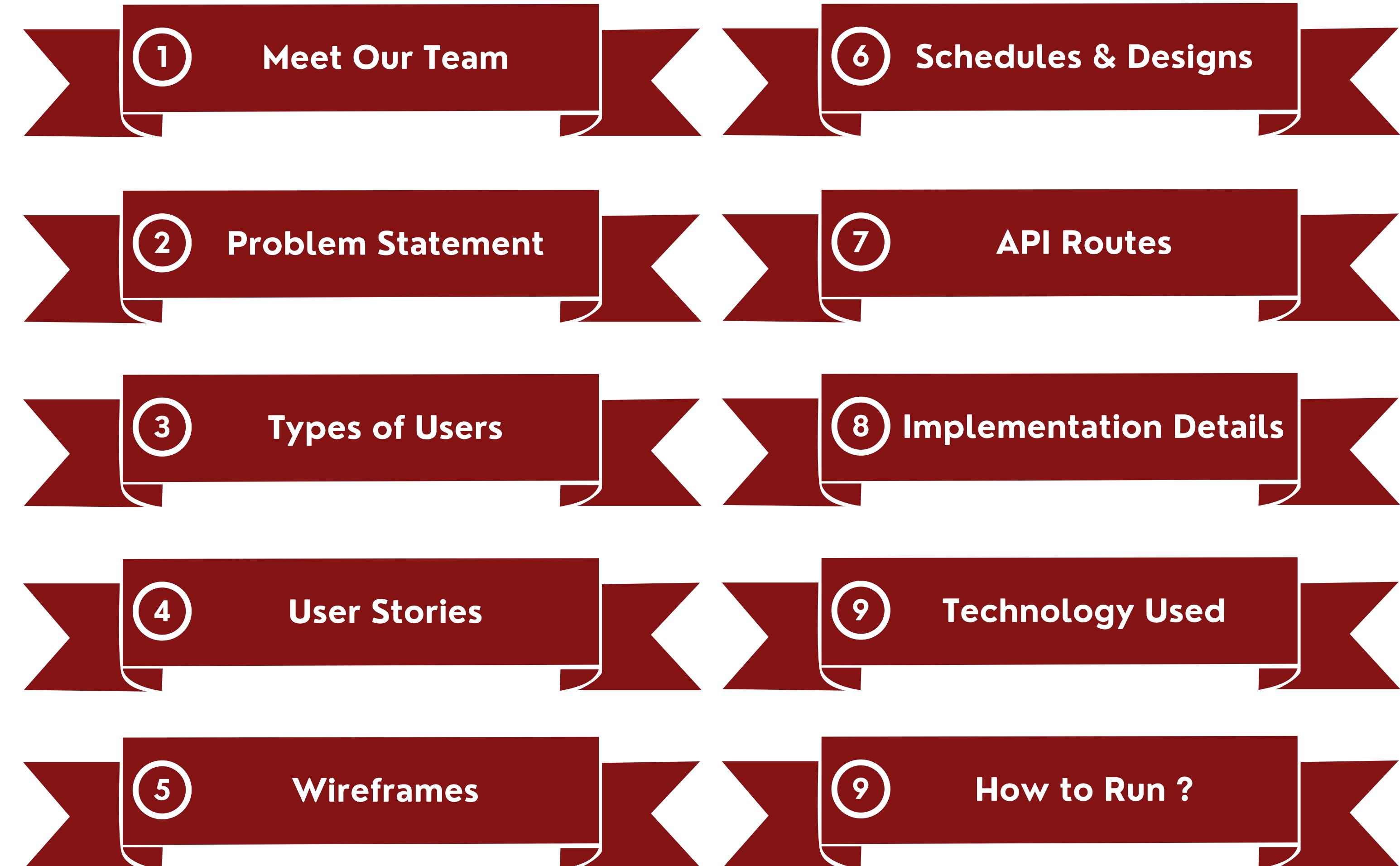




Software Engineering Project

JAN 2025 - TEAM 16

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Meet Our Team



ANISH



ACHIN



ATHARVA



ABHISHEK



RITUPARNO



SARATH



Dr. AMBRISH



PROBLEM

STATEMENT

Problem Statement

The SEEK portal harnesses **Generative AI (GenAI)** to enhance academic guidance by providing **personalized learning support**. It enables students to engage more effectively with course materials through **AI-driven automation and intelligent assistance**, transforming digital education into an interactive and adaptive experience.

1. Learning Environment

- Video Lectures & Course Materials for easy access to study resources.
- Announcements & Updates on coursework, deadlines, and events.

