Indian Institute of Technology, Madras


Software Engineering Project

Milestone 3 Submission

# A Learning-Path Recommendation System for IIT(M) B.S. Degree

*Submitted by:*


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# 1 Scheduling and Design

**Tasks**

1. **Project Schedule** - come up with a schedule of your overall project based on the user stories created in the previous milestones.
2. **Project Scheduling Tools** - which tools are you using? E.g. Pivotal Tracker, Jira
3. **Design of Components** - Describe different components of your system based on the user stories created in the previous milestones.
4. **Software Design** - Basic class diagrams of your proposed system.

## 1.1 Project Schedule

### *1.1.1 Gantt Chart*

After a lot of discussion, a general schedule mentioned in Figure 1 has been decided. The breakdown of individual milestone in Figure 1 is given in Figure 2, Figure 3 and Figure 4. Details about each task is given in Table 1.

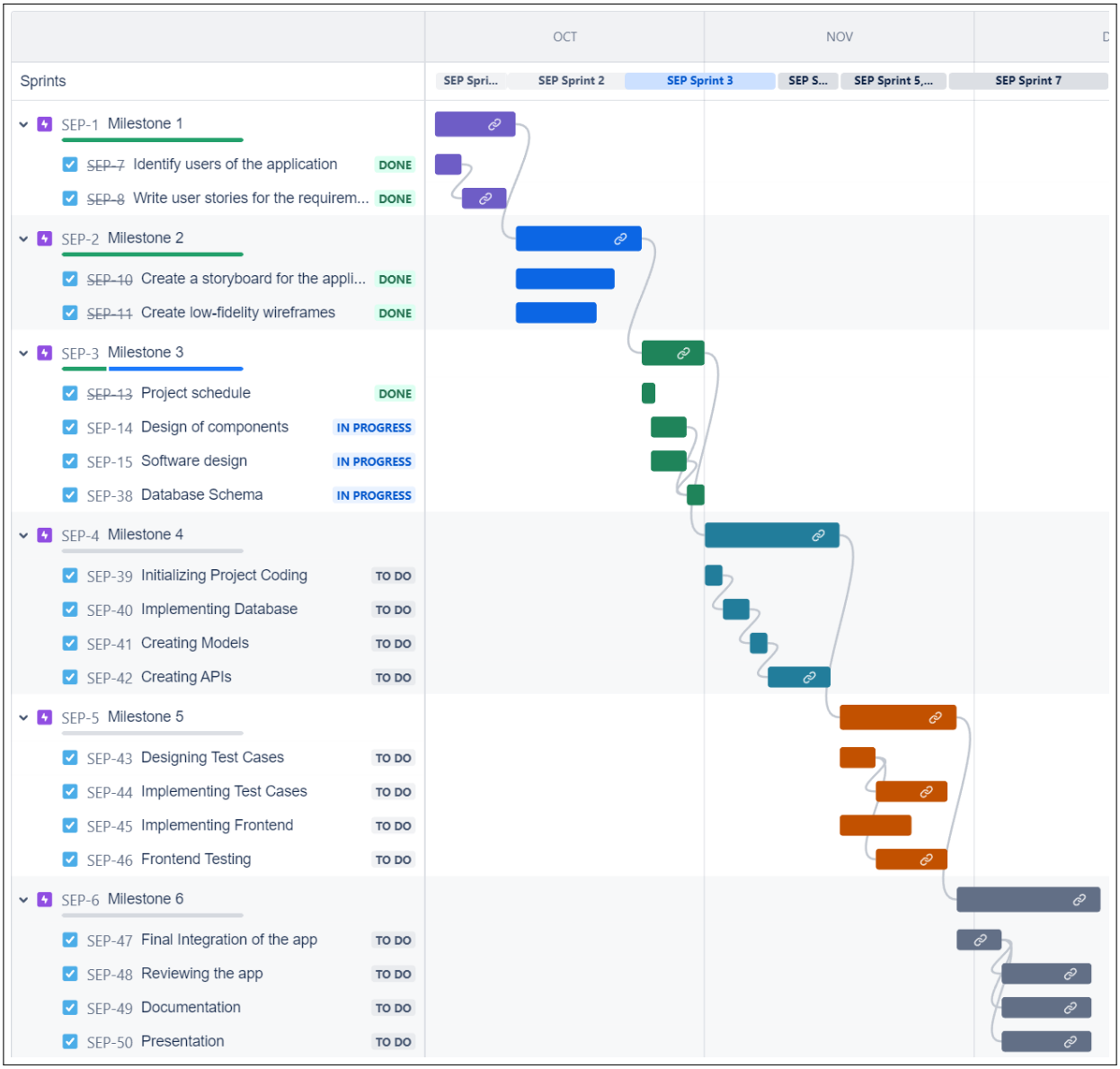


Figure 1: Complete Project Timeline

