

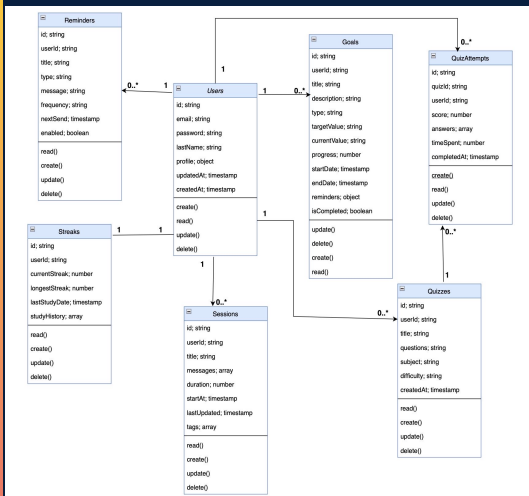
<Knight Foundation School of Computing and Information Sciences> <Summer> <2025> Senior Design Project <AI Study Buddy Chatbot>

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PROBLEM

Many students struggle to stay focused, organized, and consistent in their studies. Tools like flashcards, Google, and even ChatGPT offer help, but they lack structure, personalization, and habit tracking. Without real-time guidance or motivation, it's easy to fall behind on their studies. There's a need for a smarter study companion that adapts to individual needs and supports long-term academic success.

SYSTEM DESIGN



VERIFICATION

Test Case / Test Case	Title	Precondition	Test Steps	Expected result	Pass/Fail	Test Case
Test Case 1:	Bookmark icon is visible from each saved session.	User has at least one saved session.	1. Select a session 2. Click on the "Bookmark" icon (the bookmark icon)	A bookmark icon is displayed below each saved session alongside the other icon options.	pass	Icon
Test Case 2:	User can unbookmark a session.	The selected session needs to have been bookmarked already.	1. Click the top of all saved sessions 2. Select pinned bookmark to unbookmark 3. Wait for it to go back to the rest of the saved sessions	The session should go back to the rest of the other sessions, no longer visible from the top of the page.	pass	Icon
Test Case 3:	Users can bookmark multiple sessions.	User has at least one saved session.	1. Bookmark at least 3 different sessions 2. View them appear at the top of the page, in the order it was saved (first at the bottom, last bookmarked on the top)	Session remains bookmarked and visible after reload.	pass	Icon
Test Case 4:	Icon changes based on bookmarked status.	At least more than one session needs to be saved.	1. Click on the bookmark icon of a saved session 2. Observe icon become a darker shade 3. Click again to unbookmark 4. Observe the icon change back to a lighter shade	All sessions that were bookmarked appear on the top, with a visible pin on the right side.	pass	Icon
Test Case 5:	Flashcard creation and session bookmarking.	Flashcard creation and session bookmarking.	1. Click on the "Flashcard Generator" button 2. Fill in the required fields 3. Click on the "Generate" button	A session should be visible for previous attempts of a specific session.	pass	Flashcard
Test Case 6:	Ensure that each quiz is "removable".	User has taken at least one quiz.	1. Navigate to "Quiz Generator" 2. Scroll to the bottom of the page 3. Select quiz to remove 4. Select "Remove Quiz" button	Each question shows the answer selected by the user during the quiz.	pass	Quiz
Test Case 7:	Verify that correct answers are displayed for each quiz question.	Quiz contains at least one incorrect answer.	3. Open a quiz attempt with incorrect answers.	For every incorrect answer, the correct answer is clearly indicated.	pass	Quiz
Test Case 8:	Verify that an explanation is shown for each incorrect question only.	Quiz contains at least one incorrect answer.	3. Open a quiz attempt with incorrect answers.	For every incorrect answer, there should be a brief explanation as to why it is incorrect.	pass	Quiz
Test Case 9:	Verify that users can retake a completed quiz.	At least one quiz has been completed.	1. Open a past quiz 2. Select "Retake Quiz" button	A new attempt will be generated in a different page.	pass	Quiz
Test Case 10:	Verify that retaking a quiz saves it as a new attempt.	The user has retaken a quiz.	1. Retake a past quiz 2. Navigate back to the session quiz page.	Both the original and retake attempts are visible as separate attempts.	pass	Quiz

