minutes:

1. Project Schedule

Sprint Schedule:

Sprint 1: 10/6/2024   18/06/2024: Requirement Gathering and User Stories

Sprint 2: 19/06/2024   25/06/2024: Review of Stories and Storyboard Drafting

Sprint 3: 26/06/2024   30/06/2024: Making Wireframes and Designs

Sprint 4: 01/07/2024   05/07/2024: Component Design

Sprint 5: 03/07/2024   05/07/2024: Database Design and ER Diagrams

Sprint 6: 06/07/2024   11/07/2024: Development - Backend and APIs

Sprint 7: 12/07/2024   17/07/2024: Development - Frontend and API Connections

Sprint 8: 17/07/2024   18/07/2024: Development - LLM Integration

Sprint 9: 18/07/2024   20/07/2024: Development - Frontend and Backend Integration

Sprint 10: 21/07/2024   26/07/2024: Development - Additional Features

Sprint 11: 27/07/2024   05/08/2024: Testing of the Application

Sprint 12: 06/08/2024   12/08/2024: Deployment and Final Report Compilation

Scrum Meetings: Scheduled twice a week on Mondays and Thursdays at 5 PM.

2. Project Scheduling Tools

Trello Board: Used for task assignment and tracking progress.

Jira: Used for managing sprints, issues, and detailed tracking of user stories and tasks.

3. Design of Components

Student:

- **Authentication**: Login and register forms with JWT tokens for authentication and RBAC for authorization.
- **My Courses**: Display courses taken by the student in the current term along with assignment marks.
- **Course Details**: Each course will contain modules, lectures, notes, and assignments.
- **Programming Assignments**: Includes a text editor for coding with Gen AI support for code suggestions.

Instructor:

Content Planner: Gen AI planner for course materials and assignments.

Instructor Dashboard: Displays course statistics and management options.

Update Course: Allows CRUD operations on course materials and assignments.

Admin:

- **Authentication:** Admin login with JWT tokens and RBAC.
- **Add Course:** CRUD operations on course details.
- **Student Details:** Manage student course enrollments and payments.
- **Statistics:** Track assignment status and feedback with Gen AI support.

4. Software Design

Class Diagrams:

- Created basic class diagrams to represent system architecture and interactions among different components.

Meeting 2

Date: July 10, 2024
Time: 5:00 PM   5:30 PM

Attendees:

Uroosha

Avijeet

Sayan

Preetam

Sachin

Ayush

Ramesh

Agenda:

1. **Review of User Stories**
   - Confirm completion and accuracy of user stories.

2. **Wireframe and Design Review**
    ● Evaluate the wireframes and design drafts.

3. **Component Design Discussion**
    ● Finalize the design of system components.

Minutes:
    ● Reviewed and confirmed all user stories are accurate and complete.
    ● Evaluated wireframes and made minor adjustments based on feedback.
    ● Finalized component design, ensuring alignment with user stories and system requirements.

Action Items:
    ● Avijeet to finalize the database design and ER diagrams by the next meeting.
    ● Sachin will set up the backend structure and Preetam will do the authentication system.
    ● Sayan to start integrating Vue Router for frontend.