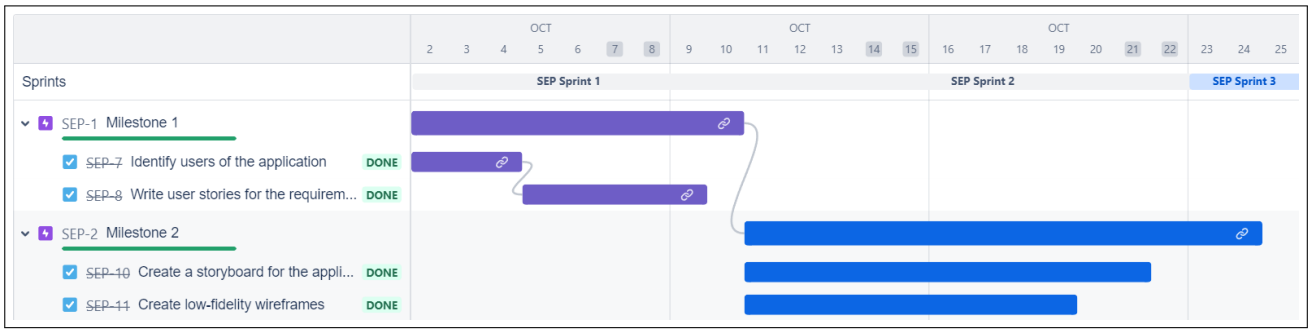


Figure 2: Milestone 1 and 2 Schedule

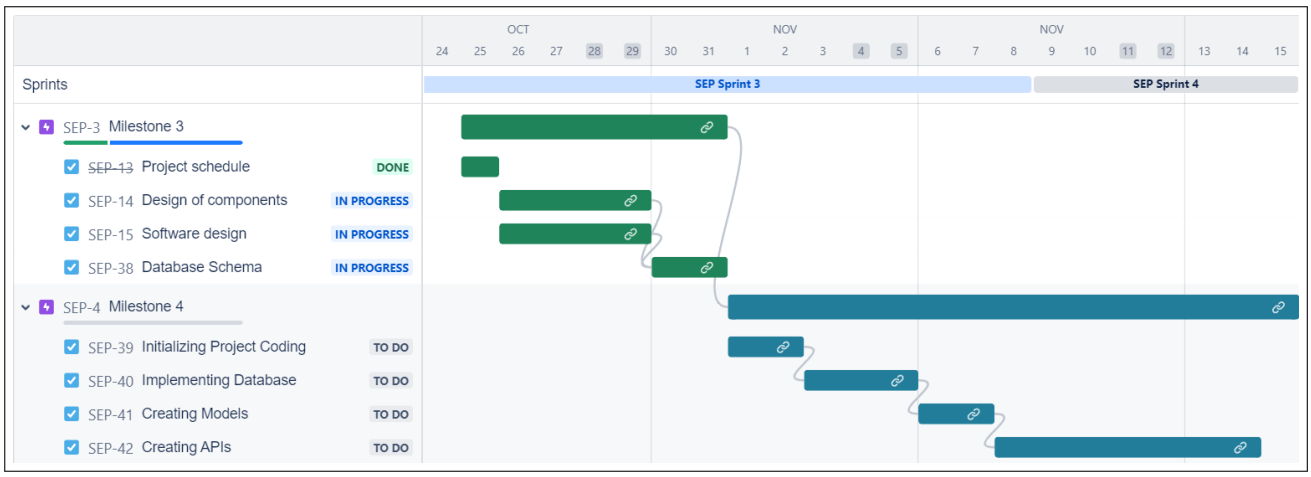


Figure 3: Milestone 3 and 4 Schedule

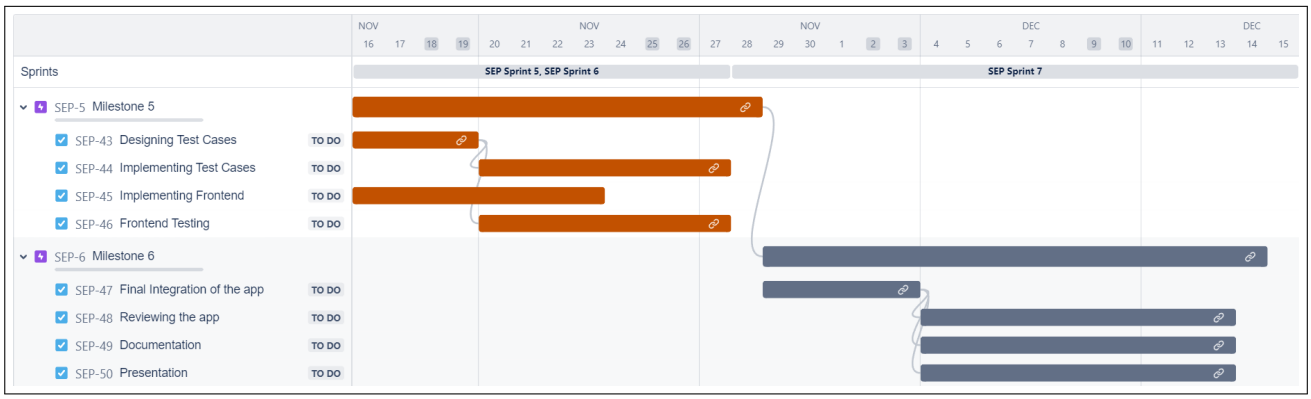


Figure 4: Milestone 5 and 6 Schedule

As evident from the figures, each task in the milestones is self-explanatory and need not be further described.

The tasks above have divided into various sprints, details of which are in Table 1.

### *1.1.2 SPRINT Schedule*

| Activity | Start Date (dd/mm/yyy) | End Date (dd/mm/yyyy) | Duration (days) |
|---|---|---|---|
| **Sprint 1** | | | |
| Identify users of the application | 02/10/2023 | 04/10/2023 | 3 |
| Write user stories | 05/10/2023 | 09/10/2023 | 5 |
| **Sprint 2** | | | |
| Create storyboards | 11/10/2023 | 21/10/2023 | 11 |
| Create low-fidelity wireframes | 11/10/2023 | 19/10/2023 | 9 |
| **Sprint 3** | | | |
| Project schedule | 25/10/2023 | 25/10/2023 | 1 |
| Design of components | 26/10/2023 | 29/10/2023 | 4 |
| Software design | 26/10/2023 | 29/10/2023 | 4 |
| Database Schema | 30/10/2023 | 31/10/2023 | 2 |
