

● BSCSS3001 Software Engineering

Integrating GenAI into SEEK learning Portal | 2024 T2

Project Presentation

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TEAM 8

8

Problem Statement

Effective integration of Generative AI into programming learning environments

Learners in the IITM BS degree program primarily engage with content through the SEEK portal, which offers learning videos, resources, assignments, and quizzes, supporting self-paced learning. With the rapid growth of generative AI (GenAI), this term's software engineering project aims to explore how GenAI can be effectively integrated into learning environments like SEEK.

User Stories

1

As a learner,
I want to register/login on the platform,
So that I can access and view the
available learning content.

2

As a learner,
I want the option to generate a summary
for any specific video after watching it,
So that I can reinforce my understanding
of the video content.

3

As a learner,
I want GenAI to give real-time
hints while I code,
so I can improve instantly.

4

As a learner,
I want GenAI to analyze my
programming quiz attempts and
provide detailed feedback
So that I can enhance my
programming skills.

User Stories

1

As a learner,
I want GenAI to evaluate my subjective assignments for accuracy, grammar, and missed points,
So that I can understand areas for improvement and enhance my answers.

2

As an instructor,
I want to utilize GenAI to automatically evaluate and provide feedback on code Submissions
So that I can offer more detailed and helpful feedback to students.

3

As an administrator,
I want to add, delete, and update content and assignments,
So that I can ensure learners have access to the most relevant and up-to-date materials.

4

As an administrator,
I want to ensure that all GenAI-enhanced features undergo rigorous unit testing,
So that I can verify their functionality and reliability.

