

Study Helper

COSC612 Sprint 1

Team 4

Kate Dingman,
Andrei Kondashov,
Aravind Shyamanapally,
Pablo Rodas,
Vachana Bangalore Krupashankar

TEAM RESUME.....	3
PLANNING AND SCHEDULING.....	8
TEAMWORK BASICS SUMMARY.....	9
Ground Rules for Effective Teamwork.....	9
Work Norms.....	9
Facilitator Norms.....	9
Communication Norms.....	9
Meeting Norms.....	9
Consideration Norms.....	10
Hints for Handling Difficult Behavior.....	10
Overly talkative members.....	10
Too quiet.....	10
Argumentative member.....	10
Complainers.....	11
Hints for Handling Group Problems.....	11
PROBLEM STATEMENT.....	13
SYSTEM REQUIREMENTS.....	17
APPENDIX.....	19

TEAM RESUME

Columbia, MD

vachanakrupashankar@gmail.com

Vachana Bangalore Krupashankar

EDUCATION

- **Towson University, Towson, MD**
Masters of Science, Computer Science, 2024-2026 (expected)
- **Visveswaraya Technological University, Bengaluru, India**
Bachelor of Engineering, Computer Science, 2018

PROFESSIONAL SUMMARY

Experienced in software development with strong background in coding, debugging, and software design. Proficient in Java, SpringBoot, and Agile methodologies with focus on creating impactful, high-quality software that drives results.

WORK EXPERIENCE

Software Specialist 04/2020 - 02/2023
AIRONE Travel Solution Private Limited, Bengaluru, India

- Company Overview: Travel Services Company

Software Specialist 07/2019 - 03/2020
Slipstream IT Solutions Private Limited, Bengaluru, India

- Company Overview: IT Solutions and Consulting Services Company

PROJECTS

- **SCLIK Shell - Secure Command Line Interface Kit, 2024**, Developed a custom shell kit that can be run on any system which builds on nuances such as auto-completion, auto-correction and secure connect to external servers with a focus on user friendly interface.
- **Efficient and Expressive Keyword Search Over Encrypted Data in Cloud, 2017 - 2018**, Developed context-based search algorithm to crawl over encrypted data.
- **Selective Repeat ARQ, 2016 - 2017**, Developed 3D Shapes and Transformations using VC++ IDE compiler with C language.

CERTIFICATIONS

- **Microsoft Certified: Azure AI Fundamentals, 04/2024**
- **Arena Animation Certified: Animation with 3DS MAX, 03/2020**
- **Arena Animation Certified: Photoshop, 01/2020**

SKILLS

- Software development
- Software testing
- JAVA specialist
- Autodesk 3DS MAX
- Adobe Photoshop
- Data Analysis
- Data Visualization

Katherine Dingman

kdingman93@gmail.com • (443)-834-3035 • github.com/kmdingman1

SKILLS

Programming languages: Python, Java, SQL, CSS, HTML, JavaScript

Developer Tools: IntelliJ, Visual Studio Code, PyCharm, Git

Professional Skills: Project management, documentation, technical communication, time management, training & mentorship

EXPERIENCE

Precision Antibody, Columbia MD

05 2023 - 02 2024

Research Associate

- Analyzed high-throughput screening data from cell-based assays, maintaining comprehensive laboratory records
- Demonstrated strong problem-solving skills through troubleshooting experimental procedures
- Developed and implemented new Standard Operating Procedures to streamline laboratory workflows

Towson University Biology Department, Towson MD

05 2022 - 09 2023

Laboratory Research Assistant

- Maintained detailed digital records of animal health observations and experimental data, demonstrating strong documentation skills
- Developed and implemented laboratory protocols while ensuring compliance with ethical guidelines and welfare regulations
- Trained and supported new laboratory personnel on Standard Operating Procedures and safety protocols