Problem Statement

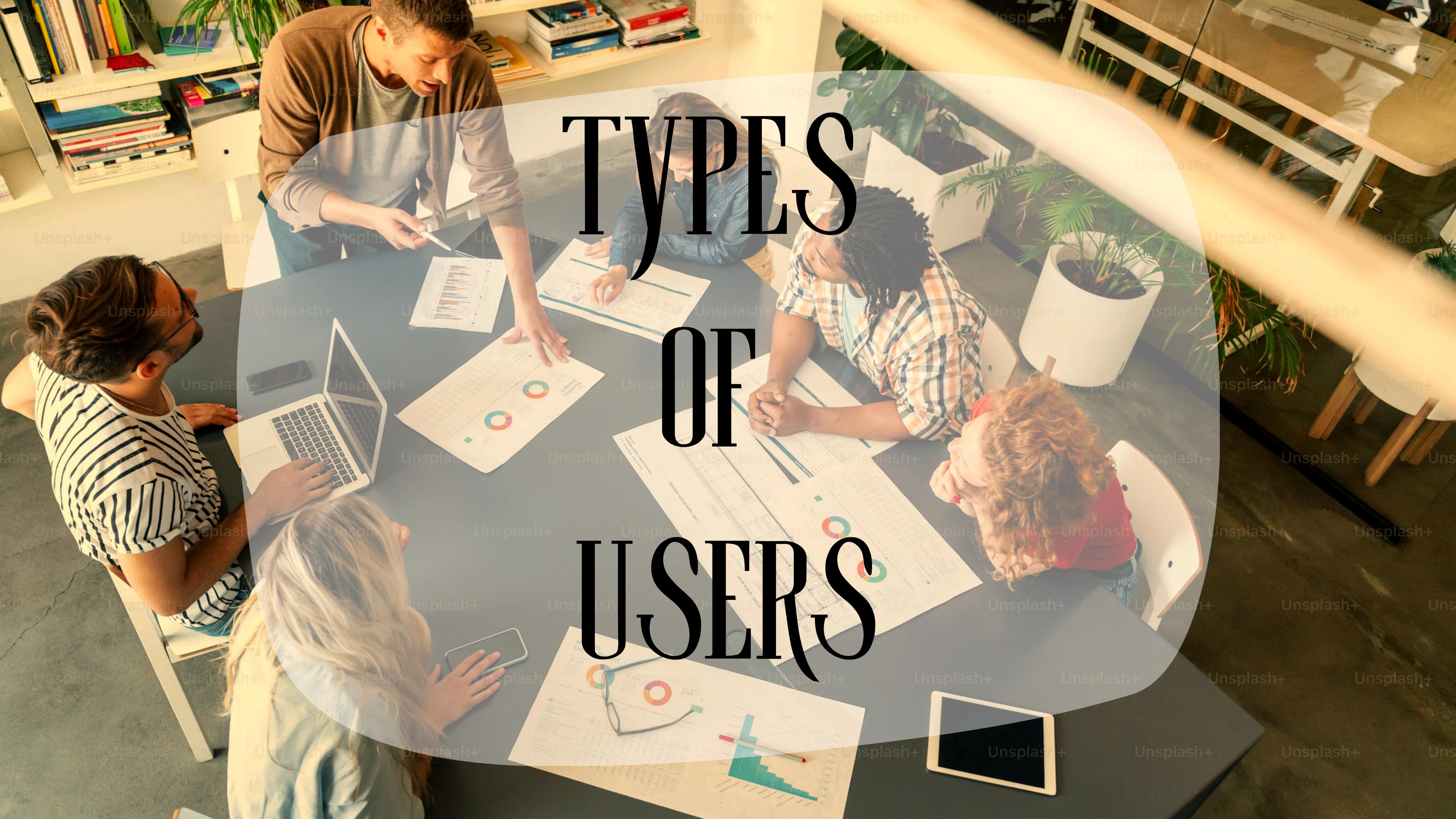
2. Coding Environment

- Live Code Execution for real-time coding, testing, and debugging.
- Automated Evaluation providing instant feedback on assignments

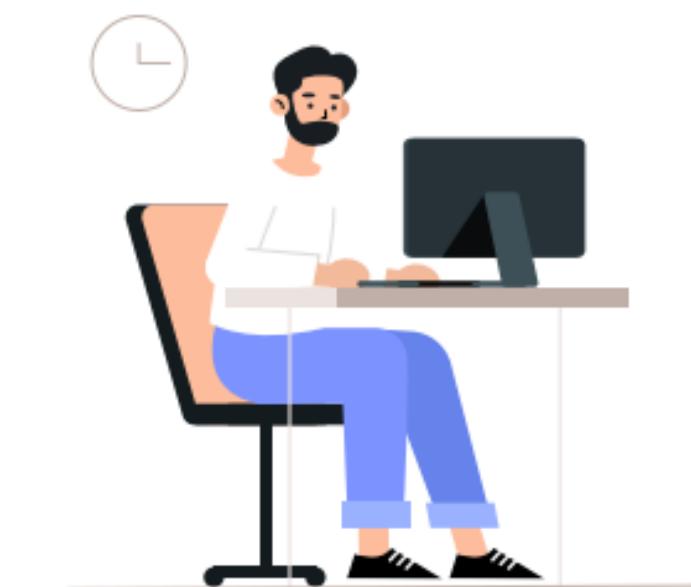
2. GenAI-Powered Academic Support

- Instant Query Resolution for course-related doubts with AI-generated responses.
- Lecture Assistance to clarify concepts from video lectures.
- AI-Powered Code Review offering optimized corrections to improve coding skills.

TYPES OF USERS



| USERS | RESPONSIBILITY |
|-------------|--|
| Students | <ul style="list-style-type: none"> • Students can enrolled in the IITM BS program. • They can access the Seek Learning portal to: <ul style="list-style-type: none"> ◦ Register for courses. ◦ Watch weekly Lessons and access resources. ◦ Complete practice and graded assignments. ◦ Participate in discussions and seek help via the discourse forum. |
| Instructors | <ul style="list-style-type: none"> • Releasing supplementary materials. • Conducting live online sessions. • Responding to student queries on the discourse forum. |
| Professor | <ul style="list-style-type: none"> • Occasionally resolve student queries. • Conduct live sessions. • Review course materials to ensure quality. • Provide technical support for the Seek portal. |
| Admin | <ul style="list-style-type: none"> • Manage tasks such as registration, scheduling, and maintenance of student records. • Oversee the effective delivery of courses and ensure smooth operations. |



USERS STORIES

For Students

- A** Search course materials to find resources efficiently.
- B** Check assignment status to track performance.
- C** Ask questions in the forum for help from peers or instructors.
- D** Participate in discussions to clarify doubts and exchange ideas.
- E** Post questions in the forum and wait for responses for assistance.

