ONLINE PRIVATE TUTORS FINDER SYSTEM

E/15/119
E/15/202
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Problem Description

The “Online Private Tutor Finders System” is a tool to assist the students to find private tutors in an interactive manner. It aims to complement the efforts of a student to find a desirable tutor.

Scope

- This system can be used by students to find tutors whenever they need it.
- Since this is a website based application, this can be used anywhere.
- This system allows students to make appointments with the tutors.
- This will be a very helpful system for tutors who love to do teaching as a part time job.
- Elimination of travel time for both students and tutors.
- Students can get highly qualified tutors at affordable prices.

Overview

Admin

Admin is the one who is responsible for adding tutors to the database. So at first tutors have to send a request to the admin giving his/her details (This happens when a tutor signs up). According to the details provided by the tutor, the admin accepts the request or discards it.

When the admin accepts the requests, all the details of the tutor will be added to the database (Tutor table) and the tutor will be informed with a tutor id, username and a password through an email (later this username and password can be changed by the tutor).

Following are the functions done by the admin.

- Login(username,password)
- View tutor requests(a request should include all the registering details of tutor) → accept (→ give tutor id and a password and add to the db with tutor reg details→ then send id and password to tutor through email) or ignore (send an email that it is not accepted)
- View registered students (can go to their profiles also)
- View accepted tutors (can go to their profiles also)
- View appointments

Tutor

To be able to access the system as a tutor, first they have to make a request to the admin through the sign up option. If the admin accepts the request, they can be signed in to the system with the provided credentials by the admin.

Following are the functions that can be done by a tutor.

- Register (Email, Fname, Lname, Address, NIC, Bdate, Gender, Contact_no., Subjects (selected set of subject names should be given to select one or more),Description (small description of themselves))
- Login (Username,Password,Tutor_ID) → given by admin

- View profile (contain → tutorID, description, name, contact no., subjects, email, gender, available time(booked or unbooked should indicate))
- Update profile (change subjects,available time etc.)
- View student requests (should contain their name,subjects,address,contact no.,time they need) → accept (should update the available time in profile) or ignore (should send a message that it cannot be accepted)
- Change (username,password)

Student
To be able to access the system as a student, first they have to sign up as a student.
Following are the functions that can be done by a student.

- Register (email,name,contact no.,birthdate,username,password,address,gender)
- Login (username,password)
- View tutors
- View subjects
- Rate tutors
- View accepted or not accepted messages
- Search tutors - by subject , tutor's name or location
- Update their profile
- Forgot password ? - send email to reset

Technology Used

Frontend :- Reactjs
Backend :- MongoDB, Nodejs and Express JS

MongoDB

MongoDB is a cross-platform document-oriented database program. Classified as a NoSQL database program, MongoDB uses JSON-like documents with optional schemas.

MongoDB Atlas

MongoDB is also available as an on-demand fully managed service. MongoDB Atlas runs on AWS, Microsoft Azure, and Google Cloud Platform. (For the development of database we used MongoDB Atlas which runs on Google Cloud Platform)

Server-side JavaScript execution

JavaScript can be used in queries, aggregation functions (such as MapReduce), and sent directly to the database to be executed.

Transactions

MongoDB supports multi-document ACID transactions since the 4.0 release in June 2018.

Comparing with RDBMS (Relational Database Management System)

- In MongoDB, data is represented in a collection of JSON documents while in MySQL, data is in tables and rows. JSON documents can compare to associative arrays when using PHP and directory objects when using Python.

- When it comes to querying, MySQL uses SQL which will expose our DB susceptible to SQL injection attacks On the other hand, MongoDB's querying is object-oriented, which means we pass MongoDB a document explaining what our querying is.

- With MySQL, you can have one document inside another (embedding). You would have to create one table for comments and another for posts if you are using MySQL to create a blog. In MongoDB, you will only have one array of comments and one collection of posts within a post.

- One of the best things about MongoDB is that you are not responsible for defining the schema. All you need to do is drop in documents. Any 2 documents in a collection need not be in the same field. You have to define the tables and columns before storage in MySQL. All rows in a table share the same columns.

- There are no reporting tools with MongoDB, meaning performance testing and analysis is not always possible. With MySQL, you can get several reporting tools that help you prove the validity of your applications.

- You do not have to come up with a detailed DB model with MongoDB because it is non-relational. A DB architect can quickly create a DB without a fine-grained DB model, thereby saving on development time and cost.

- Comparatively easy to set up and get it running.

- No support for the foreign key. But if you need these types of constraints, you have to handle it in the code itself which is a bit complex. (while other RDBMS supports foreign key)

- Best suitable for hierarchical data storage

- MongoDB is almost 100 times faster than traditional database systems.

Security Features Used

Hashing

Hashing is used to secure the password. It is a one-way function that scrambles plain text to produce a unique message digest. With a properly designed algorithm, there is no way to reverse the hashing process to reveal the original password.

In the project, we have used **bcryptjs** to hash passwords before we store them in our database. We used the industry-grade and battle-tested **bcrypt algorithm** to securely hash and salt passwords. bcrypt allows building a password security platform that can evolve alongside hardware technology to guard against the threats that the future may bring, such as attackers having the computing power to crack passwords twice as fast.

Authentication

Database security measures include authentication, the process of verifying if a user's credentials match those stored in your database, and permitting only authenticated users access to your data, networks, and database platform.

In our project, we have used **passport-jwt**. Passport strategy for authenticating with a JSON Web Token (JWT); lets you authenticate endpoints using a JWT

Authorization

In our project **jsonwebtoken** was used for authorization

With this, once the user is logged in, each subsequent request will include the JWT, allowing the user to access routes, services, and resources that are permitted with that token.

Database Security

MongoDB Atlas makes it easy to control access to the database. With this, the database instances are deployed in a unique Virtual Private Cloud (VPC) to ensure network isolation. Other security features include IP whitelisting or VPC Peering, always-on authentication, encryption at rest and encryption in transit, sophisticated role-based access management, and more.