EDUCATION

Towson University, Towson MD

09 2024 - Present

Master of Science, Computer Science

- GPA 3.7

Towson University, Towson MD

09 2018 - 05 2023

Bachelor of Science, Biology

PROJECTS

Automated Plant Irrigation System

09 2024 - 12 2024

- Designed and built an automated plant irrigation system using Raspberry Pi technology
- Wrote custom Python scripts to manage soil moisture monitoring and automated watering schedules
- Developed data logging functionality to track moisture readings and watering events

Healthcare Database Application

09 2024 - 12 2024

- Developing standalone application interface to manage and interact with healthcare database
- Designing intuitive forms and menus using Tkinter for seamless user interaction
- Establishing secure SQL database connections using Python's database libraries

ANDREI KONDRASHOV

Towson, MD • (443) 380-9223 • kondrashovan1999@gmail.com • [GitHub](#) • [LinkedIn](#)

TECHNICAL SKILLS

- Languages: Java (Advanced), Python (Basic), JavaScript (Advanced), C (Basic), SQL (Advanced)
- Systems: Microsoft Windows, Linux
- Software: Microsoft Excel, Microsoft Word
- Development Tools: IntelliJ IDE, Git/GitHub, Visual Studio, Maven, Docker, Postman
- Server Software: Apache httpd, Tomcat, Jetty, MySQL, PostgreSQL, MongoDB
- Enterprise/Web-Application Platforms: Java/Spring Framework, JavaScript/Node.js&Express.js
- Additional Web Technologies: HTML, CSS

EDUCATION

- | | |
|---|-----------------|
| Master of Science, Computer Science , Towson University, Towson, MD | 04/2024-present |
| <ul style="list-style-type: none">• Cumulative GPA: 4.0• <u>Related courses</u>: Database Management Systems, Advanced Data Structures and Algorithm Analysis, Operating System Principles | |
| Master of Science, Computer Science , University of the Potomac, Washington, DC | 08/2023-04/2024 |
| <ul style="list-style-type: none">• Cumulative GPA: 4.0• <u>Related courses</u>: Cloud Computing, Data Integration and Warehousing | |
| Master of Science, Electrical Engineering , Moscow Power Engineering Institute, Russia, Moscow | 09/2021-12/2022 |
| <ul style="list-style-type: none">• Cumulative GPA: 4.0 | |
| Bachelor of Science, Electrical Engineering , Moscow Power Engineering Institute, Russia, Moscow | 09/2017-08/2021 |
| <ul style="list-style-type: none">• Cumulative GPA: 3.89• <u>Honors</u>: Diploma with honor | |

EXPERIENCE

- | | |
|---|-----------------|
| Back End Developer , Intellectual Electro Energetic Systems LLC, Russian, Moscow | 09/2022-11/2022 |
| <ul style="list-style-type: none">• Designed and implemented business logic for automated project diagram generation in electrical engineering applications using Java and Spring Framework.• Enhanced workflow efficiency by automating diagram generation, reducing manual effort.• Achieved a 10% reduction in manual effort through automation. | |
| Technical Support Engineer , Production Association 'OVEN', Russia, Moscow | 09/2021-09/2022 |
| <ul style="list-style-type: none">• Assisted clients with technical issues, resolving over 20 daily inquiries to enhance customer satisfaction.• Provided support via email, phone, and in-person interactions.• Solved log-in issues, device setup, and maintenance for clients | |

PROJECTS

- | | |
|---|-----------------|
| <u>Prison management system API</u> , Database Management System Course Project | 10/2024-12/2024 |
| <ul style="list-style-type: none">• Developed a RESTful API using Spring Boot to manage prison operations, including inmate records, staff assignments, and facility logistics.• Designed and implemented a relational database schema in MySQL, ensuring efficient data storage and retrieval.• Containerized the application using Docker, with separate containers for the backend and database, improving scalability and deployment.• Implemented CRUD operations with Spring Data JPA, enforcing data integrity. | |

ARAVIND SHYAMANAPALLY

52 Acorn Cir, Apt. 302, Towson MD 21286
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Objective

As I embark on my Master's journey, I see a pivotal step in my educational and professional career. With a solid foundation in software development principles and programming, completed hands on experience through internships and projects, I am eager to contribute to on-campus jobs or assistantships. My goal is to apply my technical and collaborative skills to support university initiatives while gaining valuable experiences that will shape my future as a technology professional.