For Instructors

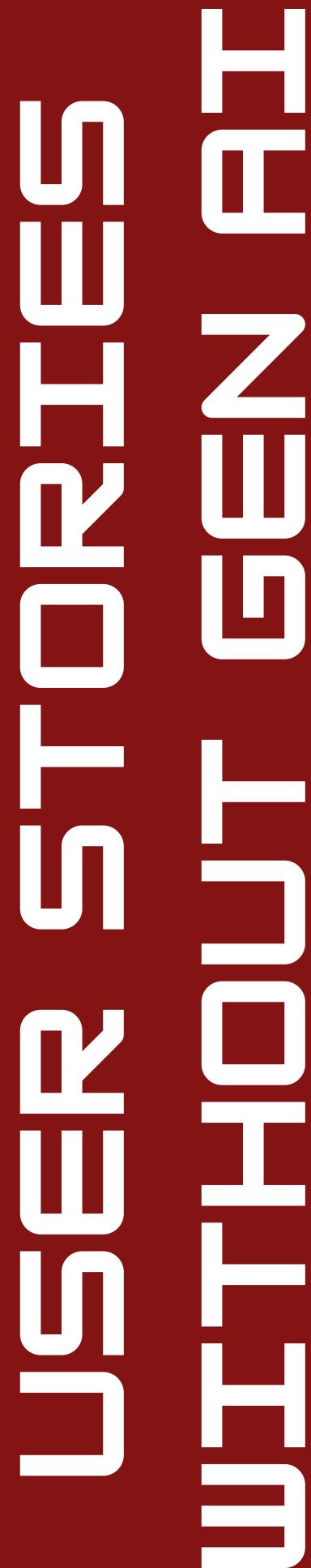
- A** Respond to student queries on the forum for timely solutions.
- B** Conduct live sessions via the Seek portal for real-time engagement.
- C** Upload and organize assignments manually for easy student access.

For Professors

- A** Address advanced queries to clarify complex topics, provide in-depth explanations, and guide students effectively.
- B** Upload, manage, and organize academic materials to ensure easy access and structured learning for students.

For Admin

- A** Handle student complaints, resolve issues efficiently, and ensure smooth academic operations.
- B** Upload, manage, and organize academic materials to ensure easy access and structured learning for students.



For Students

- A** Suggest relevant study materials for focused learning.
- B** Analyze provide insights for improvement.
- C** Offer hints/debugging tips for programming assignments.
- D** Notify about deadlines and new course materials.
- E** Provide immediate responses for quick doubt resolution.

For Instructors

- A** Handle common student queries to focus on complex issues.
- B** Provide automated hints for practice assignments.
- C** Suggest relevant practice assignments for better understanding.

For Professors

- A** Handle initial student queries efficiently, allowing professors to focus on deeper academic discussions and provide more in-depth support.
- B** Assist professors in uploading new academic materials, ensuring students have timely access to course updates.

For Admin

- A** Suggest possible resolutions for common student complaints, enabling admin staff to address concerns faster and streamline issue resolution.
- B** Assist professors in uploading new academic materials, ensuring students have timely access to course updates.

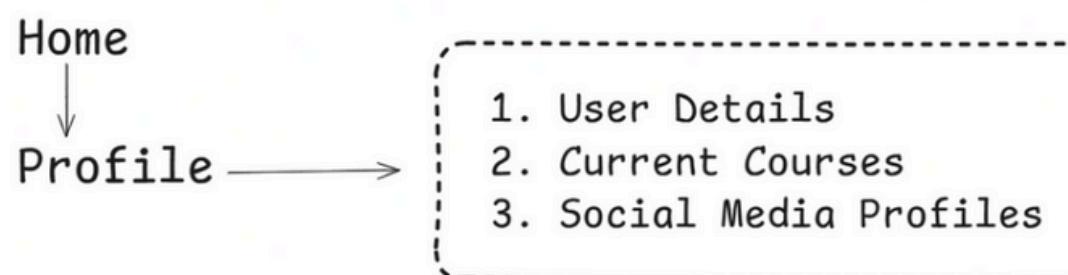
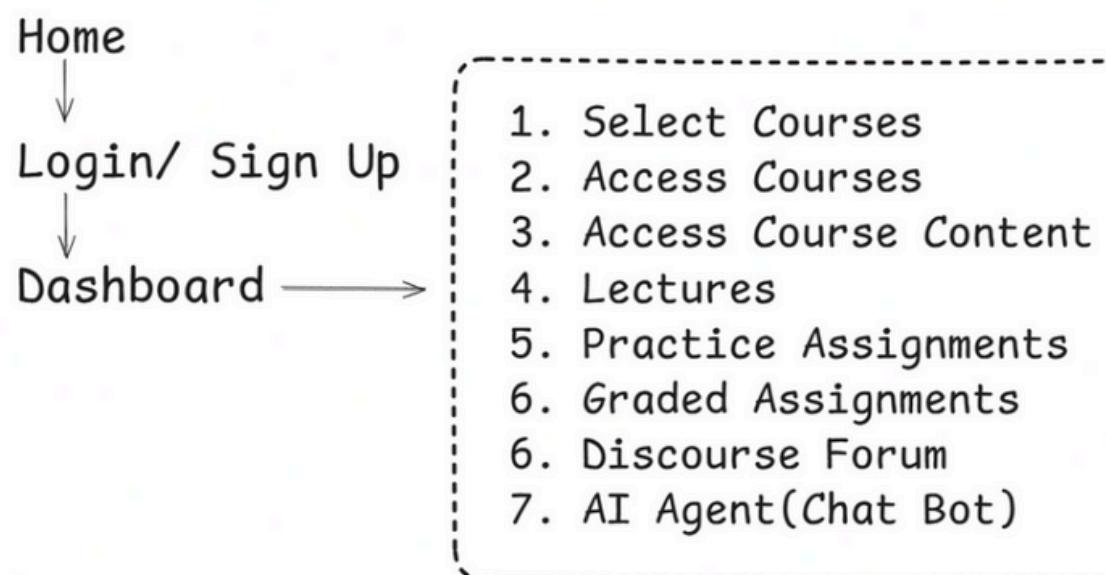




