Project Final Report

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Team members: - Rumjhum Singru and Esha Acharya

Title - Organ Acquisition and Donation Management System

1. Readme:

Designed a database to efficiently organize data regarding organ transplantation network.
Created back-end APIs using FLASK framework.

Base requirements -
Python 3 and MySQL Workbench

Tech Stack - MySQL, Python, Flask, HTML, CSS

How to run this project:

Database steps:
Execute the following files as SQL scripts:

1. Create Tables - This file has table schemas, procedures, functions and triggers.
2. All files in templates - These insert data statement to be able to perform CRUD operations.
3. Or database dump provided.

Python steps:

1. Download the following dependencies using pip:
    1. pip install flask
    2. pip install mysql-connector and pip install mysql-connector-python
    3. pip install matplotlib
    4. pip install numpy
2. Open command prompt in the location where the "main.py" file resides.
3. Run this file py main.py
4. The project will be running on localhost:5000
5. Make sure to change the password in main.py to your MySQL password. (Total 4 places)
6. Log in using the following credentials username: admin and password: admin

2. Technical specifications:

Front end framework and tools:

HTML and CSS for styling.

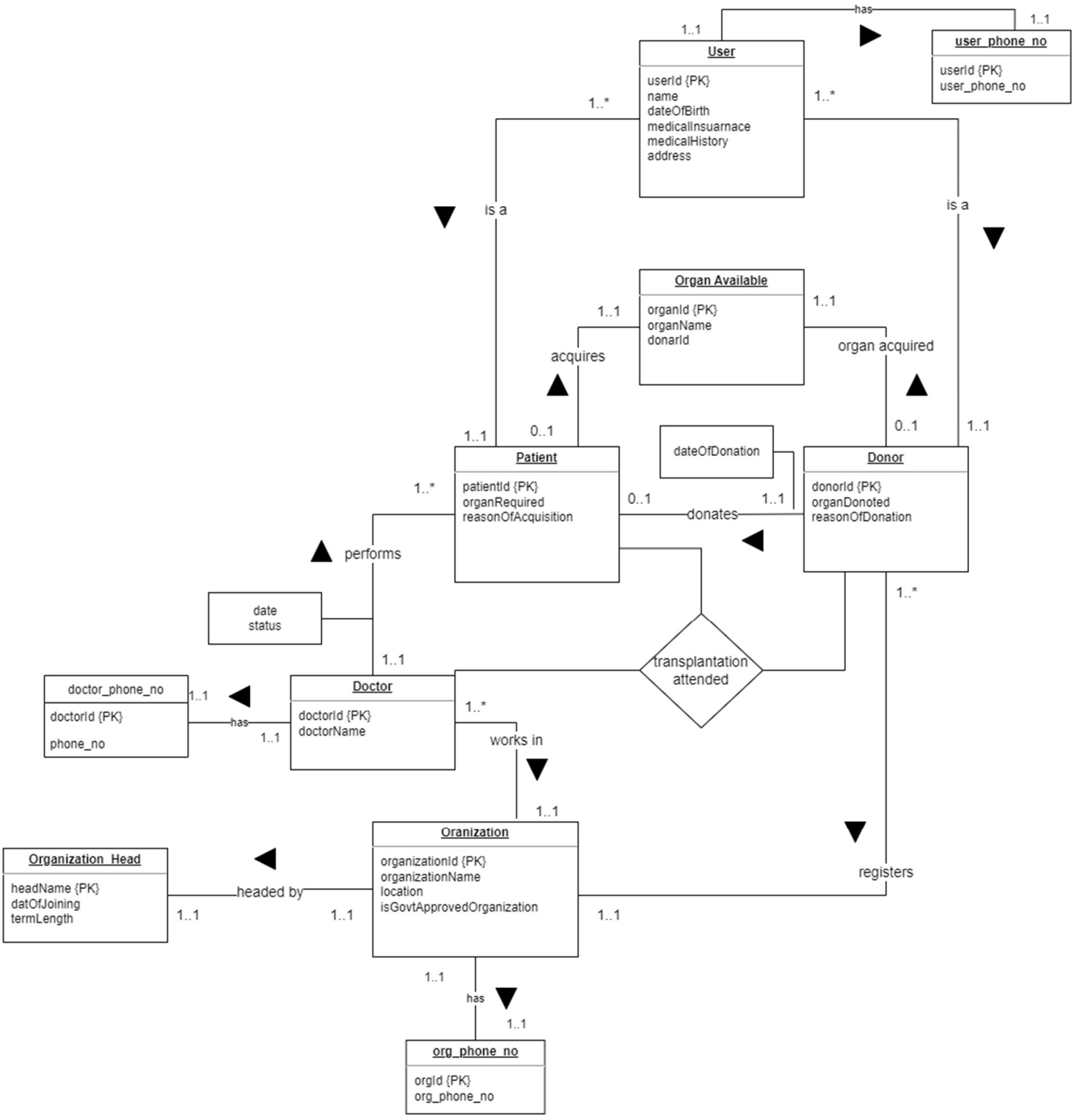
Backend framework and tools:

Python, Flask. Libraries: MySQL-Connector, NumPy, Matplotlib

Database:

MySQL

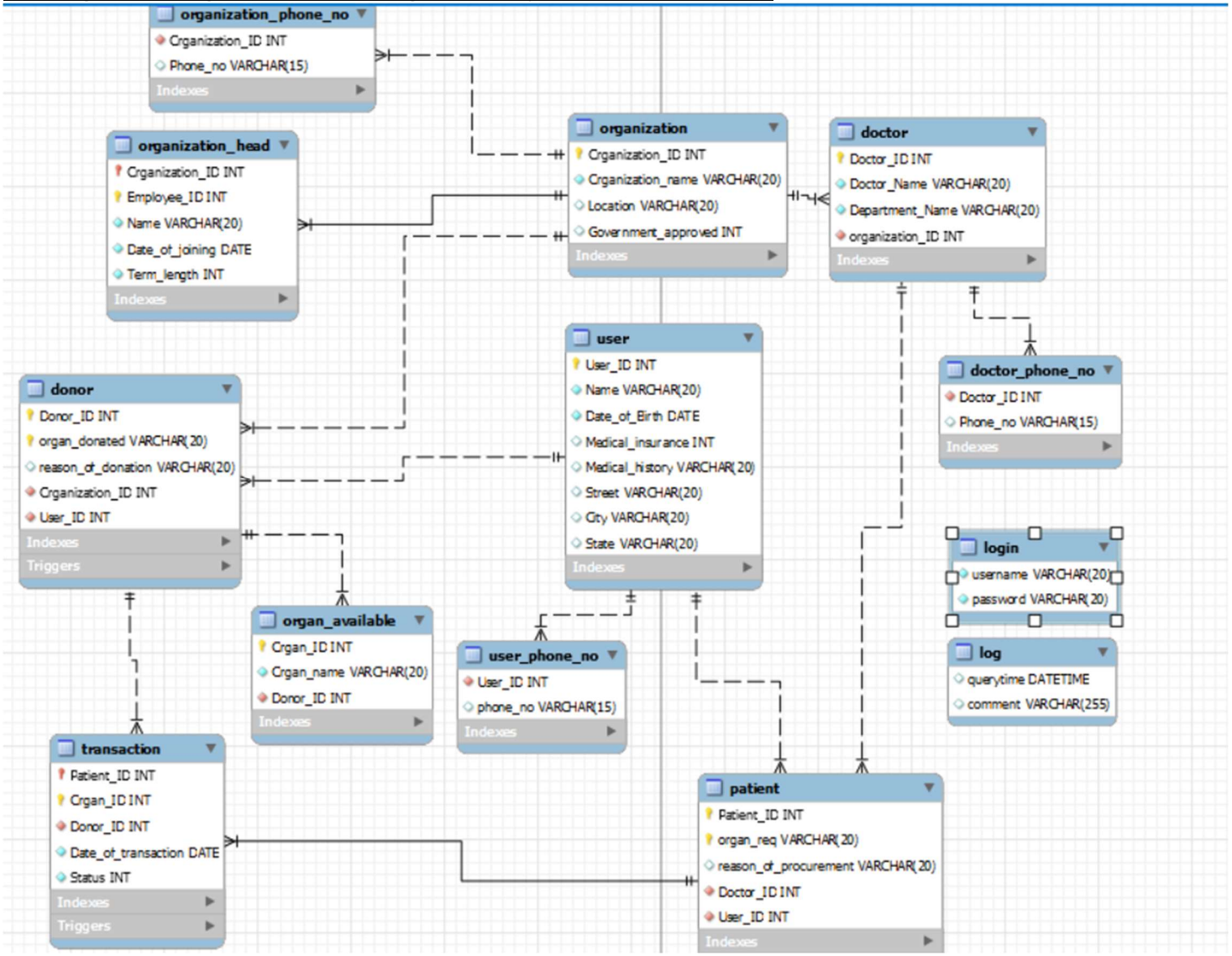
3. Conceptual design as a UML



Ternary Relationship -

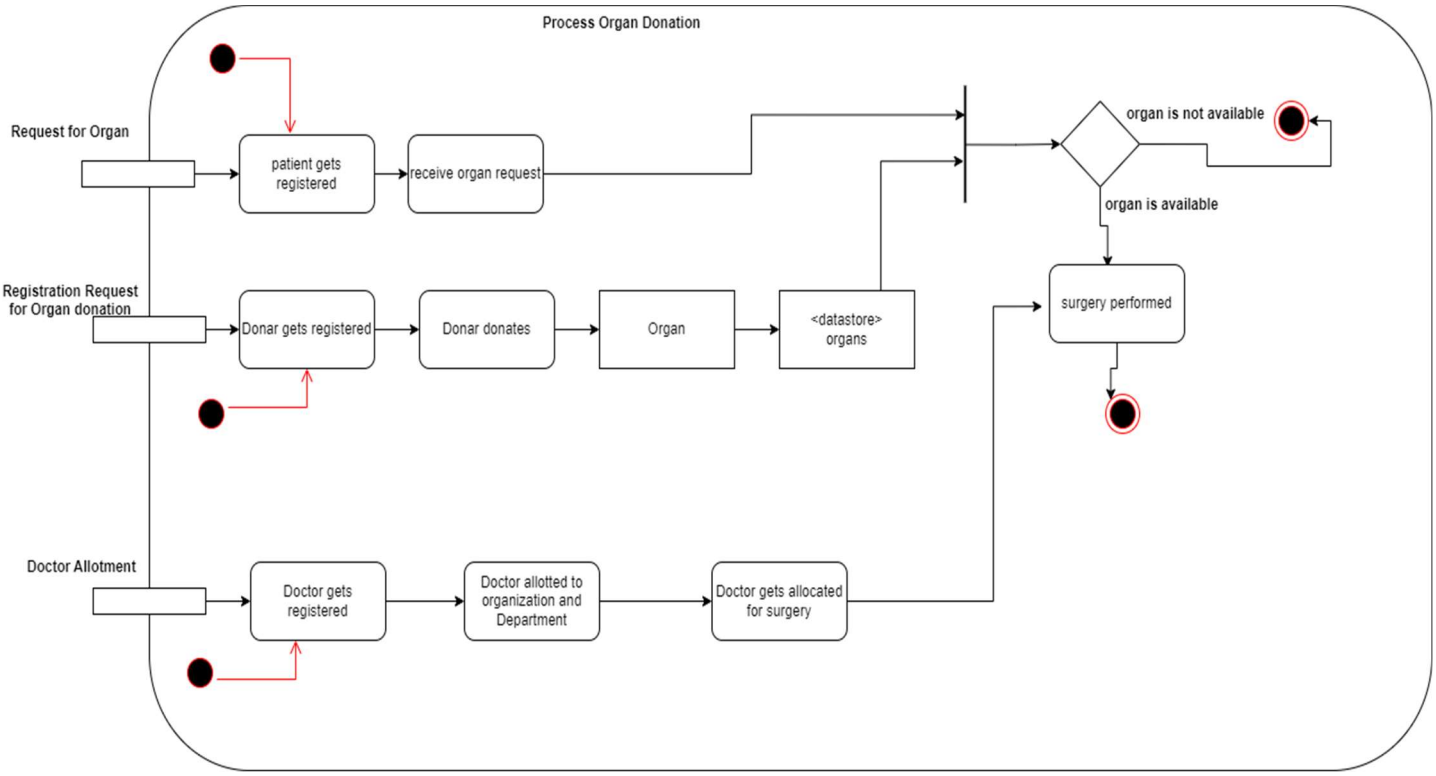
Transplantation Attended - The transplantation performed by the doctor - acquiring an organ from a donor and transplanting it to the patient by surgery.

