

# **Project Final Report**

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**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.

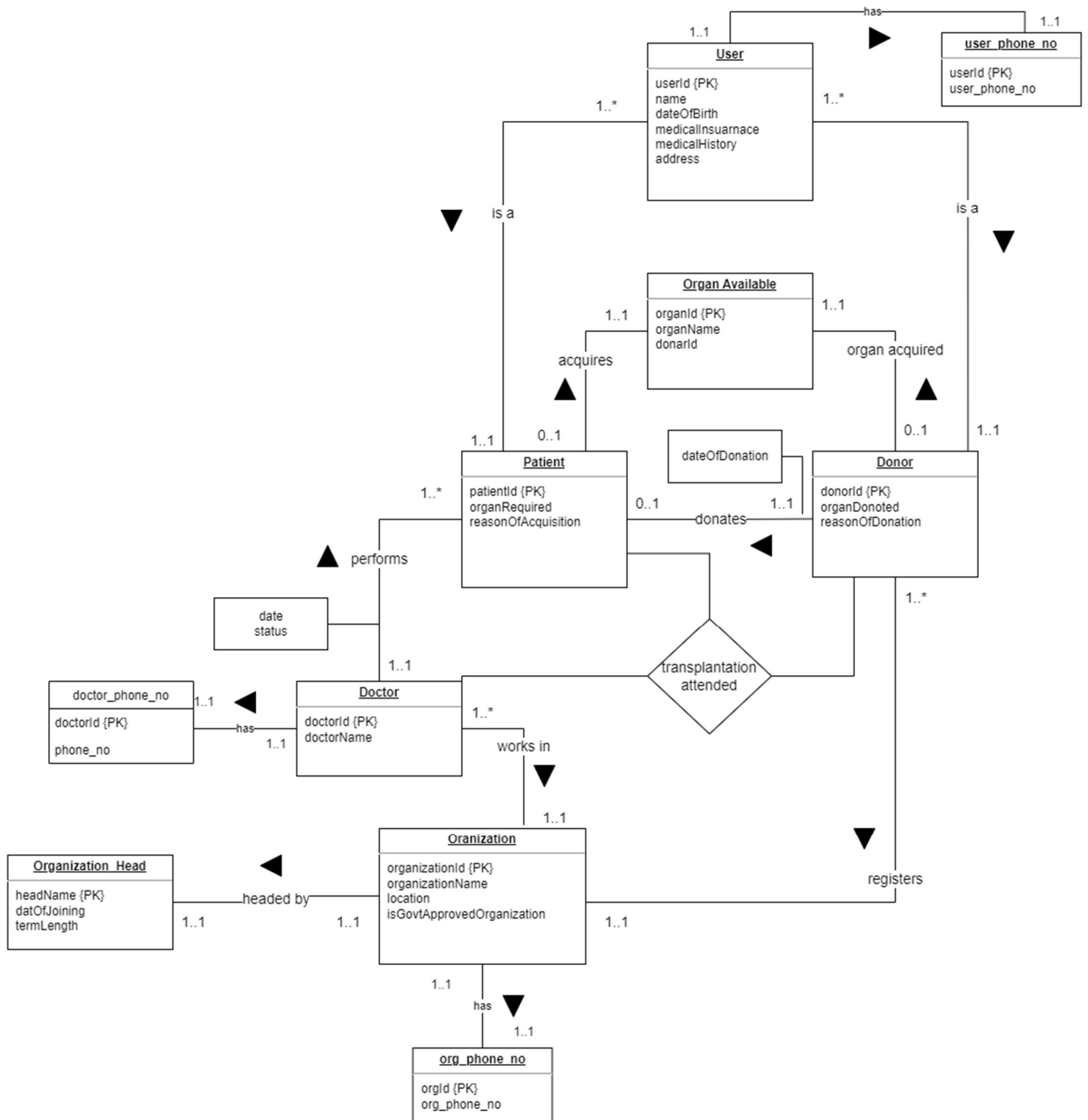