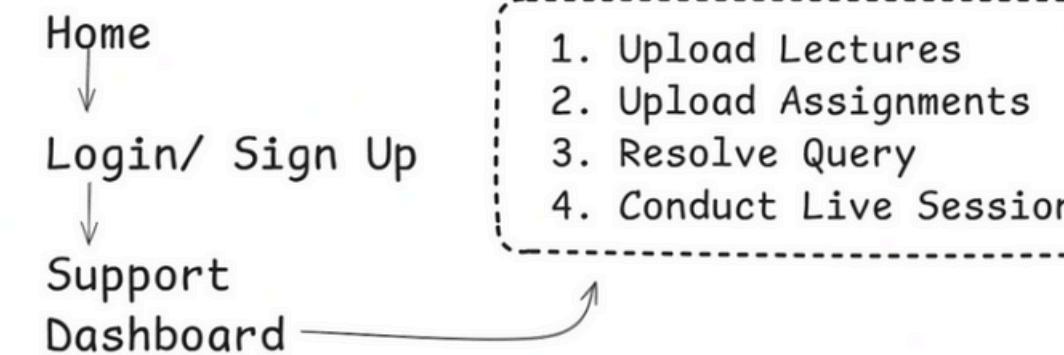
WIREFRAMES

APP USERFLOW

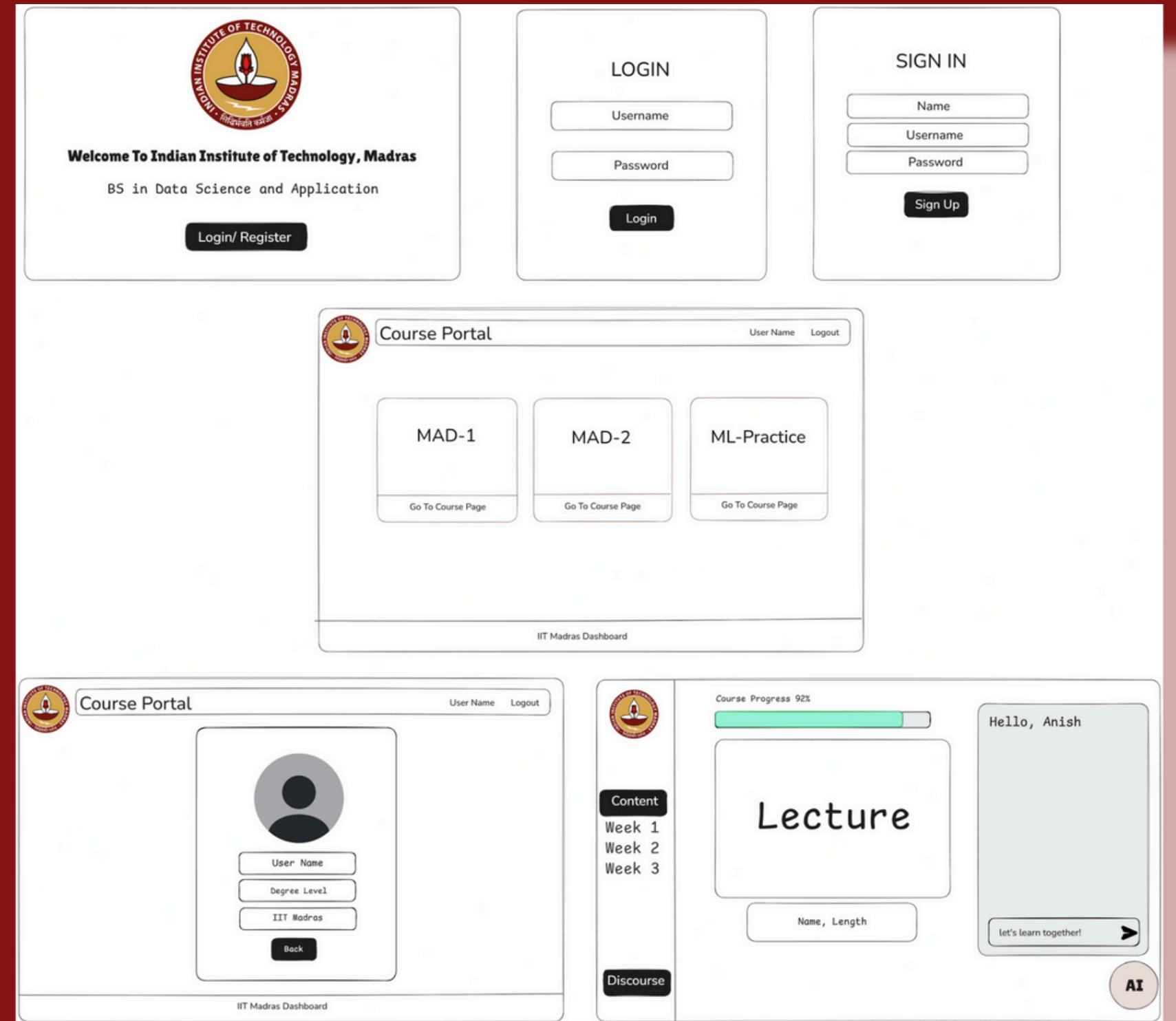
Basic User flow (Client Side)