Database Authentication

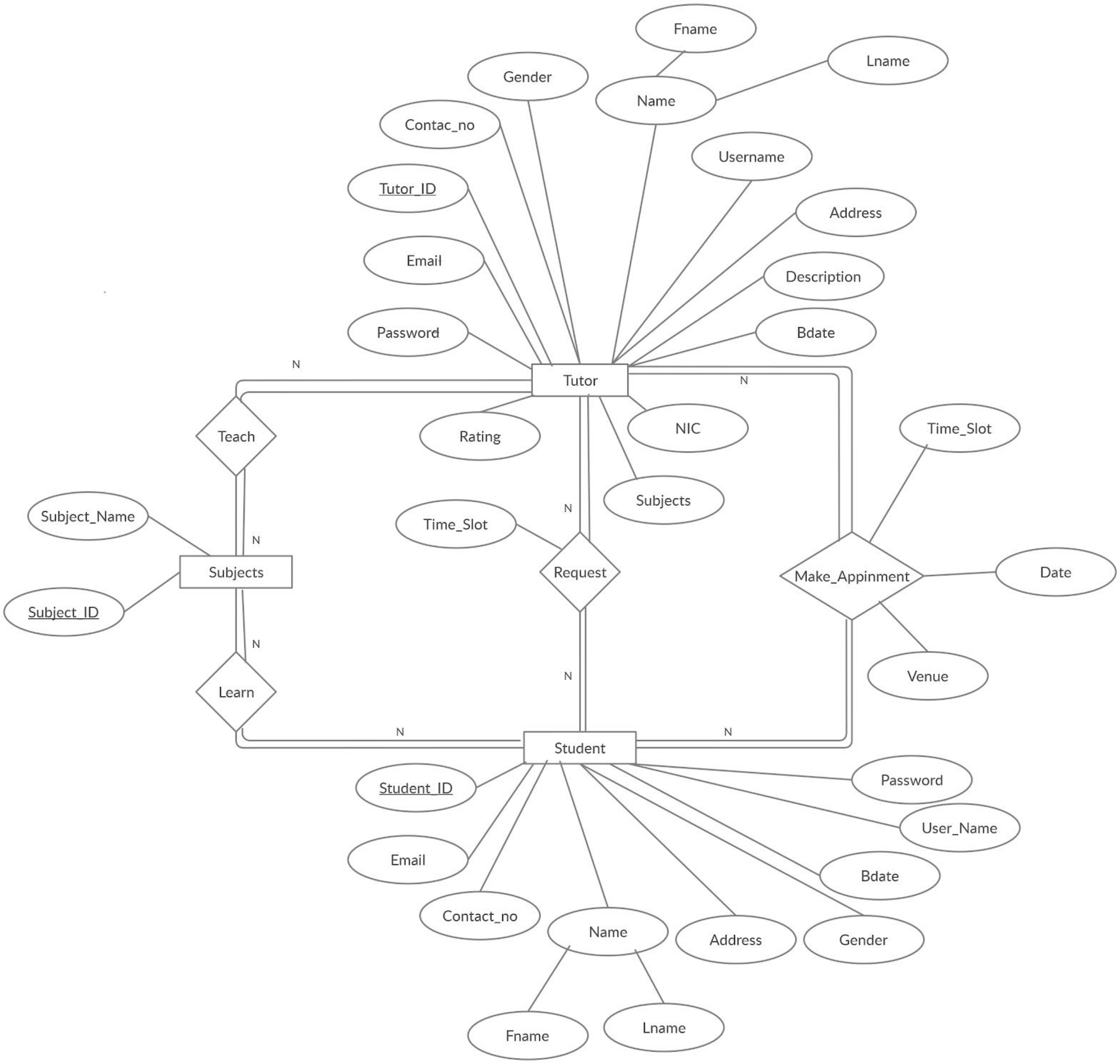
Authentication is the process of verifying the identity of a client that is trying to connect with a database. MongoDB offers various methods to verify a client's identity. Challenge-based default measures include SCRAM-SHA-1 and MongoDB-CR.

Back Up with Atlas

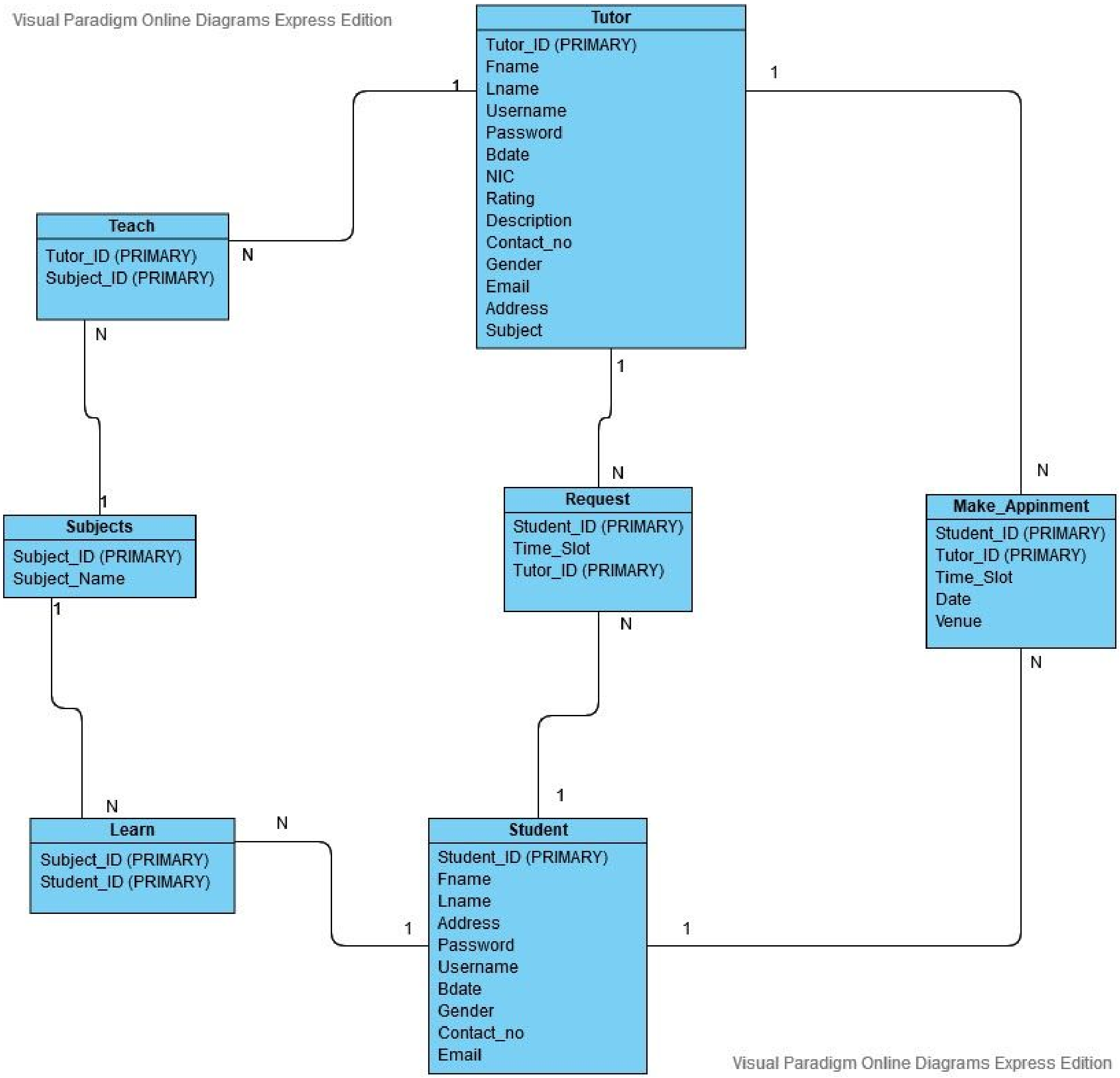
MongoDB Atlas, the official MongoDB cloud service, provides 2 fully-managed methods for backups:

1. **Continuous Backups**, which take incremental backups of data in your cluster, ensuring your backups are typically just a few seconds behind the operational system. Atlas continuous backups allow you to restore from stored snapshots or from a selected point in time within the last 24 hours. You can also query a continuous backup snapshot.
2. **Cloud Provider Snapshots**, which provide localized backup storage using the native snapshot functionality of the cluster's cloud service provider.