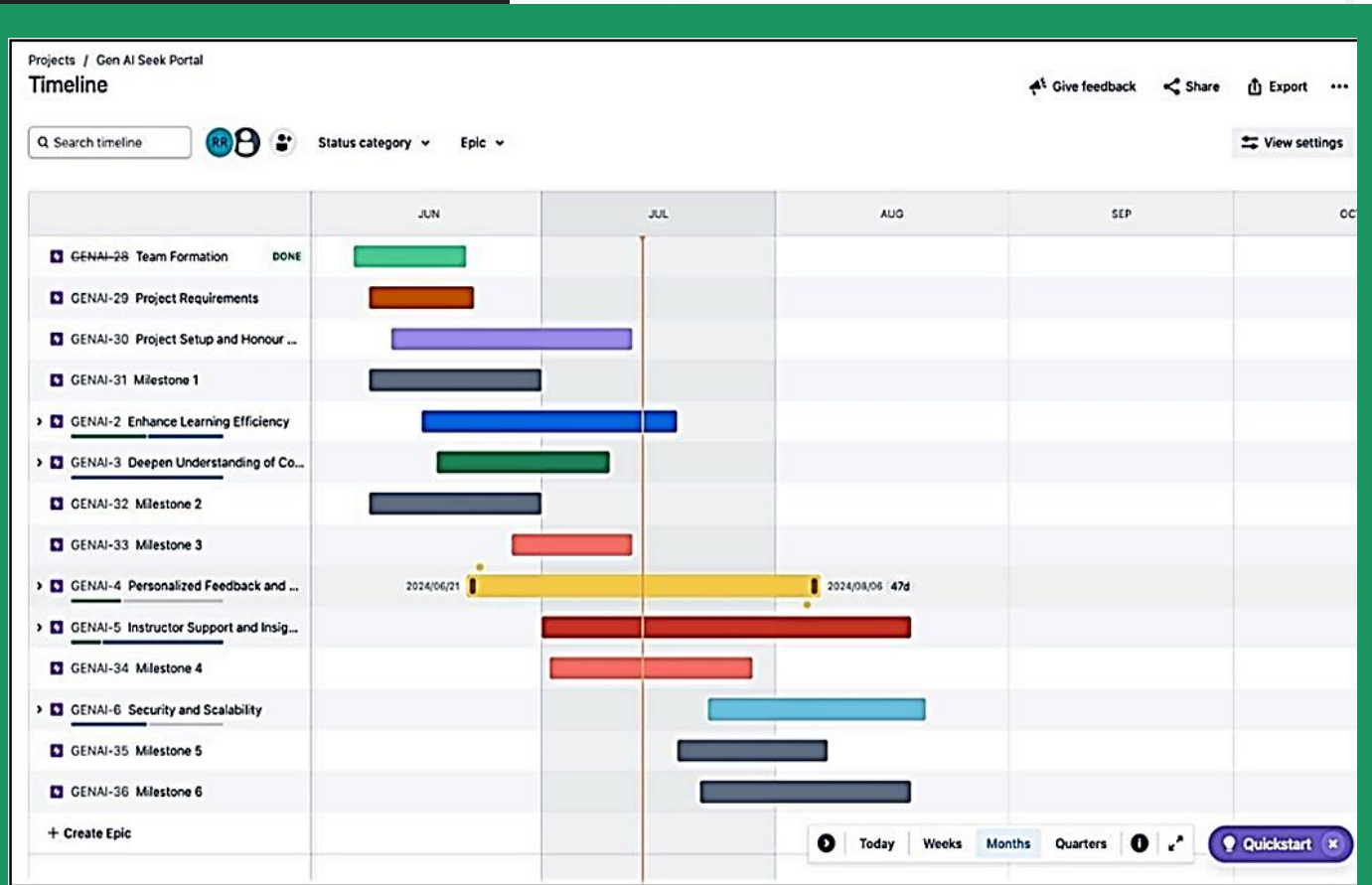
Project Scheduling

We use JIRA/ATLAS for project management, creating and assigning Epics, Activities, and Tasks. We've customized JIRA with workflows, dashboards, and goal planning, aligning the project schedule with the course timeline.

The project schedule is aligned to the course project timeline:

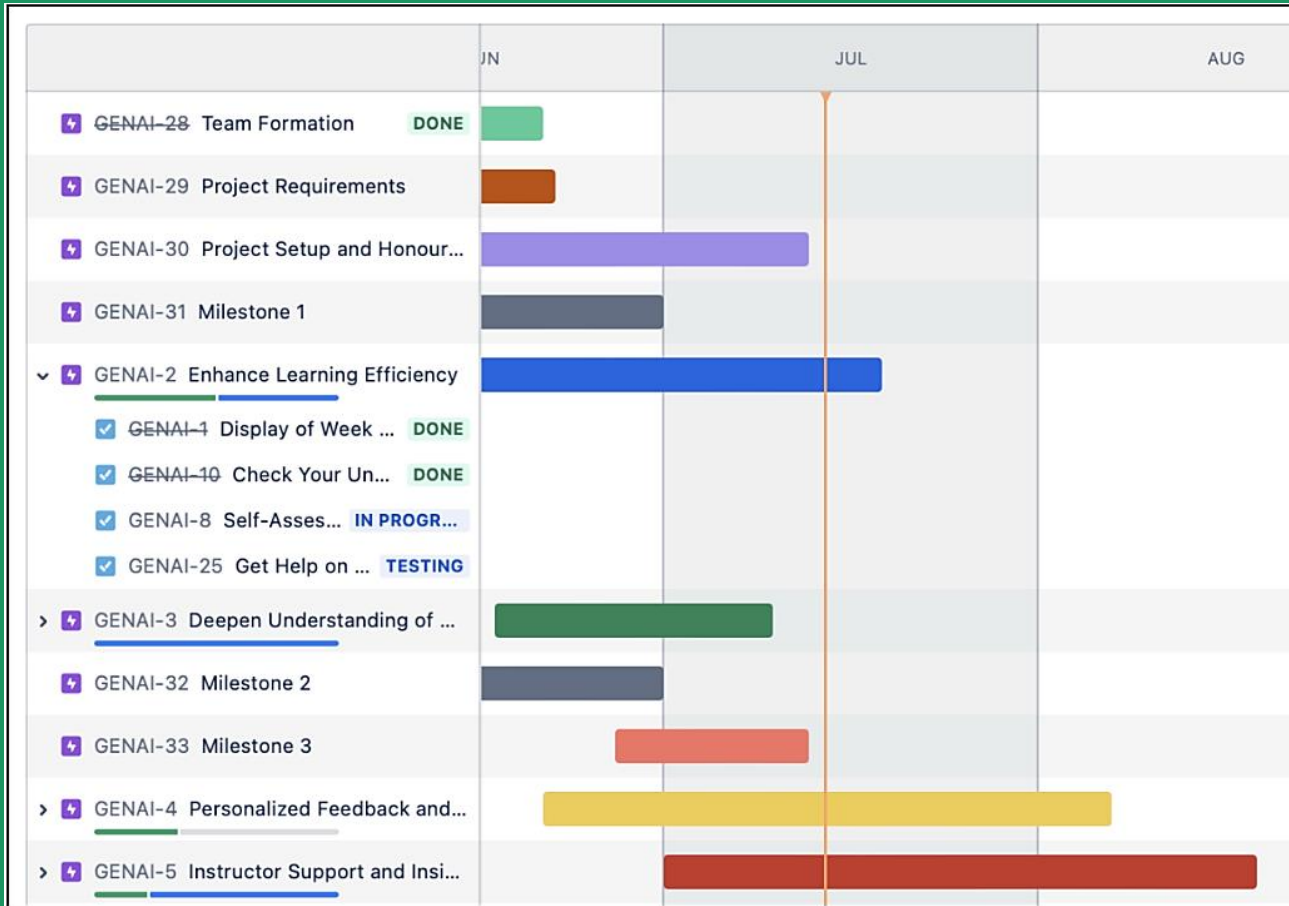
Milestone 1	30th June
Milestone 2	30th June
Milestone 3	12th July
Milestone 4	28th July
Milestone 5	7th August
Milestone 6	18th August