### ***Backend framework and tools:***

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

### ***Database:***

MySQL

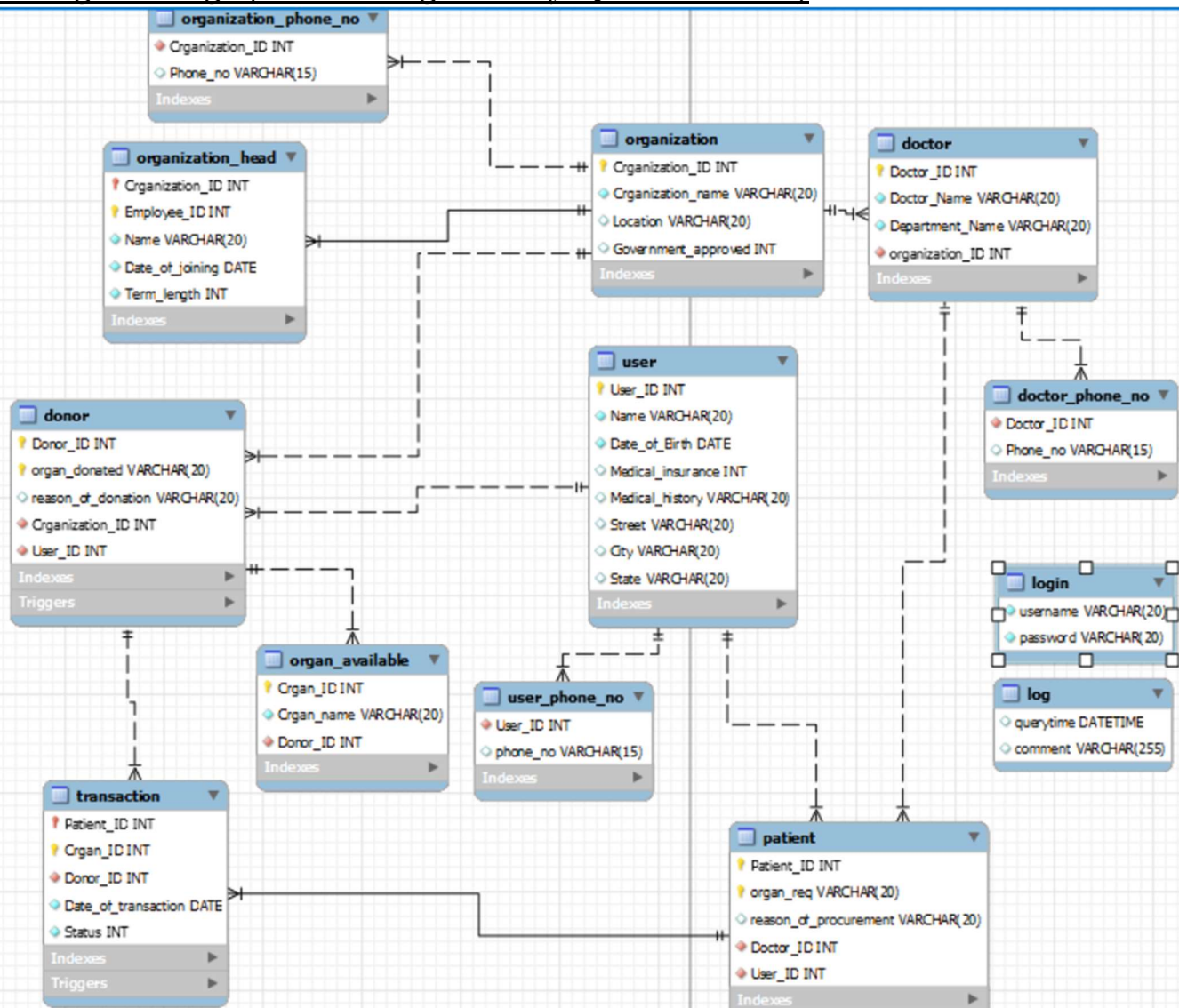
### 3. Conceptual design as a UML



Ternary Relationship -