4. Logical design (Reverse Engineer MySQL workbench)

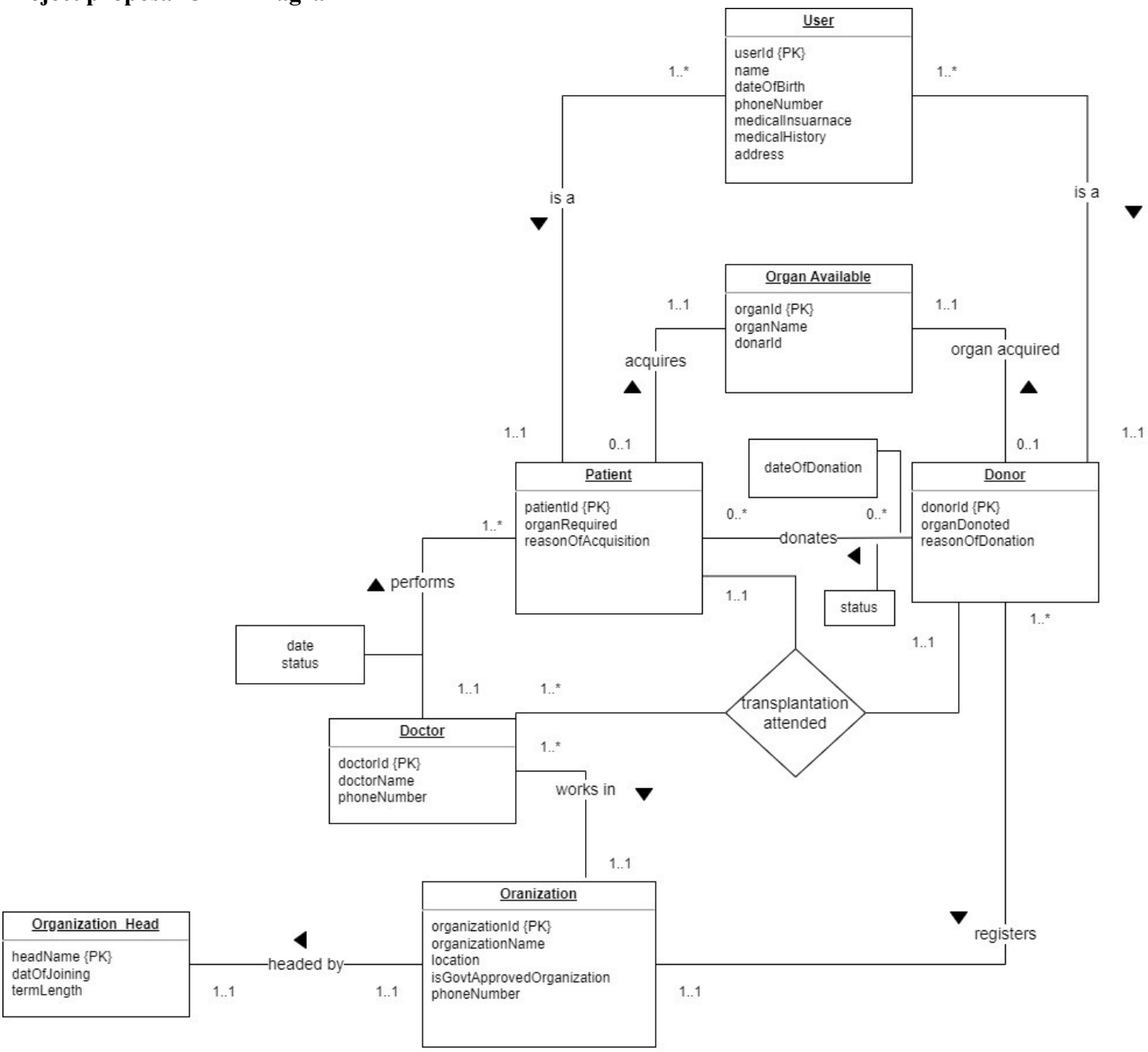


5. User flow of the system.

Updated Activity Diagram



Project proposal UML Diagram



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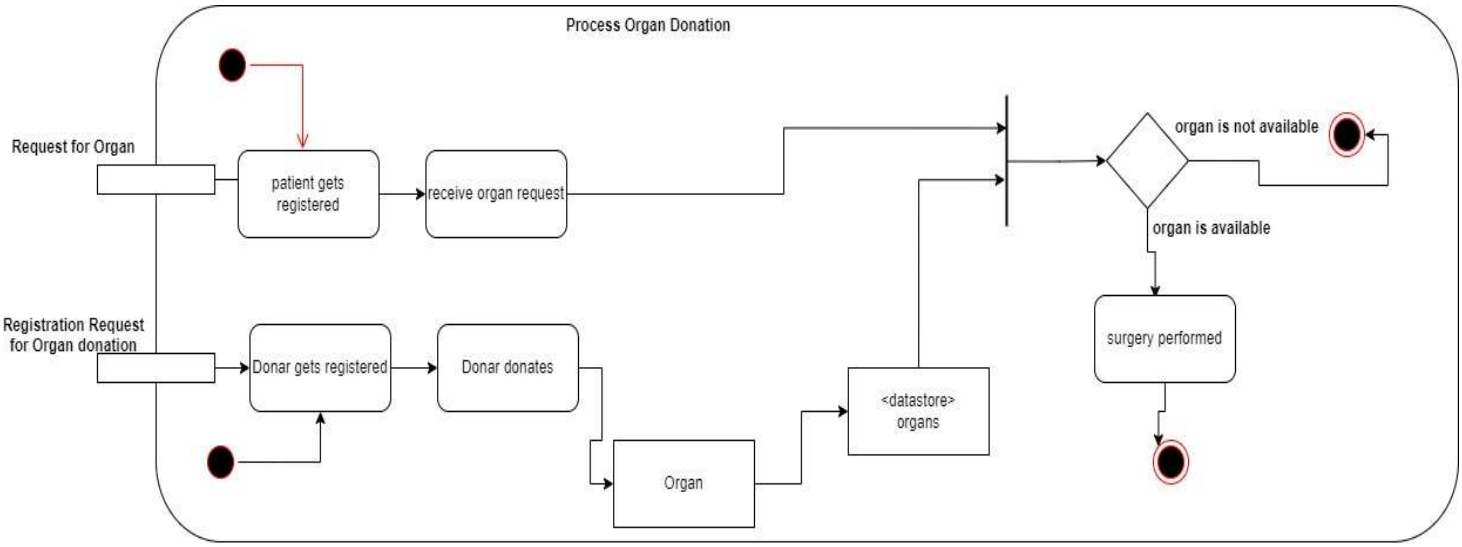


Commands/ Methods the user performs to interact with the system:

5.1 Login to the system

Users must enter a username and password to enter the system.

5.2 User details:

This functionality has two options.

i) View: The user needs to enter the user Id in order to view details of that user. The columns displayed in the view are name, DOB, medical insurance, medical history, street, city, state, phone numbers.

ii) Delete: The user needs to enter user Id to delete profile of that user.