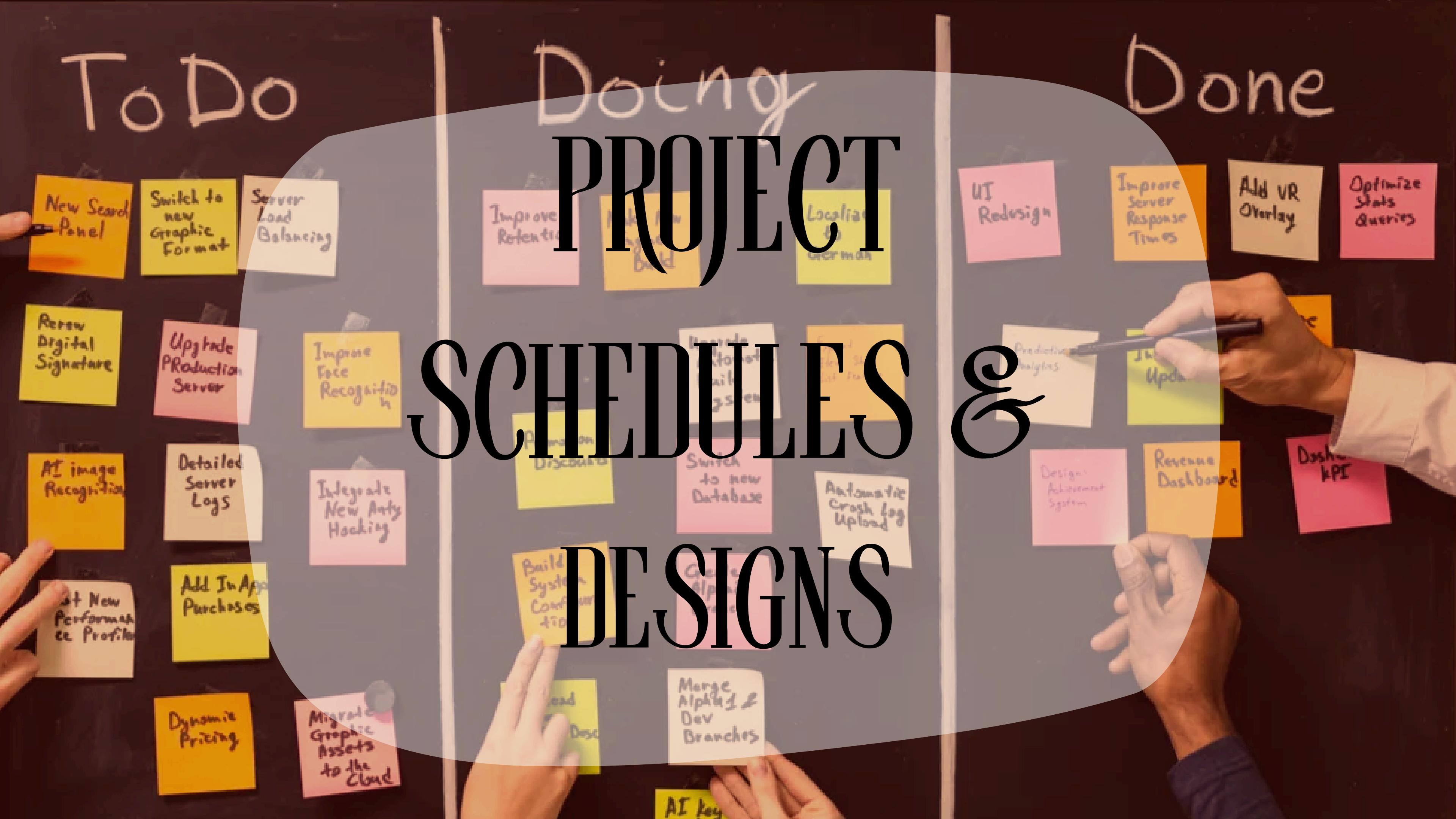
Basic User flow (Support Side)



WIREFRAMES (LOW FIDELITY)