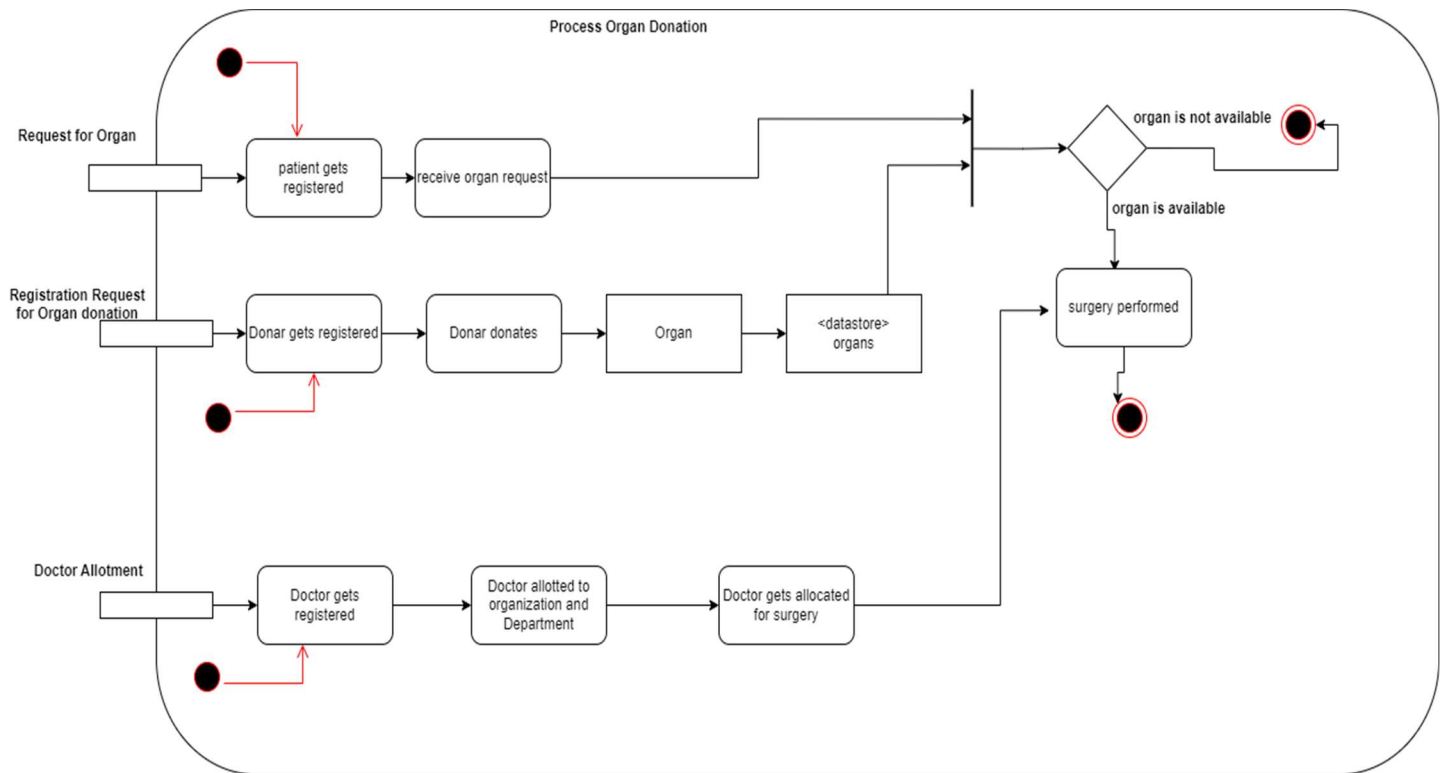
Transplantation Attended - The transplantation performed by the doctor - acquiring an organ from a donor and transplanting it to the patient by surgery.