Project Timeline: Gantt Chart – Epics and Sprints



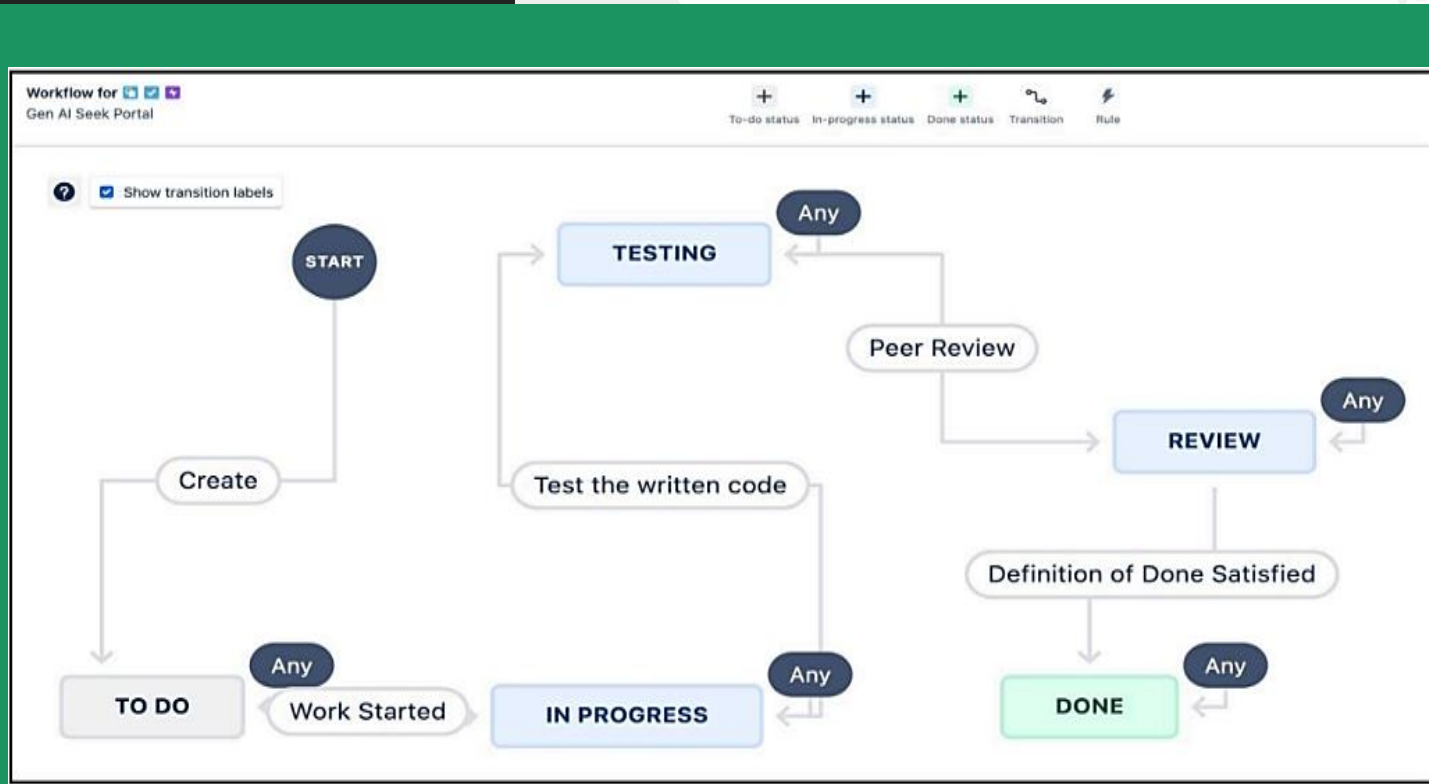
- Jira also has Gantt Charts.
- The Gantt chart is a commonly used project management tool that displays work completed over a period of time.
- Individual tasks were assigned to specific members. Tasks were also assigned backup members based on availability and priority.