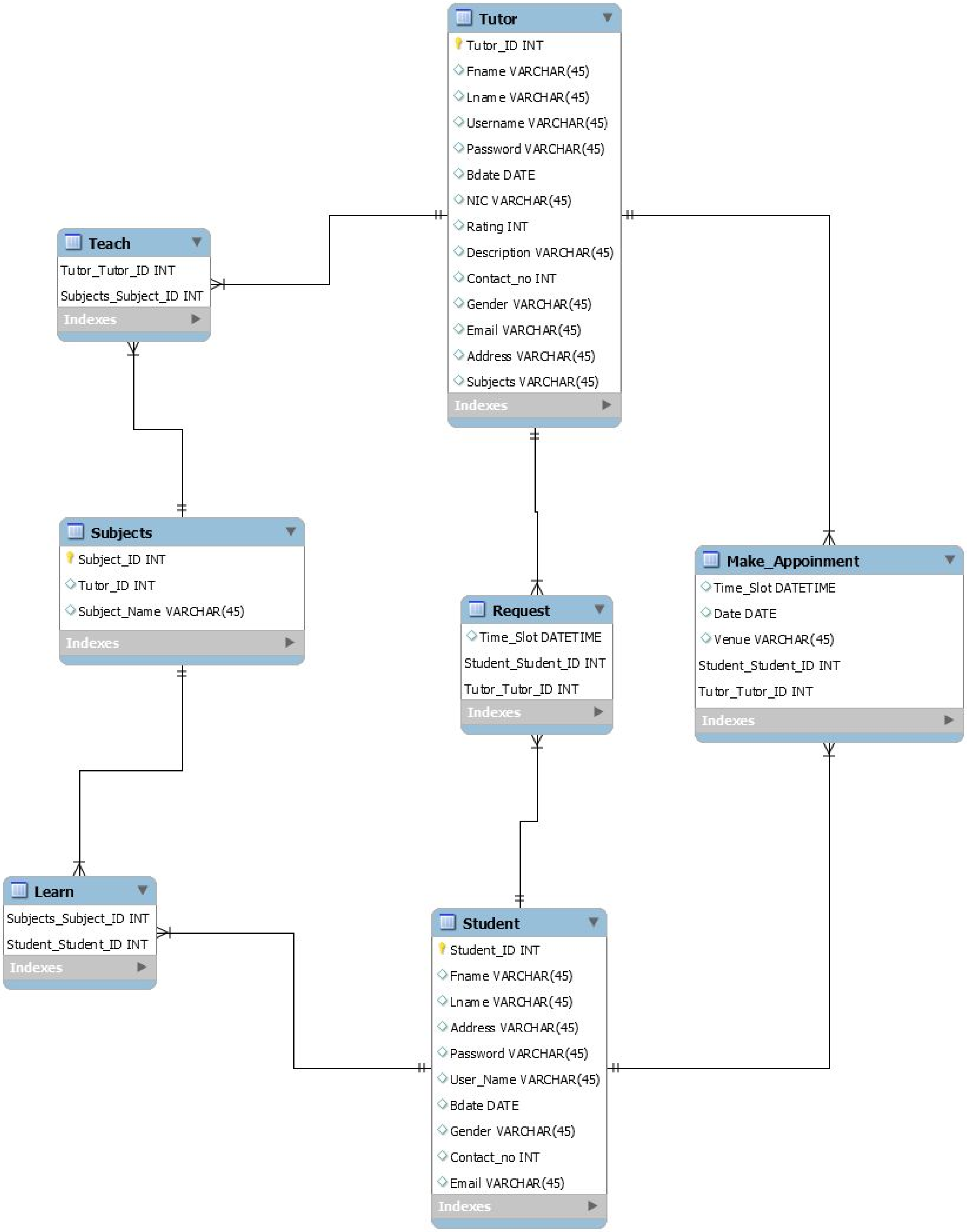
Entity-Relationship Diagram



Logical Design



Physical Design



Database Tables

1.Admin

1. Name
2. AdminID - primary key
3. Password
4. Email

2.Tutor

1. Username
2.Password
3.Tutor_ID -primary key
4.Firstname - Tutor First Name (Fname)
5.Lastname - Tutor Last Name (Lname)
6.DOB - Tutor Birthday (Bdate)
7.Gender
8.Address
9.Email
10.Description
11.Contact_no
12.Subjects
13.Rating

3.Students

1.Username
2.Password
3.Student_ID - primary key
4.Firstname - Student First Name (Fname)
5.Lastname - Student Last Name (Lname)
6.DOB - Student Birthday (Bdate)
7.Gender
8.Address
9.Email
10.Contact_no