| Initializing Project Coding | 01/11/2023 | 02/11/2023 | 2 |
| Implementing Database | 03/11/2023 | 05/11/2023 | 3 |
| Creating Models | 06/11/2023 | 07/11/2023 | 2 |
| **Sprint 4** | | | |
| Creating APIs | 08/11/2023 | 14/11/2023 | 7 |
| **Sprint 5** | | | |
| Designing Test Cases | 16/11/2023 | 19/11/2023 | 4 |
| Implementing Test Cases | 20/11/2023 | 27/11/2023 | 8 |
| **Sprint 6** | | | |
| Implementing Frontend | 16/11/2023 | 23/11/2023 | 8 |
| Frontend Testing | 20/11/2023 | 27/11/2023 | 8 |
| **Sprint 7** | | | |
| Final Integration of the app | 29/11/2023 | 03/12/2023 | 5 |
| Reviewing the app | 04/12/2023 | 13/12/2023 | 10 |
| Documentation | 04/12/2023 | 13/12/2023 | 10 |
| Presentation | 04/12/2023 | 13/12/2023 | 10 |

Table 1: Sprint schedule created in Jira

Various Sprints have been created to complete the tasks. Each Sprint has Analysis, Design and Implementation as its sub-phases may it be for drawing (Storyboards) or coding (API coding). Also, each task in the sprints is self-explanatory and need not be further described.