Project Timeline: Gantt Chart – Tasks/Issues



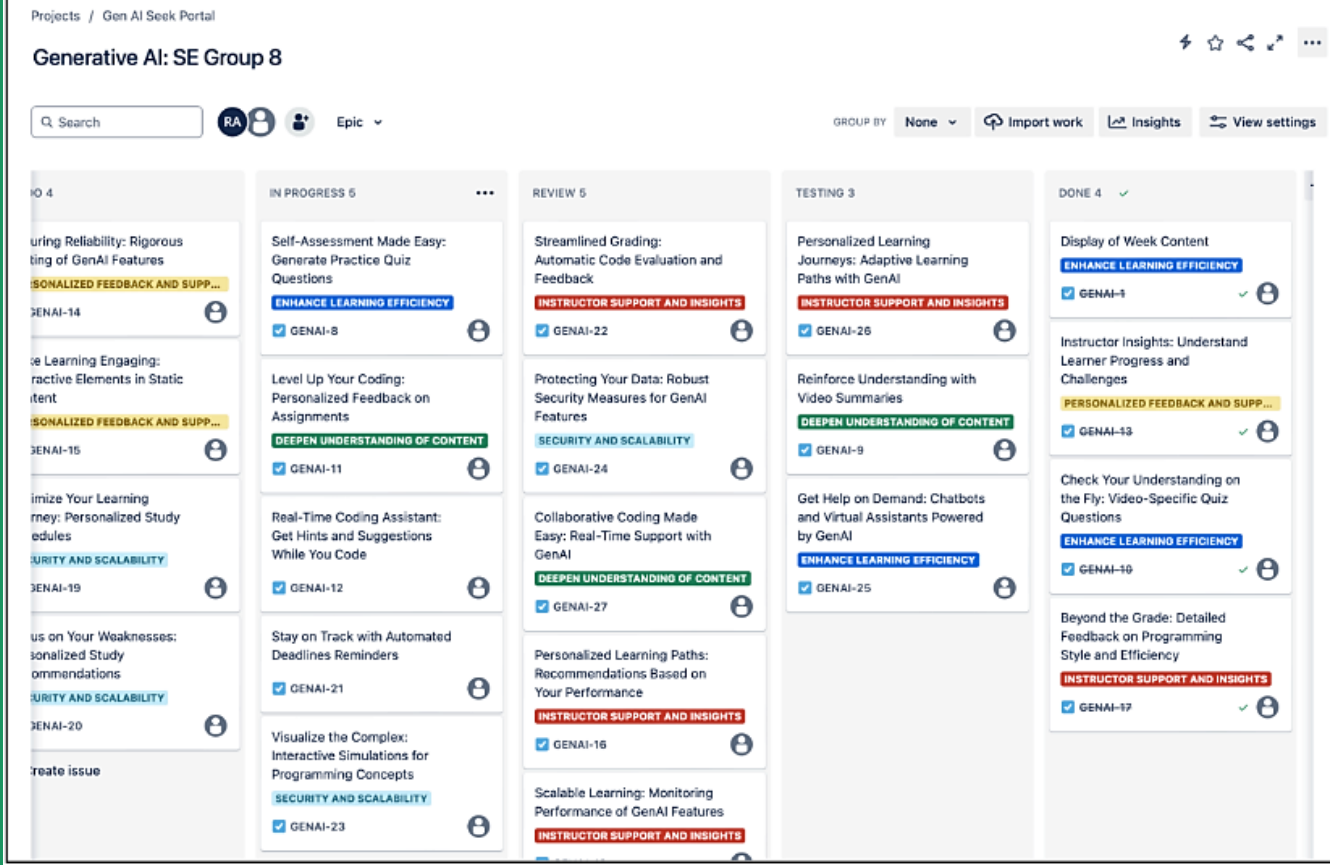
- The tasks allow us to integrate scheduling with start date and end date.
- Here we can also assign tasks to team members for action.
- Each task also has a status that shows as To-Do, In progress or Done.

