

Tutor

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Abstract:

It is common that every parent has some problems in their children's school life. Items such as doing homework, Explaining materials, revision even final revisions. You may need someone who just came to help your child do his homework even in specific subject or all of them, a private lesson or a group lesson, or any other way of learning. Education. With any home, there are an almost infinite number of students who need tutoring in each subject. If you notice that your child's to-do list is getting longer rather than shorter, consider using home tutor services to help find the best tutor for him.

Tutor is a private employment online service that operates via mobile apps.

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Chapter 1: Introduction

1.1 Motivation:

This application has many teachers in each subject, there is a variety of professional experts who can help you with your study needs, you choose the one that suits you best by checking its qualifications, reviews, etc.

1.2 Problem statement:

Locating a tutor is a challenging task especially when you are moving into a new grad because of a change of curriculum. different grades and differ in costs, quality, and type of lesson “privet or in group”. Another problem that exists is finding a tutor who fits your child. A good teacher falls under the category of small center.

- Students may struggle to find suitable teachers to feel comfortable with them and understand from them also with a suitable price, so they get to choose their own teachers among all the teachers, and the teachers get to choose their students and accept or refuse the price that the student offers.

1.3 Goals of the project:

Often Self-learning leads to stressful life and finding perfect tutor is the most stressful job. Once the job is done in the quality way then there will be no stress or pressure in school life. Then, the platform will be tackling the following:

1. **Time:** This app helps to save precious time. No one wants to waste their time at any cost. By choosing the right tutor, it helps to save parents' time in various ways. Also, the teacher's time will be saved by incorporating an intelligent independent scheduling system.
2. **Cost:** Saving the money is everyone's favorite thing and for all aged peoples (Students, Parents). Based on the rate, customers can book necessary subjects, through which we can avoid spending the money in an unwanted way.
3. **Quality work (Rating + Reviews System):** Most of the teachers won't explain the lessons properly or in a satisfying way and they will cost a lot even for small lessons. To avoid these kinds of tragedy, using the platform will be the prime choice. The learning, teacher and the price can all be selected in fractions of seconds as well as in an effective way.

4. Location: Locating the nearest available teacher is a major problem that will be handled by the platform.

1.4 Currently available Applications:

We got some of the applications for Privet employment and this is a list of some applications available in word:

- LinkedIn.
- Upwork
- Gopeer
- Wyzant
- Orcas

1.5 Features matrix:

Features	LinkedIn	Upwork	Gopeer	Wyzant	Orcas	Tutor
Free	✓	✓	X	X	✓	✓
Location	✓	X	✓	✓	✓	✓
Review	X	✓	X	✓	✓	✓
Categorized	✓	X	X	X	✓	✓
Teacher List	X	X	✓	✓	X	✓
Bookstore	X	X	✓	X	X	✓
Cash payment	✓	✓	X	X	X	✓
Add Price	✓	X	X	X	X	✓
Chatting	✓	✓	✓	✓	✓	✓

1.6 Software Development Methodology Used:

We used the **Agile** method. The Agile Method is a particular approach to project management that is utilized in software development. This method assists teams in responding to the unpredictability of constructing software. It uses incremental, iterative work sequences that are commonly known as sprints.

Agile is so useful for big projects due to his rules also his flexibility so:

1. Superior quality product
2. Customer satisfaction
3. Better control
4. Improved project predictability
5. Reduced risks.
6. Increased flexibility
7. Continuous improvement
8. Improved team morale.

Chapter 2: Requirements Analysis

2.1 Survey:

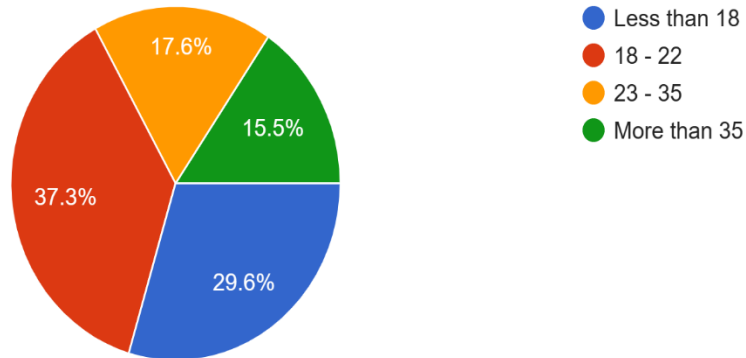
Surveys are one of the most inexpensive methods of gathering quantitative data that is currently available, Surveys are useful in describing the characteristics of a large population. No other research method can provide this broad capability, which ensures a more accurate sample to gather targeted results in which to draw conclusions and make important decisions.

2.2 Results of (Part 2.1)

Q1:

Age

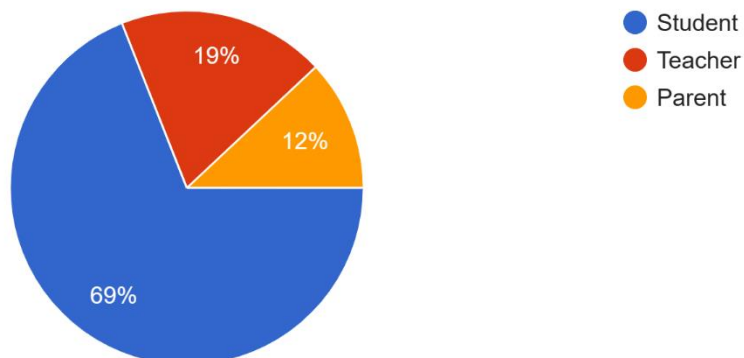
142 responses



Q2:

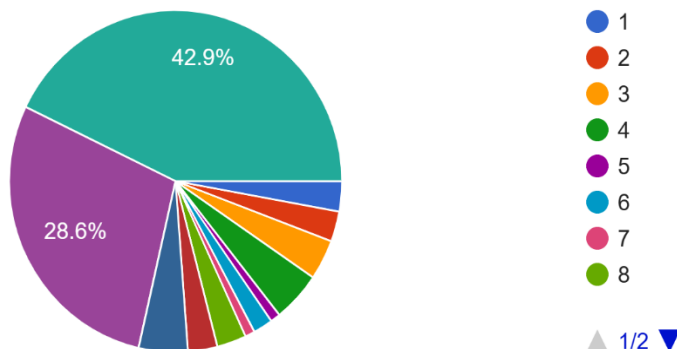
You Are ?

142 responses



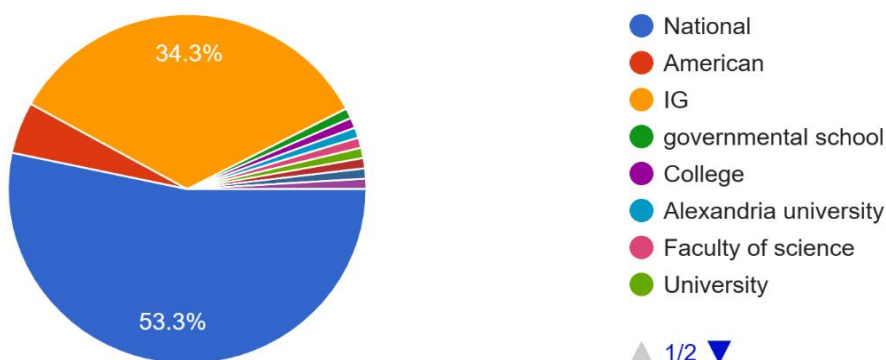
Q3: As we see from this figure that 42.9% of the sample were in **grade 12** and another 26.6% were in **grade 11** the remaining 30% is divided between other grades

Grade
105 responses



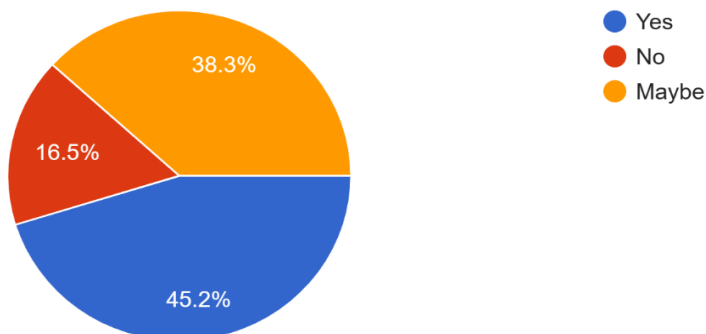
Q4: As we see from this figure that 53.3% of the sample were in **National** and another 34.3% were in **IG** the remaining 12.5% is divided between different schools' systems

your school system
105 responses



Q5:

Do you face problems to find a suitable teacher? هل تواجه مشاكل في إيجاد المدرس المناسب لك
115 responses

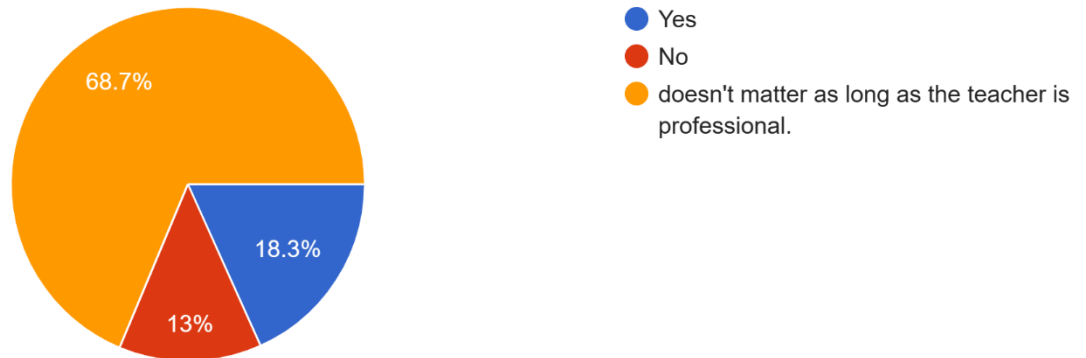


Q6:

هل تمنع إذا كان مدرّسك الخاص ؟ Do you have problems about the teacher being an undergraduate student ?

لا يزال يدرس

115 responses



Q7: What is your biggest problem with finding a teacher!