Education

Towson University Master's in Computer and Information Sciences Towson, Maryland, US	2025
Marri Laxman Reddy Institute of Technology and Management Bachelor of Technology in Computer Science Information Technology, Telangana, India	2020 – 2024 GPA: 6.73
Vignan Jr College Intermediate in MPC, Hyderabad, Telangana, India	2018 – 2020 GPA: 9.09
Vikas High School Siddipet, Telangana, India	2018 GPA: 8.80

Technical Skills

- **Programming languages** : Java, Python.
- **Web technologies** : HTML, CSS, JavaScript.
- **Database** : MySQL.
- **Technical Foundations:** Data Structures and Algorithms, Operating Systems, Object-Oriented Programming.
- **Software Tools:** Microsoft office Suite.

Internship

Shiash Info Solutions **March 2024 – July 2024**

- Completed an intensive internship focused on "Java Development", honing object-oriented programming techniques and enhancing my problem-solving capabilities.
- Developed a cryptographic data security system using Advanced Encryption Standard (AES) to protect sensitive educational data and certificates.
- Built proficiency in SQL for efficient database management and optimized data storage and retrieval processes.

Academic Projects

Rainfall forecasting | Multiple Linear Regression

- Designed and implemented a rainfall prediction model integrating Genetic Programming (GP) and Multiple Linear Regression (MLR) to enhance accuracy of daily forecasts.
- Contributed to the development of the system as part of a team, ensuring effective coordination and task allocation to meet project deadlines.
- Played a key role in data analysis and algorithm implementation to support water resource management and risk mitigation in industries like agriculture.
- Gained experience in working with diverse datasets and collaborating on complex problem-solving tasks.

Skills

- Strong Communication and Collaboration.
- Effective Time Management and Quick Learning
- Attention to Detail

Pablo Rodas
prodasl@students.towson.edu
(443) 635-0450

Skills and Experience:

- Data analysis and interpretation
- Programming languages: C++ and Java
- Critical thinking and problem solving
- Scientific research and laboratory skills
- Bi-lingual (Spanish)
- Team orientated
- Technical and Computer proficiency
- Attention to detail

Education:

Year Graduated	Degree and Major/Minor	School Attended
2023	Bachelor of Applied Science Biology Major Molecular Biology, Biochemistry and Bioinformatics Minor	Towson University 8000 York Road Towson, Md 21204

Continued Education:

Expected date of graduation	Degree and Major/Minor	School Attended
Fall 2026	Master of Computer Science	Towson University 8000 York Road Towson, Md 21204

Related coursework: Advance data structures and algorithms, Operation systems, computer organization and assembly language.

Work History:

Dates/Position	Responsibilities	Company Information
2023 to 2024 Research assistant	Conducting experiments, collecting data, analyzing results, Inventory.	John Hopkins 1800 Orleans st, Baltimore, Md 21287
2020 to 2023 Office Manager	Management, scheduling, payment processing, filing claims, inventory, translator.	Levin Eye Care 4830 Butler Road Glyndon, Md 21071
2016 to 2020 Chiropractor assistant	Responsible for patient care, filing insurance claims, translator to medical doctors, management of scheduling.	Maryland Healthcare Clinics 10806 Reisterstown Road Owings Mills, Md 21117

PLANNING AND SCHEDULING

Assignee Name	Email	Task	Duration (Hours)	Dependency	Due Date
Andrei Kondrashov	akondra1@students.towson.edu	Setting up github repo, slack channel, project setup, system requirements, formatting report	10 hours	GitHub, GoogleDocs	03/02/2025
Kate Dingman	kdingm1@students.towson.edu	Setting up the report as outlined. Answering Problem Statement 1-5	10 hours	GitHub, GoogleDocs	02/28/2025
Aravind Shyamanapally	ashyama1@students.towson.edu	Teamwork basics (Ground Rules - Norms 1 - 5)	2 hours	Github, Google Docs	03/03/2025
Pablo Rodas	prodas1@students.towson.edu	Teamwork basics assignment.	4 hours	Github, Google Docs	03/03/2025
Vachana Bangalore Krupashankar	vbangal1@students.towson.edu	Setting up Kanban view, Answering Problem statement 6-10	10 hours	GitHub, GoogleDocs	02/28/2025