4.Subjects

1.Subject_ID - primary key
2.Subject_Name

5.Make_Appoinment

1.Tutor_ID - primary key
2.Subject_ID -primary key
3.Date
4.Time_Slot
5.Venue

6.Request

1.Student_ID - primary key
2.Tutor_ID - primary key
3.Time_Slot

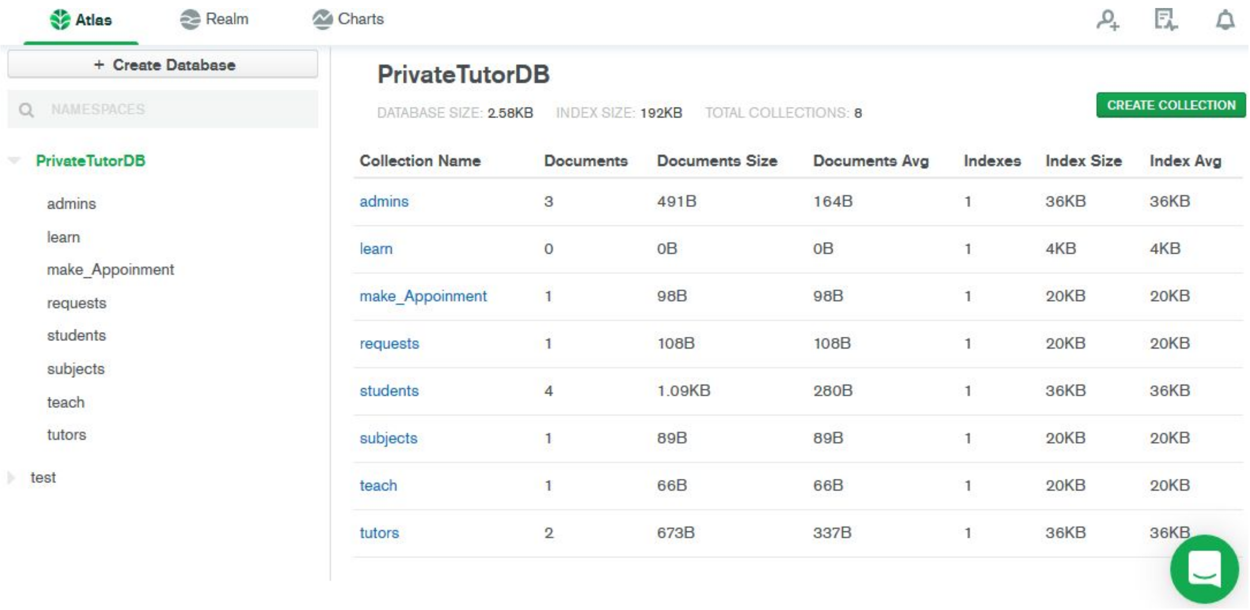
7.Teach

1.Tutor_ID
2. Subject_ID

8.Learn

1.Student_ID
2.Subject_ID

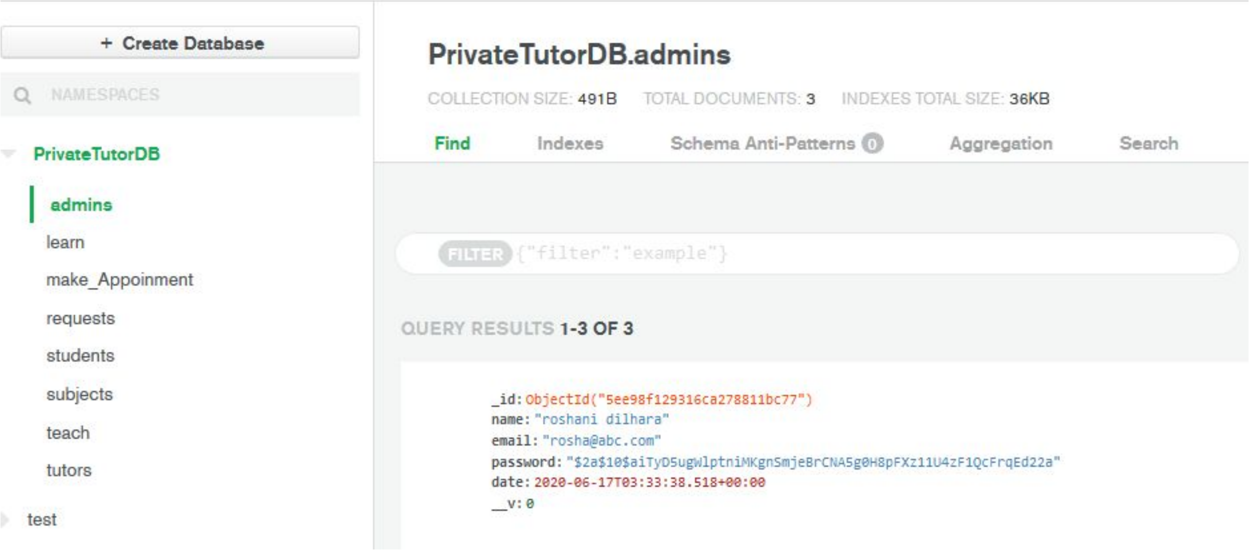
Backend



PrivateTutorDB

DATABASE SIZE: 2.58KB INDEX SIZE: 192KB TOTAL COLLECTIONS: 8

Collection Name	Documents	Documents Size	Documents Avg	Indexes	Index Size	Index Avg
admins	3	491B	164B	1	36KB	36KB
learn	0	0B	0B	1	4KB	4KB
make_Appoinment	1	98B	98B	1	20KB	20KB
requests	1	108B	108B	1	20KB	20KB
students	4	1.09KB	280B	1	36KB	36KB
subjects	1	89B	89B	1	20KB	20KB
teach	1	66B	66B	1	20KB	20KB
tutors	2	673B	337B	1	36KB	36KB

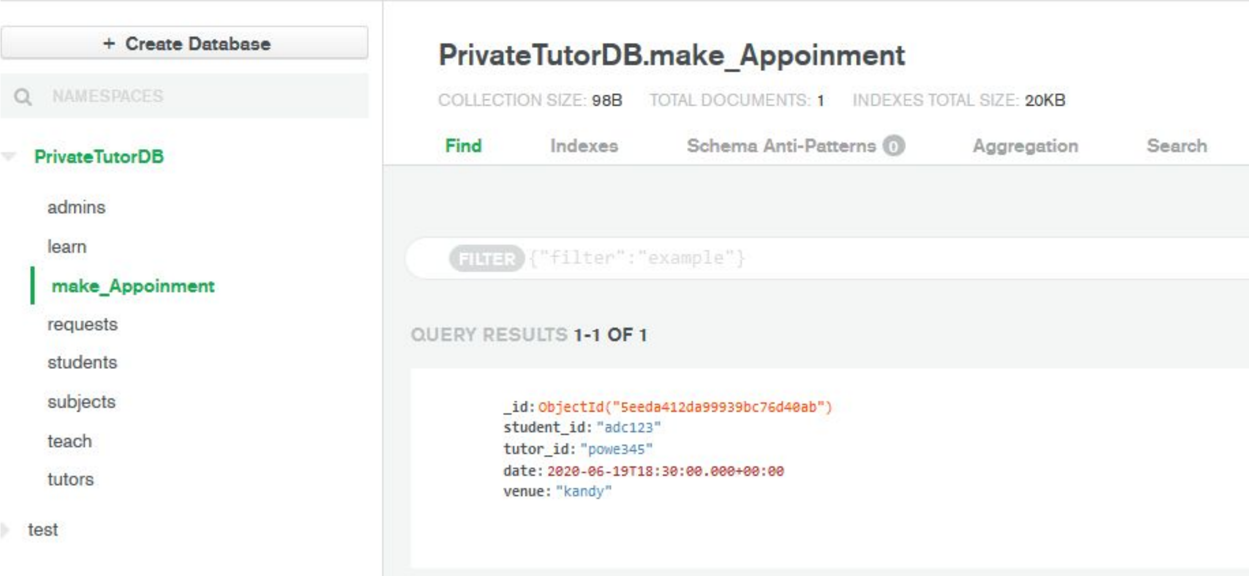


PrivateTutorDB.admins

COLLECTION SIZE: 491B TOTAL DOCUMENTS: 3 INDEXES TOTAL SIZE: 36KB

QUERY RESULTS 1-3 OF 3

```
_id:ObjectId("5ee98f129316ca278811bc77")
name:"roshani dilhara"
email:"rosha@abc.com"
password:"$2a$10$aiTyD5ugWlptniMKgnSmjeBrCNA5g0H8pFXz11U4zF1QcFrqEd22a"
date:2020-06-17T03:33:38.518+00:00
__v:0
```

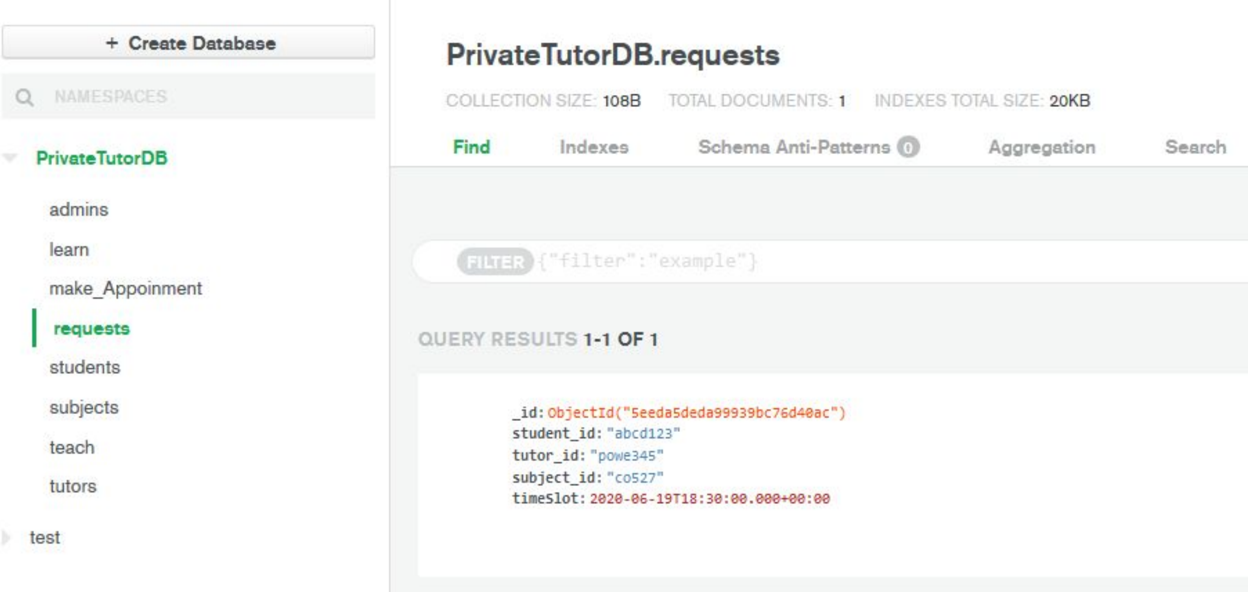


PrivateTutorDB.make_Appoinment

COLLECTION SIZE: 98B TOTAL DOCUMENTS: 1 INDEXES TOTAL SIZE: 20KB

QUERY RESULTS 1-1 OF 1

```
_id: ObjectId("5eeda412da99939bc76d40ab")
student_id: "adc123"
tutor_id: "powe345"
date: 2020-06-19T18:30:00.000+00:00
venue: "kandy"
```

