VISVESVARAYA TECHNOLOGICAL UNIVERSITY
BELAGAVI, KARNATAKA

A Mini Project Report

(Fifth Semester)

on

"ORGAN TRANSPLANT MANAGEMENT SYSTEM"

Submitted in the partial fulfillment for the requirements for the conferment of degree of

BACHELOR OF ENGINEERING

in

INFORMATION SCIENCE AND ENGINEERING

By

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2021-2022

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CERTIFICATE

This is to certify that the Mini Project (Fifth Semester) entitled **"ORGAN TRANSPLANT MANAGEMENT SYSTEM"** is a bonafide work carried out by **Mr. A Gautham (1BY19IS001)** in partial fulfillment for the award of **Bachelor of Engineering Degree in Information Science and Engineering** of the Visvesvaraya Technological University, Belagavi during the year 2021-2022 It is certified that all corrections/suggestions indicated for internal assessment have been incorporated in this report. The mini project report has been approved as it satisfies the academic requirements with respect to mini project work for the B.E Degree.

_____   _____

Signature of the Guide   **Signature of the HOD**

Dr. Sheela Kathavate   Dr. Pushpa S. K

Examiner

    Name   Signature

1.

2.

ACKNOWLEDGEMENT

We are happy to present this Mini Project after completing it successfully. This Mini Project would not have been possible without the guidance, assistance and suggestions of many individuals. We would like to express our deep sense of gratitude and indebtedness to each and everyone who has helped us make this Mini Project a success.

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Nevertheless, we express our gratitude towards our family and friends for the encouragement and support which helped us to finish this project successfully.

<div align="right">

By,

A Gautham

</div>

DECLARATION

We, hereby declare that the Mini Project titled "ORGAN TRANSPLANT MANAGEMENT SYSTEM" is a record of original Mini Project work undertaken for the award of the degree of Bachelor of Engineering in Information Science and Engineering of the Visvesvaraya Technological University, Belagavi during the year 2021-22. We have completed this Mini Project work under the guidance of **Dr. Sheela Kathavate,** Associate professor, Dept. of ISE.

I also declare that this Mini Project report has not been submitted for the award of any degree, diploma, fellowship or other title anywhere else.

ABSTRACT

Organ transplantation is a medical procedure in which an organ is removed from one body and placed in the body of a recipient, to replace a damaged or missing organ. Organ Donation and Procurement Organizations play an important role in today's medical institutions. Such organizations are responsible for the evaluation and procurement of organs for organ transplantation. These organizations have direct contact with the hospital and the family of a recently deceased donor. The work of such organizations includes identifying the best candidates for the available organs and to coordinate with the medical institutions to decide on each organ recipient.

The ORGAN TRANSPLANT MANAGEMENT SYSTEM is database management system developed mainly for general hospitals, clinics and other health centers to manage the donor and patient registration and user maintenance. The public can retrieve information about organ donation in this web site. People who interested can register themselves through this system. The application will be processed by the administrator and each donor will receive feedback about their application status. Furthermore, the authorized user's account will be maintained by the administrator. The donor record will be managed by four main users such as administrator, doctor, medical assistant and management staff. Only administrator has the authority and privileges to print organ list report and total donation report according to district from this system. The methodology of this system is Structured System Analysis and Design.

An analysis study has been done based on the current manual system and all the problems statements and requirements have been identified. Moreover, ORGAN TRANSPLANT MANAGEMENT SYSTEM is three tier architecture system which involves client tier, business tier and database management tier. The interfaces for ORGAN TRANSPLANT MANAGEMENT SYSTEM have been designed according to the requirement and needs of the current market Rather than that, this system also has been tested and evaluated in real life. This ORGAN TRANSPLANT MANAGEMENT SYSTEM will help to improve the performance of current situation and overcome the problems that arise nowdays.

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CHAPTER 1: INTRODUCTION

1.1 Outline:

Database is an organized collection of data. The data is typically organized to model aspects of reality in a way that supports processes requiring information. A DBMS makes it possible for end users to create, read, update and delete data in a database. The DBMS essentially serves as an interface between the database and end users or application programs, ensuring that data is consistently organized and remains easily accessible.

The DBMS manages three important things: the data, the database engine that allows data to be accessed, locked and modified and the database schema, which defines the database's logical structure. These three foundational elements help provide concurrency, security, data integrity and uniform administration procedures. The DBMS can offer both logical and physical data independence.

The Organ Transplant Management System is a database Management system that uses database technology to construct, maintain and manipulate various kinds of data about a person's donation or procurement of a particular organ. It is a medical procedure in which an organ is removed from one body and placed in the body of a recipient, to replace a damaged or the missing organ. The donor and recipient may be at the same location, or organs may be transported from a donor site to another location. Also it maintains a comprehensive medical history and other critical information of every person in the database design. It maintains a database of users containing statistical information regarding network of organ donation and procurement of different countries.

Organ Donation and Procurement Organizations play a pivotal role in today's medical institutions. Such organizations are also responsible for the evaluation and procurement of organs for organ transplantation. These organizations will represent the front-line of organ procurement, having direct contact with the hospital and the family of a recently deceased donor/Patient.The work of such organizations includes to identify the best candidates for the available organs and to coordinate with the medical institutions to decide on each organ recipient. They are also responsible for educating the public to increase the awareness of and their participation the organ donation process. Also, it keeps track of all transplantation operations carried till date.

The Organ Transplant Management System is a database management system that uses the database technology to construct, and maintain and manipulate various kinds of data about a person's donation or procurement of a particular organ.

In short, it maintains a database containing statistical information regarding network of organ donation and procurement of different people throughout and across the country.

1.2 Motivation and Scope:

- To deploy a website which keeps track of each organ donated by the donor and the organ transplanted into the patient. Thus, creating a transparent and a user friendly website for Organ transplantation Management system.
- To reduce the prevailing malpractices.
- To reduce the wastage of organs due to lack of proper database management system.
- To create live statistics of donors (graph between successful and failed transplantation)
- The Organ Transplant Management System is a platform where a user can log in and reither become a donor or a procurer to donate or procure a specific organ.
- Organ Donation and Procurement Management System contains a database of users who are spread worldwide as a result it can be beneficial for anyone in need for organ which can save a person's life.
- A patient can come and look for which organization is offering a particular organ so that the patient can contact the donor to make a transaction.
- A donor can be called by a doctor through an organization if any patient is in need of any organ if they are agreeing to give.
- The Donor and Patient transaction can be competed in the same platform which is implemented using stored procedures.

1.3 Problem Statement:

An Organ transplantation is a medical procedure in which an donor organ is removed from one body and is placed in the body of a recipient, to replace a damaged or missing organ. Organ Donation and Procurement Organizations play an important role in today's medical institutions. Such organizations will be held responsible for the evaluation and procurement of organs for organ transplantation. These organizations have direct contact with the hospital and the family of a recently deceased donor.