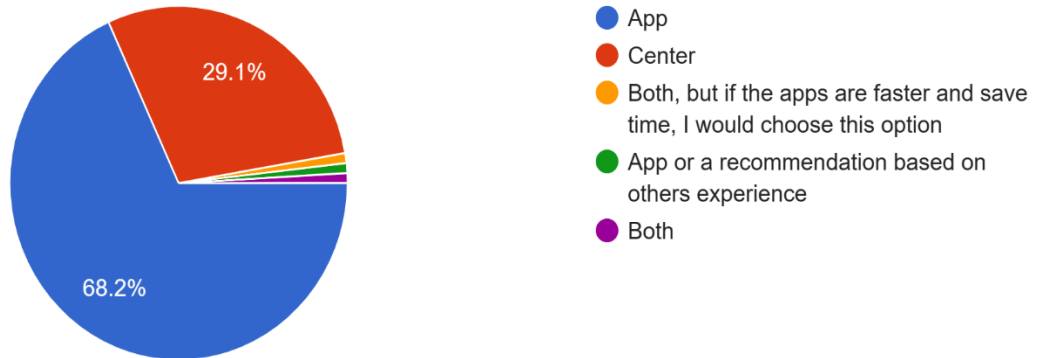
- To be professional
- Someone who is qualified.
- His Location
- They almost busy and difficult to find appropriate hours for my circumstances.
- The comments of Facebook groups where everyone says he is a successful teacher but it's just advertisements.
- Not knowing who is the best until trying them and that waste time.
- Finding a good professional teacher with experience
- To find a professional and friendly teacher
- Difficulty communicating
- Finding the teacher who's going to help me and assist me through the whole year and who's patient with me.
- Fake reviews or ads
- Can't find the suitable teacher with good price.
- It's not easy to find a teacher with the specifications and the price you prefer.
- Can't find good physics and mechanics teachers and even if recommended contact isn't available.

- o. some teachers use low ways to advertise for themselves by paying their assistants or current students and whatnot, so I'm no longer sure who to trust when they give me their opinion about a teacher.
- p. Knowing who is the best teacher for each subject.
- q. Can teach.

Q8:

Do you prefer using an app to search for your teacher or going to a center ?

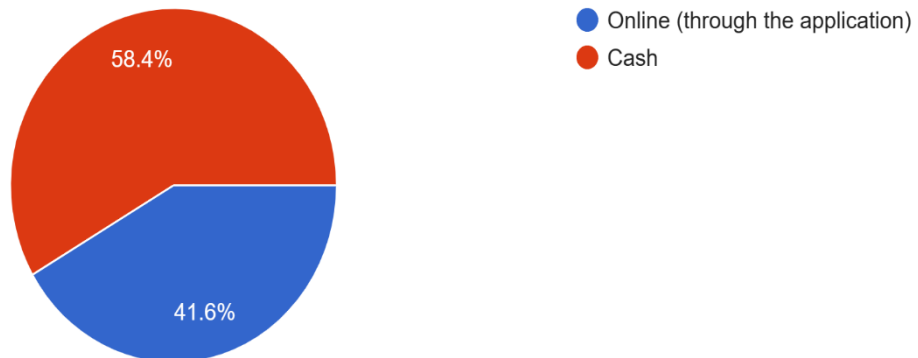
110 responses



Q9:

Do you prefer the payment method to be:

113 responses



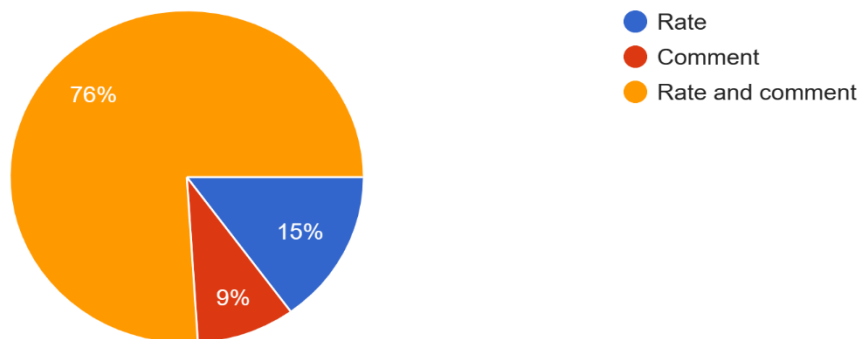
Q10: If you have ever paid online, what were the disadvantages of the online payment?

- a. Problems with the card/bank
- b. could get hacked and credentials get stolen if the app isn't safe or secure enough.
- c. hard to get a refund.
- d. Technical problems
- e. Not available in most of the time
- f. online payment is good but still many Egyptian families aren't familiar with it so they ask me to pay for them too and then they pay me which makes it a bit annoying but by time everyone will have their own smart wallets.
- g. Sometimes there is additional fee.
- h. Sometimes online payments occasionally fail when the system is down or experiencing a clash, and that gives us reason for concern when we pay online.
- i. The delaying in the deposition of the money in my account may result in the delaying of attending the classes.
- j. lagging and error, don't receive confirmation messages/emails.
- k. Sometimes money is taken from my credit card due to server issues.
- l. there's an error in the transaction sometimes and the teacher didn't receive the cash happened to me once and I paid the whole course two times.

Q11:

Would you like to have the option to review your teacher

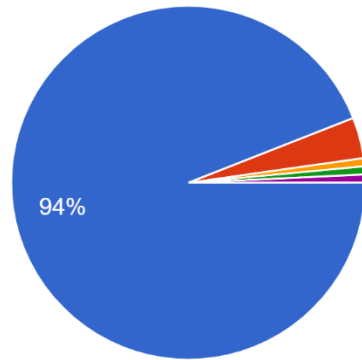
100 responses



Q12:

Is the application Useful?

134 responses

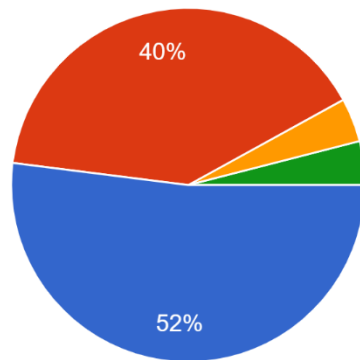


- Yes
- No
- ممكن يبقى مهم بالنسبة لحد ف سن اكثر من ١٨ سنة بس مش هيبقى مهم للفئة الصغيرة اللي اهلهم بيختارولهم المدرسين
- I don't use it.
- Idk

Q13:

Do you prefer using an app or going to a center?

25 responses

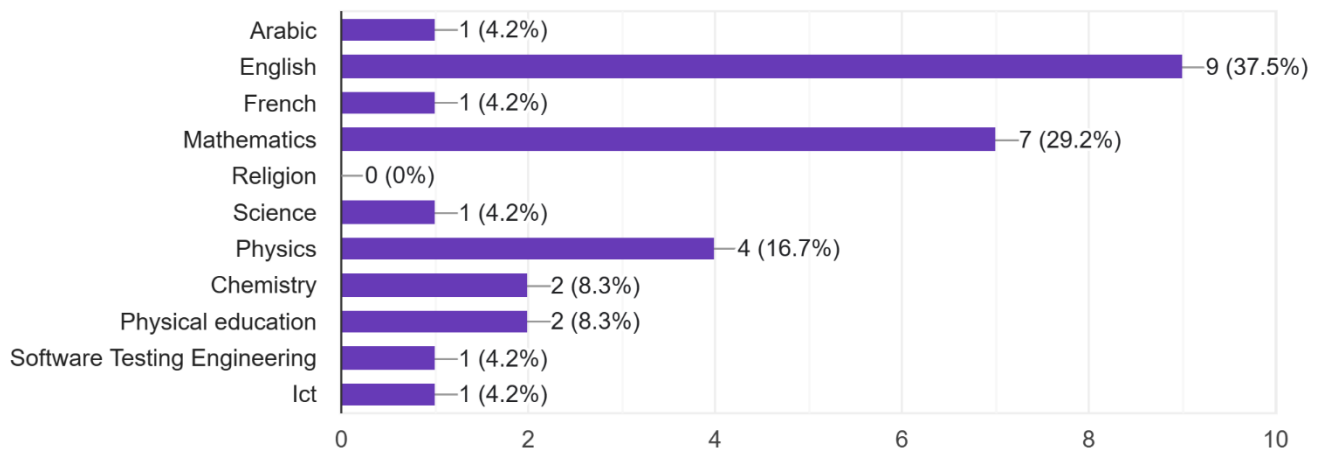


- App
- Center
- I teach in my Institute
- Both


Q14:

Your subject

24 responses



Q15: Do you have something on your mind that we can add in our application?

- a. Location for search
- b. Communication. (chatting)
- c. will it be in both Arabic and English?
- d. cv for the teacher
- e. The search method should be more advanced.
- f. Add the most rated teachers in a side menu!
- g. feedbacks, previous results of both students and teachers (statistics), rating system
- h. You can add introduction video for each teacher.
- i. To add a part for the disadvantages of the teacher
- j. U can add global teachers. Especially for the Ig, Ib n American It would be a super useful opportunity to offer international teachers to them. It will increase their English fluency n they gone share n gain experience.
Can't wait to see the final app 
- k. Including pictures of the teachers and personal info such as ID and parents' number
- l. All the details Have to be written like the price of the course, how many sessions per week, review of other students must be available to us, and the most important thing that must be a trial class before registering with the teacher
- m. Communication between teacher and students

2.3 Discussion of results in (Part 2.2):

We get that from the results of our survey.

- application should be localized
- profile of teacher should include personal information as introduction video "way he will teach."
- we should offer communication between teachers and students via chat system
- the review of the teach matters
- ability to choose suitable price
- arrange search by review

2.4 Functional Requirement:

- Sign up: which takes different information due to how person will use the web app to create his profile then the system will generate an ID for each user:
 - ✓ User: Name, Password, Phone number, Email, Profile picture (optional), Identification (Teacher – student – parents)
- Login: which directs every user to the system in different ways by email and password:
 - ✓ Student: home page and offers provided by the system.
 - ✓ Teacher: his profile and his schedule.
 - ✓ Parents: his children profile or home page.
- Teacher management system: which determines what is allowed to him while interaction with the system, he can see and edit his profile, chat with the students and parents.
- Admin management system: admin is allowed to add or remove another admin, add – remove – edit centers and libraries either Teachers or Students. Also, he has access to view all data of users, teachers and students and their interaction with the system.
- Chat system: the way of communication between teachers and students.

Client:

- Registration. (Add Personal information // Agree to policies)
- logging in
- find a teacher (search // Prioritize results // sort by choosing one attribute // filter by)
- view Teacher
- send request. (Accept estimated time)
- Cancel request.
- Chatting log (Receiving a message // Sending a message)
- reporting
- cash payment
- Rating and review
- edit Info.