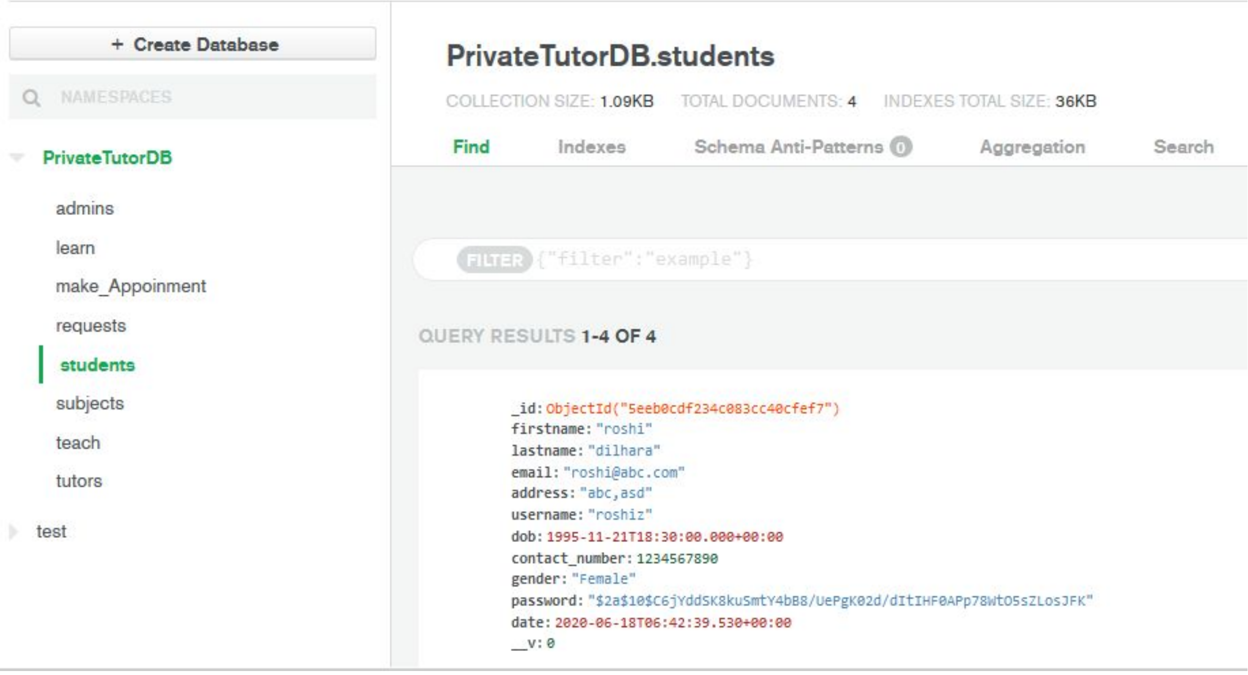


PrivateTutorDB.requests

COLLECTION SIZE: 108B TOTAL DOCUMENTS: 1 INDEXES TOTAL SIZE: 20KB

QUERY RESULTS 1-1 OF 1

```
_id: ObjectId("5eeda5deda99939bc76d40ac")
student_id: "abcd123"
tutor_id: "powe345"
subject_id: "co527"
timeSlot: 2020-06-19T18:30:00.000+00:00
```

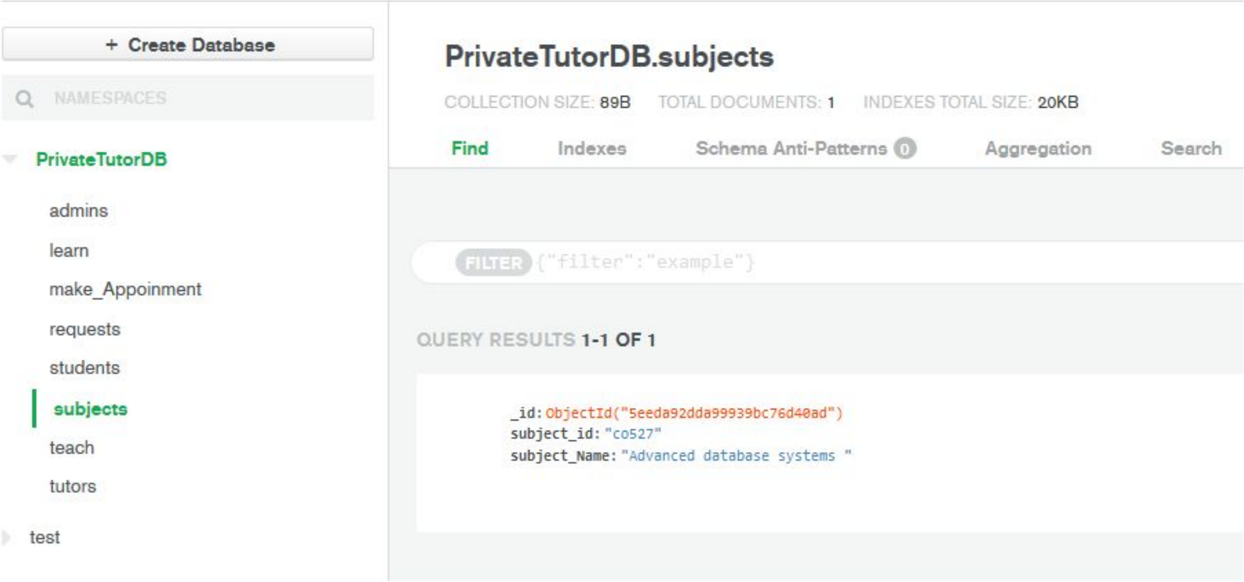


PrivateTutorDB.students

COLLECTION SIZE: 1.09KB TOTAL DOCUMENTS: 4 INDEXES TOTAL SIZE: 36KB

QUERY RESULTS 1-4 OF 4

```
_id: ObjectId("5eeb0cdf234c083cc40cfef7")
firstname: "roshi"
lastname: "dilhara"
email: "roshi@abc.com"
address: "abc,asd"
username: "roshiz"
dob: 1995-11-21T18:30:00.000+00:00
contact_number: 1234567890
gender: "Female"
password: "$2a$10$C6jYddSK8kuSmtY4bB8/UePgK02d/dItIHF0APp78WtO5sZLosJFK"
date: 2020-06-18T06:42:39.530+00:00
__v: 0
```