The work of all such organization will include identifying the best candidates for the available organs and to coordinate with the medical institutions to decide on each organ recipient.

The main problem in the current scenario is that due to prevailing malpractices,the overall transplantation and donation of organs are not executed in systematic way.

The situation of the organ wastage is the most severe in case of hearts. In a recent study conducted in January 2019, it was found that only 17% of hearts received were used by surgeons in the state of Tamil Nadu in 2018. The registry received organs from 306 brain dead patients allotted them to different hospitals based on a waiting list While 280 livers and 563 kidneys were retrieved for transplant, only 52 hearts and 13 lungs were harvested. The reason for the same was poor coordination among transplant surgeons causing delay in retrieval.

Organ Wastage is a major issue that can only be solved by having a proper database of all Patient and Donors in a well-formed way, that can be processed easily.

The **Organ Transplant Management System** is a database management system that uses database technology for constructing, maintain and manipulate various kinds of data about a person's donation - procurement of a particular organ. It maintains a comprehensive medical history and other critical information ex blood group,age, etc. of every person in the database design.In short, it maintains database containing statistical information regarding the network of organ donation and procurement of different countries.

1.4   Limitations:

The scope of this project is limited in usage by organizations for transactions, we cannot suggest suitable donor and patient pair using various biological and geographical factors.

Secondly, this project currently lacks intricate authentications of accounts of patients, donors and organisations.

CHAPTER 2: REQUIREMENT SPECIFICATIONS

2.1   Functional Requirement:

Functional Requirements mainly specify what the project should do. This project aims to bring all the people involved in the Organ Transplantation organs from donor to patient into one platform. In this project, the admin has access to add a User, add a patient, add a doctor, add a organization, add phone numbers of user and organization, doctors manage the details of the three mentioned entities. The admin also has access to provide the password to the users (patients and donors) and the organisation. The admin is also able to update the transaction details of transplants conducted which will keep track of organs availability on daily basis. Below are few functions discussed in detail.

Request for Login: The system shall require a user to login/register, in order to carry out any operations in the software. It will ask the user for information like username, password, and various other relevant fields. If the credentials used by the user are correct, then the system allows the user to carry out further operations. While registering for the first time, a user should enter details along with User-ID which is not present in the database.

Adding new Patients/Donors : An User can added as Patient or donor and can procure or donate on the basis of organ availability and it concerned requirements.

Transaction Updating: Once correct match of donor and patient is recognized concerned organisation and doctor will be contacted, and transplant will take place and the Corresponding record will be updated, and the organ available details will be updated concurrently when transplant transaction occurs, and the log is recorded.

User accounts and authentication, transaction control, procuring or donating organ, requesting for organ transplant, registration (as Donor/Patient), separate authentication IDs and tables (in the DB) for Users and Admin, connectivity between Patient requirements and Donors availability the corresponding available organs will be made visible to patients.

2.2   Non-Functional Requirement:

Performance:
- Response time of the System should be less than 3 second most of the time.
- Response time refers to the waiting time while the system accesses, queries and retrieves the information from the databases.

Reliability:
- It shall be available 24 hours a day, 7 days a week
- It shall always provide an accurate listing of the available organs based on transplantation procedures conducted

Integrity:
- Only the system administrator has the right to change system parameters, such as deleting unwanted/spam Details concerned to users/organizations and organ details..
- Users need to be authenticated before having access to any data.

A Convenient dashboard, user-friendly UI, separation of working pages for user's convenience, separate dashboards for Patient/Donors and Admin is a must.

2.3   Domain Constraints:

Domain constraints are defined as the valid set of values of an attribute. In this project, we have used various domain constraints such as primary keys, foreign keys and restriction on the type of data stored in the table. The tables use the VARCHAR Data type to store strings and text values. INTEGER data type is used to store respective entity. Integrity constraints are also managed in this project. The Primary Key used is unique and does not repeat. The Foreign Key used is derived from an existing table and is used for a valid attribute to make connections to the tables and run the queries easily. Normalization, which is defined as the process of storing data in a database, was also used. Normalization up to 3 Normal Form was used so as to reduce redundancy

- **Regulatory policies**: It is mandatory that no text box must contain insufficient data
- **Hardware limitations:** There must be a 64 MB on board memory.
- **Control functions**: The software is user-friendly and displays appropriate error messages.
- **Parallel operations**: It supports many users simultaneously.
- **Safety/security considerations**: The application always exits normally.
- **Software Requirement**: OS- Windows/Mac, Browser- Chrome/Mozilla Firefox
- Hardware Requirement: **Processor- 32 , Memory- 4GB RAM**

CHAPTER 3: SYSTEM/REQUIREMENT ANALYSIS

3.1   Overall System Design:
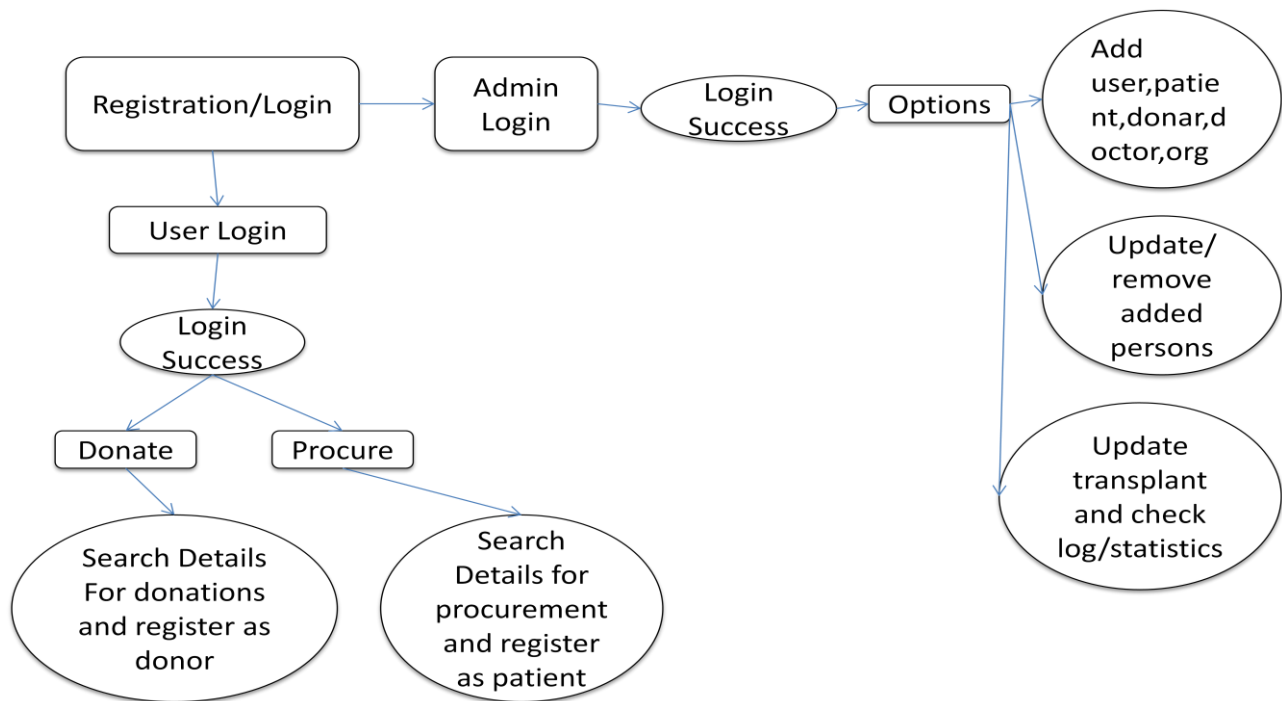
The first step in our project was having a discussion about what functionalities we want to provide with our work. After getting a mutual understanding of what the end product might look like, we worked on the database design. Two of us made our own database schema, compared them, and put together a final database schema that we all could agree upon, with parts of all our works to make what we deemed to be the most functionally accurate database.