Project Timeline: Custom Workflow



- We customized task workflows in Jira by setting a sequential status flow.
- Tasks move through statuses and trigger a review step upon completion, changing to Done after review.

Project Scheduling: KANBAN Board - Overall



- Kanban is an agile framework that visualizes tasks on a board with statuses: To Do, In Progress, Review/Test, Done, and Blocked.
- This helps our team track task progress and requirements.

Project Scheduling: Backlogs

Projects / Gen AI Seek Portal

Backlog

Search [] Epic [] View settings []

Board (21 issues)

GENAI-1	Display of Week Content	ENHANCE LEARNING	DONE	8
GENAI-13	Instructor Insights: Understand Learner Progress and Challenges	PERSONALIZED FEED	DONE	8
GENAI-16	Check Your Understanding on the Fly: Video-Specific Quiz Questions	ENHANCE LEARNING	DONE	8
GENAI-17	Beyond the Grade: Detailed Feedback on Programming Style and Efficiency	INSTRUCTOR SUPPO	DONE	8
GENAI-8	Self-Assessment Made Easy: Generate Practice Quiz Questions	ENHANCE LEARNING	IN PROGRESS	8
GENAI-11	Level Up Your Coding: Personalized Feedback on Assignments	DEEPEN UNDERSTAN	IN PROGRESS	8
GENAI-12	Real-Time Coding Assistant: Get Hints and Suggestions While You Code		IN PROGRESS	8
GENAI-14	Ensuring Reliability: Rigorous Testing of GenAI Features	PERSONALIZED FEED	TO DO	8
GENAI-15	Make Learning Engaging: Interactive Elements in Static Content	PERSONALIZED FEED	TO DO	8
GENAI-19	Optimize Your Learning Journey: Personalized Study Schedules	SECURITY AND SCAL	TO DO	8
GENAI-20	Focus on Your Weaknesses: Personalized Study Recommendations	SECURITY AND SCAL	TO DO	8
GENAI-21	Stay on Track with Automated Deadlines Reminders		IN PROGRESS	8
GENAI-22	Streamlined Grading: Automatic Code Evaluation and Feedback	INSTRUCTOR SUPPO	REVIEW	8
GENAI-23	Visualize the Complex: Interactive Simulations for Programming Concepts	SECURITY AND SCAL	IN PROGRESS	8
GENAI-24	Protecting Your Data: Robust Security Measures for GenAI Features	SECURITY AND SCAL	REVIEW	8
GENAI-26	Personalized Learning Journeys: Adaptive Learning Paths with GenAI	INSTRUCTOR SUPPO	TESTING	8
GENAI-9	Reinforce Understanding with Video Summaries	DEEPEN UNDERSTAN	TESTING	8
GENAI-25	Get Help on Demand: Chatbots and Virtual Assistants Powered by GenAI	ENHANCE LEARNING	TESTING	8

Quickstart

- The backlog is a prioritized list of tasks and features for the project.
- It serves as the source for future work, helping us manage and schedule tasks based on priority and project needs.

API Test Cases

API unit testing ensures that individual API endpoints function correctly by validating their responses against expected outcomes.

For each user story, new API endpoints are created



User Login API

Input

```
{  
  "username": "johndoe",  
  "password": "securePassword123"  
}
```

- **API being tested:** /user_login
- **Expected Output:**
 - Status Code: 302
 - Response Body: Redirect to user dashboard
- **Actual Output:**
 - Status Code: 302
 - Response Body: Redirect to /user_dashboard
- **Result:** Success

Admin Login API

Input

```
{  
  "ad_username": "janesmith",  
  "passwd": "adminSecurePassword456"  
}
```

- **API being tested:** /admin_login
- **Expected Output:**
 - Status Code: 302
 - Response Body: Redirect to admin dashboard
- **Actual Output:**
 - Status Code: 302
 - Response Body: Redirect to /admin
- **Result:** Success