#### 4. Logical design (Reverse Engineer MySQL workbench)

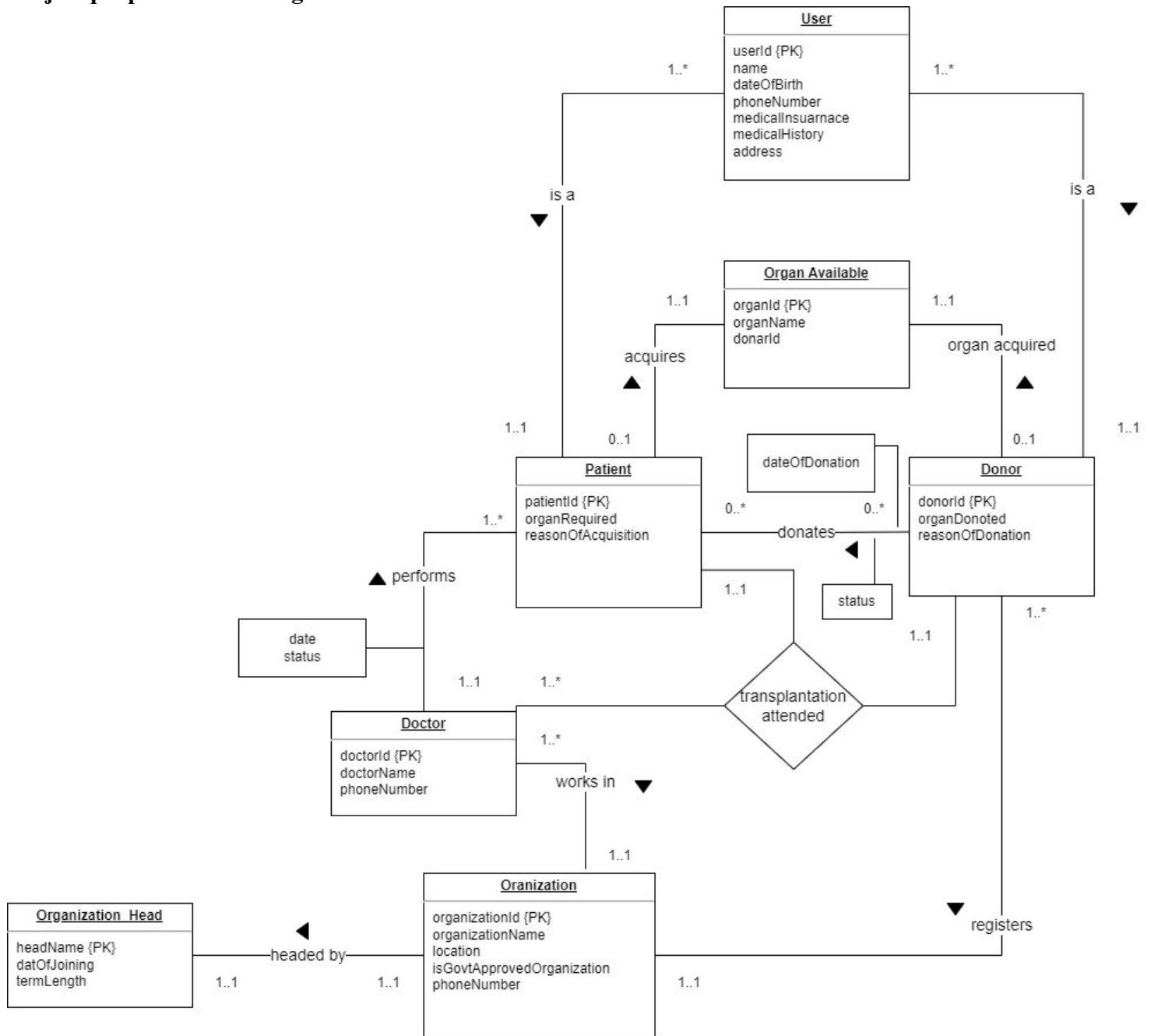


## 5. User flow of the system.

### Updated Activity Diagram



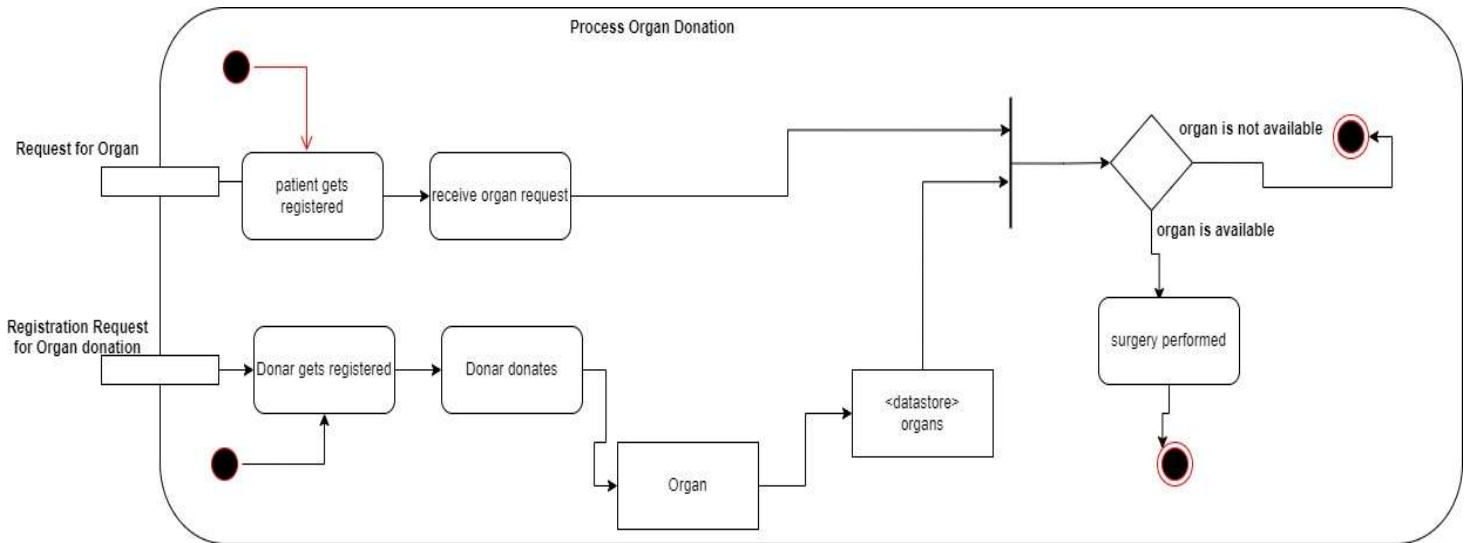
## Project proposal UML Diagram



Ternary Relationship-

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

## Project proposal Activity Diagram



### 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

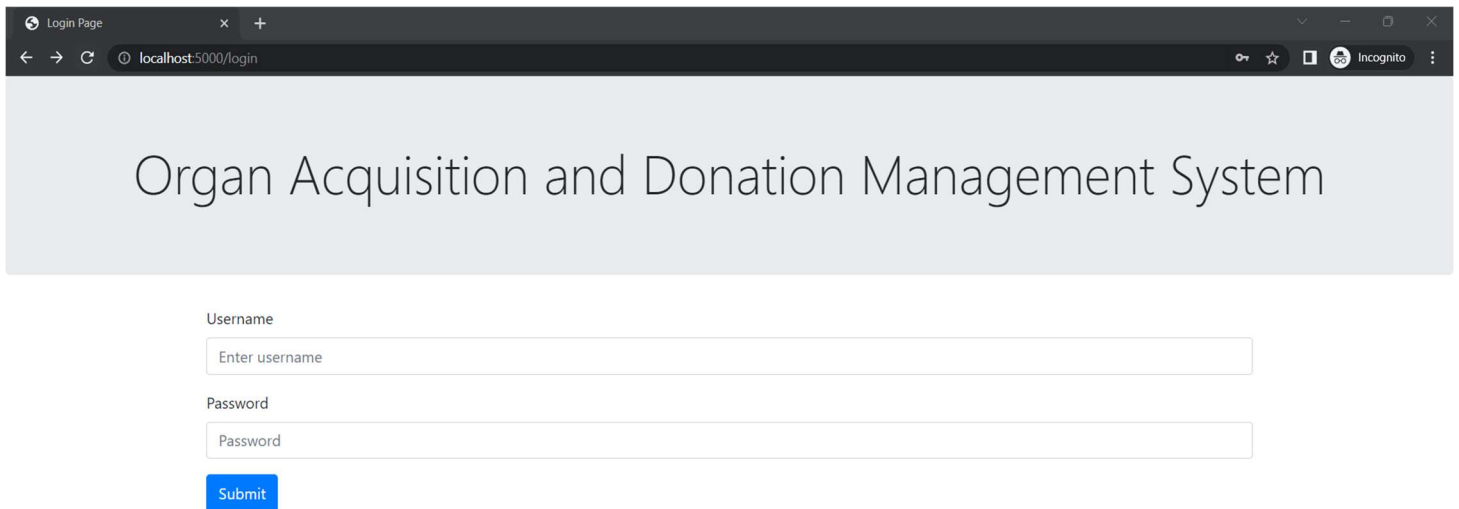
This section has 4 methods implemented as follows.

- 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



A screenshot of a web browser showing the login page of the 'Organ Acquisition and Donation Management System'. The browser's address bar shows 'localhost:5000/login'. The page has a light blue header with the system name. Below the header, there are two input fields: 'Username' with a placeholder 'Enter username' and 'Password' with a placeholder 'Password'. A blue 'Submit' button is located below the password field.