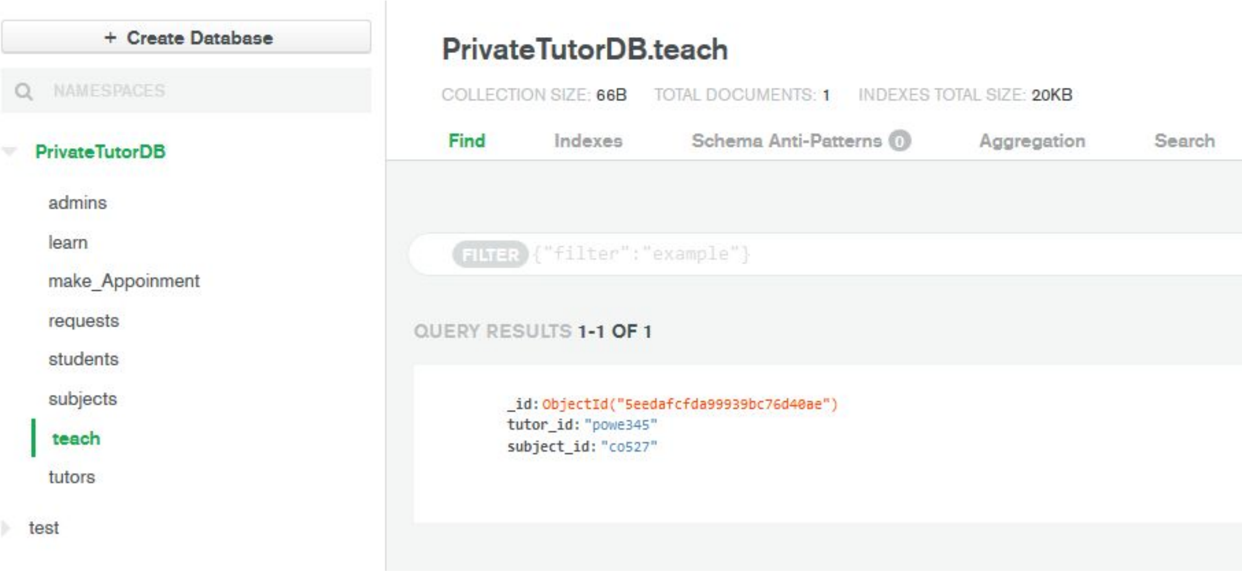


PrivateTutorDB.subjects

COLLECTION SIZE: 89B TOTAL DOCUMENTS: 1 INDEXES TOTAL SIZE: 20KB

QUERY RESULTS 1-1 OF 1

```
_id: ObjectId("5eeda92dda99939bc76d40ad")
subject_id: "co527"
subject_Name: "Advanced database systems "
```

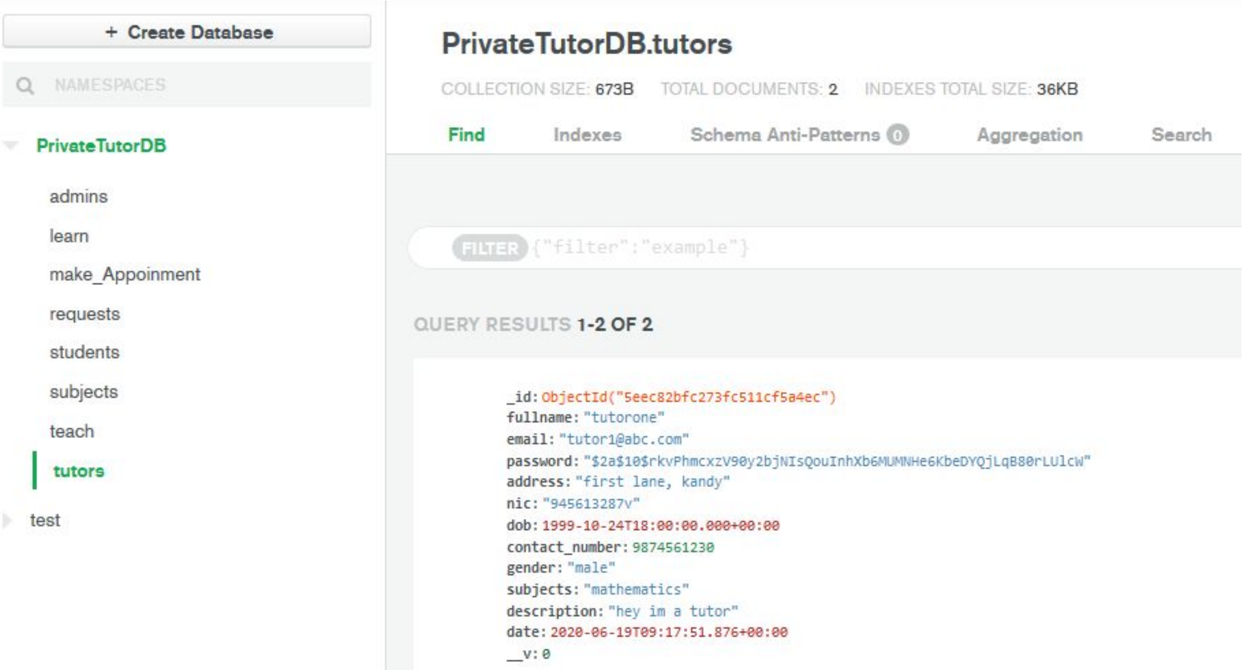


PrivateTutorDB.teach

COLLECTION SIZE: 66B TOTAL DOCUMENTS: 1 INDEXES TOTAL SIZE: 20KB

QUERY RESULTS 1-1 OF 1

```
_id: ObjectId("5eedafcfda99939bc76d40ae")
tutor_id: "powe345"
subject_id: "co527"
```