Create Course API

Input

```
{  
  "cat_name": "Introduction to Programming",  
  "cat_details": "A beginner course on programming.",  
  "cat_img": "<binary data>"  
}
```

- **API being tested:** /admin/create_course
- **Expected Output:**
 - Status Code: 302
 - Response Body: Redirect to course list
- **Actual Output:**
 - Status Code: 302
 - Response Body: Redirect to /admin
- **Result:** Success

Update Course API

Input

```
{  
  "cat_name": "Introduction to Programming",  
  "cat_details": "A beginner course on programming.",  
  "cat_img": "<binary data>"  
}
```

- **API being tested:** /admin/<cat_id>/update
- **Inputs:** Path Parameter: {cat_id} = 1
- **Expected Output:**
 - Status Code: 302
 - Response Body: Redirect to course list
- **Actual Output:**
 - Status Code: 302
 - Response Body: Redirect to /admin
- **Result:** Success

Create Content API

Input

```
"content_type": "assignment",  
"assignment_question": "What is the complexity of binary search?",  
"option_a": "O(n)",  
"option_b": "O(log n)",  
"option_c": "O(n log n)",  
"option_d": "O(1)",  
"correct_answer": "O(log n)"
```

- **API being tested:**
`/admin/<cat_id>/create_content`
- **Inputs:** Path Parameter: {cat_id} = 1
- **Expected Output:**
 - Status Code: 302
 - Response Body: Redirect to content list
- **Actual Output:**
 - Status Code: 302
 - Response Body: Redirect to `/admin/<cat_id>/contents`
- **Result:** Success

Update Content API

Input

```
{  
  "content_type": "assignment",  
  "assignment_question": "Updated question?",  
  "option_a": "Updated option",  
  "correct_answer": "Updated option"  
}
```

- **API being tested:**
`/admin/<cat_id>/<content_id>/update`
- **Inputs:** Path Parameters: {cat_id} = 1, {content_id} = 1
- **Expected Output:**
 - Status Code: 302
 - Response Body: Redirect to content list
- **Actual Output:**
 - Status Code: 302
 - Response Body: Redirect to `/admin/<cat_id>/contents`
- **Result:** Success

Prompt with video API

Input

```
{  
  "prompt": "Explain the concept of polymorphism."  
}
```

Expected Output (Response body)

```
{  
  "Answer": "Polymorphism allows objects to be treated as instances of their  
    parent class rather than their actual class."  
}
```

- **API being tested:** /process_prompt
- **Expected Output:**
 - Status Code: 302
- **Actual Output:**
 - Status Code: 302
 - Response Body: As Expected
- **Result:** Success

Prompt with web API

Input

```
{  
  "prompt": "Explain the concept of polymorphism."  
}
```

Expected Output (Response body)

```
{  
  "Answer": "Polymorphism allows objects to be treated as instances of their  
    parent class rather than their actual class."  
}
```

- **API being tested:** /process_web_prompt
- **Expected Output:**
 - Status Code: 302
- **Actual Output:**
 - Status Code: 302
 - Response Body: As Expected
- **Result: Success**

Coding Answer API

Input

```
{  
  "coding_question": "Write square root function"  
}
```

Expected Output (Response body)

```
"Answer": "def square_root(x): if x < 0: return "Square root of a negative  
number is not real." else: return x ** 0.5 # Example usage:result =  
square_root(16) print("The square root is:", result)"
```

- **API being tested:** /get_coding_answer
- **Expected Output:**
 - Status Code: 302
- **Actual Output:**
 - Status Code: 302
 - Response Body: As Expected
- **Result: Success**

Coding Answer hint API

Input

```
{  
  "coding_question": "Write square root function",  
  "additional_input": "a=b^2",  
}
```

Expected Output (Response body)

```
'Answer': "Consider using the exponentiation operator ** with 0.5 to compute  
the square root of a number."
```

- **API being tested:** /get_coding_hint
- **Expected Output:**
 - Status Code: 302
- **Actual Output:**
 - Status Code: 302
 - Response Body: As Expected
- **Result:** Success

Check User Code API

Input

```
"code": "def square_root(x):  
    return x ** 0.5  
",  
"input": "16,  
"expected_output": "4",
```