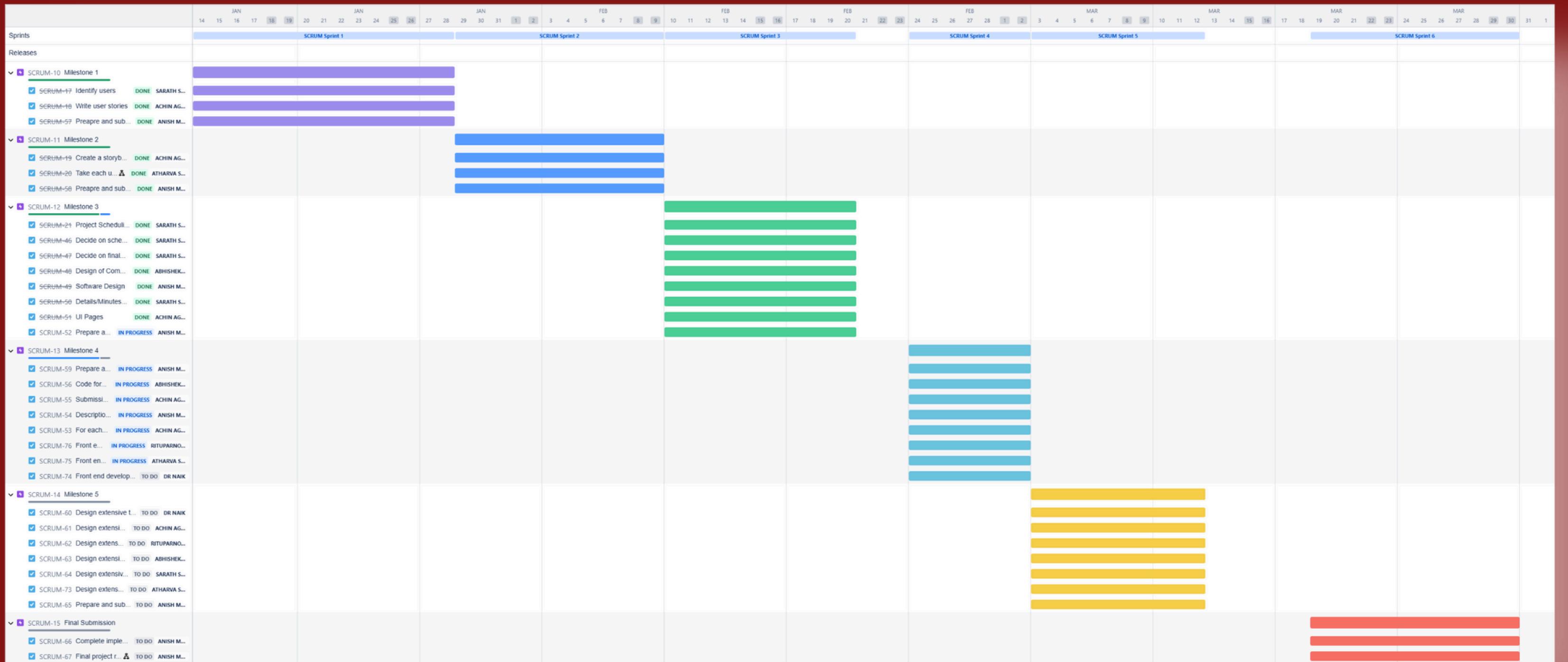
PROJECT SCHEDULES & DESIGNS



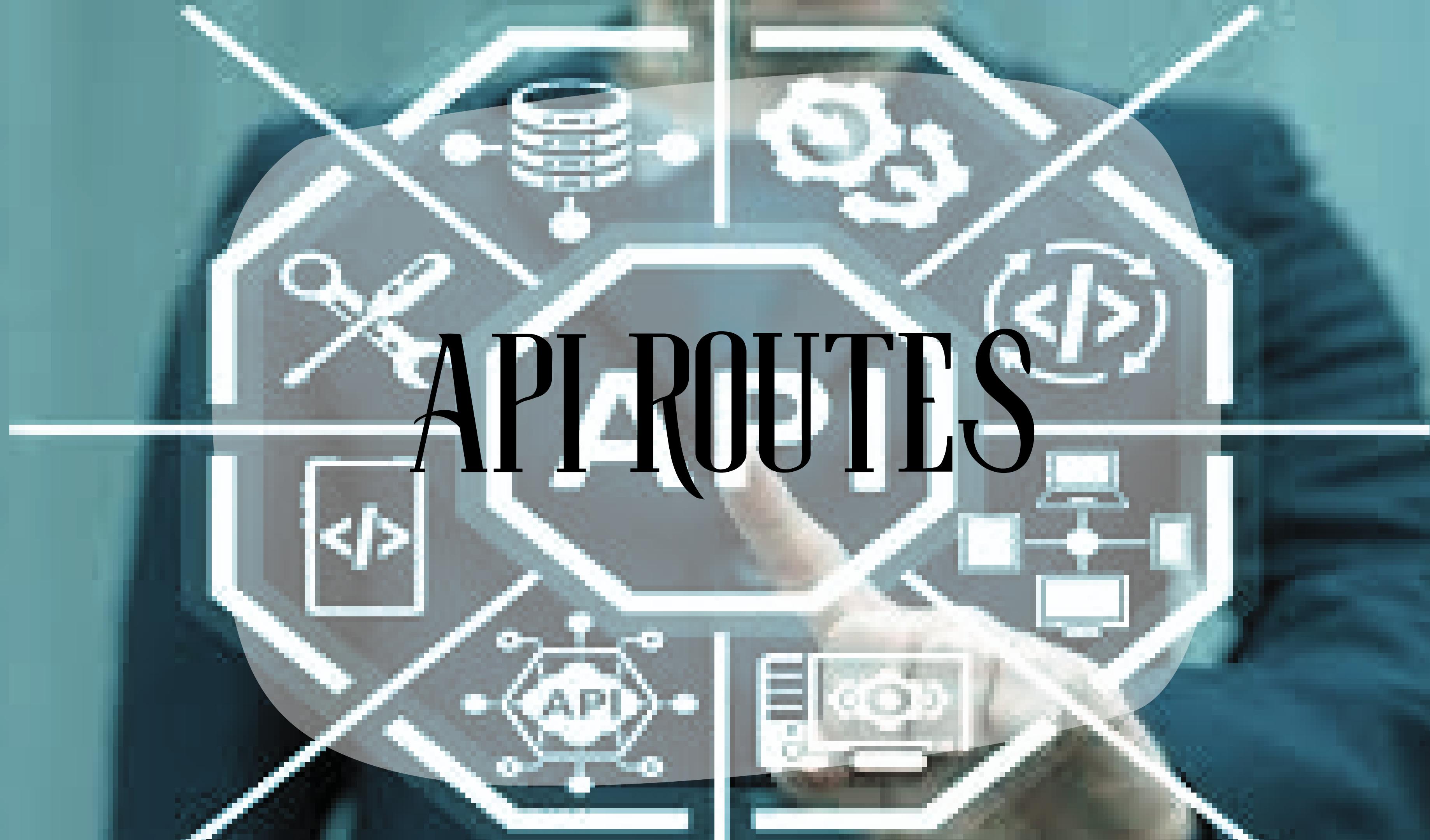
Sprint Schedule

| Sprint No. | Topic/Task | Timeline |
|------------|---------------------------------|-----------------------------|
| Sprint 1 | Identifying User & Requirements | 14 Jan, 2024 - 28 Jan, 2024 |
| Sprint 2 | User Interfaces | 29 Jan, 2024 - 9 Feb, 2024 |
| Sprint 3 | Scheduling and Design | 10 Feb, 2024 - 20 Feb, 2024 |
| Sprint 4 | API Endpoints | 24 Feb, 2024 - 2 Mar, 2024 |
| Sprint 5 | Testing All the Test Cases | 3 Mar, 2024 - 12 Mar, 2024 |
| Sprint 6 | Integrate Frontend & Backend | 19 Mar, 2024 - 30 Mar, 2024 |

GANTT CHART



API ROUTES



Authentication

POST /login User Login

POST /signup User Signup

POST /refresh_token Refresh Access Token

POST /logout User Logout

Admin

GET /top-support-queries Get top support queries in the past 7 days

GET /query-detail/{query_id} Get details of a specific query

POST /solve-query/{query_id} Solve a specific query

POST /add-course Add a new course

PUT /edit-course/{course_id} Edit a specific course

POST /add-course-material/{course_id} Add course material

PUT /edit-course-material/{material_id} Edit course material



Student

GET /student-profile Retrieve student profile details

GET /student-dashboard Retrieve student dashboard details

Instructor

POST /lesson Add a new lesson (Supplementary Material)

POST /assignment Add a new assignment

POST /livesession Add a new live session

Professor

GET /pending-instructors Retrieve all pending instructor requests

PUT /approve-instructor/{request_id} Approve or reject an instructor request

GET /solved-issues Retrieve all solved issues

GET /pending-issues Retrieve all pending issues

Chatbot

POST /chatbot Interact with the chatbot for educational hints and resources