The next step was frontend development (using HTML + CSS) and database creation (using MySQL), both of which were done simultaneously. The frontend was made with regular interaction with the backend-in-charge, to make sure it properly reflects the backend and at the same time is user-friendly.

After these were done, Flask framework was used to put the project together, some final touches were added, and was then hosted onto the internet.

3.2   Admin Module:

```
            ( Add )
   [Admi] ---> ( Updat ) ---> ( Contac )
            \
             ( Update ) ---> ( Contac )
```
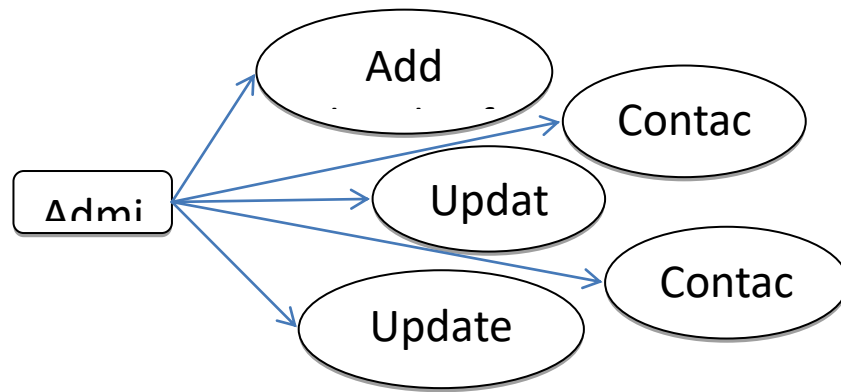
Admin upon login is redirected to a Dashboard where the admin can view all the previously entered data by user i.e. Patients and Donors and can update them as well. The Admin can go through the different organs available and perform possible transplant updating which can be performed based on organization processes which take place. And can view log of all transactions and newly added patients and donor details and can also check the statistics of transplants performed. Admin can also take data of new organizations registered and their doctors available.

The Admin has all rights to update and remove any of the entities in the platform..

3.3   USER – Patient/Donor Module:

```
              [Donat] ---> ( Search for patients,org )
             /        \
   [User] --            ( Registe )
             \        ( Search for donor,organ, )
              [Procu] /
                     \       ( Update )
                    ( Registe )
```
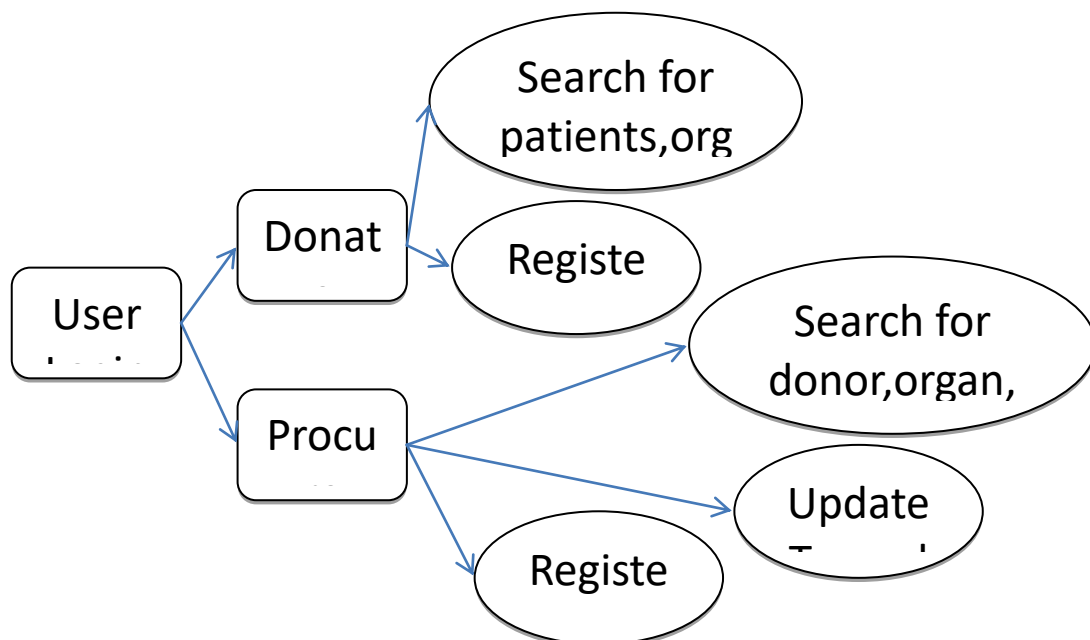
A Donor/Patient upon login is redirected to a Dashboard where he/she can view the two options either donate or procure. The User can choose as required and register himself as donor or patient as per his requirements of transplant. The user can also check available doctors, organizations, and the available organs. The transaction can also be updated.