5.3 Search:

This functionality lets the user search for any keyword from various entities in the system like User, Patient, Donor, Organ, Organization, Organization Head, Doctor, Transaction, Log.

5.4 Add

This functionality lets the user insert new information (rows) to the tables such as User, User Phone Number, Patient, Donor, Doctor, Doctor Phone Number, Organization, Organization Phone Number, Organization Head and Transaction.

5.5 Update

This functionality lets the user update the existing records in the tables - User, Doctor and Organization.

5.6 Remove

This functionality allows the user to delete the existing details from the tables by inputting the following values for the corresponding tables:

Input required to delete the row	TABLE
User Id	User
Patient Id, organ required by patient	Patient
Donor id, organ donated by patient	DONOR
Doctor Id	Doctor
Organization Id	Organization
Organization Id, Employee Id	Organization HEAD

5.7 Statistics and data visualization

This functionality represents two Pie charts and one bar graph.

The first pie chart displays the ratio of organs required by patients while the second chart portrays the proportion of organs donated.

The bar graph represents the success and failure rate of organ transplantation.

5.8 Procedures

This segment has 3 procedures.

1) Total organs that are available currently
2) Patient's personal details and doctor treating them.
3) Contact numbers of government approved organizations.

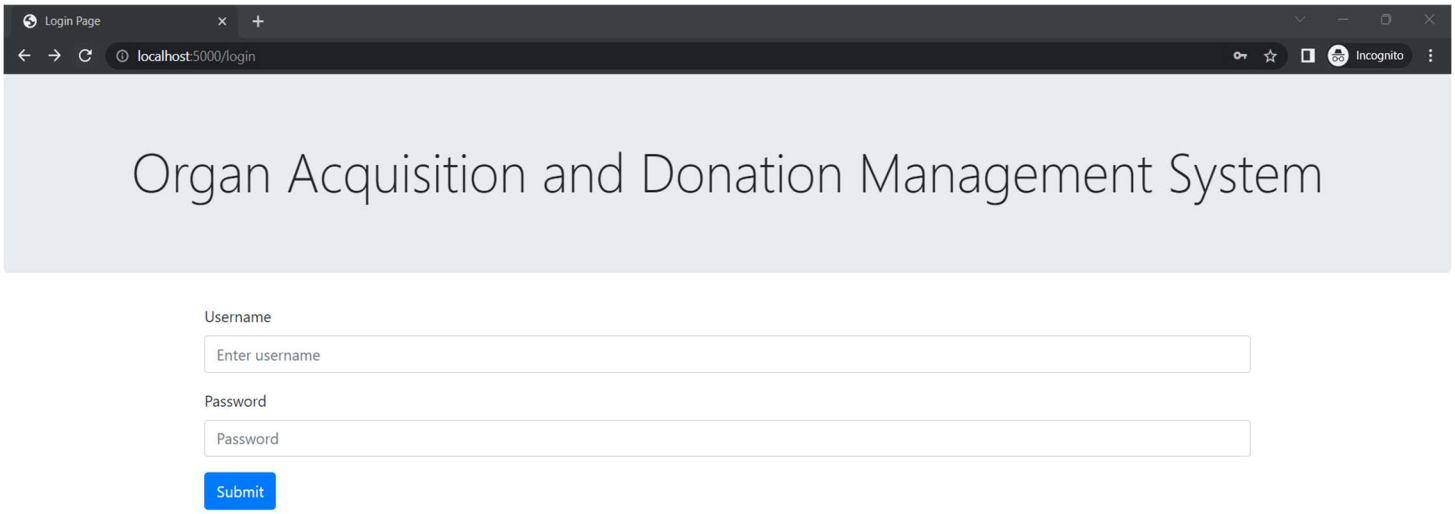
5.9 Functions

This section has 4 methods implemented as follows.

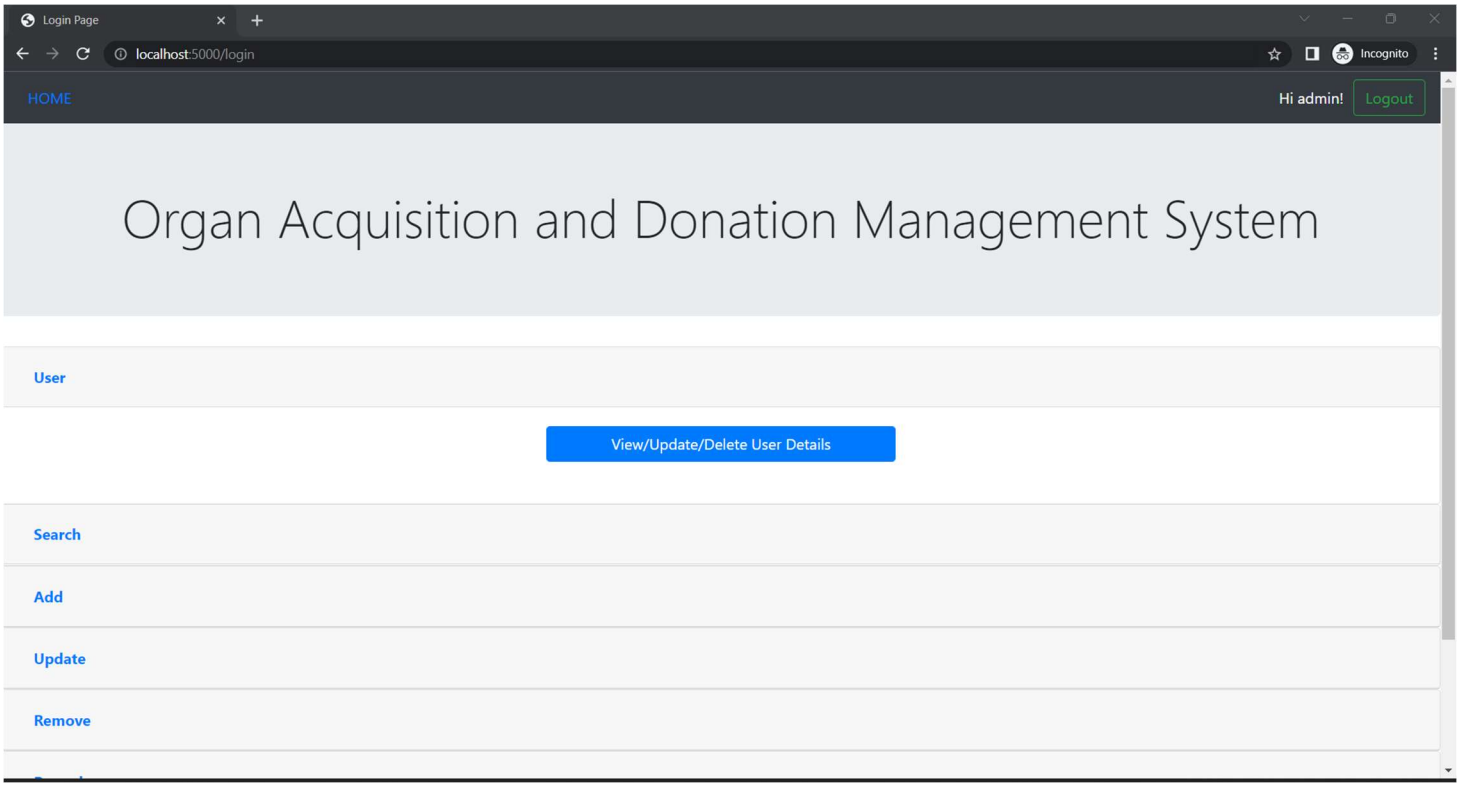
1) This function displays the output as the name of the doctor who performed most surgeries.
2) This function shows the organization name having most donors.
3) This method displays the organ name that is most required.
4) This method shows the most donated organ by the donors.