IMPLEMENTATION DETAILS

Implementation Details of the Project

Backend Implementation:

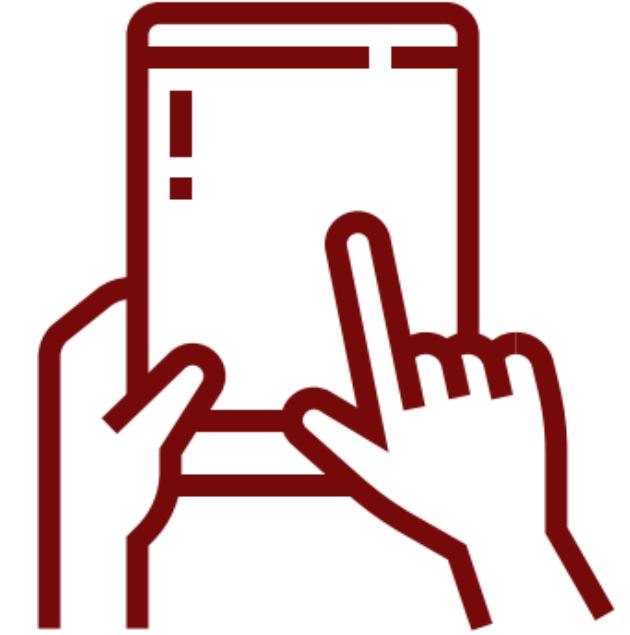
- Developed a RESTful API with Flask for authentication, course management, and GenAI interactions.
- Implemented role-based access control (RBAC) for students, faculty, and admins.
- Integrated GenAI features:
 - a. Automated feedback on programming assignments.
 - b. Personalized study plan generation.
 - c. Context-aware academic support for course queries.
- Secured API with JWT/OAuth authentication and HTTPS encryption.



Implementation Details of the Project

Frontend Implementation:

- Designed and developed a **reactive, user-friendly dashboard** using Vue to improve accessibility and usability.
- Integrated **real-time AI-based assistance**, enabling dynamic responses to user queries without page reloads.
- Created an **intuitive course browsing experience**, allowing students to access syllabi, assignments, and learning materials efficiently.
- Implemented a **notification system** to alert students about deadlines, feedback, and updates.
- Ensured **responsive design** for compatibility across desktops, tablets, and mobile devices.



Implementation Details of the Project

Database Schema:

- Designed a **normalized relational database MySQL** to efficiently manage:
 - a. **Users** (students, faculty, admins) with role-based attributes.
 - b. **Courses** with structured modules, assignments, and materials.
 - c. **Assignment submissions** and AI-generated feedback logs.
 - d. **User interaction history** for AI-driven personalized recommendations.
- Optimized **database indexing and relationships** to ensure fast query execution and support AI-driven insights.
- Implemented **backup and recovery mechanisms** to prevent data loss and ensure reliability.