TEAMWORK BASICS SUMMARY

Ground Rules for Effective Teamwork

Making clear ground rules helps the team understand what is expected of them. This leads to smoother workflows, improved communication, and a positive atmosphere where everyone feels respected and valued.

Work Norms

- **Task Distribution.** Tasks will be assigned based on individual strengths, workload capacity, and team discussions. **Deadlines.** Team members will collectively decide on deadlines to ensure timely submissions.
- **Accountability.** If someone fails to meet a deadline, they must communicate with the team in advance and propose a solution.
- **Quality Control.** Work will be reviewed through peer evaluations, with final approvals by the team lead or a designated reviewer.
- **Work Styles.** Team members will respect different working habits but adhere to the agreed-upon timelines.

Facilitator Norms

- **Facilitator Role.** The facilitator ensures meetings run smoothly and team members stay focused.
- **Selection.** The role will rotate among members to share responsibilities.
- **Responsibilities:**
 - Setting the agenda for meetings.
 - Ensuring equal participation.
 - Resolving conflicts professionally.
 - Keeping track of discussions and follow-ups.

Communication Norms

- **Preferred Communication Methods.** Team members will use email for formal updates and a group chat (e.g., WhatsApp/Slack) for quick discussions.
- **Response Time.** Members are expected to acknowledge messages within 24 hours.
- **Transparency.** Updates on progress, delays, or challenges should be shared promptly.

Meeting Norms

- **Scheduling.** Meetings will be scheduled based on team availability with a fixed frequency (e.g., weekly or biweekly).

- **Coordination.** One person (rotational or fixed) will schedule meetings and send reminders.
- **Attendance.** Team members are expected to be punctual. Missing a meeting without prior notice will be noted.
- **Missed Meetings.** If a member misses multiple meetings, the team will discuss their commitment level and address concerns.

Consideration Norms

- **Meeting Etiquette.** Eating is allowed unless it becomes disruptive. Smoking is prohibited in team meetings.
- **Balanced Participation.** If a member dominates the discussion, the facilitator will encourage balanced input from all members.
- **Norm Adjustments.** Any team member can propose changes to the norms, which will be discussed and decided by a majority vote.

The team will create a positive, efficient, and collaborative working environment that fosters success throughout the project by adhering to these ground rules.

Hints for Handling Difficult Behavior

Overly talkative members

Ensure the whole group has a chance to share opinion, if one person is overly talkative try to encourage others to share or try humor to try and get everyone involved. If a person continues behavior a one-on-one conversation with this person to try to encourage others to participate may be required.

Example: The facilitator redirects the discussion by saying, "*Great thoughts! Let's hear from others—what do you all think?*" If the behavior persists, a private conversation encourages balanced participation.

Too quiet

Nicely encourage quiet team members to share opinions and help by asking if he/she has any questions. Over time quieter members become less shy, and begin to engage more.

Example: The leader directly asks for their input, "*Alex, you've worked on this before—what's your perspective?*" Over time, this builds their confidence to engage more.

Argumentative member

Take into consideration how you criticize others. If done in a rude or loud tone it may become aggressive. To handle this type of behavior immediately notify the person of behavior and

communicate how it may affect the team and individuals and how it affects production amongst the team.

Example: The leader calmly intervenes, *"I appreciate your passion, but let's keep the discussion constructive. How can we find a middle ground?"* If the behavior continues, a private discussion addresses the issue.

Complainers

Listen to all opinions and complaints, and if reasonable discuss solutions. If not, try to redirect team members back on track or try to have a beneficial conversation and attitude towards the problem at hand, encouraging team members to help find a solution.