Username

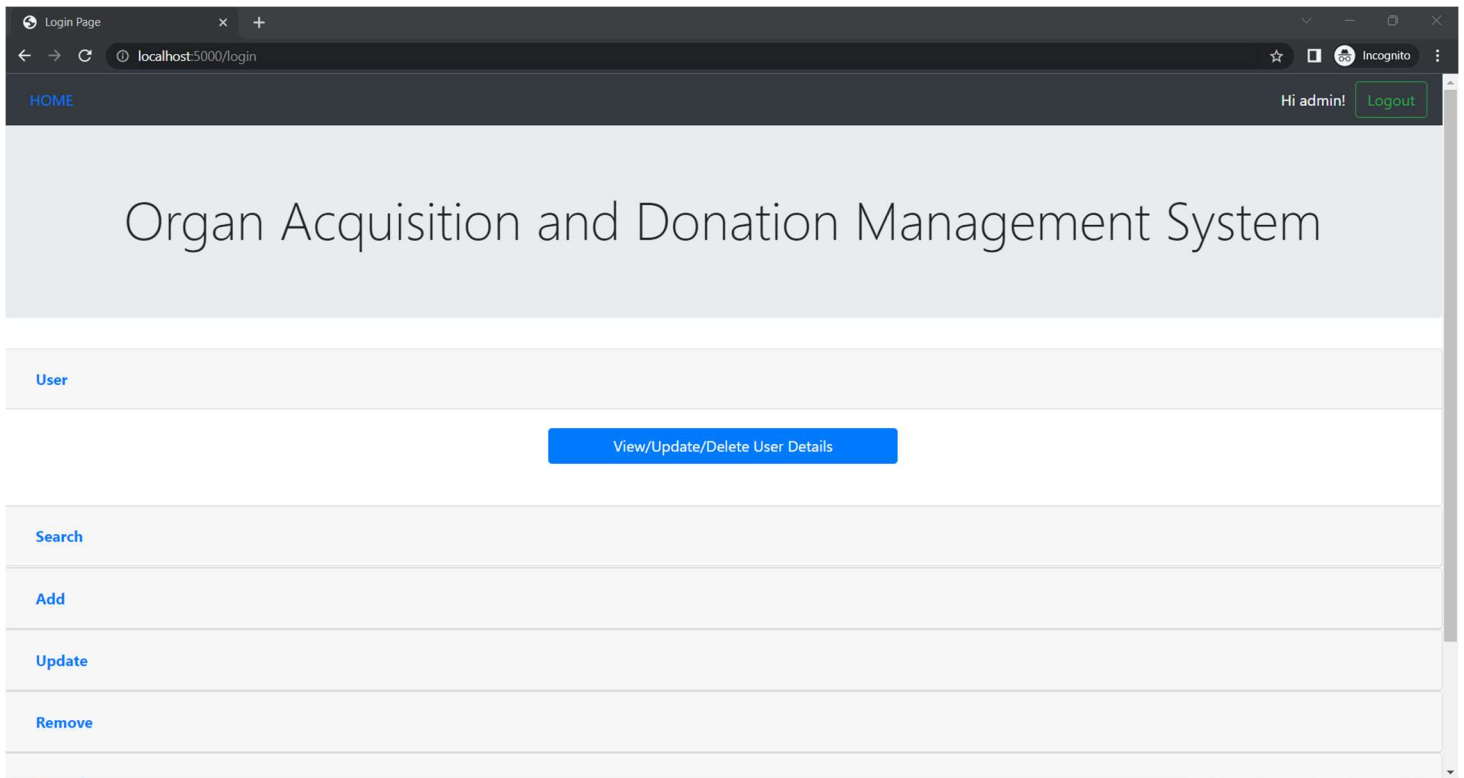
Enter username

Password

Password

Submit

### 2) Home Page



A screenshot of the home page of the 'Organ Acquisition and Donation Management System'. The browser's address bar shows 'localhost:5000/login'. The page has a dark blue header with 'HOME' on the left and 'Hi admin! Logout' on the right. Below the header, there is a large light blue section with the system name. Underneath, there is a 'User' section with a blue button labeled 'View/Update/Delete User Details'. Below this, there are four sections: 'Search', 'Add', 'Update', and 'Remove', each with a blue button.