CHAPTER 4: SYSTEM DESIGN

4.1   Entity Relationship Diagram:

4.1.2   Entity Sets:

- User

- Donor
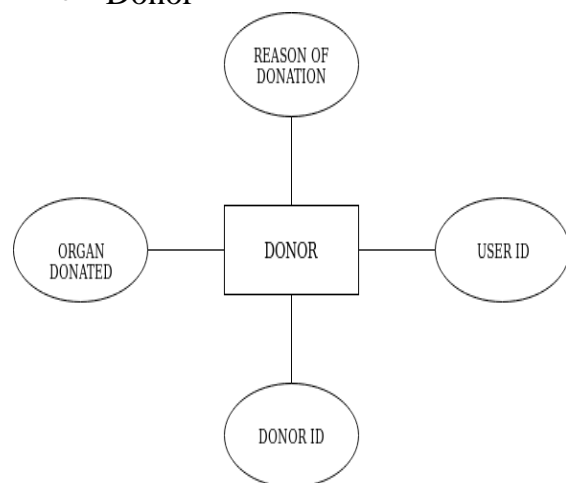
- Patient
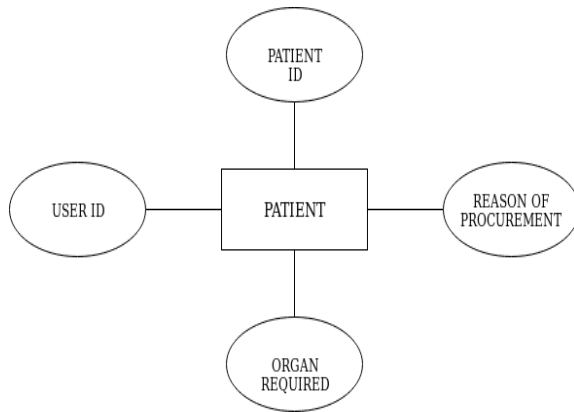
- Organisation
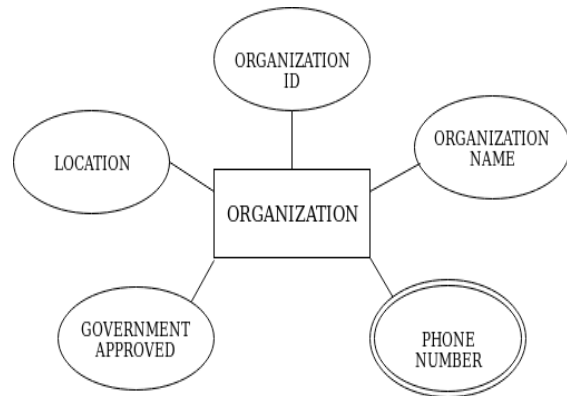
- Doctor
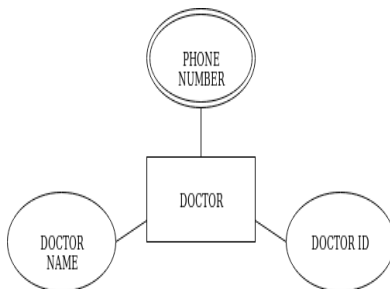
- Organisation Head
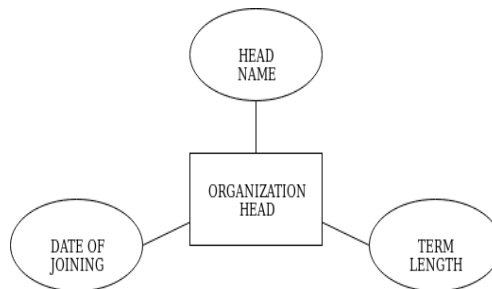
- Organ Available
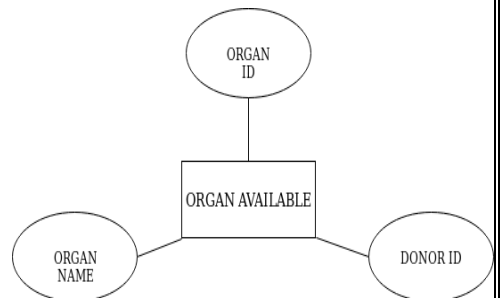
4.2 Schema Diagram :
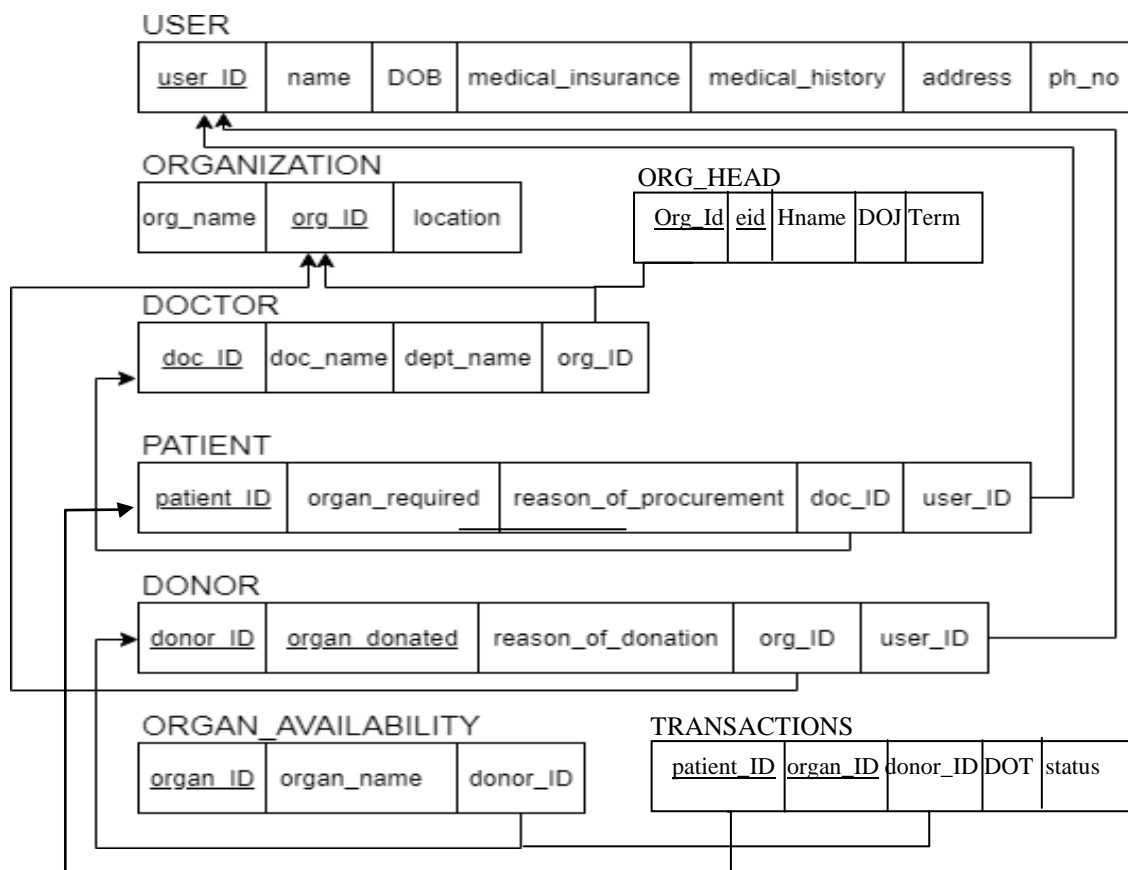
Schema Diagram :
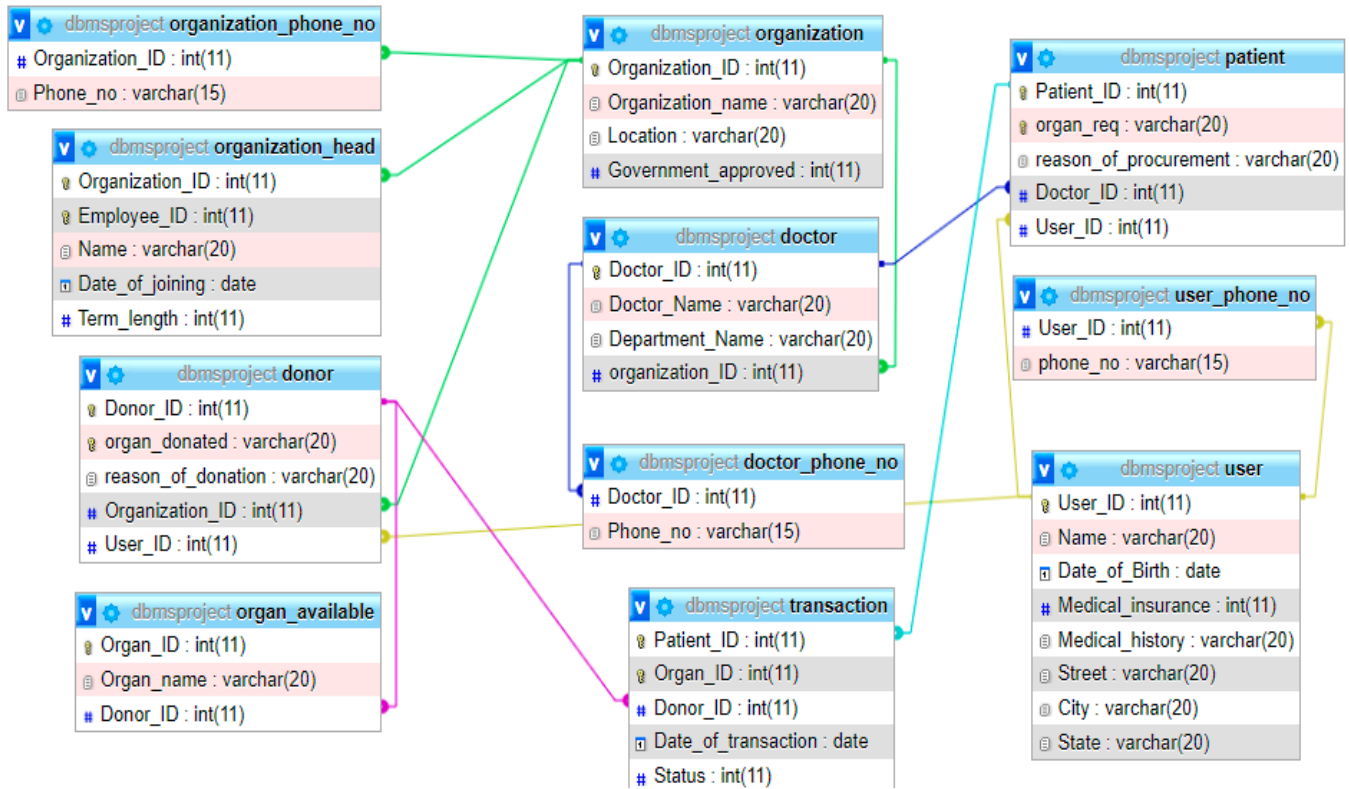
CHAPTER 5: IMPLEMENTATION