Teacher:

- Registration. (Add Personal information // Registration approval)
- Interview
- logging in
- My schedule
- upload posts
- respond to requests (accept // reject “cancel job”)
- edit profile.
- deactivate account.
- get route.
- messages
- report client

Admin:

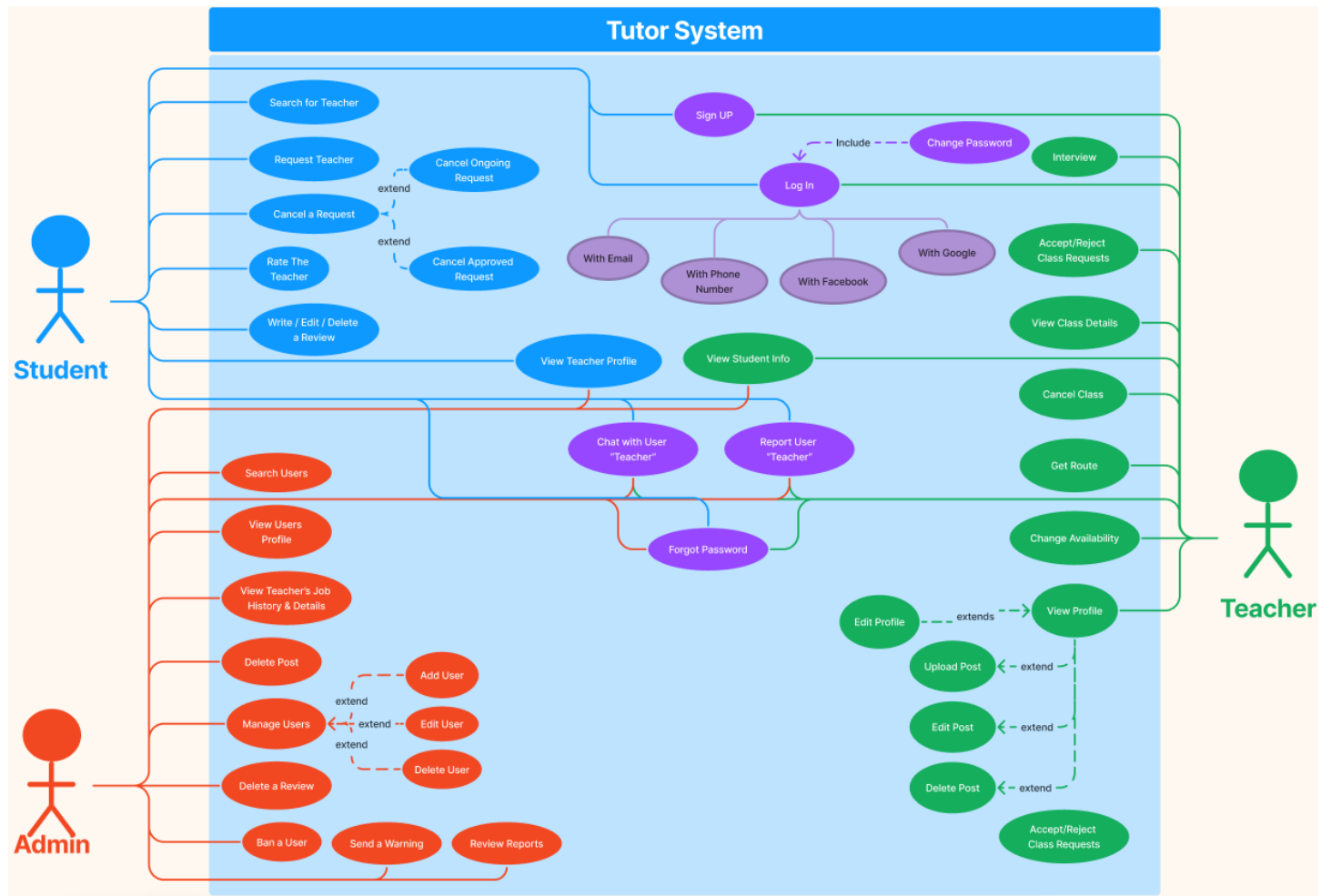
- Add user.
- Delete user.
- Edit user.
- Search for users (clients // teacher)
- View teacher schedule.
- Delete review.
- Contacted us messaging.
- Delete post.
- Accept teacher (Interview for adding)
- Receive reports.
- Ban users.
- Check user’s activities.

2.5 Non-Functional Requirement:

- **Usability:** Application can be used easily by people from the age 12+, // Application interface font are easy to read and see, // Big app icons to be clicked, // System should be user friendly so that student shouldn’t waste time to learn how to use or remember his services so system should be clear as much as possible
- **Response Time:** Screen refresh time shouldn’t take more than 3 seconds, and the data transfer should be fast as possible.

- **Reliability:** the system should be structured as small independent components so that can help us to have a small failure rate.
- **Flexibility:** the system should be easy to improve and accept any change or addition of functionality without changing our basics like database or affecting current data saved.
- **Availability:** the system should be available almost 24 hours per day every day of the week.
- **Robustness:** a system should take less than 30 seconds to restart if any failure occurs, so we should take into considerations all possible interactions that can cause the failure and even if one component fail other don't and the system meets the user needs.
- **Security:** Keep personal information for each user (Username. Password) away from other users and can't be changed or accessed from another user but it's only allowed to admin to add and remove them.
- **Portability:** Using application on android and IOS.
- **Reusability:** It's the use of existing assets in some form within the software product development process, Google APIs
- **Efficiency:** Can be used by low end phones / doesn't put a load on the phone processor.
- **Performance:** Amount of useful work accomplished by a computer system Like -Time taken for the components to run the application initially or perform tasks like reminding the teacher of his lessons and loading up data to be fast.
- **Data Integrity:** It's the maintenance /assurance of data accuracy and consistency over its entire life cycle only authorized users can change or update critical data from the application that's available for admins.
- **Fault tolerance:** It's the property that enables a system to continue operating properly in the event of the failure of one or more faults within some of its components.

2.6 Use Case Diagram:



Use Case Name: **Registration**

Actors	Student & Teacher
Priority	High
Scope	Tutor System
Pre-condition	User (Student/Teacher) is registered to the system
Description	<p>The user wishes to create account to access Tutor services by:</p> <ul style="list-style-type: none"> • Username (Required) • Email (Required) • Password (Required) • Confirm password (Required)
Trigger	User Selects the “Login” Link.
Possible Exception Paths	User provides invalid login parameters (See login Failed)
Post Condition	<p>The user stay logged in to the system unless the user logged out.</p> <p>A new session is created and session</p>

Use Case Name: **Login**

Actors	Admin & Student & Teacher
Priority	High
Scope	Tutor System
Pre-condition	User (Student/Teacher) is registered to the system
Description	<p>The user wishes to access Tutor services by:</p> <ul style="list-style-type: none"> • Username OR Email (Required) • Password (Required)
Trigger	User Selects the “Login” Link.
Possible Exception Paths	<p>User provides invalid login parameters.</p> <p>Result: See login Failed</p>
Post Condition	<p>The user is either logged in.</p> <p>A new session is created, and session time is being recorded for the life-span of his/her session</p>

Use Case Name: **Reset Password**

Actors	Admin & Student & Teacher
Priority	High
Scope	Tutor System
Pre-condition	User (Student/Teacher) is logged in to the system
Description	<p>The user wishes to Reset password Tutor services by:</p> <ul style="list-style-type: none"> • Username OR Email (Required) • Password (Required)
Trigger	User requests the rest password
Possible Exception Paths	<p>User provides invalid login parameters.</p> <p>Result: See login Failed</p>
Post Condition	<p>The password is reset successfully.</p> <p>Old password is replaced with a new one in the records table</p>

Use Case Name: **Lost Password**

Actors	Admin & Student & Teacher
Priority	High
Scope	Tutor System
Pre-condition	User (Student/Teacher) is registered to the system
Description	The user has forgotten his password and clicks the “Forget Password” Link
Trigger	User requests the Change password
Possible Exception Paths	User provides invalid Username parameters. Result: See Failed to change password
Post Condition	The password is reset successfully. Old password is replaced with a new one in the records table

Use Case Name: **Add Post**

Actors	Teacher
Priority	High
Scope	Tutor System
Pre-condition	User (Teacher) is logged in to the system
Description	Teacher needs to upload a post in order to make his profile look more concise and fresher
Trigger	User selects the “Upload post”
Possible Exception Paths	User must at least write in the text field or upload an image, file Else an error message is shown, and user is redirected back with no uploaded post.
Post Condition	User successfully uploads his post. Result: A record is inserted in the database containing the post.

Use Case Name: **Edit Post**

Actors	Teacher
Priority	High
Scope	Tutor System
Pre-condition	User (Teacher) is logged in to the system
Description	Teacher needs to edit or delete an already uploaded post
Trigger	User selects the “Edit post” icon
Possible Exception Paths	User must at least write in the text field or upload an image, file Else an error message is shown and user is redirected back with no edited post.
Post Condition	<p>User successfully change his post.</p> <p>Result: A record is updated in the database containing the post.</p> <p>The post will be marked as edited</p>

Use Case Name: **Edit Profile**

Actors	Teacher
Priority	High
Scope	Tutor System
Pre-condition	User (Teacher) is logged in to the system
Description	Teacher needs to edit his profile information
Trigger	User request to “Edit profile”
Possible Exception Paths	User must at least write in the text field or upload an image, file Else an error message is shown, and user is redirected back with no edited post.
Post Condition	User successfully change his profile. Result: A record is updated in the database containing the post.

Use Case Name: **Deactivate Account**

Actors	Teacher
Priority	High
Scope	Tutor System
Pre-condition	User (Teacher) is logged in to the system
Description	Teacher needs to deactivate his account
Trigger	User request to “deactivate account”
Possible Exception Paths	none
Post Condition	User successfully deactivate his account. Result: his information is deleted from the database.

