CSE411: Distributed Systems
Project Delivery – Phase 1

Contents

Introduction

The aim of this project is to design a prototype for the distributed database of an online store. The online store acts as an open market in which the users can sell or buy items. Each account can be a seller or a buyer, or both. The store provides the following features:

- Create a new account
- Login/Logout
- Edit cart (Add and remove items. Change the count of a bought item)
- Specify the price of the sold items
- Transfer the profit from every sale to the seller's credit card automatically
- Make discounts
- Deposit cash into the user's account to purchase items
- Search for items for sale
- Once a sale is made. The items are transferred from the seller's account to the buyer's account, and the selling price is transferred from the buyer's account to the seller's account (with a percentage deducted and transferred to the marketplace's account as profit for the marketplace).
- View and edit account information such as:
    - Name
    - Bank account information
    - Purchase history
    - Sale history
    - Items available for sale
- Generate reports such as user statistics

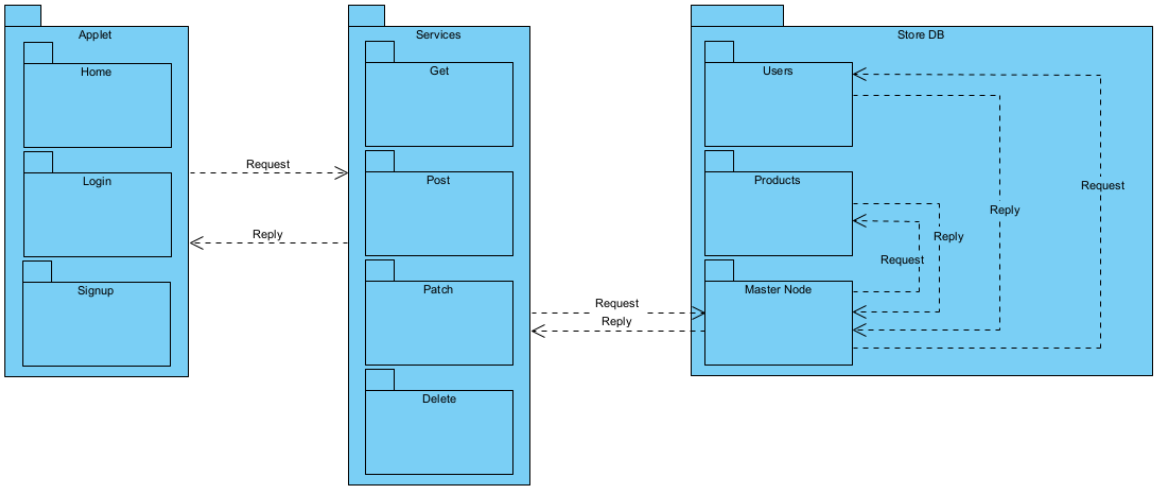
Target Beneficiaries of the Project

The store employs a flexible yet simple paradigm that allows sellers of different sizes (individuals, small shops, major corporations) to sell their products through the platform. By deducting a small amount from every sale made. The seller can focus on their product and its packaging, while the store envoys handle transferring the sold units from the seller to the buyer. The aim of this project is to create a market with an affordable price that allows start-ups with smaller capital to sell their products and compete with bigger companies. Also, it exposes the buyers to a broader and more versatile store from the comfort of their home.

Adopted Programming Language

The project uses Node.js and MongoDB for the backend of the database. For the front end, HTML, CSS, JavaScript and Bootstrap were used.

System Architecture



The system consists of the above main blocks: Applet, Services, Store DB.

Applet

The applet is the visible interface to the user. The user interacts with it through a GUI. It allows the user to login, sign up with a new account. When the user logs in, they can access the store home, which shows a list of the products available for sale, sorted by popularity. In the home screen the user can search for products, add products to cart, or go to their personal page to check out for view/edit their information, or manage their sold items.