Example: A leader listens to concerns and asks, *"What solutions do you suggest?"* If complaints aren't productive, the conversation is redirected to focus on problem-solving.

Hints for Handling Group Problems

- **Floundering.** Group may struggle with direction or task due to accustoming to the role or familiarizing with the team. To solve this, distribute tasks to be accomplished and try creating a to do list suggesting next steps to continue.
 - **Example :** Group created Github to distribute tasks and google doc to combine tasks.
- **Going off on digression and tangents.** When conversation gets off topic, gently suggest refocusing on the task at hand, this can be done through questions and comments on progress of the project.
 - **Example:** During a meeting about project deadlines, the team starts discussing their favorite movies, losing focus on the task. A team member redirects the conversation by asking, *"How does this relate to our project timeline?"*
- **Making a decision too quickly.** Sometimes group members work at different pace, this may result in making decisions quickly or without other options. To ensure this doesn't happen the whole team should first provide input to ensure everyone is on the same page.
 - **Example:** Team set up due dates to ensure deadlines are met and everyone remains at the same pace.
- **Not making decisions.** To avoid not making decisions some type of voting method should be established; this ensures discussions take place by making everyone engage in the voting process.
 - **Example:** In our project we decided to have a poll on the suggested project ideas where we concluded creating a study helper since it had the most votes.

- **Feuding between group members.** Any type of conflict or argument must first be resolved to progress. To ensure the problem is resolved, have parties talk to one another encouraging peace and using listening techniques.
 - **Example:** Two team members disagree over which coding approach to use, leading to tension and stalled progress. A facilitator (Andrei for the sprint 1) encourages a discussion where both sides explain their reasoning, encouraging active listening and finding a compromise.
- **Ignoring or ridiculing others.** Ensure that you are not disrespecting or excluding anyone. Try not to cause division within a group by not leaving anyone excluded and making sure there's respect amongst the group.
 - **Example:** To prevent this our group set up a policy that all ideas must be shared and considered and most importantly discussed amongst the team.
- **Members not contributing.** If a group member isn't doing his/her part, immediately notify of their actions and have a conversation of the expectations and standards of the group to get back on track.
 - **Example:** To ensure everyone contributes we discuss the groups strengths and distributed tasks to establish group expectations.

PROBLEM STATEMENT

1. What is your product, on a high level?

- a. Our product is a study helper application that allows users to upload their study materials, such as notes, PDFs, and Powerpoints. AI is used to analyze the content of the uploads, extract key information and use that to generate personalized study tools.
- b. Users can review their material through study guides, flash cards, and practice quizzes generated by AI.
 - i. When practicing the material through flashcards and quizzes, feedback is generated on how well they did with certain topics and what topics should spend more time reviewing
 - ii. For quizzes, students can also select how they would like to take the quiz (selecting options for multiple choice, free response, and true/false)
- c. A user's account houses their uploads, study guides, flashcards, etc. They can organize their study materials into folders for easy accessibility.

2. Whom is it for?

- a. This product is aimed at students, life-long learners and educators.
 - i. Students and life-long learners will find this application useful for organizing materials they need to learn and generating study tools to help them better understand the topics they are to learn
 - ii. Educators may find this application useful for coming up with quiz or exam material which they can give their students.

3. What problem does it solve?

- a. Effective studying is something many learners struggle with, in addition it can be difficult to filter necessary information from PowerPoints, PDFs and notes.
 - i. By using AI, we aim to simplify this process for learners, by extracting key information for them, and using that to provide them with study tools to assist them in studying more efficiently
 - ii. When studying materials through quizzes or flash cards, this application will provide learners with feedback on topics they may have struggled with.
- b. Organization is necessary if you are to study effectively, this application will provide users the ability to create folders based around certain topics or classes they may be taking