Use Case Name: **Accept/Reject Requests**

Actors	Teacher
Priority	High
Scope	Tutor System
Pre-condition	User is logged in to the system
Description	This use case describes how a teacher can handle the job requests received from students
Trigger	User Accept/Reject requests”
Possible Exception Paths	<p>User might accept/reject an already cancelled job “by student.”</p> <p>Result: System will notify the user of this error and the request will be removed.</p>
Post Condition	<p>Result: an email and notification are sent to the client</p> <p>Database respiratory is updated if needed.</p>

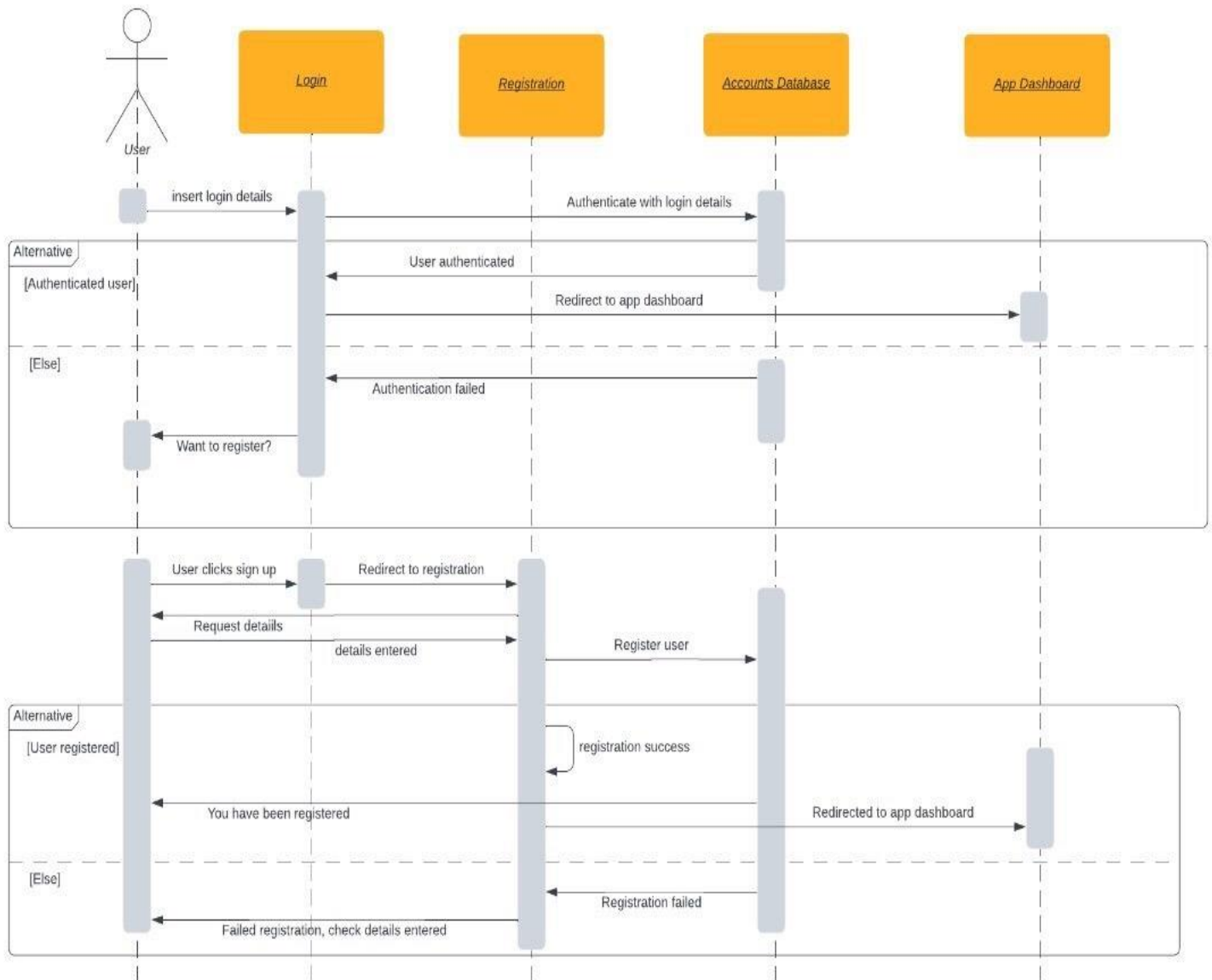
Use Case Name: **Report User**

Actors	Teacher & Student
Priority	High
Scope	Tutor System
Pre-condition	<p>User is logged in to the system.</p> <p>Teacher must have had a business transaction with the client in the past or else he can't even view the student.</p> <p>Student must have had a business transaction with the teacher in the past or else he can't report him</p>
Description	The user "Teacher/Student" have the ability to report a client that he previously worked with.
Trigger	User Selects the report button
Possible Exception Paths	None
Post Condition	<p>User is successfully reported and both parties will be notified of the consequences.</p> <p>Result: a record is inserted containing the related information and will be foreseen by the review committee</p>