Services

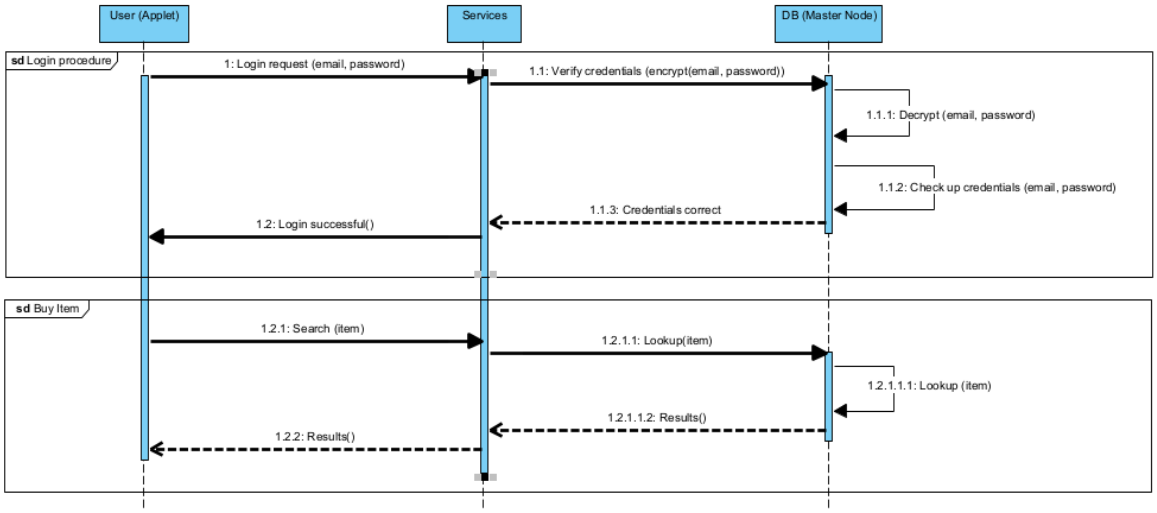
The services block has one job, and that is to translate the clicks the user makes in the GUI to valid requests to the store DB. The services block replies with success or failure alongside any requested information.

Store DB

The store DB does the actual processing of the requests. The master node is responsible for the requests handling. This node is designed as a layer of security layer against any malicious entry to the database. Also, it is a central node that organizes requests to avoid synchronization problems. The master node is the only in the system that has access to the users and items databases.

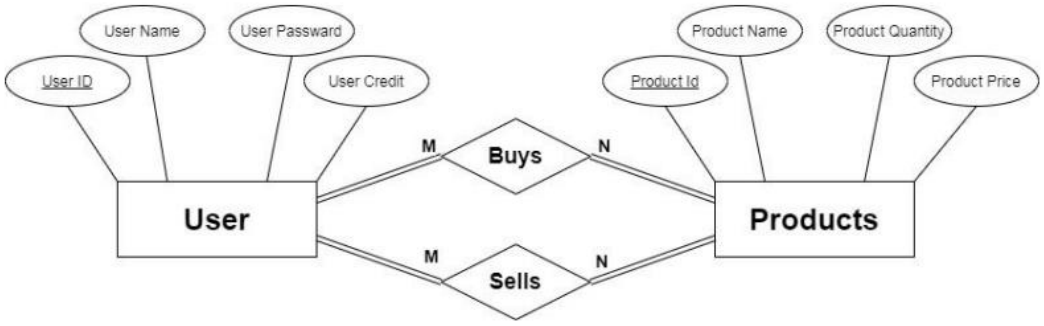
Application-Level Protocol

The ALP below shows a typical login and search procedure done by the user.