5.1   Description of Database Tool (Backend)

The Database used was MySQL, MySQL is an open source relational database management system (RDBMS) that works with an operating system to implement a relational database in a computer's storage system, manages users, allows for network access and facilitates testing database integrity and creation of backups. It is most noted for its quick processing, proven reliability, ease and flexibility of use. It is a stable, reliable and powerful solution with advanced features like: Data Security, High Performance, complete workflow control, flexibility of open source.

The MySQL Database Server is very fast, reliable, scalable, and easy   to use. If that is what you are looking for, you should give it a try. MySQL Server can run comfortably on a desktop or laptop, alongside your other applications, web servers, and so on, requiring little or no attention.

The MySQL Database Software is a client/server system that consists of a multithreaded SQL server that supports different back ends, several different client programs and libraries, administrative tools, and a wide range of application programming interfaces (APIs). It also provides MySQL Server as an embedded multithreaded library that you can link into your application to get a smaller, faster, easier-to-manage standalone product.

The MySQL Database Server is very fast, reliable, scalable, and easy to use. If that is what you are looking for, you should give it a try. MySQL Server can run comfortably on a desktop or laptop, alongside your other applications, web servers, and so on, requiring little or no attention.

We have used Flask which is an API of Python that allows us to build up web-applications. It was developed by Armin Ronacher. Flask's framework is more explicit than Django's framework and is also easier to learn because it has less base code to implement a simple web-Application. A Web-Application Framework or Web Framework is the collection of modules and libraries that helps the developer to write applications without writing the low-level codes such as protocols, thread management, etc. Flask is based on WSGI(Web Server

Gateway Interface) toolkit and Jinja2 template engine.

5.2   Description of Implementation (Frontend)

For front-end development, Visual Studio Code was used. Visual Studio Code is a free source-code editor made by Microsoft for Windows, Linux and macOS. Features include support for debugging, syntax highlighting, intelligent code completion, snippets, code refactoring, and embedded Git.

Visual Studio Code is a lightweight but powerful source code editor which runs on your desktop and is available for Windows, macOS and Linux. It comes with built-in support for JavaScript, TypeScript and Node.js and has a rich ecosystem of extensions for other languages (such as C++, C#, Java, Python, PHP, Go) and runtimes (such as .NET and Unity).

HTML5:

Hypertext Markup Language revision 5 (HTML5) is markup language for the structure and presentation of World Wide Web contents. HTML5 supports the traditional HTML and XHTML style syntax and other new features in its markup, New APIs, XHTML and error handling.

CSS:

Cascading Style Sheets (CSS) is a style sheet language used for describing the presentation of a document written in a markup language such as HTML. CSS is a cornerstone technology ofthe World Wide Web, alongside HTML and JAVASCRIPT.

JAVASCRIPT:

JavaScript is a programming language that started off simply as a mechanism to add logic and interactivity to an otherwise static Netscape browser.

CHAPTER 6: TESTING

6.1   Component Tests:

Component testing is undertaken when a module has been created and has successfully reviewed.

Each component of the software was tested individually from the adding user as patients and donors from two logins to performing transplant transactions and updating logs and multiple other components were also tested.

Registration Screen:

TEST UNIT	TEST CASE	RESULT
Registration Screen	Providing details and clicking on register user	The system takes the user to the login screen. Account has been registered as a user(Patient/Donor) and can perform login.

Login Screen:

TESTUNIT	TEST CASE	RESULT
Login Screen	Providing an registered user id and password	The system takes the user to their respective Dashboards.
Login Screen	Providing login details which do not match registered credentials	The system does not grant access to the user/admin and shows error message

Donate and Procure/ Admin Functions:

TEST UNIT	TEST CASE	RESULT
Donate/Procure	Click on tiles to perform search/ Add.	User is displayed with selected data & availed to register as donor/patient.
Admin Home	Admin Click on Add/Update/ Remove options	Admin corresponding ages opens up

Search Filters:

TESTUNIT	TEST CASE	RESULT
Search Filters	Click on filters	Search gets filtered based on the letters entries and greedy matching occurs successfully

6.2   System Test:

The whole system testing was done to evaluate the efficient working of software. All the bugs that were found were sorted out.