Expected Output (Response body)

```
"is_correct": "True"
```

- **API being tested:** /check_code
- **Expected Output:**
 - Status Code: 302
- **Actual Output:**
 - Status Code: 302
 - Response Body: As Expected
- **Result:** Success

Subjective Evaluation API

Input

```
{  
  
  "question": "What is phenomenon",  
  
  "answer": "a fact or situation that is observed to exist or happen, especially  
one whose cause or explanation is in question."  
}
```

Expected Output (Response body)

```
{  
  
  "cohesiveness_feedback": "The answer is concise and directly addresses the  
question, providing a clear definition of 'phenomenon'.",  
  
  "grammar_feedback": "The answer is grammatically correct, but the spacing  
between words could be improved for better readability.",  
  
  "plagiarism_feedback": "The given content seems to be 95% AI generated"  
}
```

- **API being tested:** `/evaluate_subjective`
- **Expected Output:**
 - Status Code: 302
- **Actual Output:**
 - Status Code: 302
 - Response Body: As Expected (with minor changes)
- **Result:** Success

Code Review & Testing

Development Sprint Reviews: We held weekly reviews with developers, the product manager, and the scrum master to assess progress, resolve issues, and plan the next sprint.

Code Demos and Reviews: Secondary developers and testers reviewed and integrated the code..



Code Review on Git: Pull Requests

The screenshot displays a GitHub Pull Request (PR) titled "Update app.py #3". The PR is open and shows a commit from "Ritik-IITM" being merged into the "dhillionavdeep:main" branch. The interface includes a navigation bar at the top with tabs for Code, Issues, Pull requests (1), Actions, Projects, Security, and Insights. Below the title, there's a status bar indicating the PR is open and showing the commit details. The main content area features a conversation thread with a comment from Ritik-IITM stating "No description provided." and a commit titled "Update app.py" with a "Verified" badge. A green checkmark indicates that the branch has no conflicts with the base branch, and a "Merge pull request" button is visible. The right sidebar contains metadata for the PR, including Reviewers (dhillionavdeep), Assignees (Ritik-IITM), Labels (None yet), Projects (None yet), Milestone (No milestone), and Development status (Successfully merging this pull request may close these issues.). At the bottom, there's a section for Notifications and a footer with a reminder to follow the GitHub Community Guidelines.

dhillionavdeep / soft-engg-project-may-2024-se-may-Team_8

Update app.py #3

Open Ritik-IITM wants to merge 1 commit into dhillionavdeep:main from Ritik-IITM:Ritik-IITM-patch-1

Conversation 0 Commits 1 Checks 0 Files changed 1 +8 -7

Ritik-IITM commented now

No description provided.

Update app.py Verified 988b884

Ritik-IITM self-assigned this now

✓ This branch has no conflicts with the base branch
Merging can be performed automatically.

Merge pull request You can also open this in GitHub Desktop or view command line instructions.

Add a comment

Write Preview

Add your comment here...

Markdown is supported Paste, drop, or click to add files

Close pull request Comment

Remember, contributions to this repository should follow our GitHub Community Guidelines.

Reviewers: dhillionavdeep (Request)

Assignees: Ritik-IITM

Labels: None yet

Projects: None yet

Milestone: No milestone

Development: Successfully merging this pull request may close these issues.

Notifications: Unsubscribe (Customize)

Code Review on Git: Issue Raised

The screenshot shows the GitHub interface for a repository named 'dhillionavdeep / soft-engg-project-may-2024-se-may-Team_8'. The 'Issues' tab is selected, displaying a list of closed issues. The search bar at the top shows the filter 'is:issue is:closed'. There are 9 labels and 0 milestones. The issues list shows two closed issues:

- Context from web part showing irrelevant prompt (not related to question)**
#2 by Ritik-IITM was closed 1 minute ago
- new user registration showing error (bugs reproducing steps attached)**
#1 by dhillionavdeep was closed 2 minutes ago

A 'ProTip!' message at the bottom suggests mixing and matching filters to narrow down the search.

Tools and Technologies Used

We used JIRA/ATLAS for project management, Kanban boards for task tracking, Git for version control, and IDEs for coding. API testing tools were employed for unit testing to ensure reliability.