HOME

Hi admin! Logout

Organ Acquisition and Donation Management System

User

View/Update/Delete User Details

Search

Add

Update

Remove

### 3) List Of Procedures

Login Page

localhost:5000/login

Incognito

User

Search

Add

Update

Remove

Procedures

Organ Availability

Patient Personal Details

Government Approved Org

Other Informational Data - Functions

Statistics

### 4) List Of Functions

Login Page

localhost:5000/login

Incognito

Search

Add

Update

Remove

Procedures

Other Informational Data - Functions

Doctor who performed the most surgeries

Organization with the most donors

Most needed organ

Most donated organ

Statistics

## 5) Search in User Table

localhost5000/search\_User\_details

HOME Hi admin! Logout

# Organ Acquisition and Donation Management System

SEARCH:

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

localhost5000/search\_Patient\_details

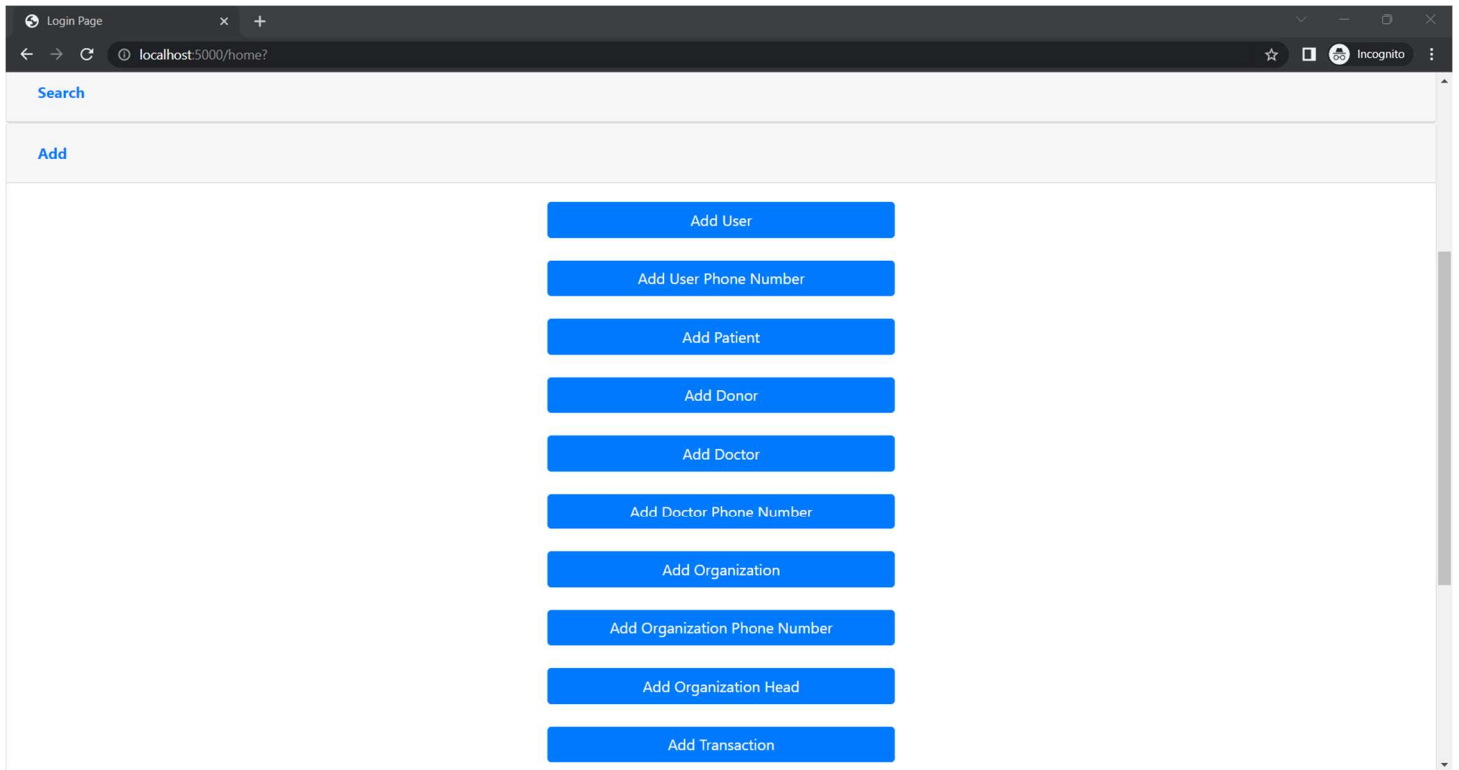
HOME Hi admin! Logout

# Organ Acquisition and Donation Management System

SEARCH:

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

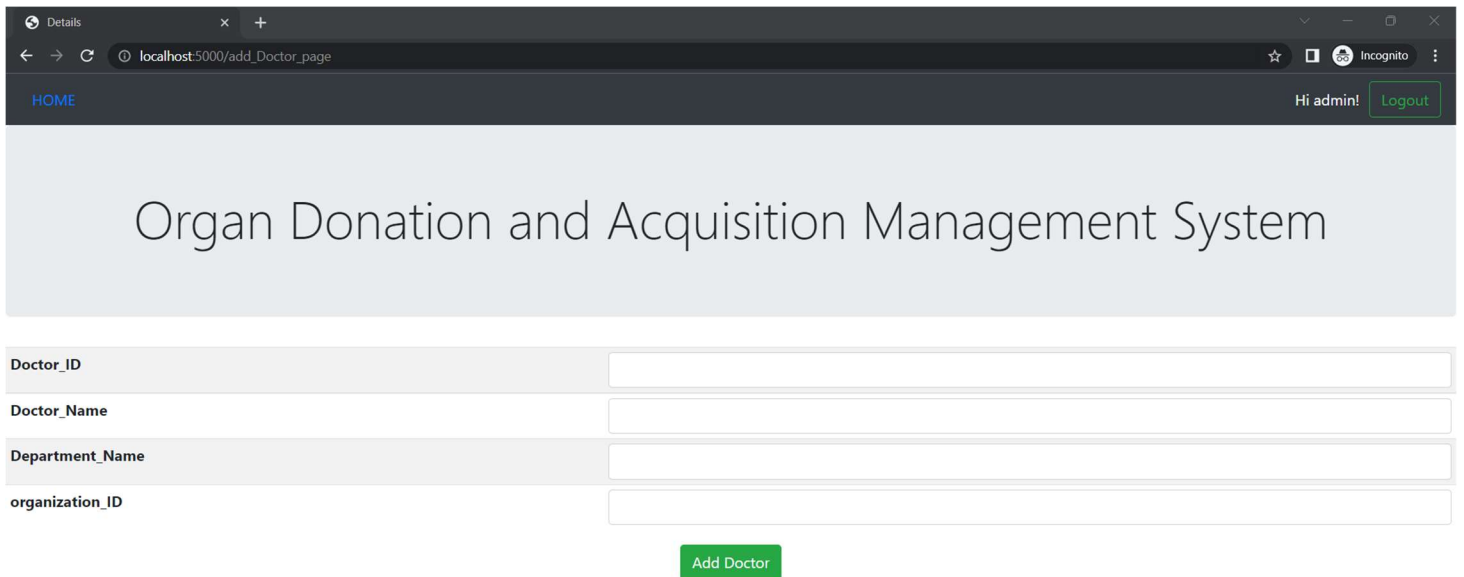
## 7) List of options in Add Section



The screenshot shows a web browser window with the address bar displaying 'localhost:5000/home?'. The page has a dark header with 'Login Page' and a search bar. Below the header, there is a section titled 'Add' with a list of ten blue buttons arranged vertically:

- Add User
- Add User Phone Number
- Add Patient
- Add Donor
- Add Doctor
- Add Doctor Phone Number
- Add Organization
- Add Organization Phone Number
- Add Organization Head
- Add Transaction

## 8) Add/Insert into Doctor Table



The screenshot shows a web browser window with the address bar displaying 'localhost:5000/add\_Doctor\_page'. The page has a dark header with 'HOME' and a user profile 'Hi admin!' with a 'Logout' button. The main content area has a light blue background with the title 'Organ Donation and Acquisition Management System'. Below the title, there is a form with four input fields and an 'Add Doctor' button:

Doctor_ID	
Doctor_Name	
Department_Name	
organization_ID	

[Add Doctor](#)

## **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