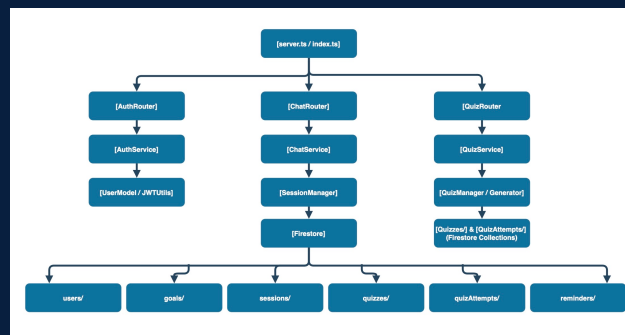
ACKNOWLEDGEMENT

The material presented in this poster is based upon the work supported by Avid Andre Trejo, Giovanni Derisca, Julio Jeronimo, and Celine Perez. We thank our professor for his assistance and mentorship that we received throughout the senior design project. We are grateful to our families and friends for their encouragement, support, and patience during this journey.

CURRENT SYSTEM

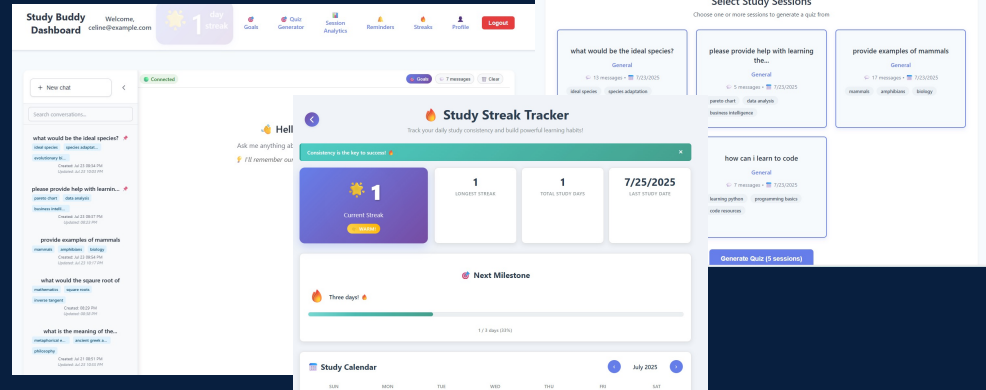
The current system allows the user to interact with an AI chatbot that helps them study in a personalized and organized way. The user can securely log in to view all their saved sessions, quizzes, and track their progress. All their data is safely stored in Firebase so they can view their saved data. However, it still lacks an AI that learns from the user's behavior to give smarter help over time.

OBJECT DESIGN



SUMMARY

The AI Study Buddy Chatbot is a web-based app built to help students stay focused, organized, and motivated in their studies. It combines an AI chatbot with smart study tools, allowing users to ask academic questions, set goals, take quizzes, and track their progress. Key features include personalized quiz generation, session bookmarking, study streak tracking, and customizable reminders. All user data is saved securely using Firebase, and progress is visualized through a simple dashboard. While the system already supports individual learning, future improvements like AI-based flashcard creation, note-taking, and smart recommendations can make the experience even more effective and engaging.



REQUIREMENTS

- Users can securely sign up and login to save their data.
- The user can interact with an AI-powered chatbot to answer academic questions and provide study support.
- The user can pin and find sessions by the tags generated for easy access.
- Users can set and track study goals (e.g., sessions completed, time studied).
- Customizable reminders for study sessions.
- Users have personalized quiz generation from past sessions. When done, they can review and/or retake the quiz.
- Saved sessions can be downloaded in PDF format, for easy review.
- Users can view their session analytics throughout their study sessions (e.g., time studied, average quiz score, total number of sessions studied).

IMPLEMENTATION

- React and TypeScript for a fast, responsive user interface.
- Node.js was used to handle backend logic.
- JWT library for user authentication.
- Used JSPDF to generate PDFs for each session summarization the user may want to download
- Firebase was used as our database to save the user's data.
- Used Llama3.1 as our AI study buddy.

SCREENSHOTS