Our Project went through two levels of testing

6.2.1 : Unit Testing

   Unit Testing is a type of software testing where individual units or components of a software are tested. The purpose is to validate that each unit of the software code performs as expected. Unit Testing is done during the development (coding phase) of an application by the developers.

6.2.1 Integration Testing

   Integration Testing is defined as a type of testing where software modules are integrated logically and tested as a group. A typical software project consists of multiple software modules, coded by different programmers. The purpose of this level of testing is to expose defects in the interaction between these software modules when they are integrated.

TEST UNIT	TEST CASE	RESULT
Sign Up	Click on the Sign Up button	Takes user to the registration page (New user Registration Form)
Login	Click on login button	The system takes the user to their dashboard And admin dashboard
Responsive Design	Resize window	System design, including navbar, sizing, styling,changes
Navbar Button	Click on Userhome/Home	The tab userhome/Admin Home Opens
Add a entity(User,patient, donor,Org,doctors)	Fill Form and click on add button	New User added and success message displays, if failure error message displayed
Saved Applications	Saved applications buttonis clicked	Resumes of applicants previously saved by theuser can be seen
Search Saved Users/patients/Don ors/organs	Search Users/patients/don ors/organs	Previously Stored entries are successfully displayed and sorted, user can search key words.
Add Transactions	Fill form for transaction	Transplant Success, organ transplant availability updated, log, updated, and statistics updated.
Logout	Click on the logout button	Successfully logs out from the user/admin account and leads to login page