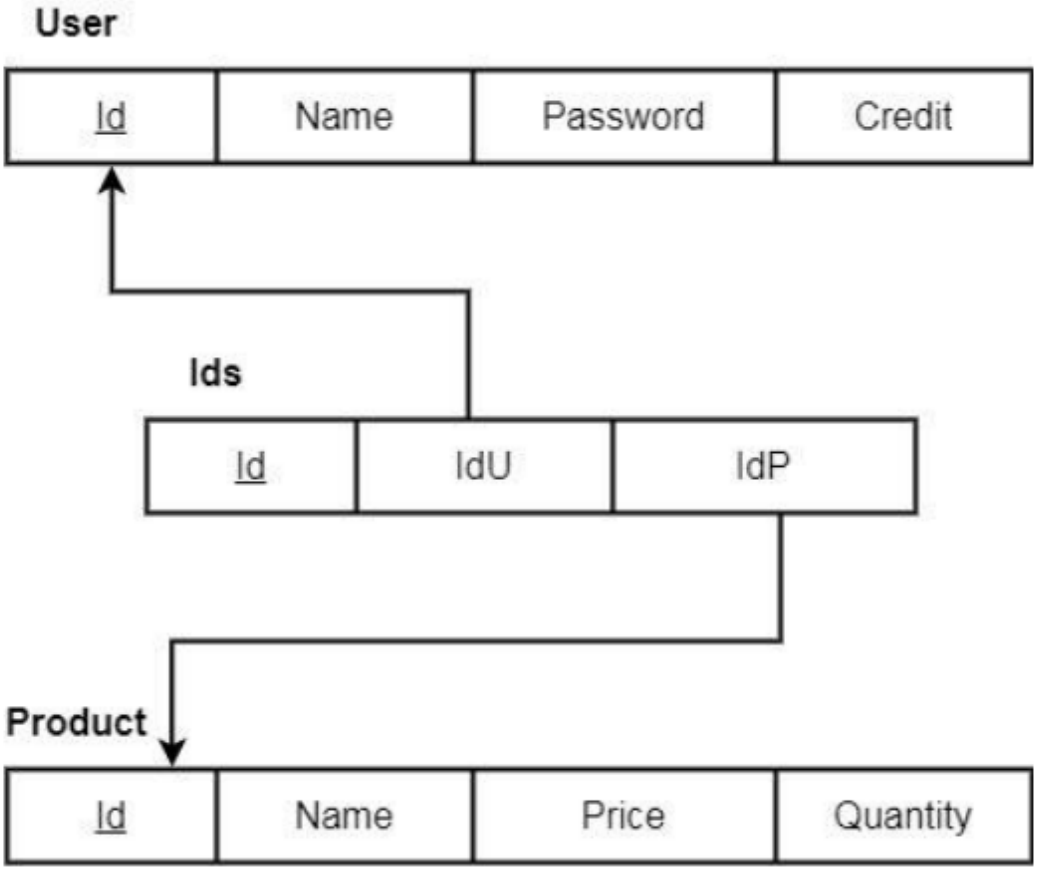


Distributed Database Design

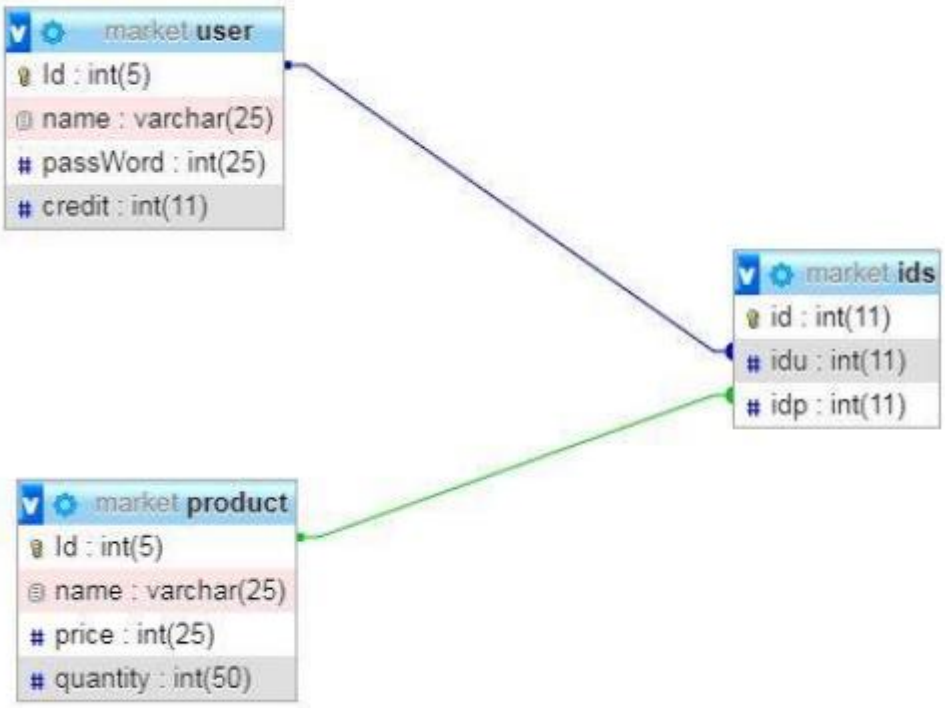
ER diagram



Relational data model



Schema

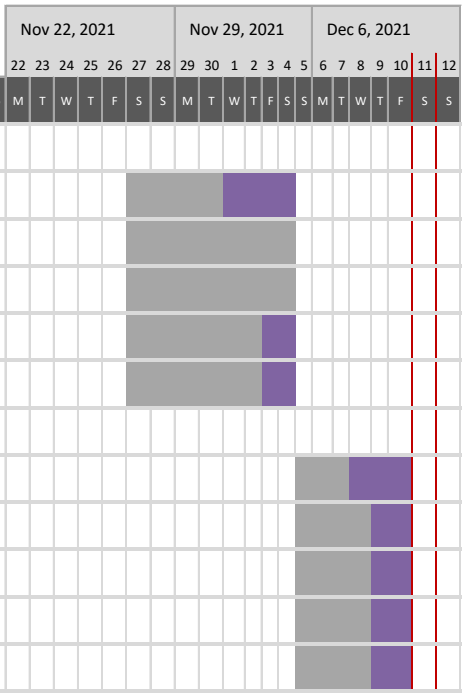

market user
Id : int(5)
name : varchar(25)
passWord : int(25)
credit : int(11)
market ids
id : int(11)
idu : int(11)
idp : int(11)
market product
Id : int(5)
name : varchar(25)
price : int(25)
quantity : int(50)