4. What alternatives are available?

- a. Quizlet:
 - i. A learning tool that allows users to create flashcards, quizzes, and study guides
 - ii. Recent AI functionality to transform user uploads into study tools
 1. Limit on uploads and generated study tools in the free version and limited plan
- b. Brainscape:
 - i. A learning tool the allows users to create flashcards and study them
 - ii. Does not automatically generate flashcards from notes
- c. Socratic (Google):
 - i. AI powered homework helper than answers questions and explains concepts
 - ii. Focusses on answer questions rather than generating study materials

5. Why is this project compelling and worth developing?

- This project addresses a common challenge, that is, to create effective study habits. Many learners struggle to extract key information from their resources and create structured study materials. The demand for solving such problems is growing.
- This application automates that process, making studying more effective and personalized which in turn reduces study time while improving retention.
- The users can focus on their weak areas, making their learning experience easy and engaging.
- Unlike existing platforms, this project integrates multiple study techniques, while allowing personalization for different learning styles and pace. This study system is not only innovative but also practical for students and educators alike.

6. Describe the top-level objectives, differentiators, target customers, and scope - of your product.

Objectives

- To simplify study by generating study materials from user-uploaded content.
- Provide a personalized learning experience.
- Improve study efficiency by offering structured feedback on weak areas.
- Allow for better organization of study materials in user-friendly folders.

Differentiators

- Using AI to extract key concepts from PDFs, PowerPoints, and notes to generate study materials.
- Personalized feedback, system tracks performance and highlights weak areas.
- Customizable quizzes (multiple choice, free response, true/false) provide flexibility for different learning styles.

Target Customers

- Students: Those looking for an engaging way to study and prepare for exams.
- Lifelong learners: Individuals who would like to gain knowledge in a new area of expertise with the need for structured learning.
- Educators: Teachers who need an easy way to generate quick in-class quiz materials/study guides for their students and keep them engaged with multiple teaching styles.

Scope

- The project focuses on developing a web application using AI, where users can upload study materials, generate personalized study resources, take quizzes, and track their learning progress with personalized feedback.

7. What are the competitors and what is novel in your approach?

- Quizlet: A learning tool that allows users to create flashcards, quizzes, and study guides Recent AI functionality to transform user uploads into study tools Limit on uploads and generated study tools in the free version and limited plan
- Brainscape: A learning tool the allows users to create flashcards and study them Does not automatically generate flashcards from notes
- Socratic (Google): AI powered homework helper that answers questions and explains concepts Focusses on answer questions rather than generating study materials.

StudyHelper overcomes the shortcomings from the above competitors:

- It covers the full study cycle right from material generation to performance tracking.
- Extracts and highlights key points automatically without the need for manual note-taking.
- Works with PDFs, PowerPoints, notes, and more.