## 1.2 Project Scheduling Tool

After checking out various tools, **Jira Software by Atlassian** was decided to be used based on its in-built features of sprints, epics, connection to github and task management features. A screenshot showing the usage of the app by the team is in Figure 5.

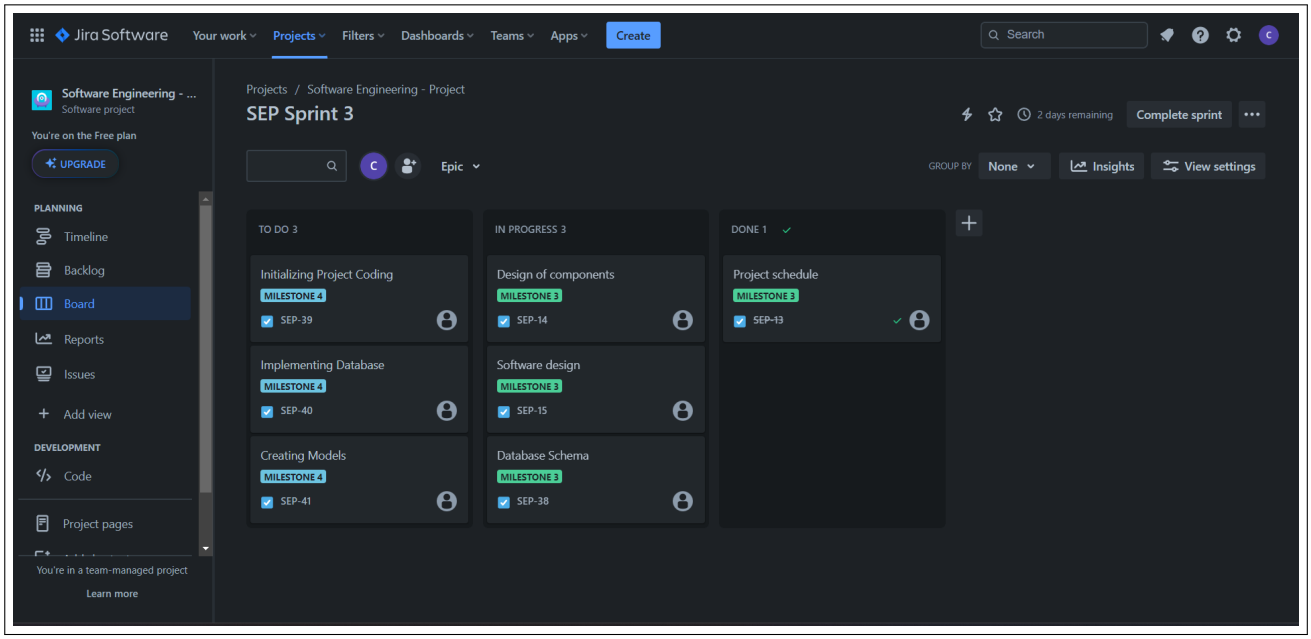


Figure 5: Sprint Board in Jira

## 1.3 Various Components

***User Management Component***

- ➔ Handles user authentication, registration, and profile creation.
- ➔ Assigns and manages user roles based on permissions.
- ➔ Provides user access control and permission management.

***Profile Management Component***

- ➔ Stores and retrieves user profile information securely.
- ➔ Manages user preferences, interests, and contact details.
- ➔ Enables profile updates and modifications by users.
- ➔ Ensures privacy and data protection measures for user profiles.
- ➔ Supports user-initiated data deletion or modification requests.

***Course Management Component***

- ➔ Adds, edits, and deletes courses from the catalog database.
- ➔ Manages course details such as name, description, instructors, and prerequisites.
- ➔ Controls the availability of courses for different terms or semesters.
- ➔ Handles updates and modifications to course information.
- ➔ Ensures data integrity and consistency within the course database.

***Enrolment and Analytics Component***

- ➔ Imports and exports enrolment data for analysis and recommendations.
- ➔ Generates statistical reports and insights for academic trends and performance.
- ➔ Tracks course popularity and student enrolment statistics.