Tools and Technologies Used

#	Tools/Technology	Usage
1	Adobe	Designing and editing content
2	Flask	Python web framework
3	Flask-SQLAlchemy	ORM integration
4	Flask-RESTful	API framework
5	Git/Git Hub	Version Control system
6	Google Docs	Collaborative Documents
7	Google Mail	Communication and sharing resources
8	Google Meet	Meetings, managing team
9	Google Sheet	Issue tracking for end user testing
10	Google Slides	Used for making presentation
11	HTML/CSS,JS	Base technologies for web development
12	JIRA	PM tool for tracking tasks, issues etc
13	Kanban	A board system used for managing tasks
14	MS Powerpoint	Presentation and announcement slides
15	MS Word	Documentation and announcement
16	ollama	Language models
17	PyTest	python testing framework
18	SQLite	Application database
19	Vscode	IDE for developing code



Flask



How we worked

Scrum meetings bring together the scrum master, product manager/owner, and scrum teams to exchange updates, address ongoing issues, review progress, gather feedback, and plan and assign upcoming tasks.

We've highlighted some key practices, tools, and deliverables that emerge from these meetings.



Meeting Planning

Step 1. Availability Calendar

Meetings scheduled based on availability. We have created an availability calendar to manage planned absences and common events (quizzes, festivals).

Step 2. Communication and Resource Sharing

Apart from our personal WhatsApp and Gmail accounts, we are also using a common WhatsApp Group to consolidate and streamline communications.

Step 3. Attendance Management


Attendance management and recording help track participation, maintain accountability, and ensure everyone stays informed by providing access to meeting records..


Step 4. Publish Team Calendar


The all-hands meet is scheduled two days in a week at 10:00 to 11:00PM. Scrum teams & milestone delivery teams schedule additional meets.


Step 5. Agenda & Meeting Report


The meeting invites include the agenda and prep work required. After meetings, a formal meeting report is published to all members.


 [Join with Google Meet](#)
meet.google.com/umc-gyve-tha



 [Join by phone](#)
(US) +1 575-518-3121 PIN: 213 191 710#


 [Take meeting notes](#)
Start a new document to capture notes


 8 guests
1 yes
7 awaiting








 


 Ritik Arora
Organizer
[Set your working location](#)


 NAVDEEP


 ANSARI MOHD TABISH FATEH MOHD (21f20014...


 MILAN

 VEDANSHI TEWARI

 Rohan Ajay Ramani

 SHUBHAM GATTANI


 TAMANNA TAK

 The Milestone 03 final review before submission.

Milestone 03 Document
: <https://docs.google.com/document/d/1Jc03foN3r-Bm-CjbC9Vu3FU4IMm8htvPvC6xCa8WpoE/edit>

Upcoming Next: MILESTONE 04

We will be closing Milestone 03 requirements by Monday, 22 July.

 10 minutes before

Meeting Report

My Drive > SE Project ▾ 👤

Type ▾

People ▾

Modified ▾

Name

Owner



Meeting Recordings



me



Meeting Notes



me

Meeting Notes

1. Review of last meeting and Milestone 1 story selection

The meeting started with a quick review of the last meeting and actions closed for Milestone 1. The team reviewed the stories from Milestone 1 for discussion and selection for further development. These stories were selected based on the fulfillment of project requirements, ability to demonstrate our understanding and capability to implement, and based on effective feasibility.

2. Shortlisted User Stories

Six stories were shortlisted. For each development story we have an assigned pair of developers from our scrum team based on personal availability and interest.

Date	4 July 2024 22:00 to 23:00
Agenda	Milestone 3 Discussion and Progress Updates
Meeting Link	https://meet.google.com/lob-jcai-yoe

Attendance

1	Milan	<input checked="" type="checkbox"/>
2	Ritik Arora	<input checked="" type="checkbox"/>
3	Vedanshi Tiwari	<input checked="" type="checkbox"/>
4	Tamanna Tak	<input checked="" type="checkbox"/>
5	Navdeep	<input checked="" type="checkbox"/>
6	Shubham Gattani	<input checked="" type="checkbox"/>
7	Rohan Ajay Ramani	<input checked="" type="checkbox"/>
8	Tabish	<input checked="" type="checkbox"/>

Table of Content

- [1. Review of last meeting](#)
- [2. Planning Milestone 3 and 4](#)
- [3. Development Preparation Tasks](#)
- [4. Open Discussion](#)
- [5. Meeting schedule for Feb-Mar 2024](#)



Thank
You