8. Make it clear that the system can be built, making good use of the available resources and technology.

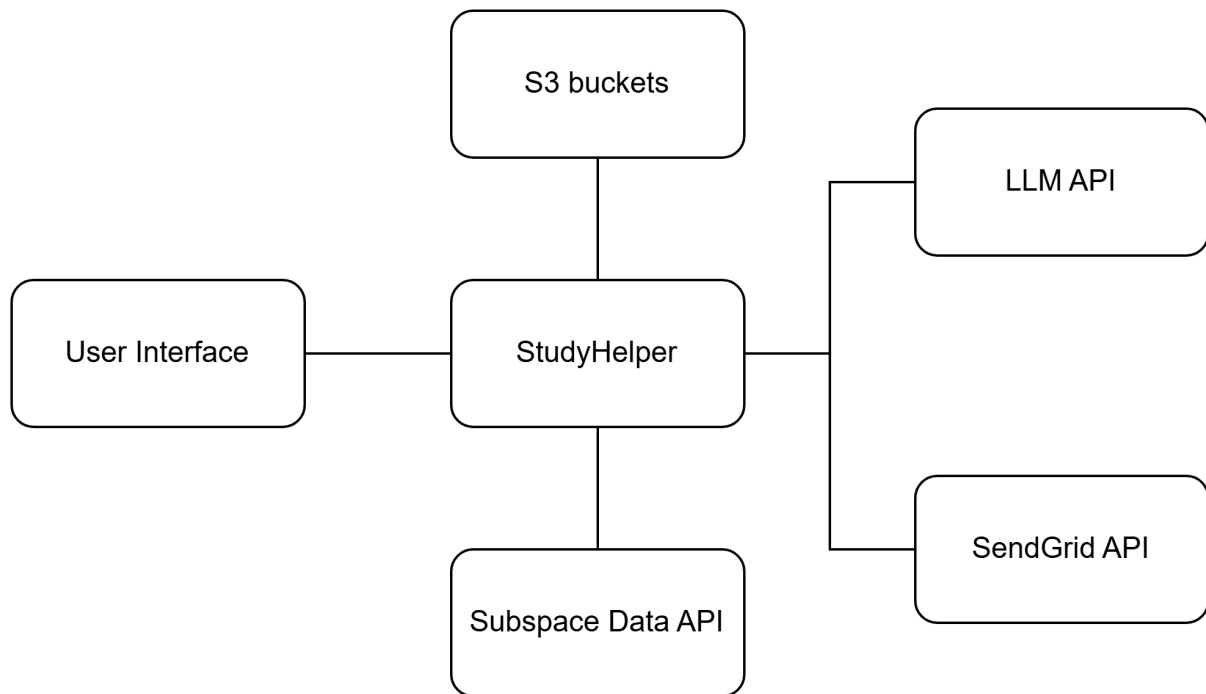
This system can be built using well-established software development tools:

- Frontend: React.js and Tailwind CSS
- Backend: Express.js
- Database: Supabase (PostgreSQL)
- Version control: GitHub
- NLP: Open source AI models like llama for text extraction and summarization.
- Cloud: AWS EC2 instance
- Containerization: Docker

9. What is interesting about this project from a technical point of view?

- This project presents several exciting technical aspects, making it a challenging project :
- Summarization: Using AI that can accurately extract and condense key information without losing context.
- Personalized Learning: Creating adaptive pathways that adjust study materials based on user performance.
- Optimized Quiz & Question Generation: Using AI to generate diverse and accurate questions.
- User Experience & Accessibility: Designing a human focused UI.

SYSTEM REQUIREMENTS



The Study Helper system will depend on three main components, which are:

1. User File Storage (S3 Buckets)

- a. Handles files storage for user-uploaded study materials
 - i. User's files are securely stored using Amazon S3 buckets, ensuring reliable access and organization.

2. AI-Powered Study Tools (LLM API - DeepSeek R1, Llama 3.1)

- a. The system analyzes uploaded content using Large Language Models (LLMs) to extract key concepts.
- b. AI generates personalized study materials

3. Database & API Support (Subspace Data API)

- a. A Subspace Data API is used to handle database operations and provide a basic CRUD API for seamless development.
- b. Each user has a personal account that stores:
 - i. Uploaded files.
 - ii. AI-generated study guides, flashcards, and quizzes.
 - iii. Folder-based organization for better accessibility.

4. SendGrid API

- a. SendGrid is an email delivery service allowing you to send transactional emails. In our case for user registration notifications

5. **User Interface**

- a. Part of the system that's responsible for interaction with a user

APPENDIX

README

Study Helper

Team Members

- Andrei Kondrashov
- Kate Dingman
- Vachana Bangalore Krupashankar
- Aravind Shyamanapally
- Pablo Rodas

	Title	...	Assignees	...	Status	...	Priority	...
1	🕒 Planning and Scheduling #7		and	▼	Done	▼	Low	▼
2	🕒 System Requirements #5			▼	Done	▼	High	▼
3	🕒 Problem Statement Questions 1-5 #9			▼	Done	▼		▼
4	🕒 Problem Statement Questions 6-10 #10			▼	Done	▼		▼
5	🕒 Problem Statement #4		and	▼	Done	▼	High	▼
6	🕒 Teamwork Basics #3		and	▼	Done	▼	Low	▼
7	🕒 Report #6		and	▼	Done	▼	Low	▼

Here's the [link](#) to the repository