CHAPTER 7: INTERPRETATION OF RESULTS
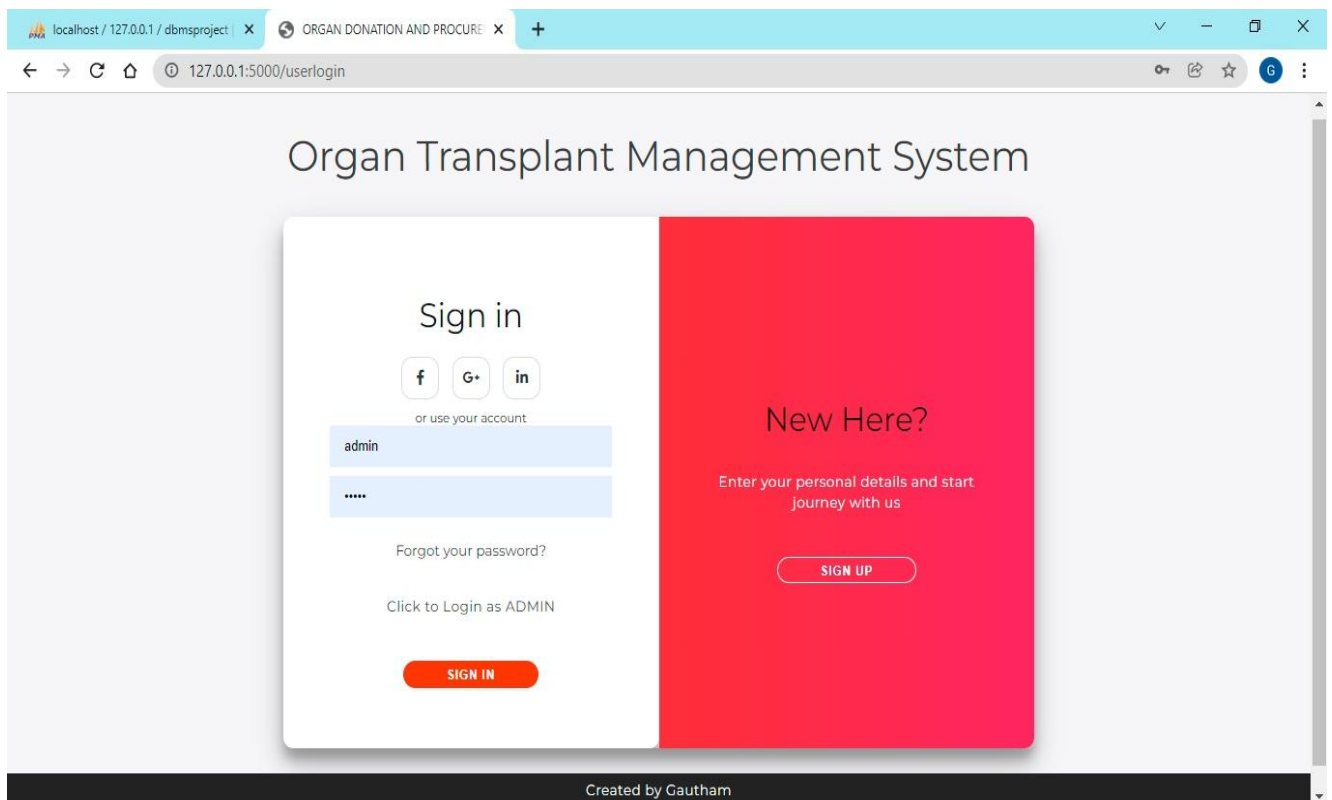
Fig. 7.1 : Home Page of Website
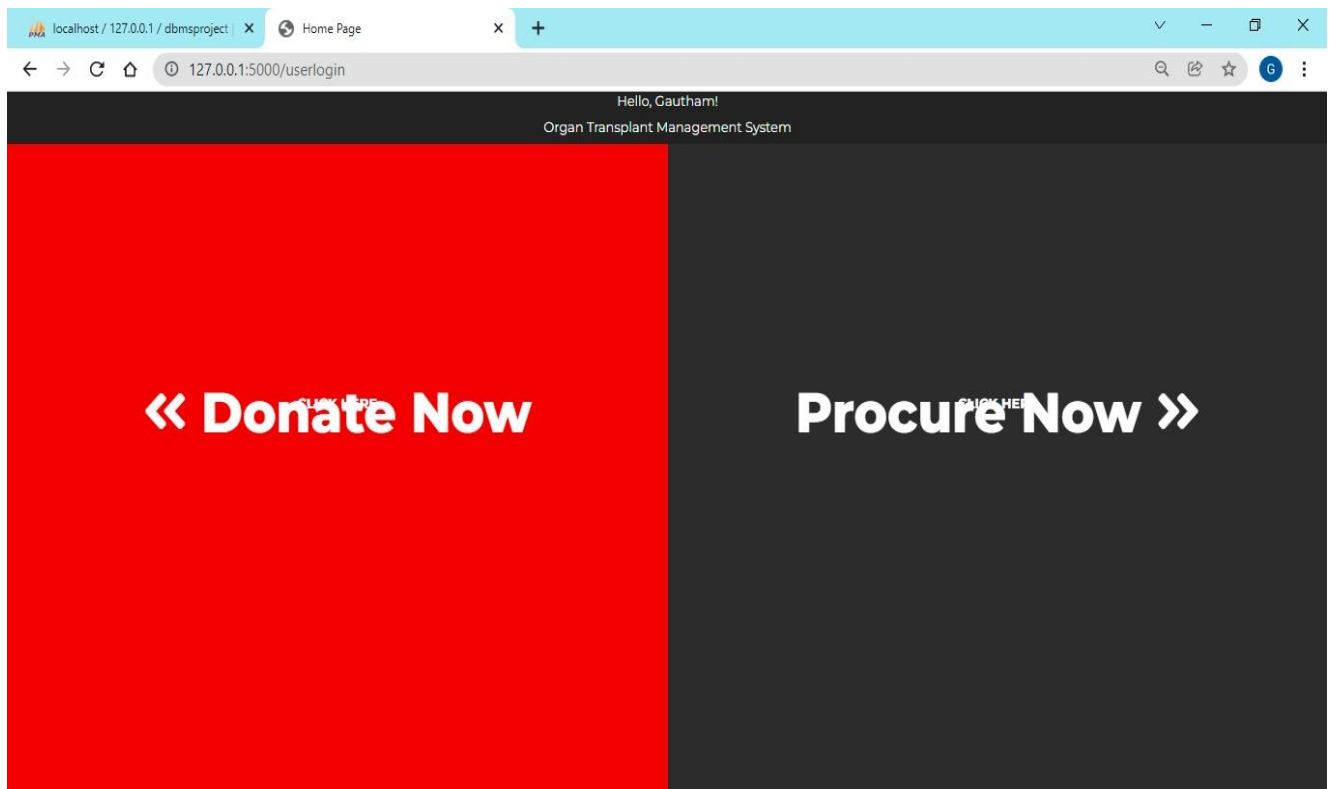
Fig 7.2 : User Home Page
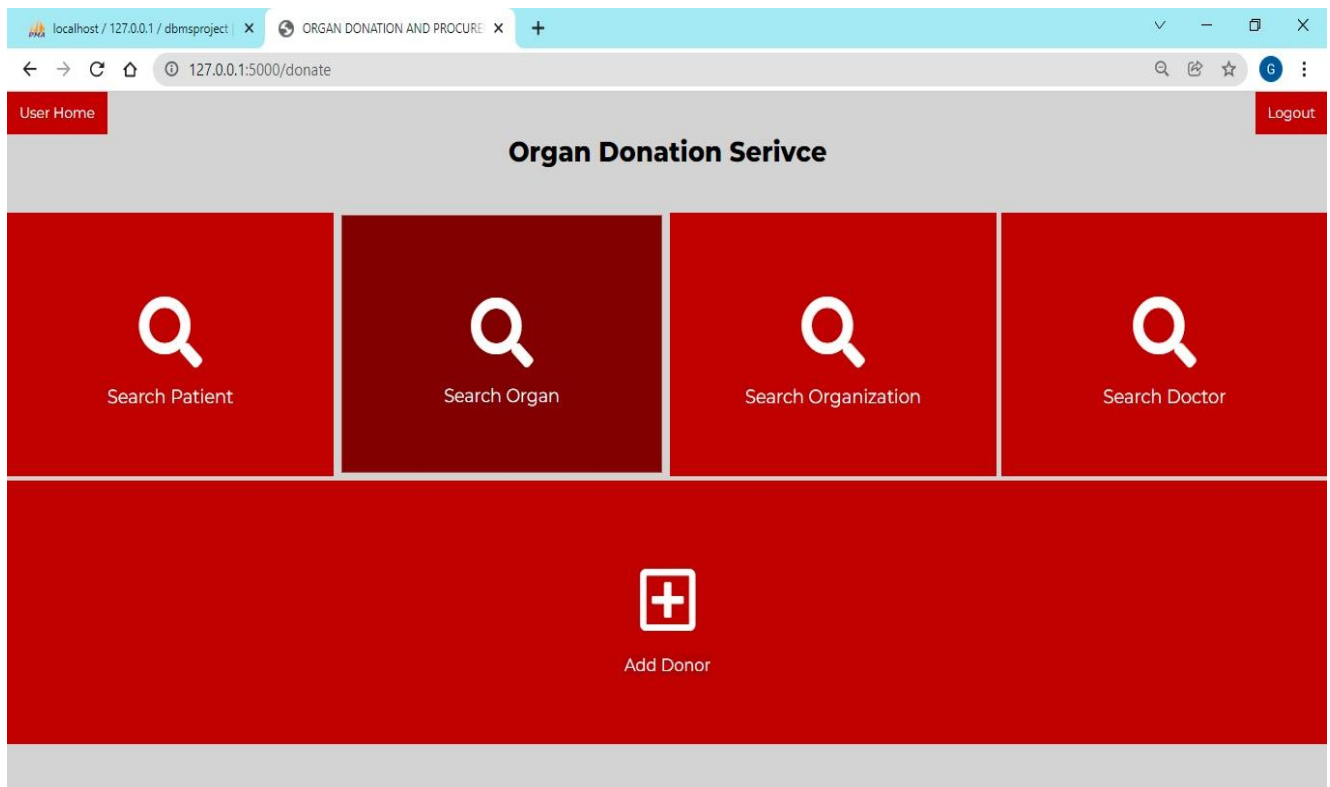
Fig 7.3 : Donor Page ,to Donate Organ
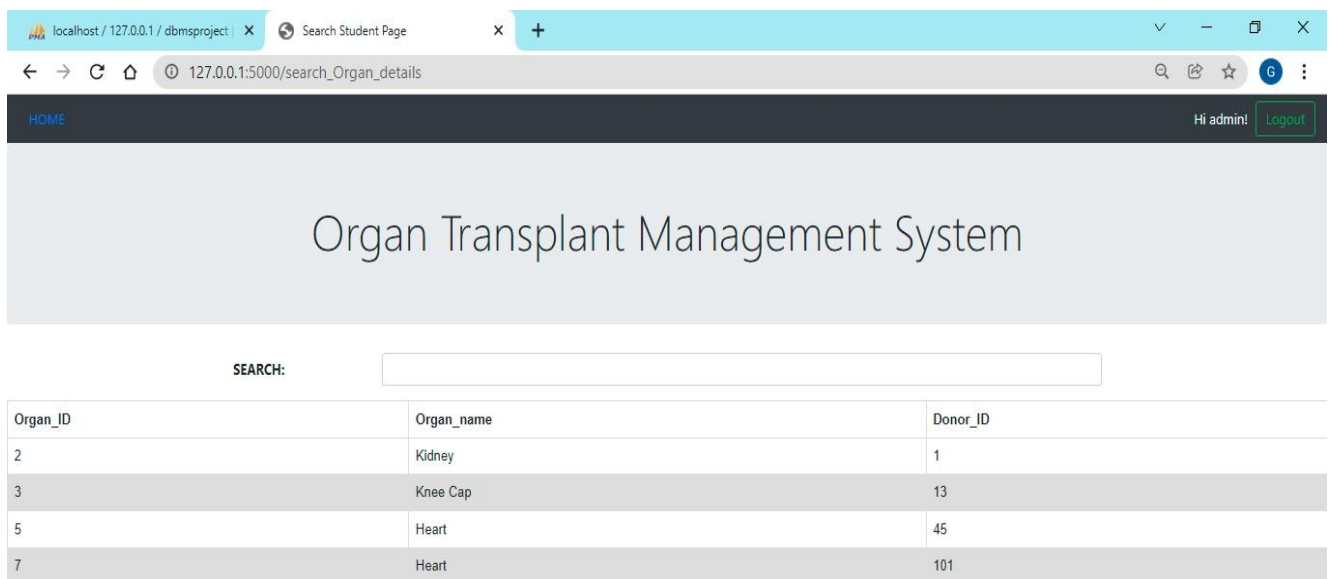
Fig 7.4 : View of Available Organs for Transplant