Screenshots:

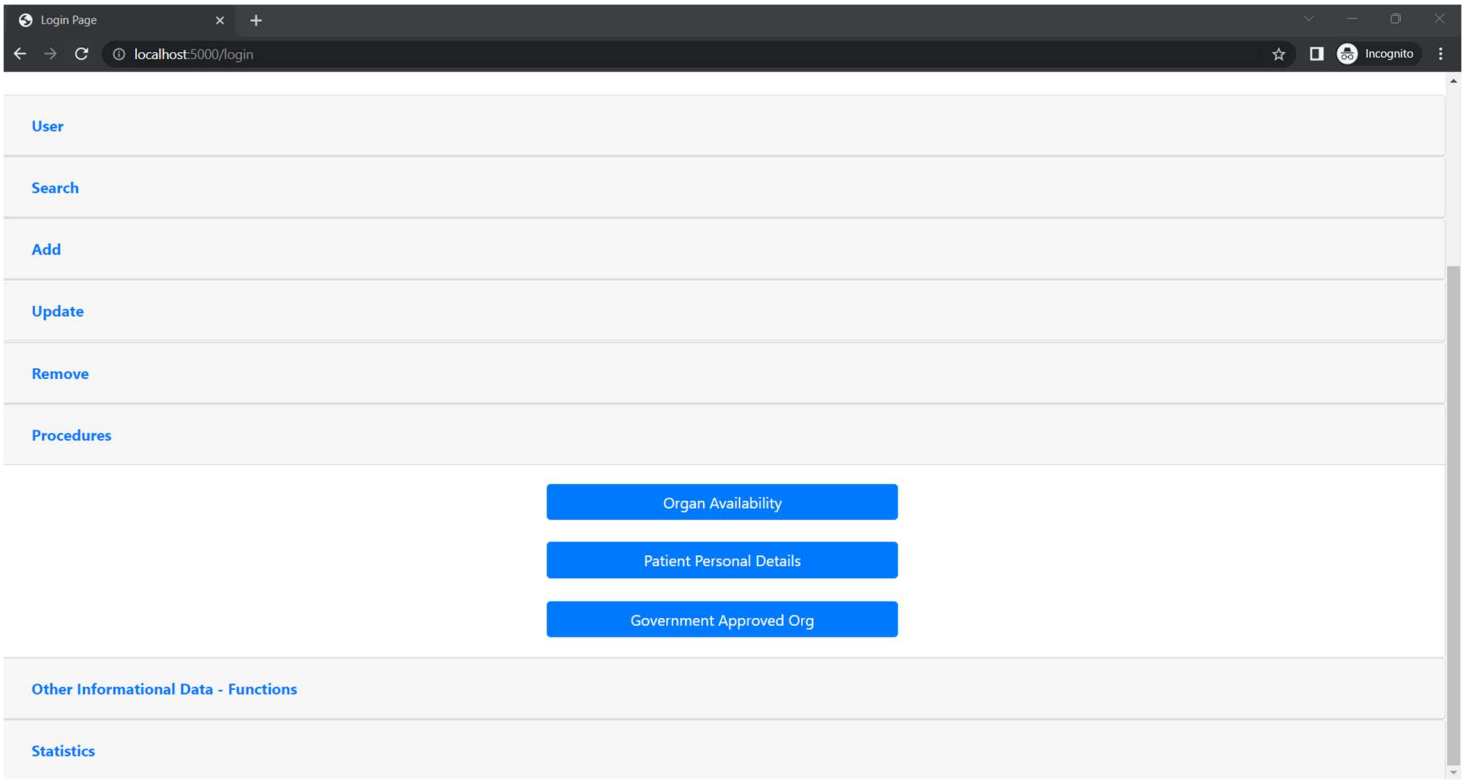
1) Login Page



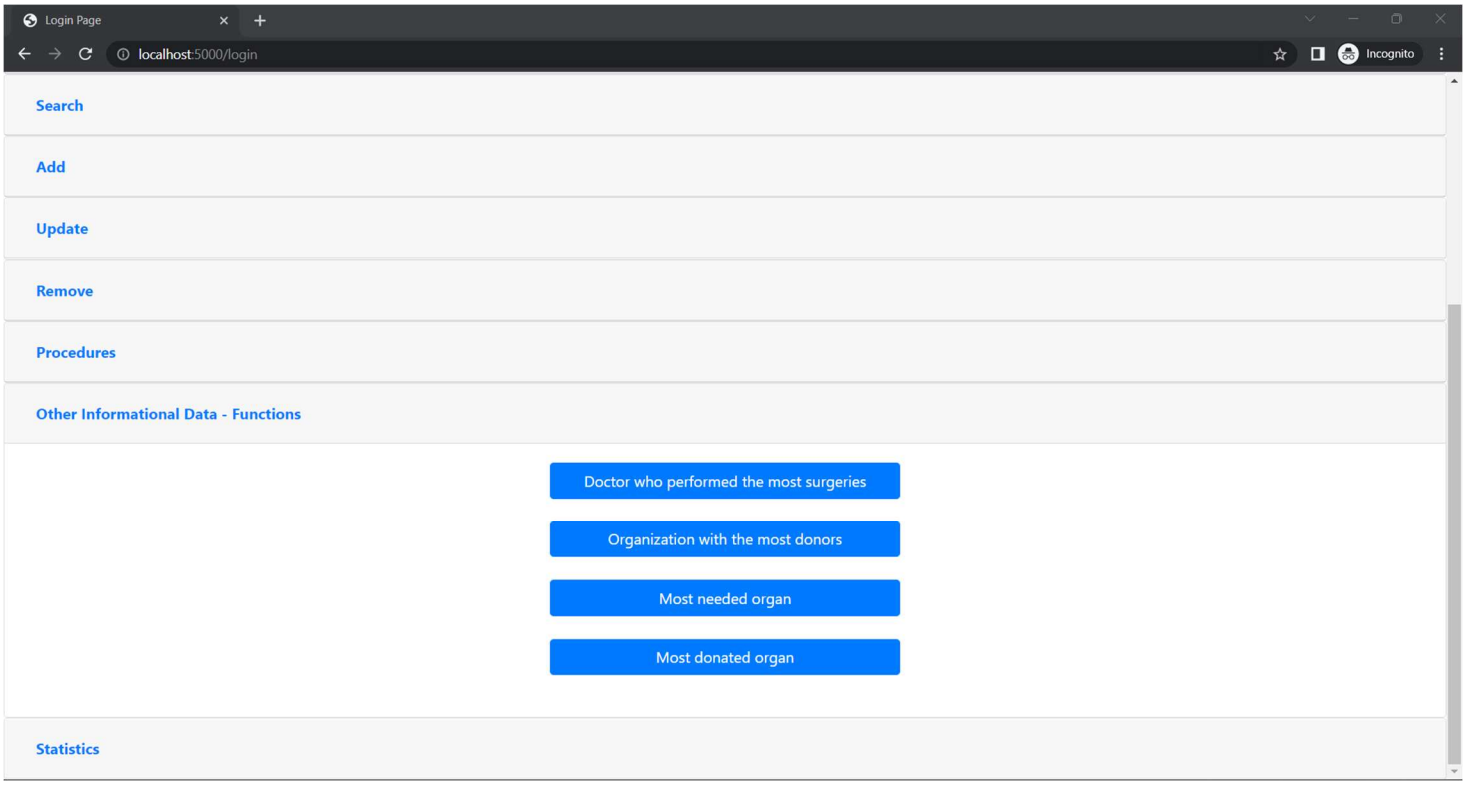
2) Home Page



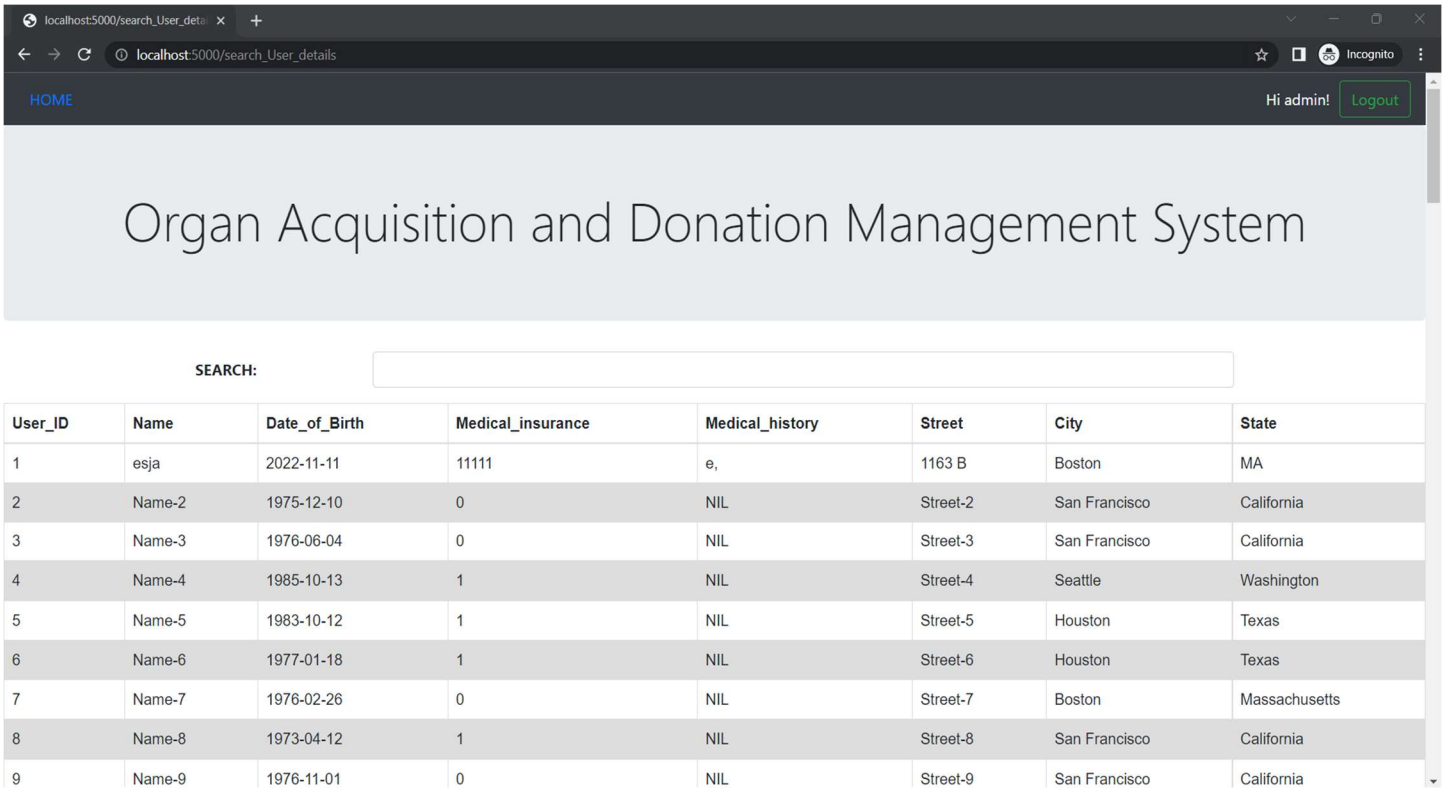
3) List Of Procedures



4) List Of Functions

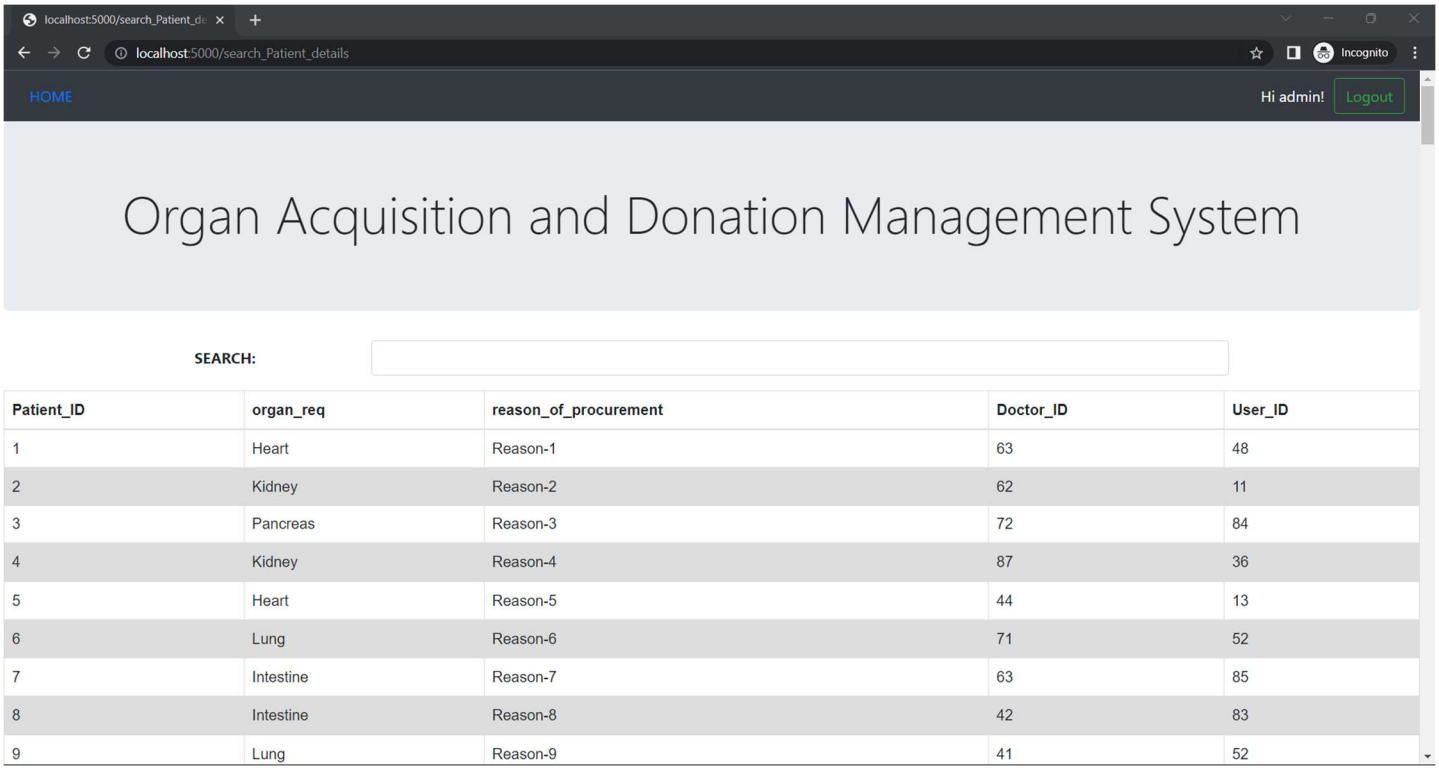


5) Search in User Table



