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CNG 495 Cloud Computing

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Capstone Project Proposal: StudyMate Mobile Application

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Table of Contents

| | |
|--------------------------------|---|
| 1. Project Description | 2 |
| 2. Cloud Delivery Models | 3 |
| 3. Diagrams | 3 |
| 4. Expected Contribution | 6 |
| 5. Planned Timeline | 7 |
| 6. References | 7 |

1. Project Description

The aim of our project is to develop a flutter-based mobile application, StudyMate, which will allow students and teachers to manage their school or university work easily through a practical and easy to use interface.

With the help of this project, the users will be able to schedule their study or work sessions with ease, have important notes in one place publicly or privately as they would like to do, along with a help forum that will allow users to post questions and send message requests to ask for help from peers. This project aims to help student and teachers stay organized, consistent and overall productive throughout the span of their academic journey.

This project will be built using Flutter and Supabase. The mobile interface would be achieved with Flutter and it will be made to run on android devices only. The backend operations, i.e., data storage, authentication, and synchronization will be taken care by Supabase. The cloud-based system would provide the users easy accessibility of their data safely on any device. Collectively, these technologies will make StudyMate a resourceful, effective, and convenient tool that allows students to better manage their studying and time management in a cloud-based, contemporary format.

2. Cloud Delivery Models

2.1 SaaS

Supabase Auth will be used to have a ready-to-use authentication for allowing users to register, and login. A unique `user_id` will be assigned to every user which will link all the relevant data of that specific user to his/her account. This will act as our Software as a Service as it eliminates the need to build a custom authentication server.

2.2 PaaS

We will use Supabase Edge functions to execute the backend logic like sending email notifications for new messages or help requests. These edge functions run in Supabase and act as our Platform as a Service and help us to execute these features without having to maintain servers.

2.3 IaaS

All the data of our application will be stored in the Supabase PostgreSQL, this data is stored on the Supabase Storage, which is a built-in service AWS S3. This adds the Infrastructure as a Service.

3. Diagrams

3.1 Use- Case Diagram

The figure below shows the use case diagram of our project; it shows the two actors User and Cloud Service (Supabase) and the different use cases.