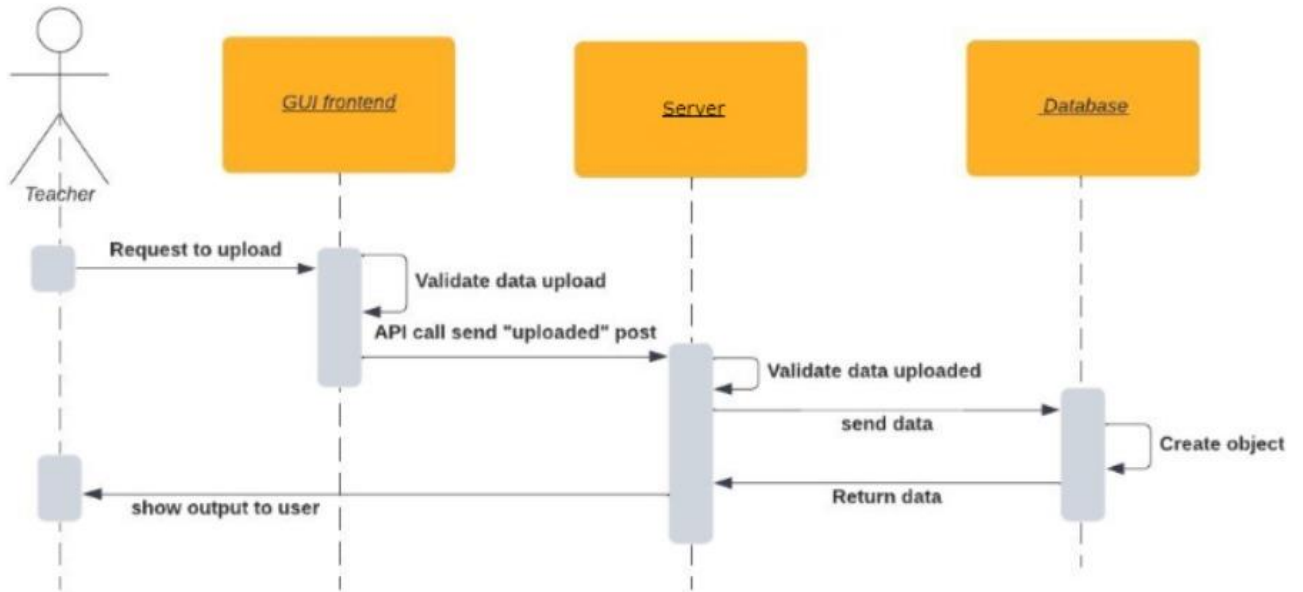
Chapter 3: Design

3.1 Sequence diagrams:

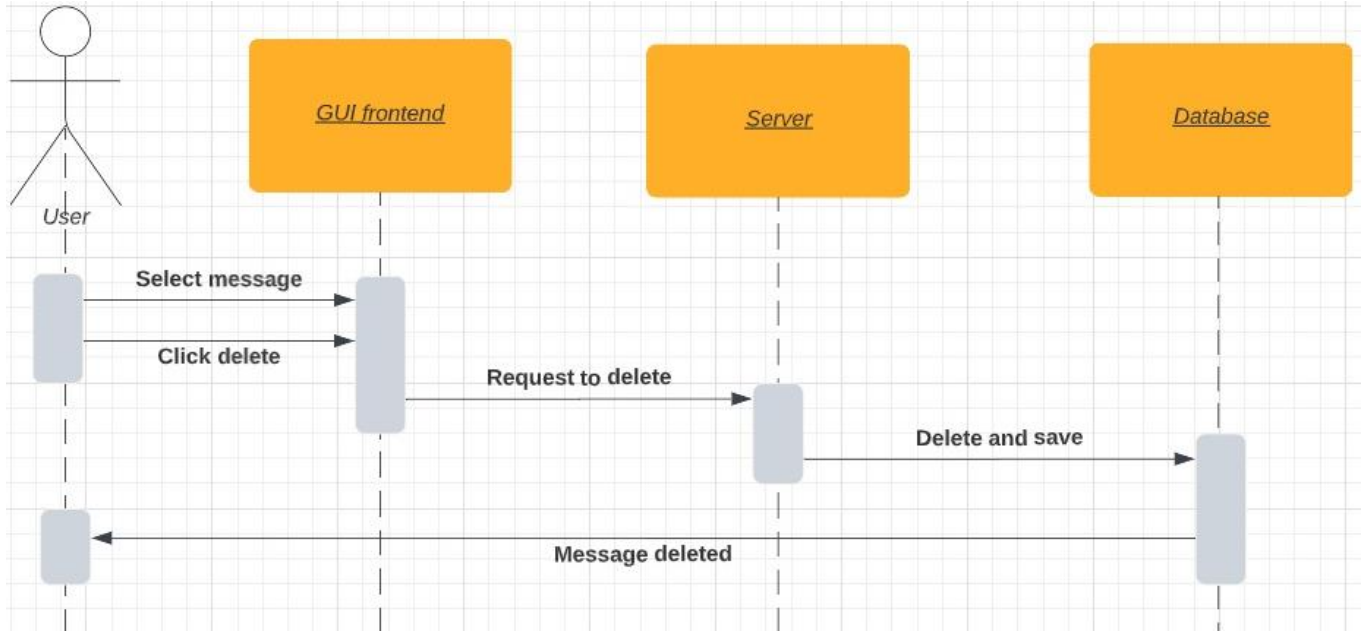
User Login & Register



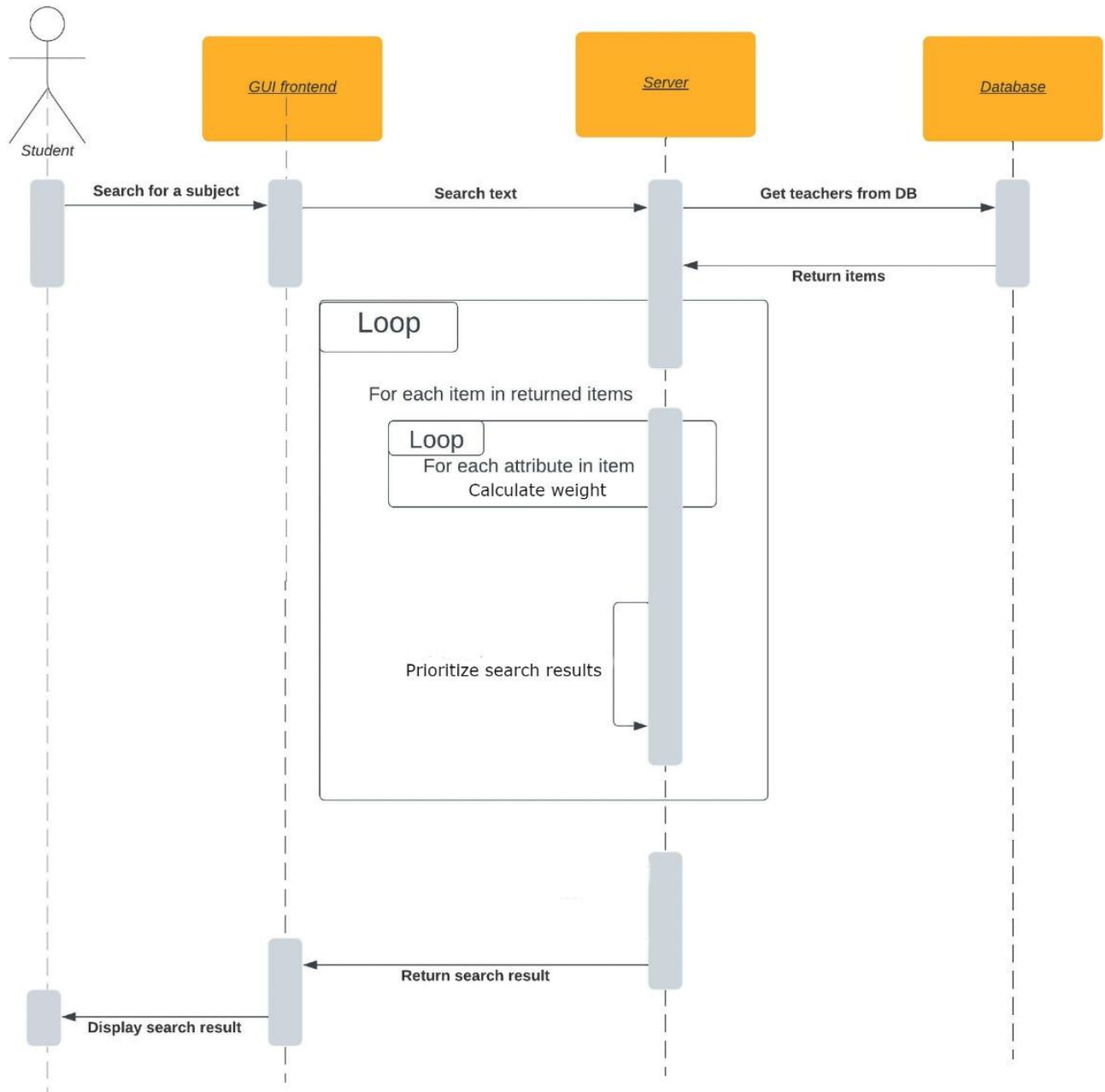
Teacher Upload Post



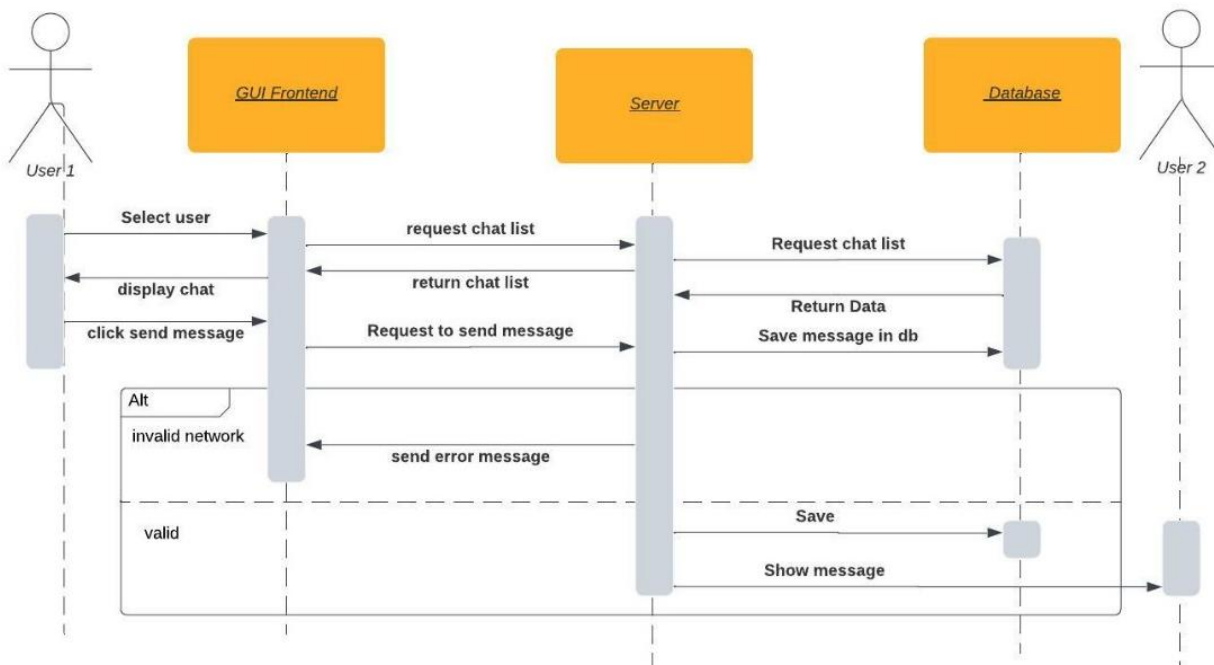
Delete Message



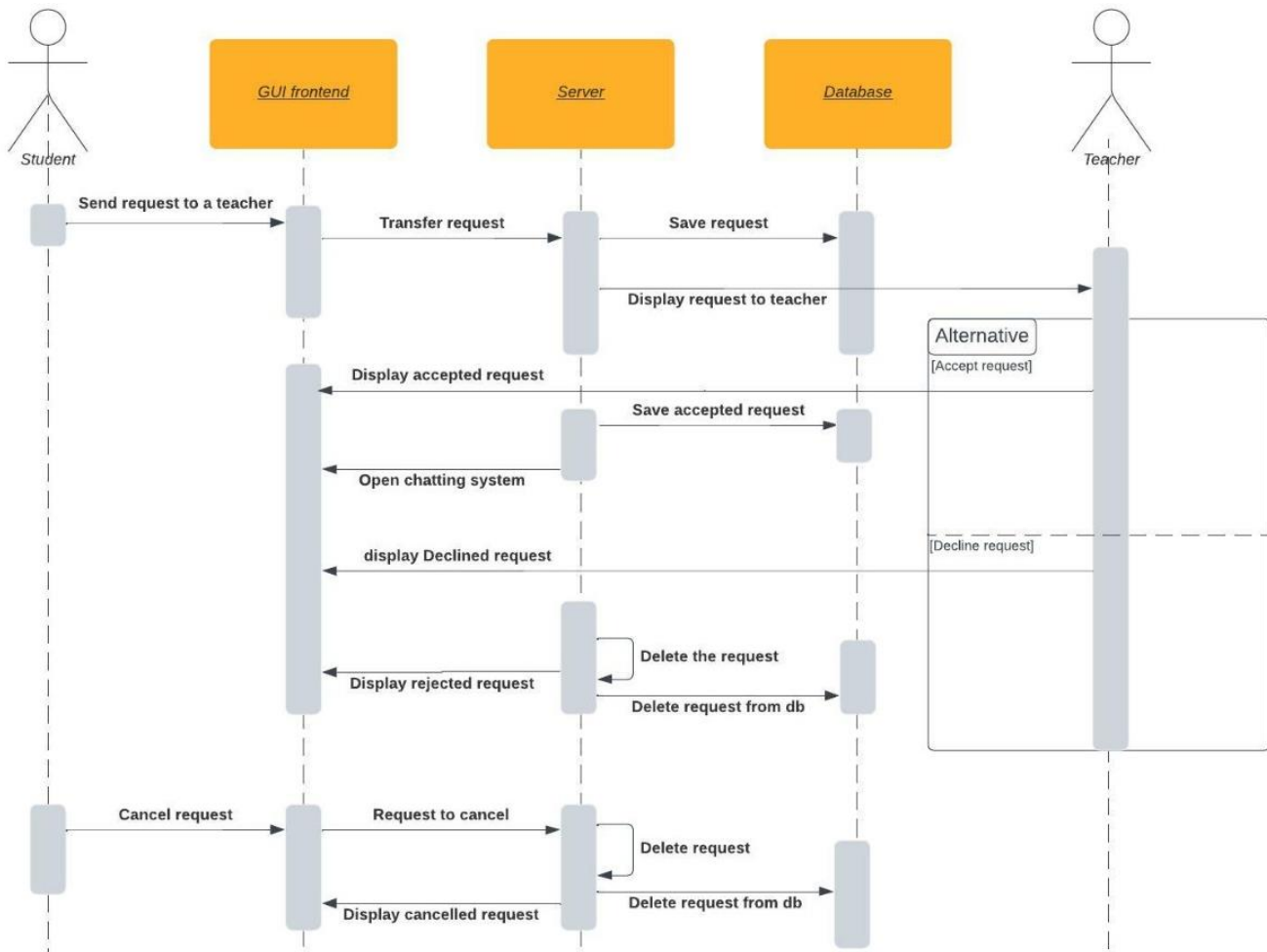
Student Search



User Sending Message

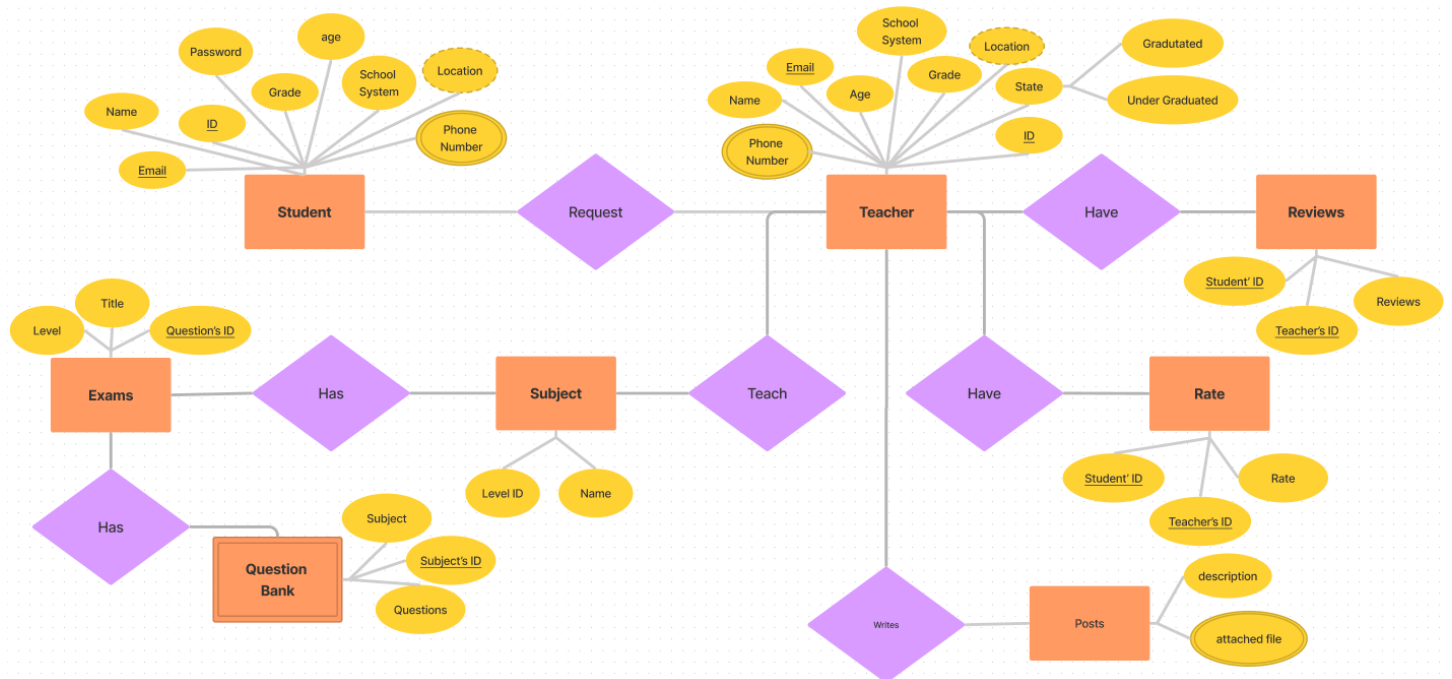


User Request

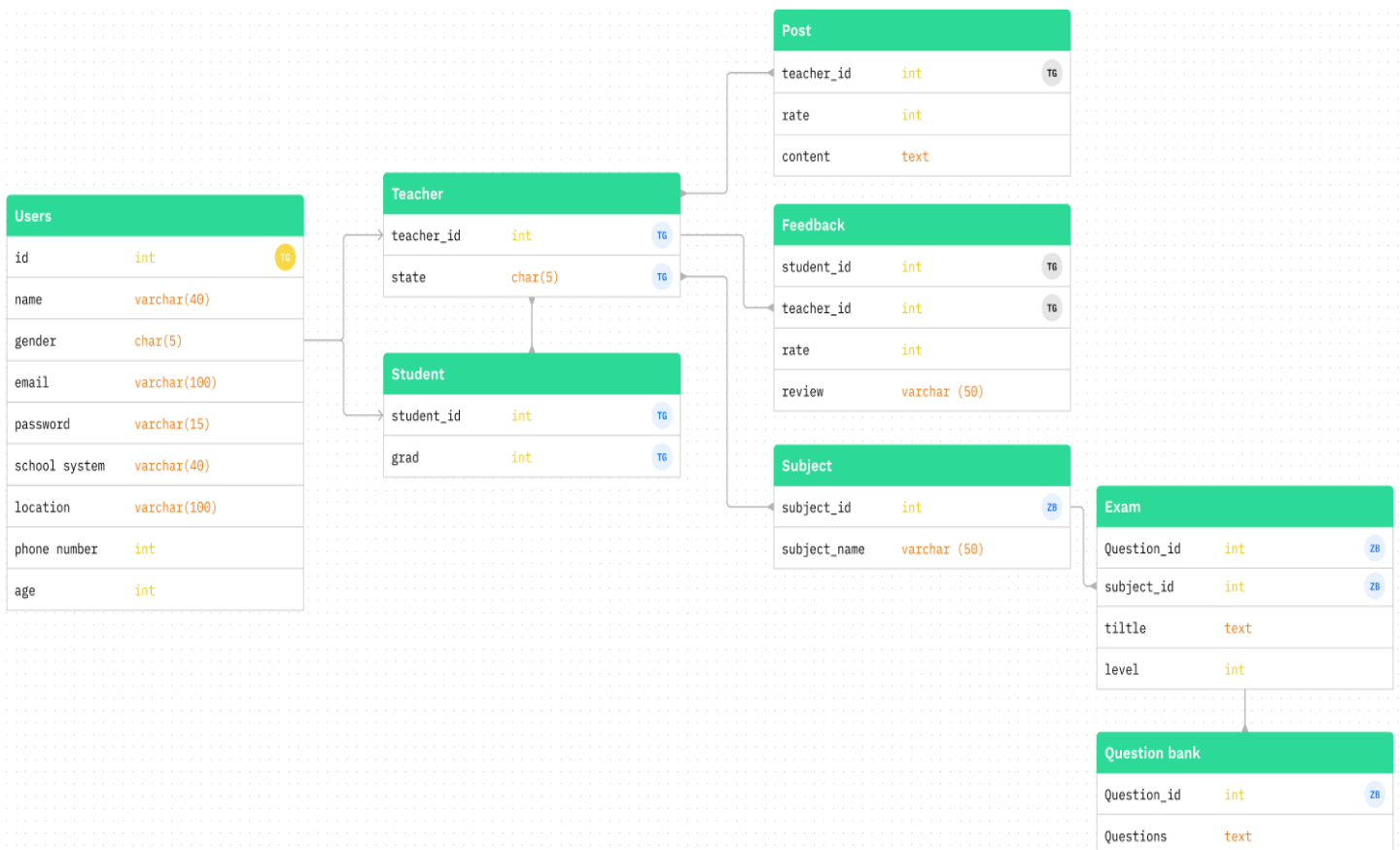


3.2 ERD:

ERD: Information engineering Style

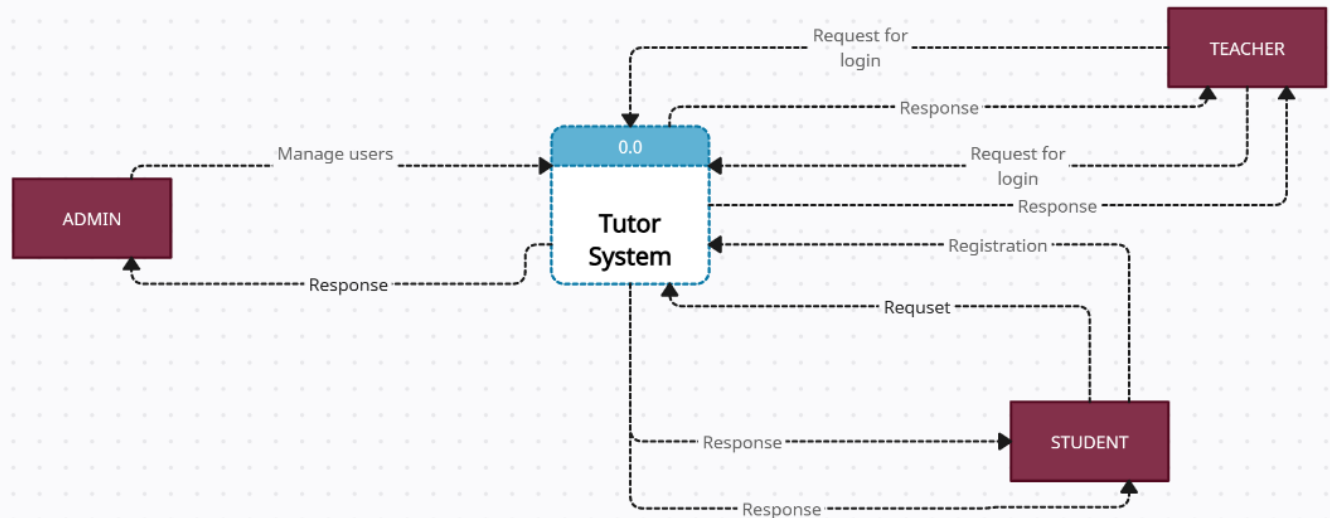


Database Schema

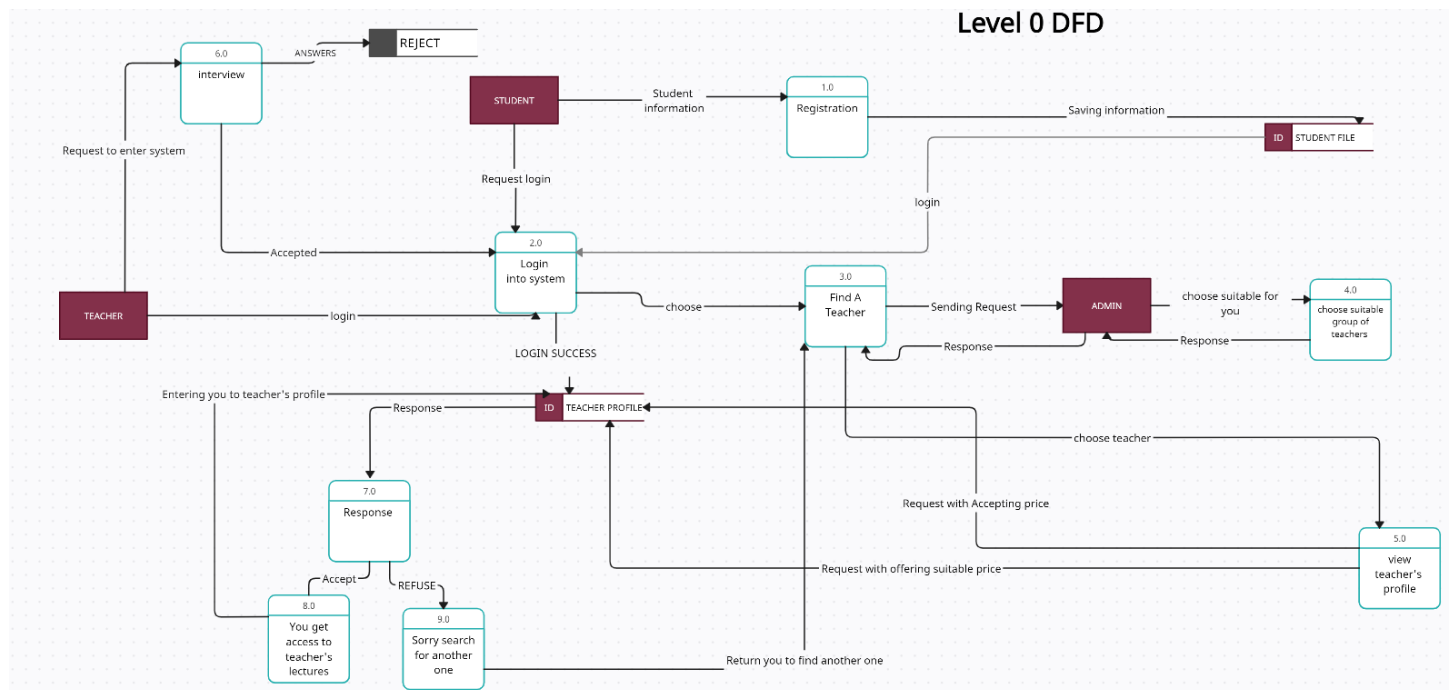


3.2.1 Context diagram (Level 0):

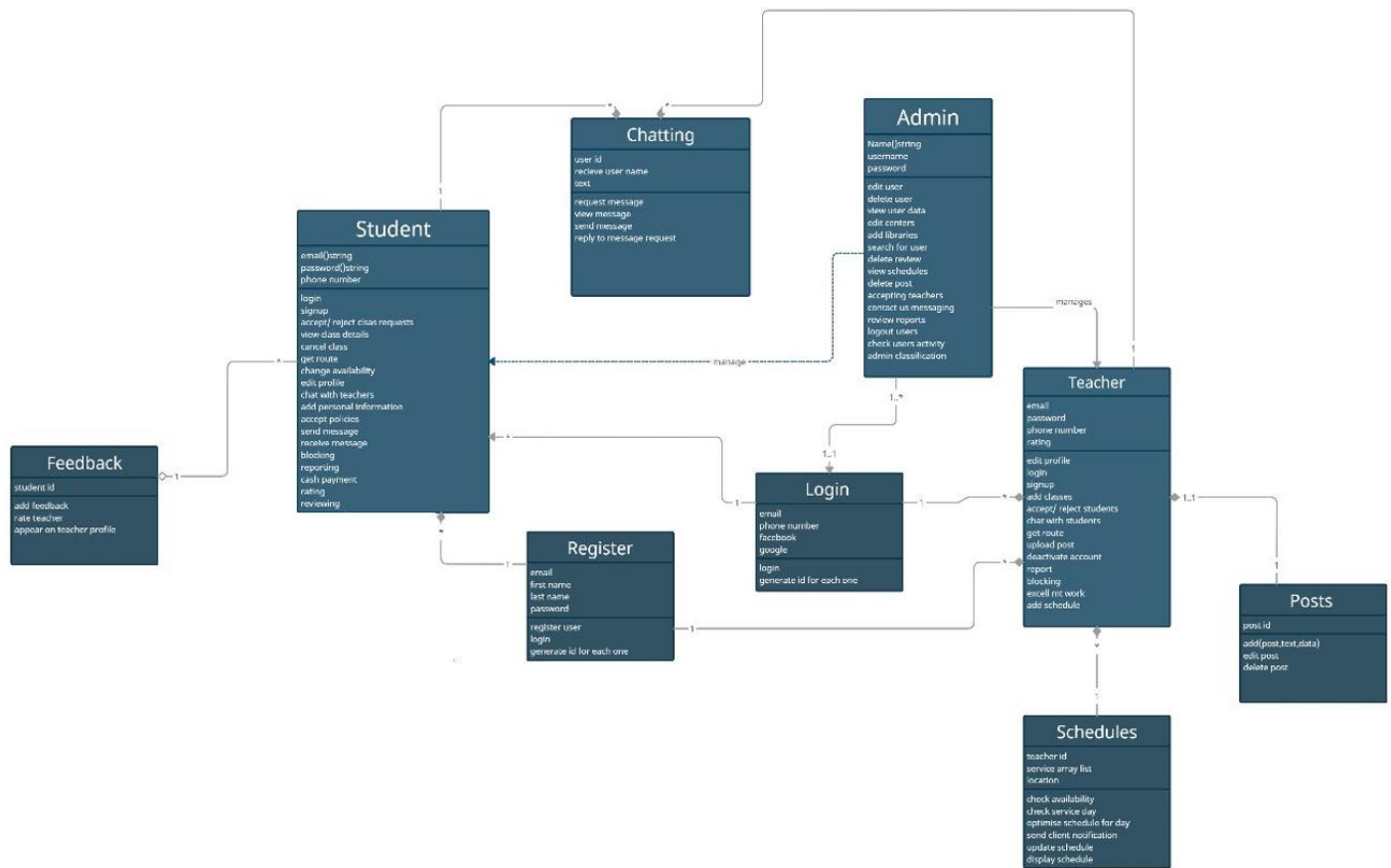
Context Data Flow Diagram



3.2.2 DFD (Level 1):



3.3 UML:

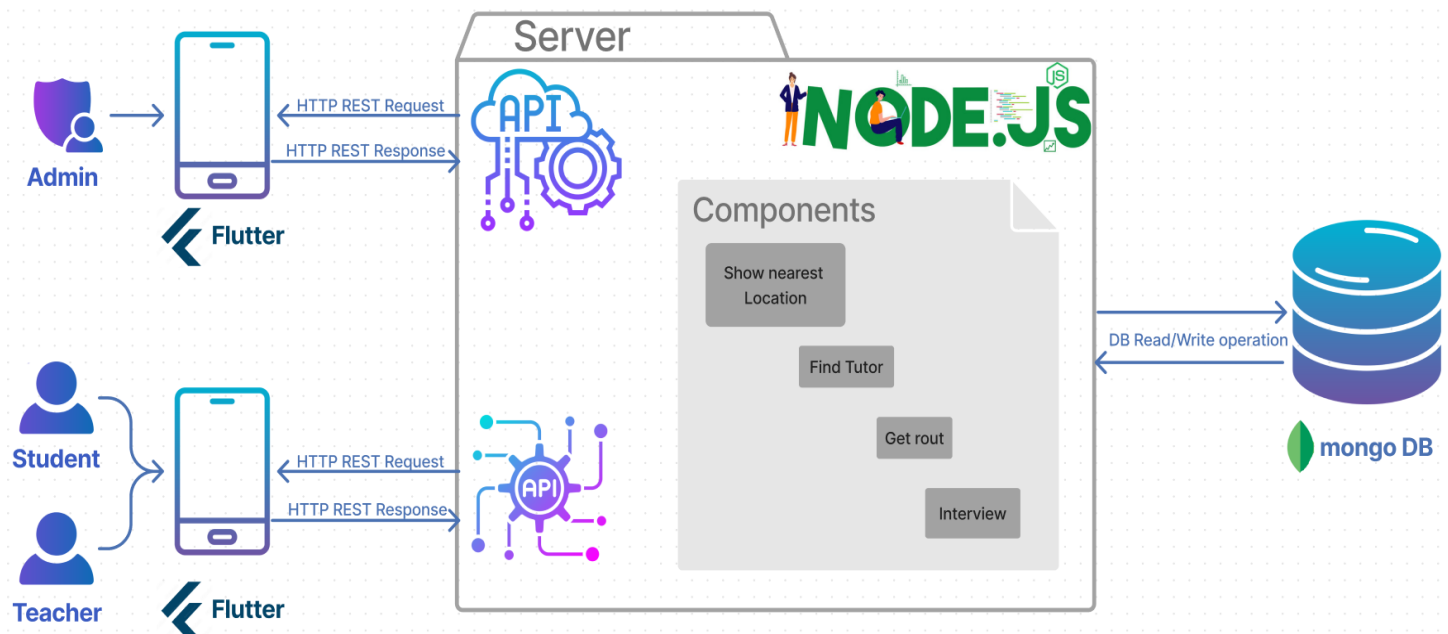


Chapter 4: Implementation

4.1 Overall system Architecture

In the following figure we can see how the system architecture works, we mainly have 3 components that are core to the application which are:

1. **Client Application:** The Application that the student can create roadside assistance requests, Assistant teacher request, this application's purpose is to student service and help them find their suitable tutor.
2. **Service Application (Teacher Application):** this is the application for the Teacher who works with us, using this application they can offer their services as they set themselves available to receive requests and help our clients.
3. **Backend Cloud Functions:** which are functions that are deployed on the server and their main functionality is to connect system components with each other.
4. **Admin Application:** the administrative application that helps our admins monitor the system's activity and they can take actions like accepting new teachers accounts, banning other application users, and other things.



4.2 Tools, Technologies and Programming Languages that will be used.

4.2.1 Front-End Development: (Flutter)

we were comparing Flutter and Android using Java in our research, and we found that:

1. Flutter is a lot faster in development because the code is a lot easier.
2. -Flutter is cross-platform which is a great advantage as it can work on IOS devices.
3. Flutter has a lot of libraries on “Pub.dev” (Official Flutter libraries website) some of them are developed by the Flutter team and some are developed by other developers.
4. Android native performance is the best.
5. Flutter performance is very high (Higher than normal cross-platform applications)

Our team has decided to use the Flutter framework for the many advantages we would benefit from.

4.2.2 Backend Development: (Node JS)

Node.js is a single threaded JS environment for backend application and has a powerful performance for I/O operations where it can handle a large number of simultaneous connections in a non-blocking manner which is good for our project when dealing with large number of users. Node.js has NPM (Node Package Manager) which has a set of useful libraries to use.