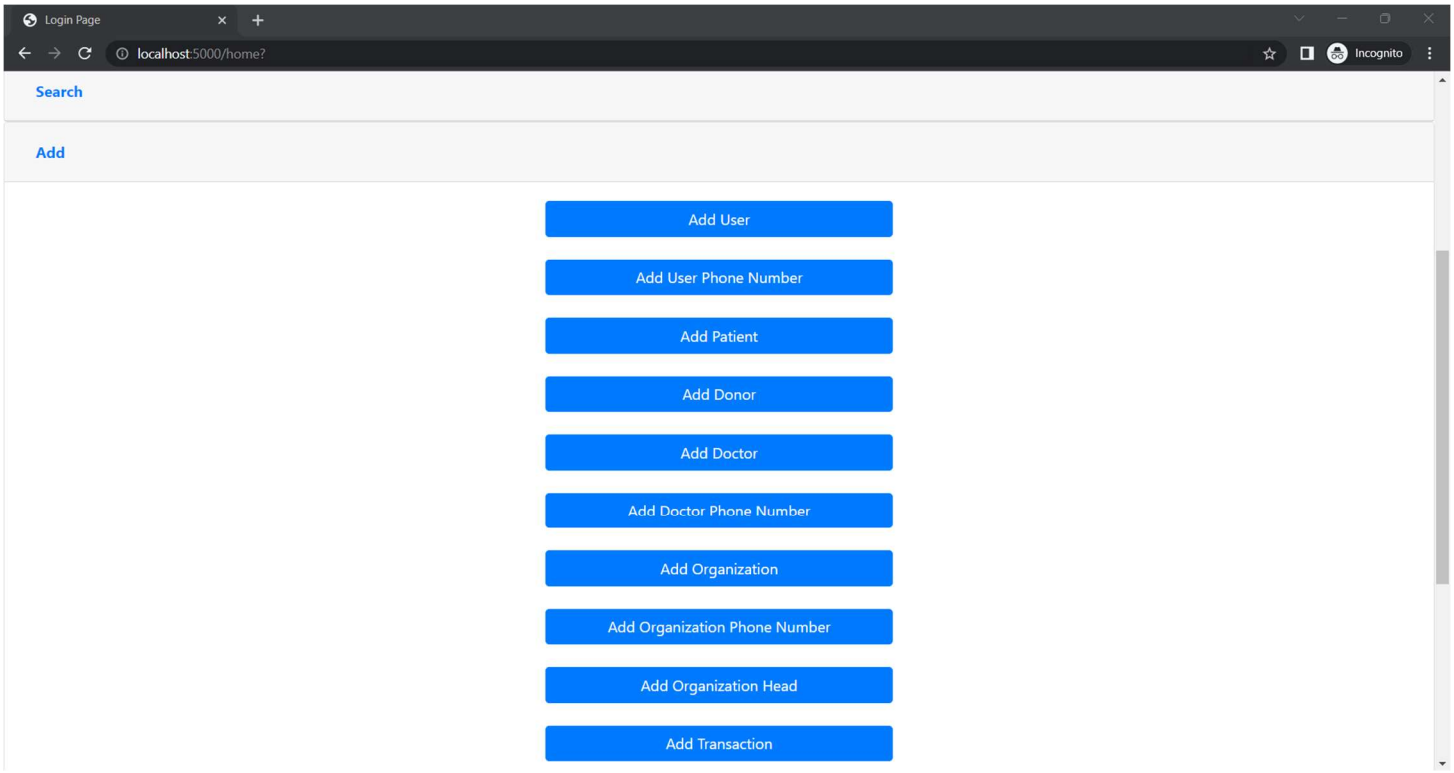
User_ID	Name	Date_of_Birth	Medical_insurance	Medical_history	Street	City	State
1	esja	2022-11-11	11111	e,	1163 B	Boston	MA
2	Name-2	1975-12-10	0	NIL	Street-2	San Francisco	California
3	Name-3	1976-06-04	0	NIL	Street-3	San Francisco	California
4	Name-4	1985-10-13	1	NIL	Street-4	Seattle	Washington
5	Name-5	1983-10-12	1	NIL	Street-5	Houston	Texas
6	Name-6	1977-01-18	1	NIL	Street-6	Houston	Texas
7	Name-7	1976-02-26	0	NIL	Street-7	Boston	Massachusetts
8	Name-8	1973-04-12	1	NIL	Street-8	San Francisco	California
9	Name-9	1976-11-01	0	NIL	Street-9	San Francisco	California