Time Plan

Project Start: 27/11/2021

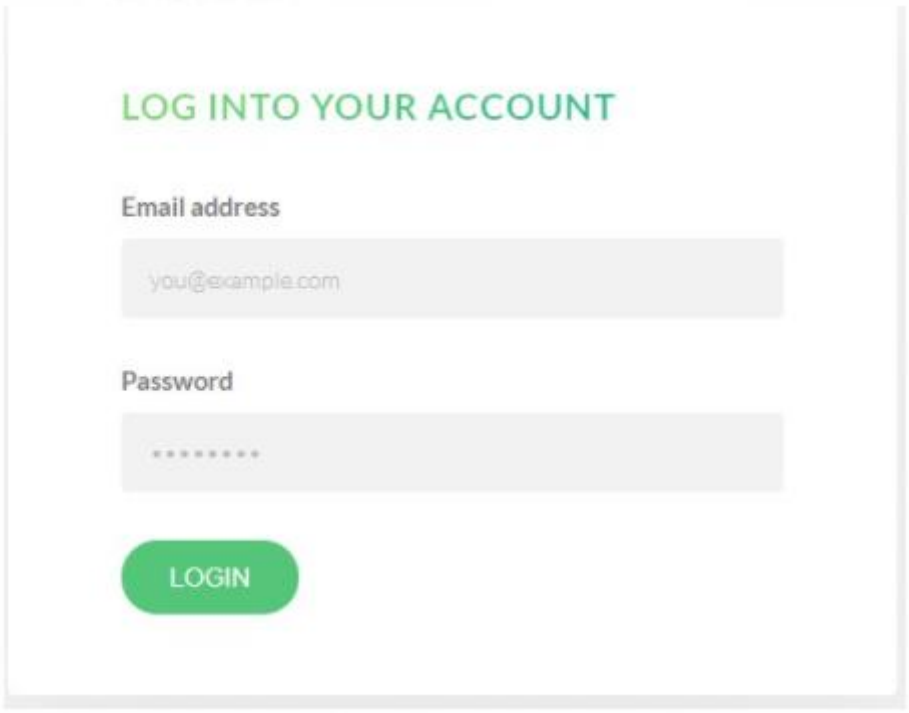
Display Week: 1

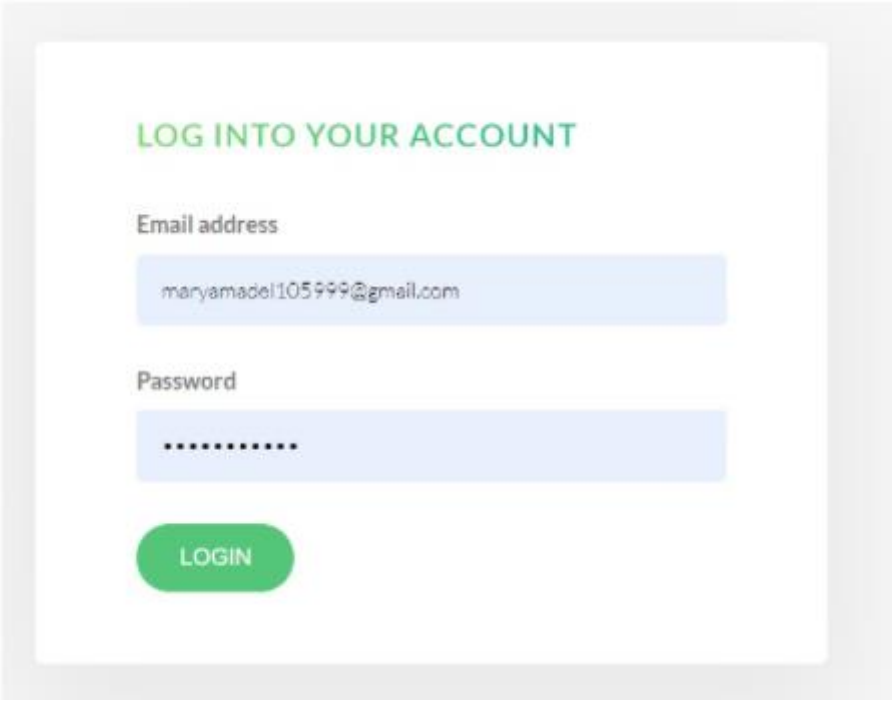
TASK	ASSIGNED TO	PROGRESS	START	END	DAYS
Learning Phase					
Frontend	Ahmed Genina	60%	27/11/2021	04/12/2021	8
Frontend	Asmaa Gamal	100%	27/11/2021	04/12/2021	8
Frontend	Marwa Fouad	100%	27/11/2021	04/12/2021	8
Backend	Maryam Adel	75%	27/11/2021	04/12/2021	8
Backend	Mohammad Rezk	75%	27/11/2021	04/12/2021	8
Development Phase					
UI Development	Ahmed Genina	50%	05/12/2021	10/12/2021	6
UI Development	Asmaa Gamal	80%	05/12/2021	10/12/2021	6
Backend-Frontend Integration	Marwa Fouad	80%	05/12/2021	10/12/2021	6
Database Design	Maryam Adel	75%	05/12/2021	10/12/2021	6
Database Distribution	Mohammad Rezk	75%	05/12/2021	10/12/2021	6