Fig 7.5 : Add Donor Form

Fig 7.6 : Procure Page ,to Procure Available Organs

Fig 7.7 : Add Patient Form

Fig 7.8 : Add Transaction Page, Successfully Conducting Transplant

Fig 7.9 : Admin Login Page

Fig 7.10 : Admin Home Page

Fig 7.11 : Updated User Details Page

Fig 7.12 : Viewing Doctors Details

Fig 7.13 : View of log page

Fig 7.14 : Update User Details Page

Fig 7.15 : Transplant statistics Page

CONCLUSION

Thus we have successfully implemented organ donation and procurement database management which helps us in centralizing the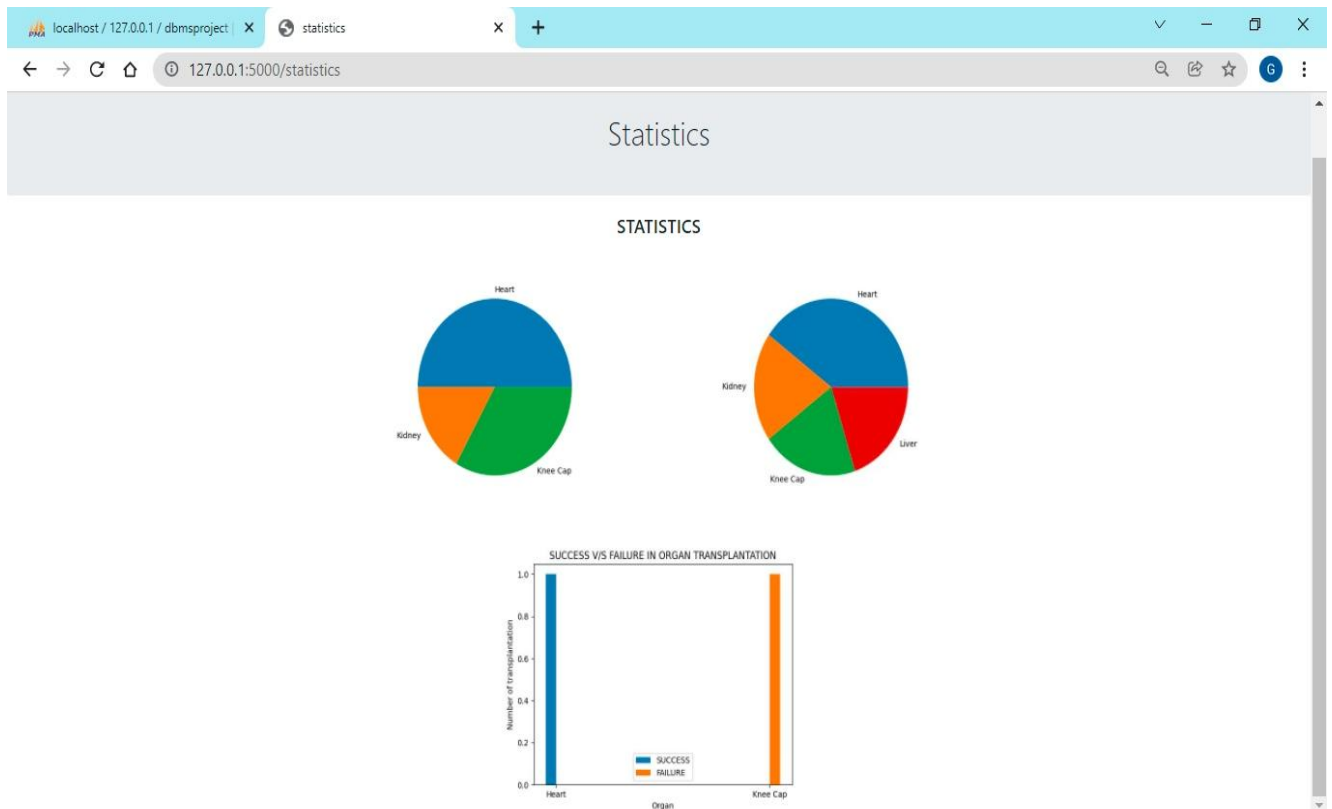 data used for managing the tasks performed in an organ donation we have successfully implemented various functionalities of MySQL and created the fully functional

database management system for organ donation and procurement.

By implementing this idea we tried to reduce prevailing malpractices and wastage of organs due to lack of communication platform between donors and patients. It reduces the workload of admin as they can retrieve data easily. We also tried to spread awareness about organ donation. Through this database we can retrieve the data of past patients and donors. We can also predict the availability of live donors in future by using statistics and since statistics can also be seen by public, so it's a proof that people must donate organ when needed as they can see number of failed and passed transaction.

Thus, with this project we tried to point out the loopholes in the current system and tried to fill them with an effective solution.

Our Organ Donation and Procurement Management System project is designed to meet all the Requirements of Donor and Patients. It has been developed in Python, HTML, and CSS keeping in Mind the specification of the system. For designing the system, HTML, CSS, JavaScript is being used as the front end.

Thus, with this project we tried to provide complete transparency between the donors and patients.

So, as anyone can view the database, different malpractices can be completely avoided.

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Department Vision & Mission

Vision

Emerge as centre of learning in the field of information science & engineering with technical competency to serve the society.

Mission

To provide excellent learning environment through balanced curriculum, best teaching methods, innovation, mentoring and industry institute interaction.

Programme Educational Objectives

PEO-1: Successful professional career in Information Science & Technology.

PEO-2: Pursue higher studies & research for advancement of knowledge in IT industry.

PEO-3: Exhibit professionalism and team work with social concern.

Programme Specific Outcomes

1. Apply the knowledge of information technology to develop software solutions.

2. Design and Develop hardware systems, manage and monitor resources in the product life cycle.

Programme Outcomes
The graduates will have an ability to

PO1   **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2   **Problem analysis**: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3   **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4   **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5   **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO6   **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7   **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8   **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9   **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10   **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11   **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12   **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.