***Feedback and Rating Component***

- ➔ Stores and manages student feedback and ratings for courses.
- ➔ Allows students to provide, edit or delete their feedback.
- ➔ Enables upvoting of helpful feedback from other students.
- ➔ Monitors and maintains the accuracy and relevance of feedback data.
- ➔ Facilitates analysis of feedback for course improvements.

***Course Catalog Component***

- ➔ Manages detailed information about available courses.
- ➔ Allows for sorting and filtering capabilities for users.
- ➔ Tracks and displays course availability and scheduling information.
- ➔ Maintains a comprehensive database of instructor details and feedback for each course.

***Data Analysis Component***

- ➔ Collects and processes statistical data for student performance.
- ➔ Conducts trend analysis for course popularity and academic patterns.
- ➔ Generates graphical representations and reports for data visualisation.
- ➔ Offers insights into academic progress and program assessment.

***Recommendation Component***

- ➔ Generates personalised course recommendations based on user profiles, completed courses, and interests.
- ➔ Utilises machine learning algorithms or rule-based systems for suggestion generation.
- ➔ Analyses user behaviour and preferences to suggest relevant courses.
- ➔ Collaborates with Enrolment and Analytics components to enhance recommendation accuracy.

## 1.4 Class Diagram

A basic class diagram describing the application is given in Figure 6. The diagram follows standard UML notations. The retuen type and parameters have been left empty for the classes, for the sake of readability.

There are 5 major Classes:

1. User
2. Recommender
3. Feedback
4. Course
5. Analytics

with their specializations as per given in the diagram. The dotted notation represents dependency of one component on another. This diagram shall be further modified to be in-line with flask framework to facilitate easy creation of APIs.