4.2.3 Database Systems: (Mongos DB)

After doing some research on the what are the differences between SQL and NO-SQL databases, we came up with the conclusion that:

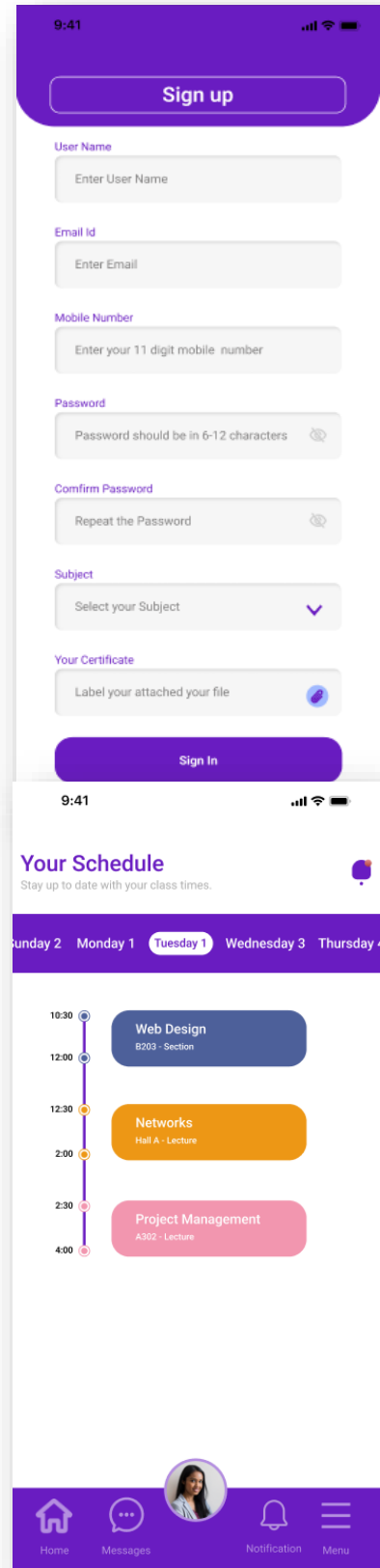
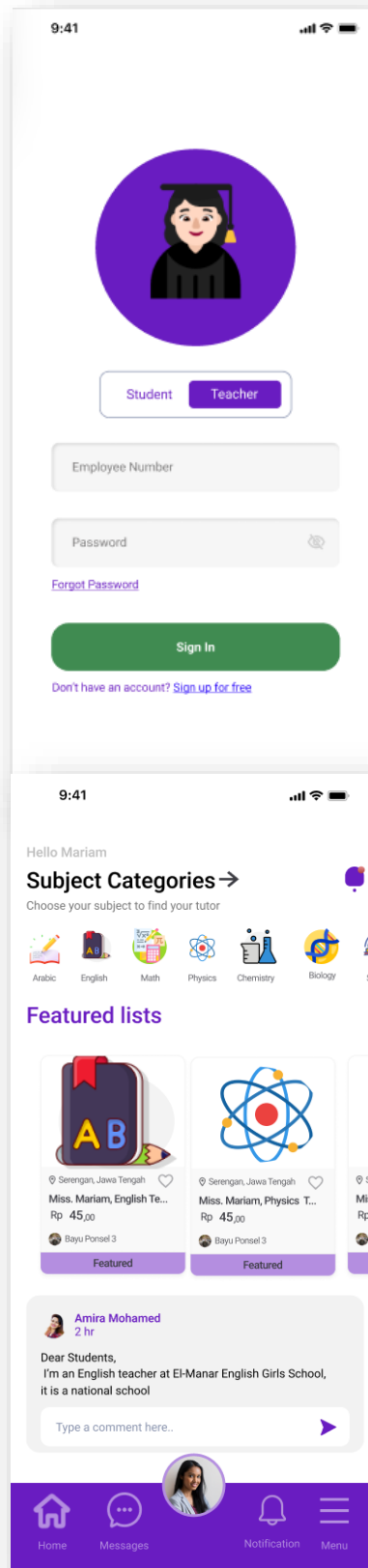
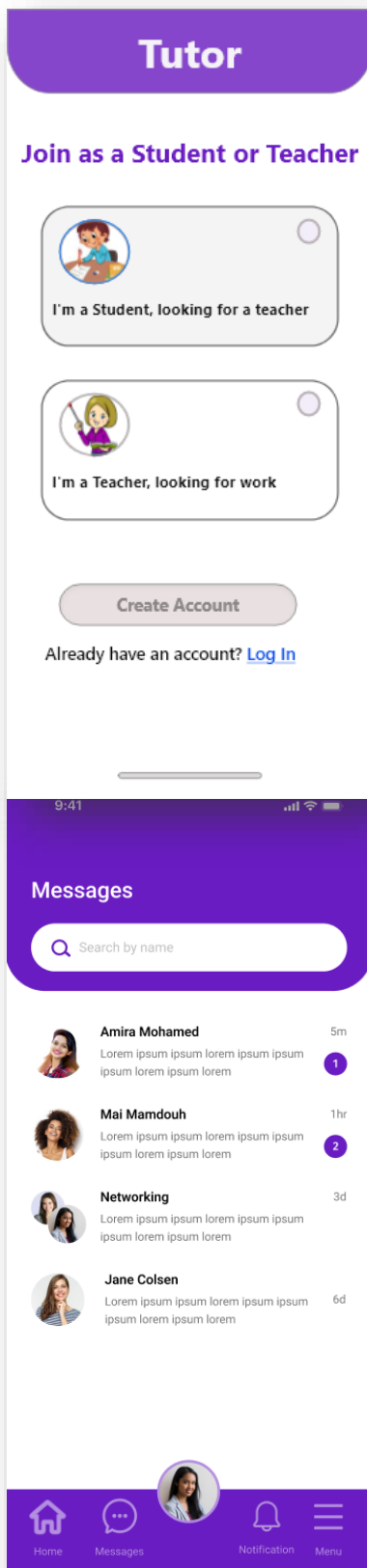
1. SQL databases are relatively easier in retrieving data.
2. NO-SQL databases (like Firestore and MongoDB) can be document-based, which gives us the ability to insert any

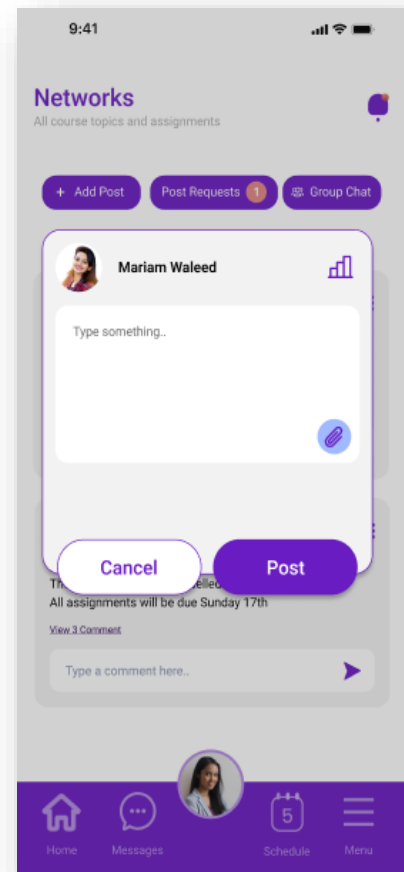
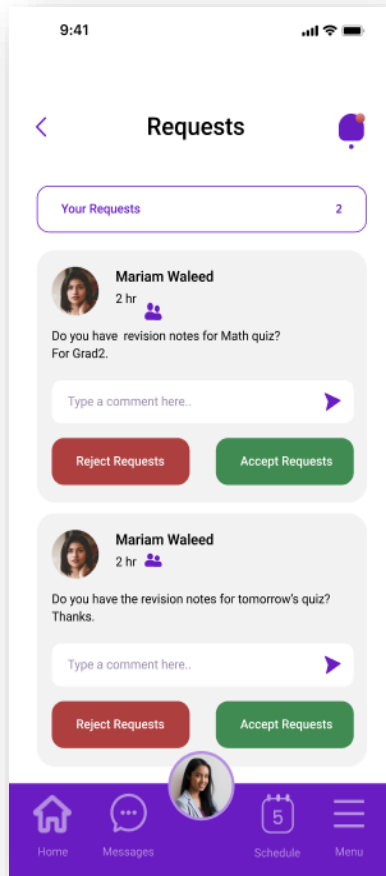
amount and type of data in each document (row) in the database, which significantly tolerates database designing changes, meanwhile SQL databases stick with the same defined structure, so we must be very cautious with the database schema, as SQL databases don't tolerate database design changes.

3. NO-SQL databases are better in scaling applications, as they can scale horizontally not only vertically like SQL databases, this happens by making replicas of the database on different nodes, which will take us to the CAP theorem, and we know that NO-SQL databases would give up either consistency or availability (milliseconds), but it would give us partition tolerance, making the database operate normally if any node (or Server) crashed or went down.

Using the NO-SQL database would give us a lot of benefits, our team has decided to use the NO-SQL database MongoDB, which will be the best practice.

4.3 Prototype





4.4 TimeLine

Name	Details	Duration	Resource Names
Feasibility Study	Search for idea	Week 1	Team
	Scope and Constraints	Week 1	Mariam & Khaled & Mazen
	Research	week 1	Team
	Features Matrix	week 1	Mariam & Farida
Directing the plan and preform surveys	Preform Survey with Students	Week 2	Team
	Preform survey with teacher	Week 2	Team
	Analysis and graphs	Week 3	Mariam
	Discussion of results	Week 3	Khaled
	Requirements elicitation and analysis	Week 3	Mariam
	Requirements specification	Week 4	Mariam
	User and System requirements	Week 4	Mariam
	Requirements Validation	Week 4	Mariam
Design	Context Diagram	Week 5	Mohamed
	DFD Diagram	Week 5	Mohamed
	Use Case	Week 5	Mariam
	UML Case	Week 6	Mazen
	Sequence Diagram	Week 6	Khaled & Farida
	ERD Diagram	Week 7	Mariam
	System Description	Week8	Mariam
	System Architecture	Week 8	Mariam
Demo	User-Interface Application	Week 9	Mariam
Second Term			
Implementation	Front-end	Week 1 - 3	Khaled & Mariam
	Chatting	Week 2 - 3	Mazen
	Back-end	Week 3 - 7	Mariam & Farida & Mohamed
	Data-base	Week 2 - 6	
	Maintain a Database that supports easy acces for data	Week 4	Mariam
	Grant Admin Authorization	Week 5	Mariam
	Testing and Validation	Week 8	Mariam