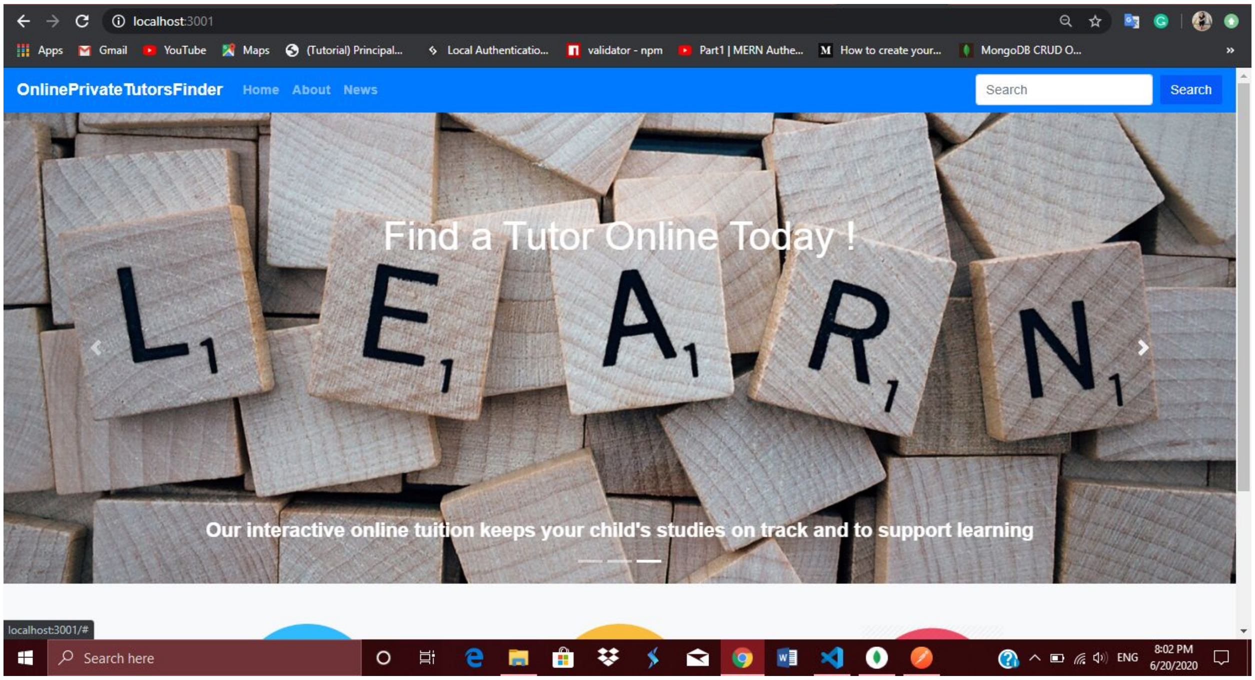
PrivateTutorDB.tutors

COLLECTION SIZE: 673B TOTAL DOCUMENTS: 2 INDEXES TOTAL SIZE: 36KB

QUERY RESULTS 1-2 OF 2

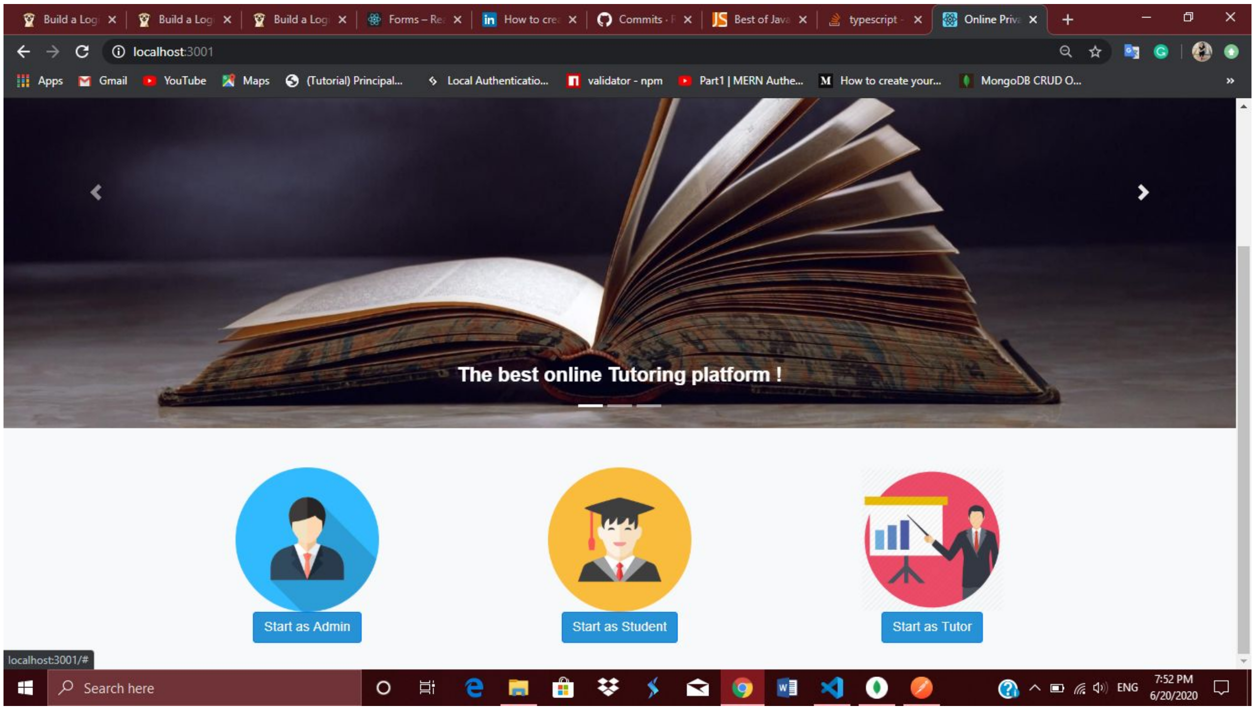
```
_id: ObjectId("5eec82bfc273fc511cf5a4ec")
fullname: "tutorone"
email: "tutor1@abc.com"
password: "$2a$10$rkvPhmcxzV90y2bjNIsQouInhXb6MUMNHe6KbeDYQjLqB80rLUlcW"
address: "first lane, kandy"
nic: "945613287v"
dob: 1999-10-24T18:00:00.000+00:00
contact_number: 9874561230
gender: "male"
subjects: "mathematics"
description: "hey im a tutor"
date: 2020-06-19T09:17:51.876+00:00
__v: 0
```

Frontend

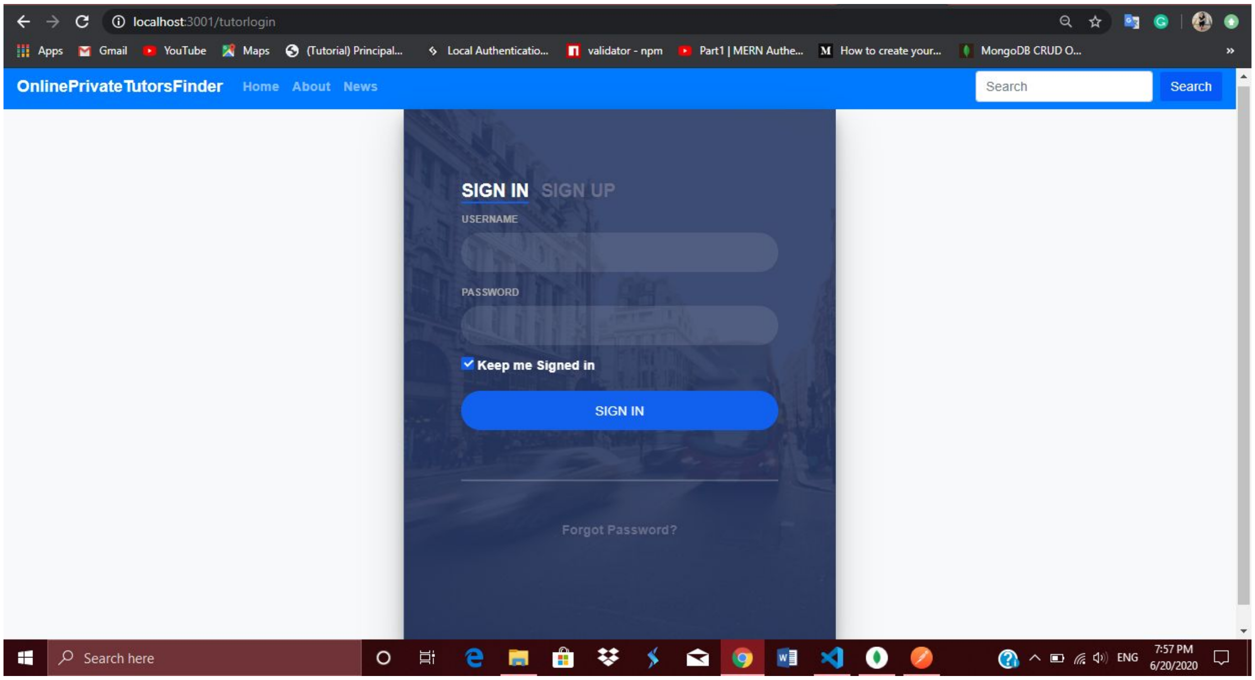


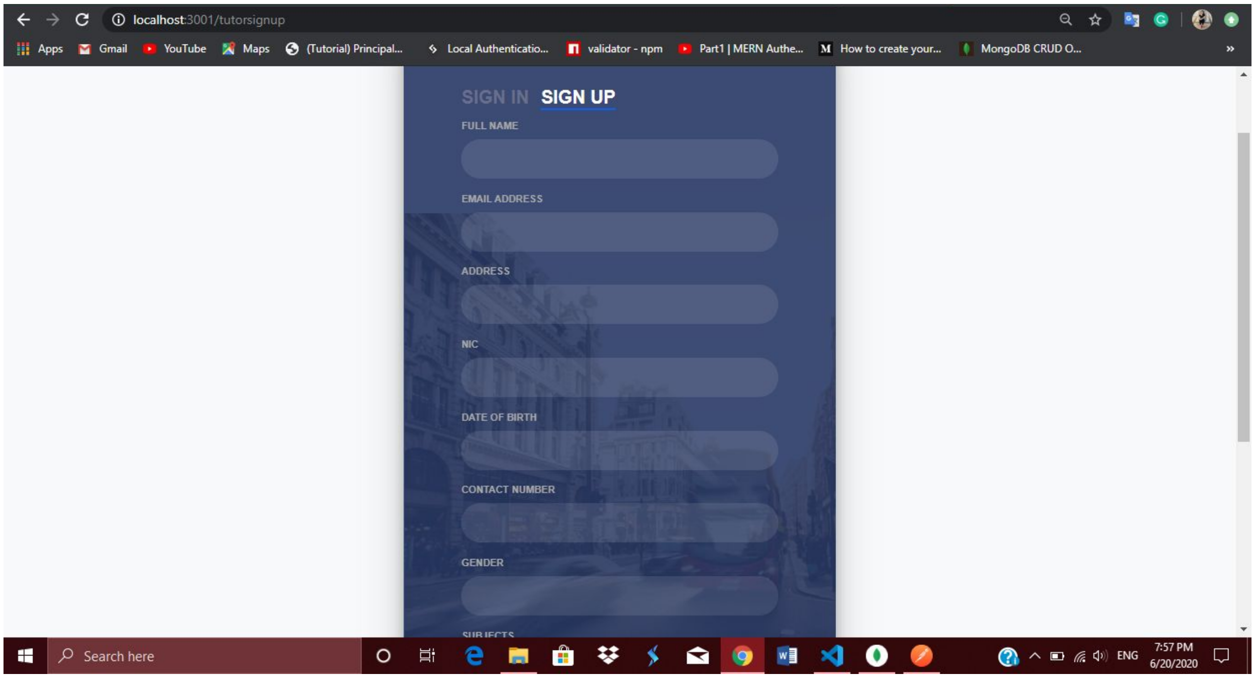
Find a Tutor Online Today !