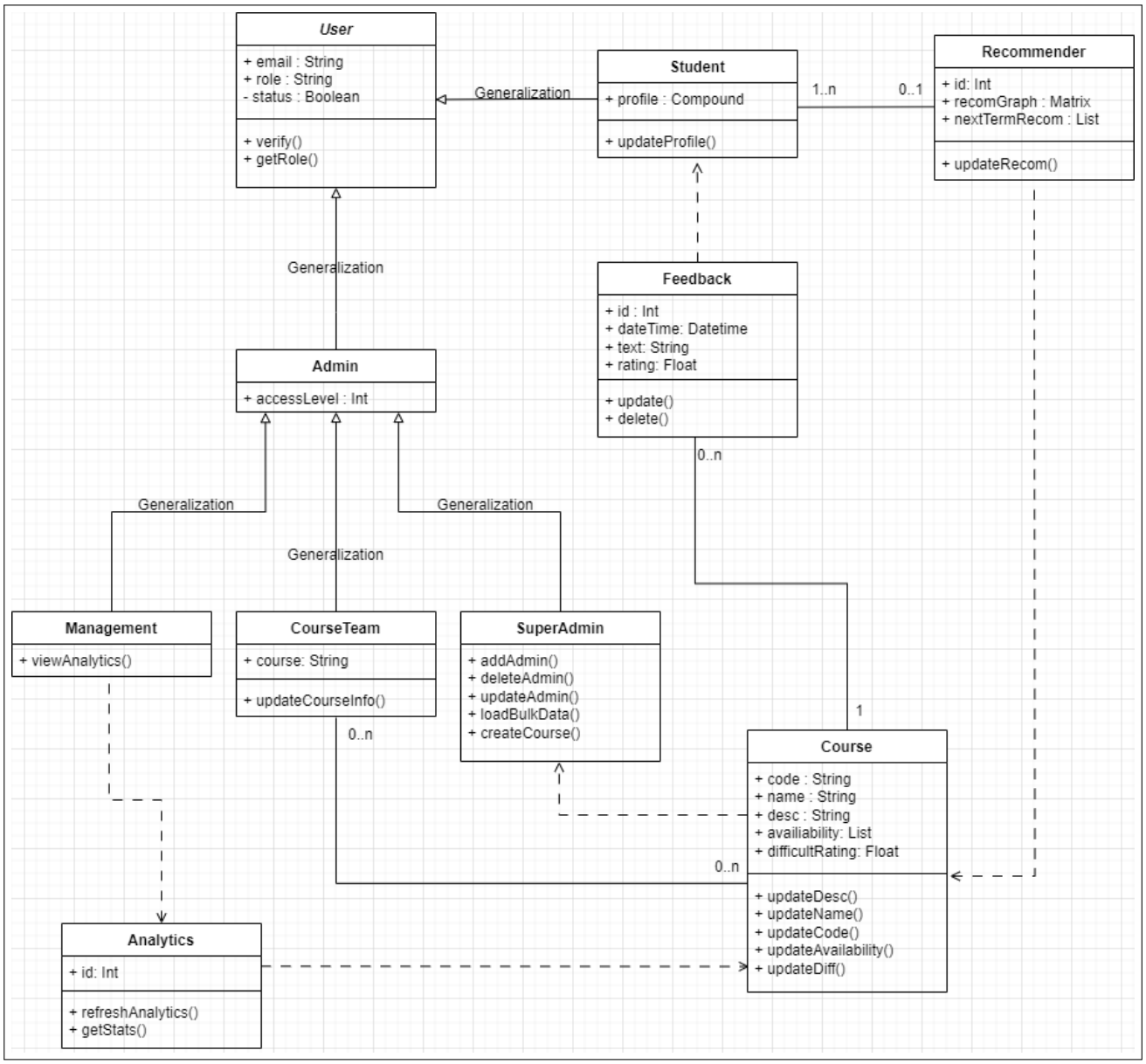


Figure 6: Basic Class Diagram

## 1.5 SCRUM Meetings Schedule and Minutes

Till date, 6 official meetings have been conducted details of which are in subsequent boxes. A lot of discussion also held via chat through WhatsApp. The major work completed, issues discussed and agenda is combined into a single heading ”Minutes of the Meeting”.

Meeting: Based on availability and need, after every 6 days starting from 2nd October.

**2nd October, 2023**

- **Time**: 17:00 to 17:50 Hours
- **Duration**: 50 minutes
- **Who Attended**: Anchit, Anhat, Jasleen, Jay, Rohit
- **Agenda**: Introduction

- **Minutes of the Meeting**: The main goal of the meeting was to introduce ourselves and to discuss basic approach to solve the given Problem Statement.
  1. Introduced Ourselves
  2. Understood which tech-stack we are comfortable
  3. Identified main components in the projects:
     (a) Backend and Frontend
     (b) API
     (c) UI
     (d) Recommendation Algorithms
  4. Understood and managed the timelines on Jira

### 8th October, 2023

- **Time**: 19:00 to 19:29 Hours
- **Duration**: 29 minutes
- **Who Attended**: Anchit, Anhat, Jasleen, Jay, Rohit
- **Agenda**: Complete Sprint 1

- **Minutes of the Meeting**:
  1. Identified Primary, Seconday and Tertiary Users
  2. Understood SMART Guidelines
  3. Understood and wrote User Stories

### 15th October, 2023

- **Time**: 16:45 to 17:15 Hours
- **Duration**: 30 minutes
- **Who Attended**: Anchit, Anhat, Jasleen, Jay, Rohit
- **Agenda**: Initialize discussion on Sprint 2

- **Minutes of the Meeting**:
  1. Wrote the important requirements for creating userboards
  2. Learnt and discussed different ways to create wireframes

### 18th October, 2023

- **Time**: 20:35 to 21:09 Hours
- **Duration**: 24 minutes
- **Who Attended**: Anchit, Anhat, Jasleen, Jay, Rohit
- **Agenda**: Ensure uniformity in storyboard and wireframe design by each team member.

- **Minutes of the Meeting**:
  1. Initiated the work on creating a storyboard
  2. Created and discussed the essential wireframes

**26th October, 2023**

- **Time**: 22:15 to 22:47 Hours
- **Duration**: 32 minutes
- **Who Attended**: Anchit, Anhat, Jasleen, Jay, Rohit
- **Agenda**: Complete Sprint 2

- **Minutes of the Meeting**:
  1. Completed all the wireframes
  2. Completed storyboards illustrating all the important features

**1st November, 2023**

- **Time**: 16:05 to 16:27 Hours
- **Duration**: 32 minutes
- **Who Attended**: Anchit, Anhat, Jasleen, Jay, Rohit
- **Agenda**: Discuss Sprint 3

- **Minutes of the Meeting**:
  1. Created/Rectified Sprints and timings in JIRA
  2. Designed all the components diagrams
  3. Created a basic required class diagram