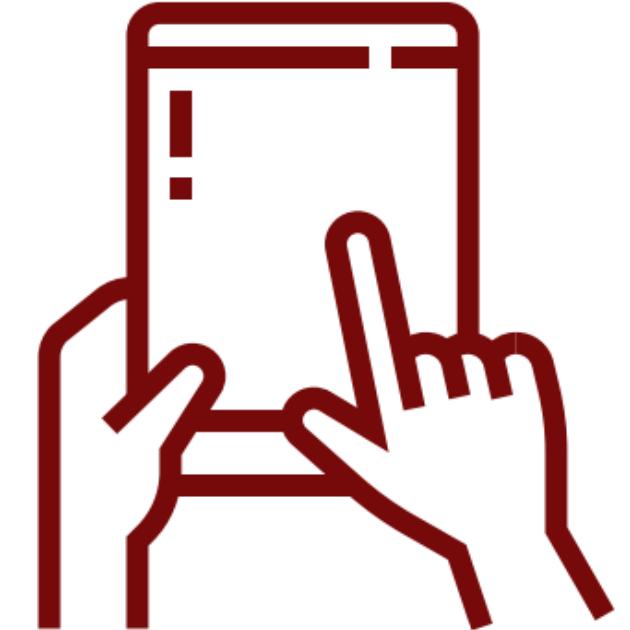


**TECHNOLOGY
USED**

Tools and Technology Used

Backend Technologies:

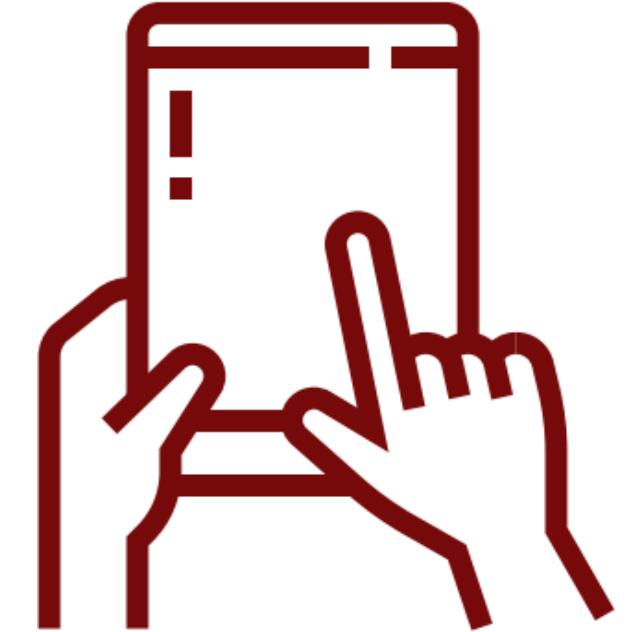
- **Flask & Flask-RESTful:** Used for developing RESTful API endpoints to handle core functionalities.
- **Flask SQLAlchemy:** Implemented as the ORM for efficient database management.
- **Pytest:** Used exclusively for unit and integration testing to ensure API reliability.
- **Swagger Editor:** Utilized for API documentation, enabling clear and structured endpoint references.
- **PostMan:** A lightweight API testing tool used for manually verifying API responses and debugging issues.



Tools and Technology Used

Frontend Technologies:

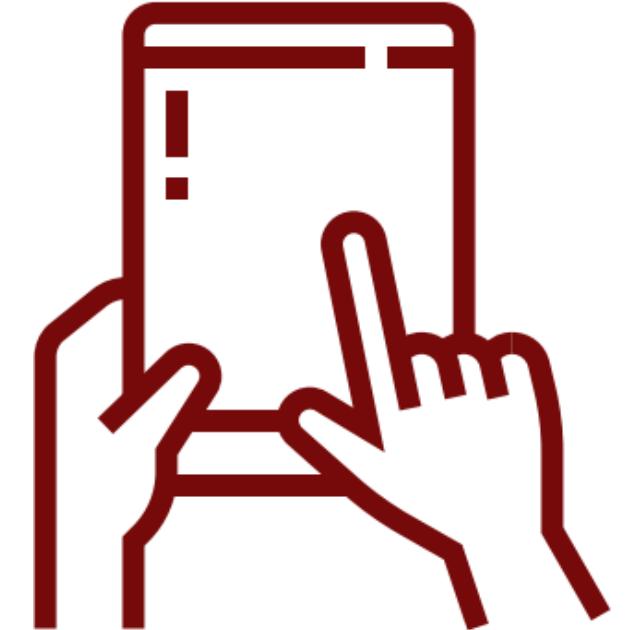
- **Vue 3 CLI:** Chosen as the primary frontend framework for building a reactive.
- **JavaScript:** The primary scripting language for frontend logic and interactions.
- **Bootstrap:** Applied for UI styling, ensuring a responsive and visually appealing design.
- **HTML & CSS:** Used for structuring and styling the user interface.
- **Axios & Fetch API:** Employed for making asynchronous HTTP requests to the backend API.



Tools and Technology Used

General Technologies Used:

- **GitHub:** Utilized for version control, code management, tracking issues, reviewing changes, and collaborative development.
- **Canva:** Used for designing reports, presentations, and documentation visuals.
- **Jira:** Implemented as the project management tool for tracking tasks, sprint planning, and progress monitoring.
- **draw.io (app.diagrams.net):** Used for creating UML diagrams, system architecture designs, and flowcharts.





Software Engineering Project

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Thank YOU !