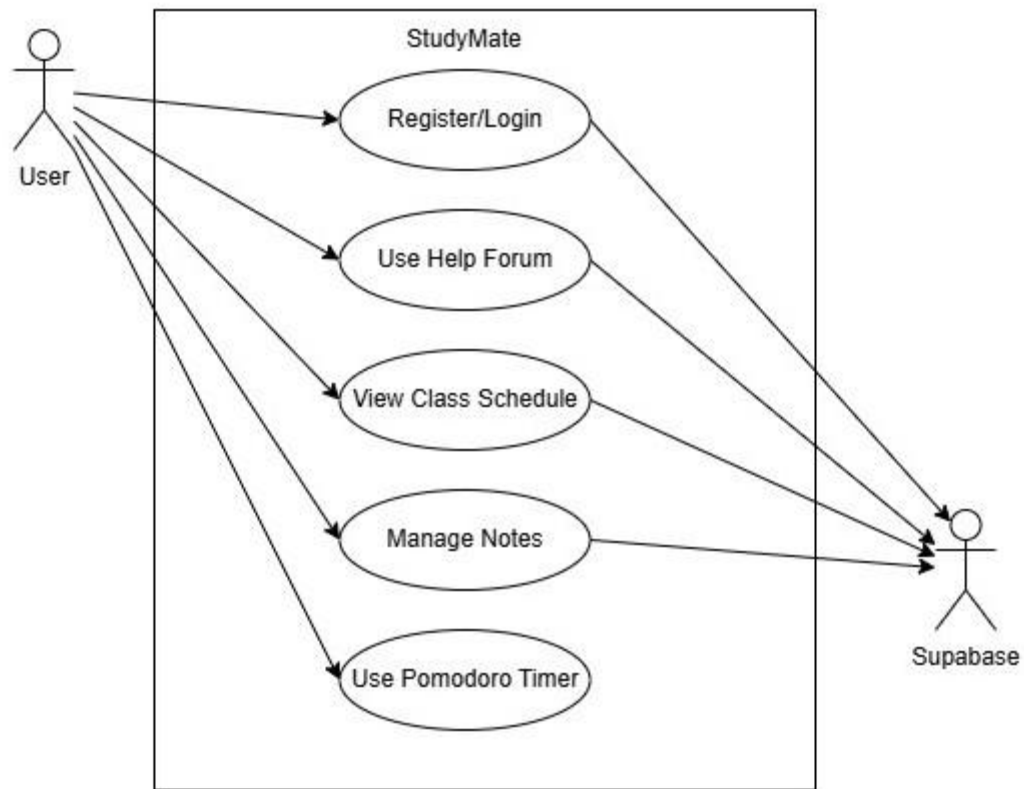


Figure 1 Use Case Diagram

3.2 Data Flow Diagram

The context level diagram represented in the figure below shows how the user interacts with the Flutter app and how it communicates with the Cloud service to execute the features required.

Flow Diagram

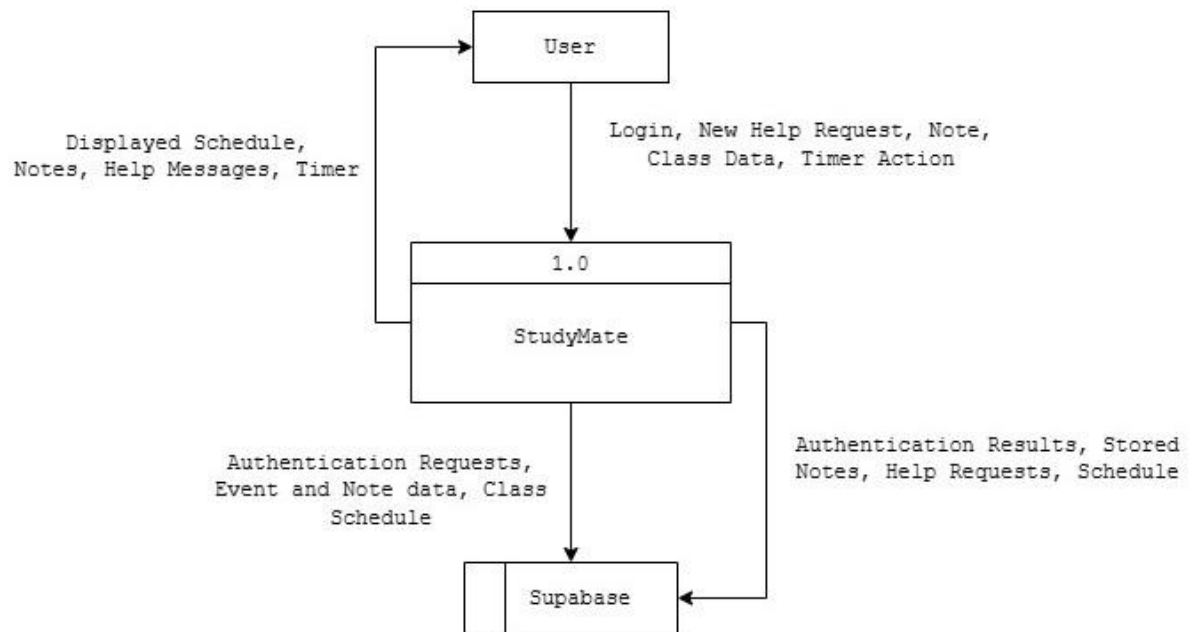


Figure 2 Context Level Data Flow Diagram

Now, the Level 1 data flow diagram is illustrated below which shows how different functions of our project handle data, like registering a new user account, using the notes forum or creating a Pomodoro timer.