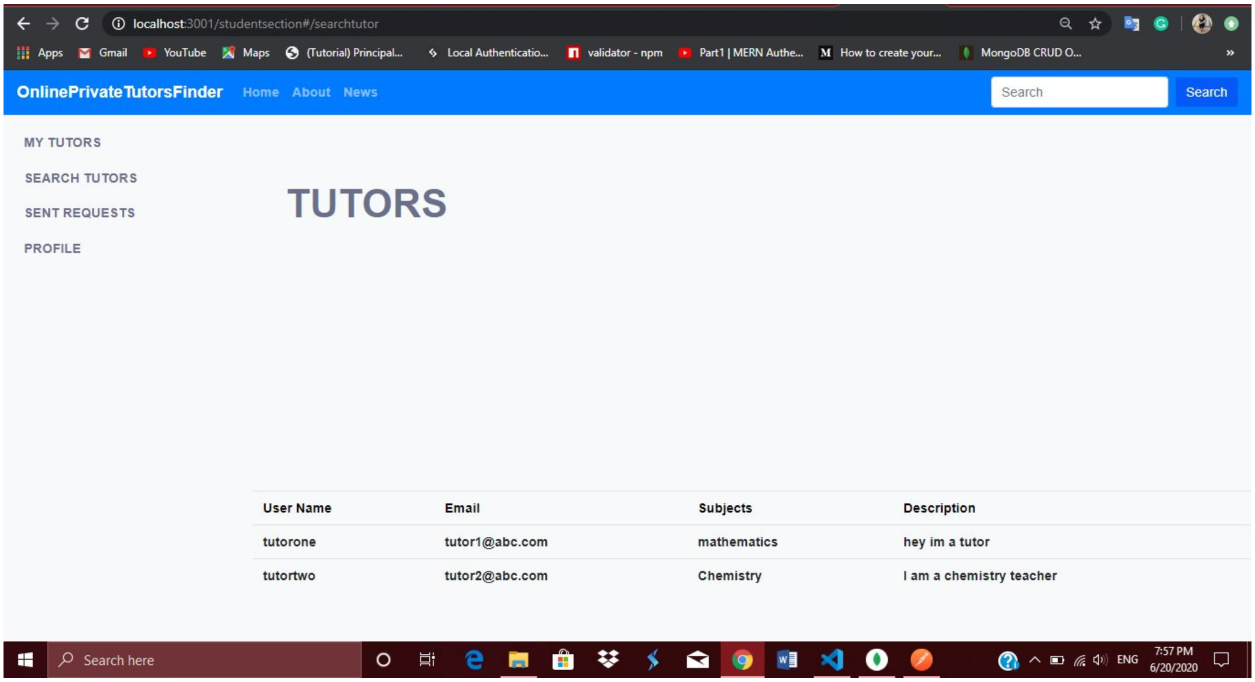
Our interactive online tuition keeps your child's studies on track and to support learning



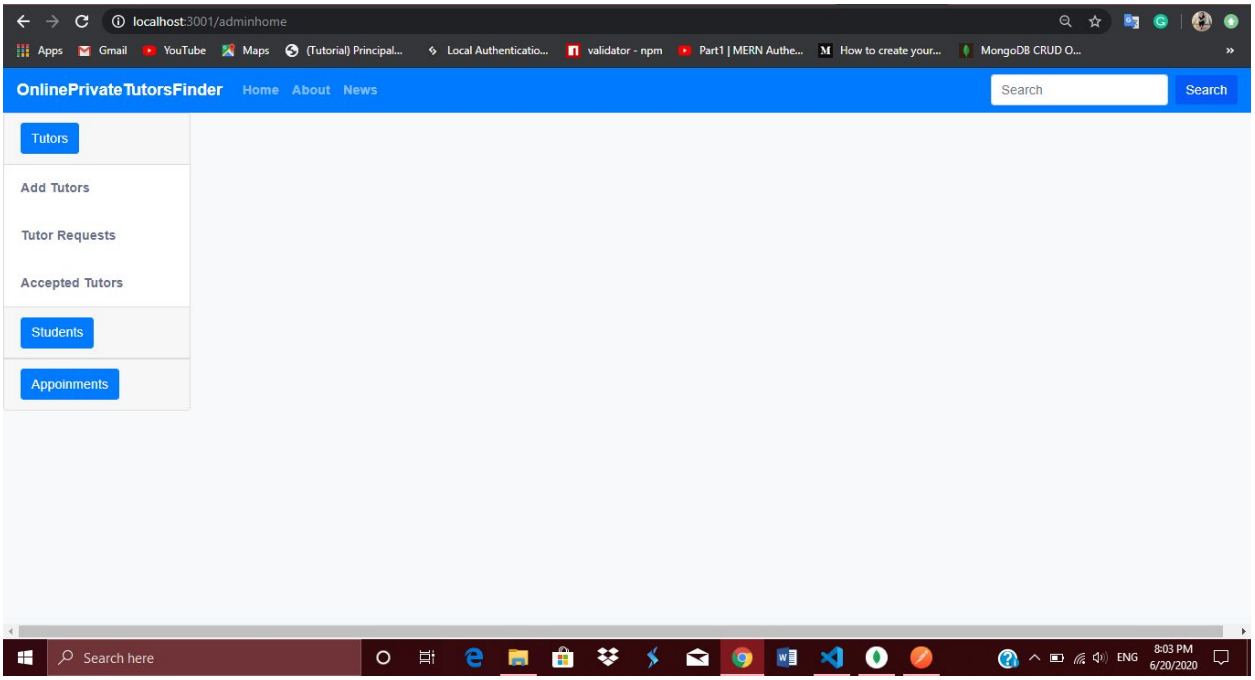
The best online Tutoring platform !


localhost:3001/tutorlogin
OnlinePrivateTutorsFinder
Home
About
News
Search
Search
SIGN IN
SIGN UP
USERNAME
PASSWORD
☑ Keep me Signed in
SIGN IN
Forgot Password?


localhost:3001/tutorsignup
SIGN IN
SIGN UP
FULL NAME
EMAIL ADDRESS
ADDRESS
NIC
DATE OF BIRTH
CONTACT NUMBER
GENDER
SUBJECTS



User Name	Email	Subjects	Description
tutorone	tutor1@abc.com	mathematics	hey im a tutor
tutortwo	tutor2@abc.com	Chemistry	I am a chemistry teacher



github links for the project:

Frontend: https://github.com/RoshaniDilhara/Online-Private-Tutors-Finder.git
Backend: https://github.com/Dulanjali-Liyanage/Backend-Online-Private-Tutors-Finder.git