6) Search in Patient Table

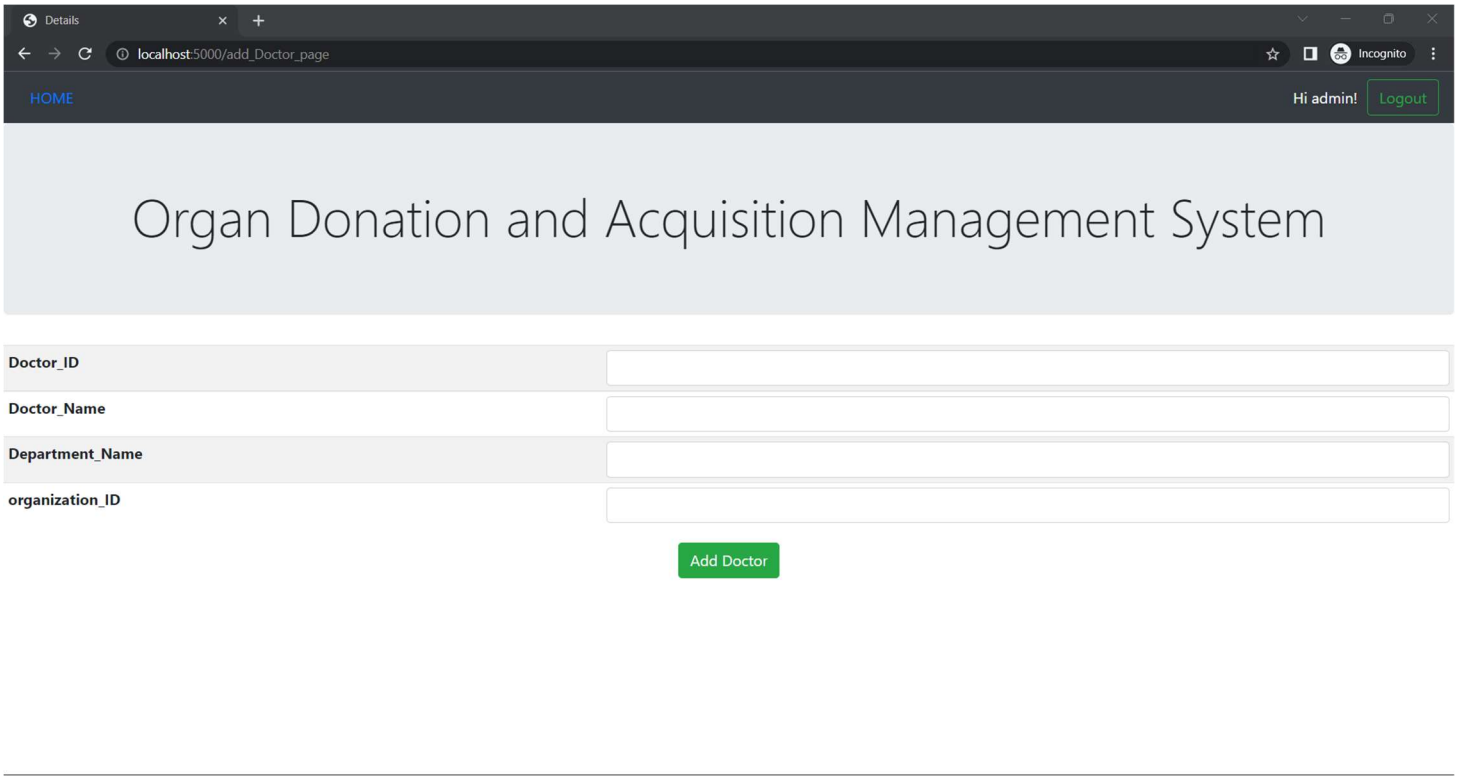


Patient_ID	organ_req	reason_of_procurement	Doctor_ID	User_ID
1	Heart	Reason-1	63	48
2	Kidney	Reason-2	62	11
3	Pancreas	Reason-3	72	84
4	Kidney	Reason-4	87	36
5	Heart	Reason-5	44	13
6	Lung	Reason-6	71	52
7	Intestine	Reason-7	63	85
8	Intestine	Reason-8	42	83
9	Lung	Reason-9	41	52

7) List of options in Add Section



8) Add/Insert into Doctor Table



6. Lessons Learned

a. Technical expertise gained

- MySQL – CRUD Operations, Functional Dependencies, Triggers, Transactions, Conceptual Design.
- HTML, CSS, Bootstrap used for building the frontend.
- Python, Flask Framework
- Got acquainted with libraries such as matplotlib, NumPy, MySQL connector, hashlib, serve

b. Insights:

- Time Management Insights:

This application allows donors and patients to get registered and the system matches the requirement of the patient as per the organ availability thereby saving the waiting time leading to better healthcare assistance for the patients.

- Data Domain Insights:

In the process of donation, the data domains include:

1. Donor which is a user
2. Patient which is a user
3. Doctor
4. Organization
5. Transaction
6. Organ
7. Organ Availability

Organization has sub-domain

1. Department
2. Organization head

The database is in the third normal form. The user contains user_phone number and similarly, organization contains organization_phone_no.

c. Realized or contemplated alternative design / approaches to the project

An alternative approach was to use MongoDB instead of MySQL. However, considering this system to be a small-scale project, it has been implemented with MySQL as the backend.

d. Document any code not working in this section

No code has been added that is not working. All CRUD operations run smoothly, and errors are handled successfully if the user tries to input data with erroneous data.

7. Future Work:

a. Planned uses of the database

- Add more Data Visualization options – graphs, scatter plots, pie-charts etc.
- Planning to add Data Visualization options dynamically. Based on the insertion and deletion of data from the database, the system must generate the pictorial representation dynamically based on the data provided.
- Accommodate more transactions and procedures.
- Using data scored in our database, we can suggest suitable donor and patient pair using various biological and geographical factors.

b. Potential areas for added functionality

• Provide more query options

• Improve GUI