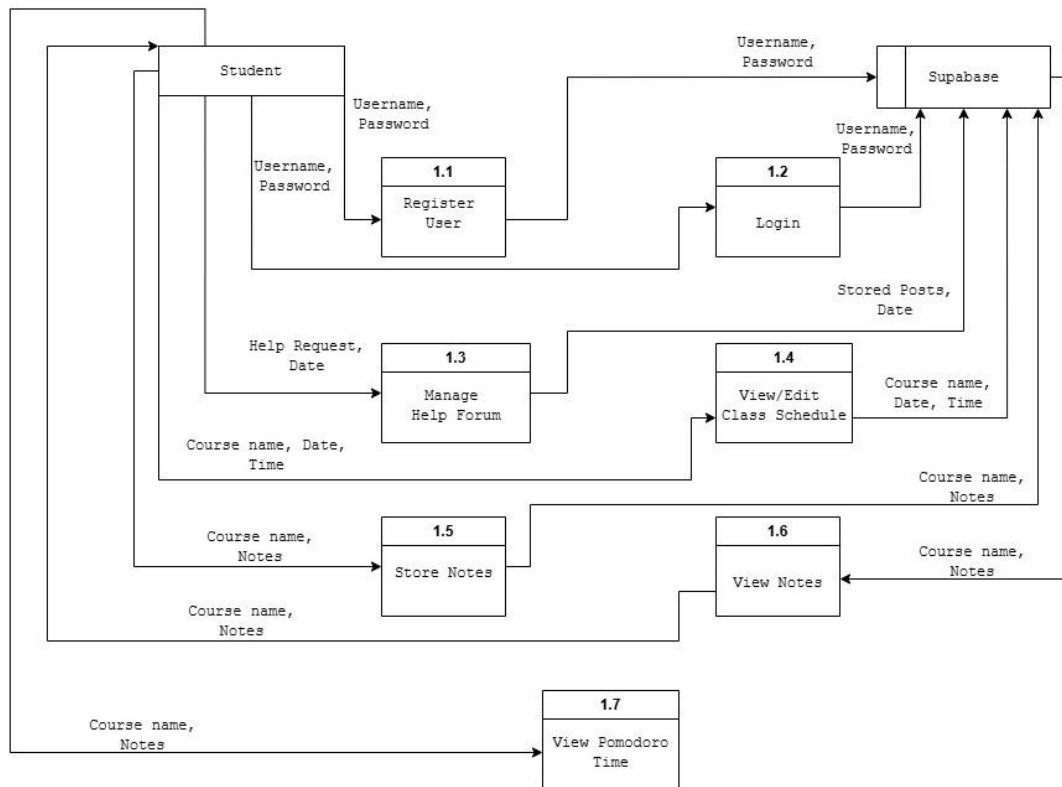


Figure 3 Level-1 Data Flow Diagram

3.3 Logical Database Requirements

The “StudyMate” application will require a relational database to store and manage various types of data related to users including help requests, class schedule, notes and information about the pomodoro session. The logical requirements for the database are based on the discussed app's core features. These relationships are shown in the diagram below.

4. Expected Contribution

As we are 2 members and our project has 4 core features, we have decided to distribute it evenly and implement 2 features per person:

- Pomodoro Timer and Notes Area by Arisha
- Help Request and Class Schedule by Faiez

5. Planned Timeline

| Week | Task |
|---------|--|
| Week 4 | Initialize GitHub repository & design initial UI |
| Week 5 | Set up Flutter environment & basic project structure |
| Week 6 | Implement authentication and user management |
| Week 7 | Develop Help Forum module (Arisha) & Pomodoro Timer module (Faiez) |
| Week 8 | Integrate Notes module (Arisha) & Class Schedule module (Faiez) |
| Week 9 | Connect all modules to Supabase database |
| Week 10 | Add storage uploads for Notes and help request attachments |
| Week 11 | Implement local notifications & refine UI across all features |
| Week 12 | Testing, debugging, documentation, and final demo/report |

6. References

Supabase. (n.d.). *Supabase documentation*. <https://supabase.com/docs>

Flutter. (n.d.). *Flutter documentation*. <https://flutter.dev/docs>

PostgreSQL Global Development Group. (n.d.). *PostgreSQL documentation*.
<https://www.postgresql.org/docs/>

Supabase. (n.d.). *Supabase Flutter SDK* [GitHub repository].
<https://github.com/supabase/supabase-flutter>

Middle East Technical University Northern Cyprus Campus. (2025). *CNG 495 Capstone project guidelines*.