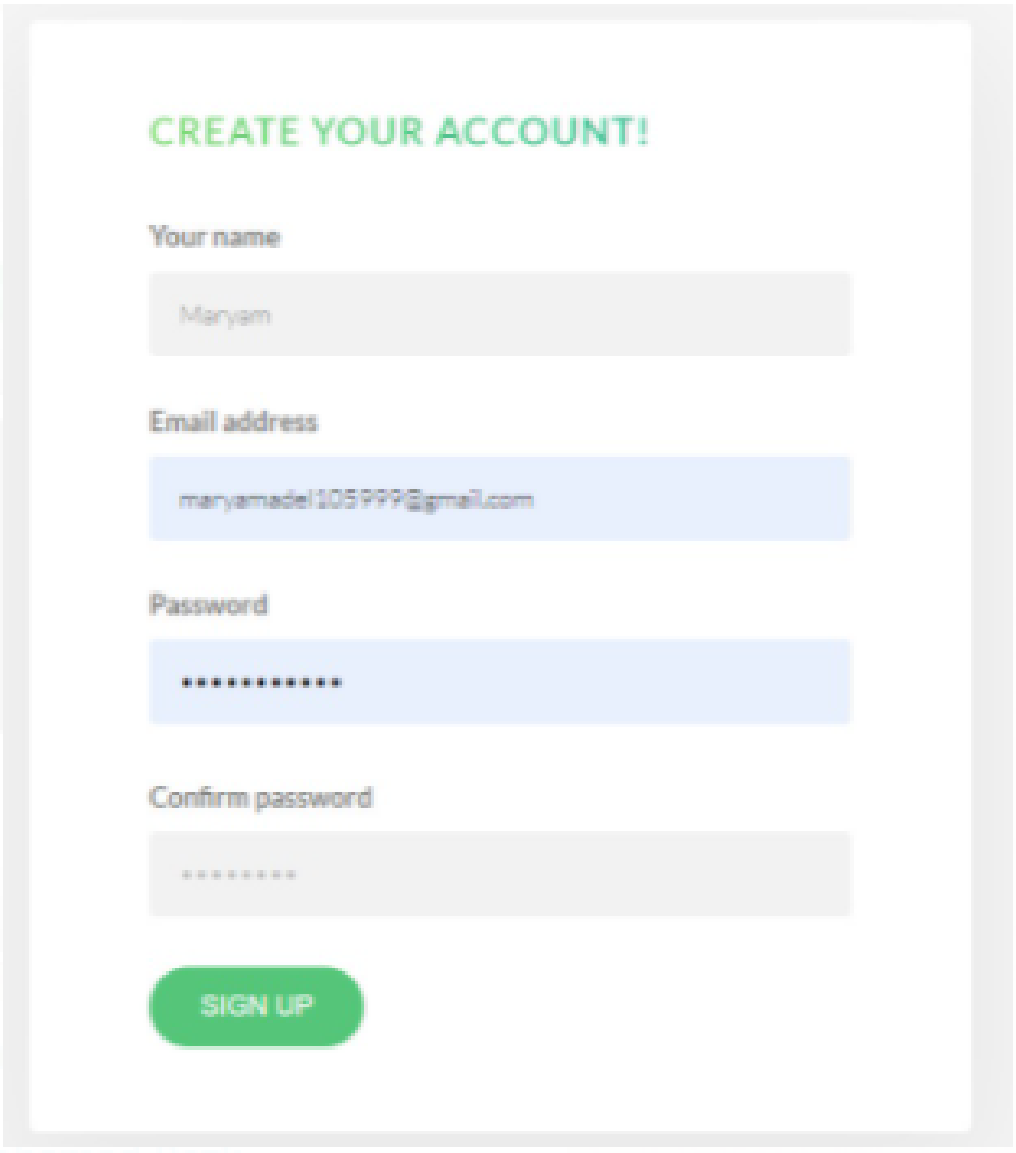


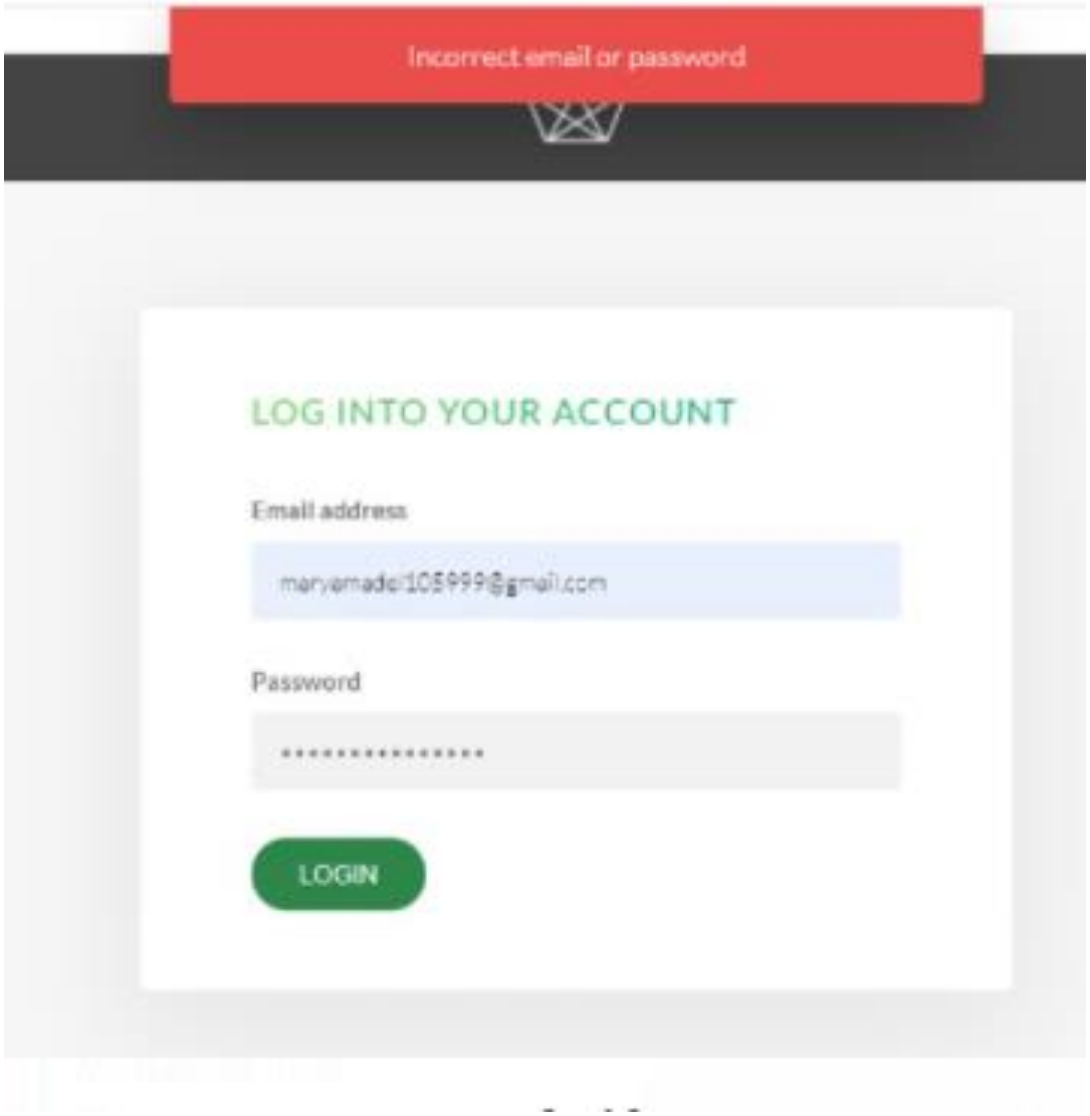
Testing

Login/account creation

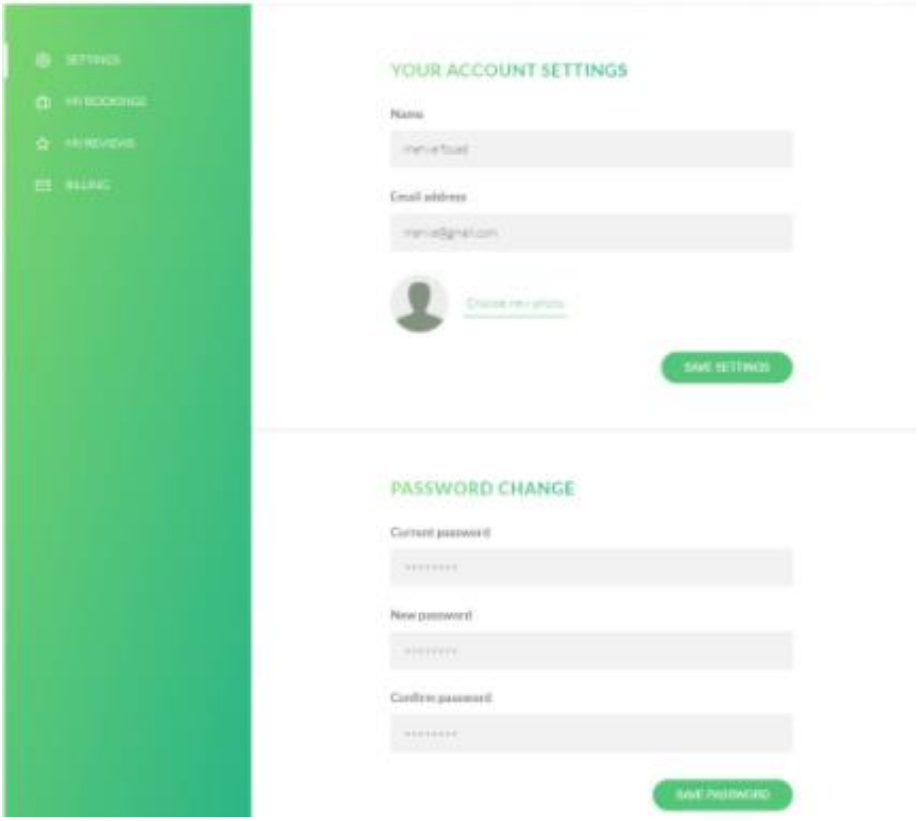





CREATE YOUR ACCOUNT!
Your name
Maryam
Email address
maryamadel105999@gmail.com
Password
Confirm password
SIGN UP


Incorrect email or password
LOG INTO YOUR ACCOUNT
Email address
maryamade105999@gmail.com
Password
LOGIN

Account info view/edit



Role of Each Member

Name	Code	Role
محمد فتحى محمد رزق	16X0103	Backend
احمد مصطفى مصطفى السيد جنينة	16E0030	Front
مريم عادل عبدالمحسن	1701402	Backend
اسماء جمال السيد عليوه	1400281	Front
مروه فؤاد حسين محمد	1701394	Front

Repository link

The repository can be found here

Appendix

Only one important point is clarified in this appendix. That is that the current delivery is by no means to be a final delivery is rather a prototype. A more elaborate documentation and implementation shall be included for this phase in the next delivery.

References

[1] George Coulouris, Jean Dollimore, Tim Kindberg, Gordon Blair: Distributed Systems: Concepts and Design, 5th Edition.