CS 5200 - Database Management Systems

Project Proposal

Blood Bank Management System

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1. README

This is a desktop application for managing a blood bank using the "Tkinter" library in Python and MySQL database for storage.

NOTE: This application that we have designed uses a python library called "Tkinter". Some of the entities in this library are not compatible with MacOS. So, for the UI to work properly, we recommend running this on Windows.

Installations:

MySQL: Follow these steps in MySQL Installation Guide for installing on either Windows or Mac.

Python: This link can be used to download Python in your system.

Python Libraries:

- import tkinter as tk
- import mysql.connector
- import subprocess
- from tkinter import ttk, messagebox
- import tkinter.ttk as ttk
- import random

Description:

This Python script uses the tkinter library for creating a graphical user interface, and the mysql.connector library for interacting with a MySQL database. The subprocess library is used for executing shell commands. The ttk and messagebox modules from the tkinter library are imported for creating specialized widgets and displaying message boxes respectively. The random library is used for generating random numbers.

Requirements:

- Python 3.6 or higher

- tkinter library (included with Python)
- mysql-connector-python library
- ttk and messagebox modules (included with tkinter)
- random library (included with Python)

We are using Python – 3.9.7, and Tkinter - 8.6.

The mysql-connector-python library can be installed using pip:

```
pip install mysql-connector-python
```

Usage:

To use this script, follow these steps:

1. Ensure that you have installed Python 3.6 or higher, and the mysql-connector-python library.
2. Open a command prompt or terminal window. You can also use open-source software like Spyder IDE (we used Spyder).
3. Change to the directory where the Python script is located.
4. Run the script.
5. The script should start running, and the graphical user interface should appear on the screen.
6. Use the interface as intended by the script.

Once you have installed all the required tools, do the following steps:

1. Download the zip file provided.
2. Now, in the folder you can see “bloodbank_schema_export.sql” file, run this in your MySQL Workbench.
3. Now, under the databases section you can see the “bloodbankdb” database available.
4. After this, open the Python IDE and then open script – “Main_Page.py” in the IDE from folder.
5. Before running the “Main_Page” script, make sure to **change the username and password to your host username and workbench password on line 13 and 14.**
6. Now run the script after saving.
7. This will open a Tkinter User Interface window through which you can navigate accordingly.

2. Technical Specifications

Database: MySQL - MySQL is an open-source relational database management system that is widely used for web-based applications. It is scalable, reliable and supports many programming languages. We use this to create our databases from the schema.

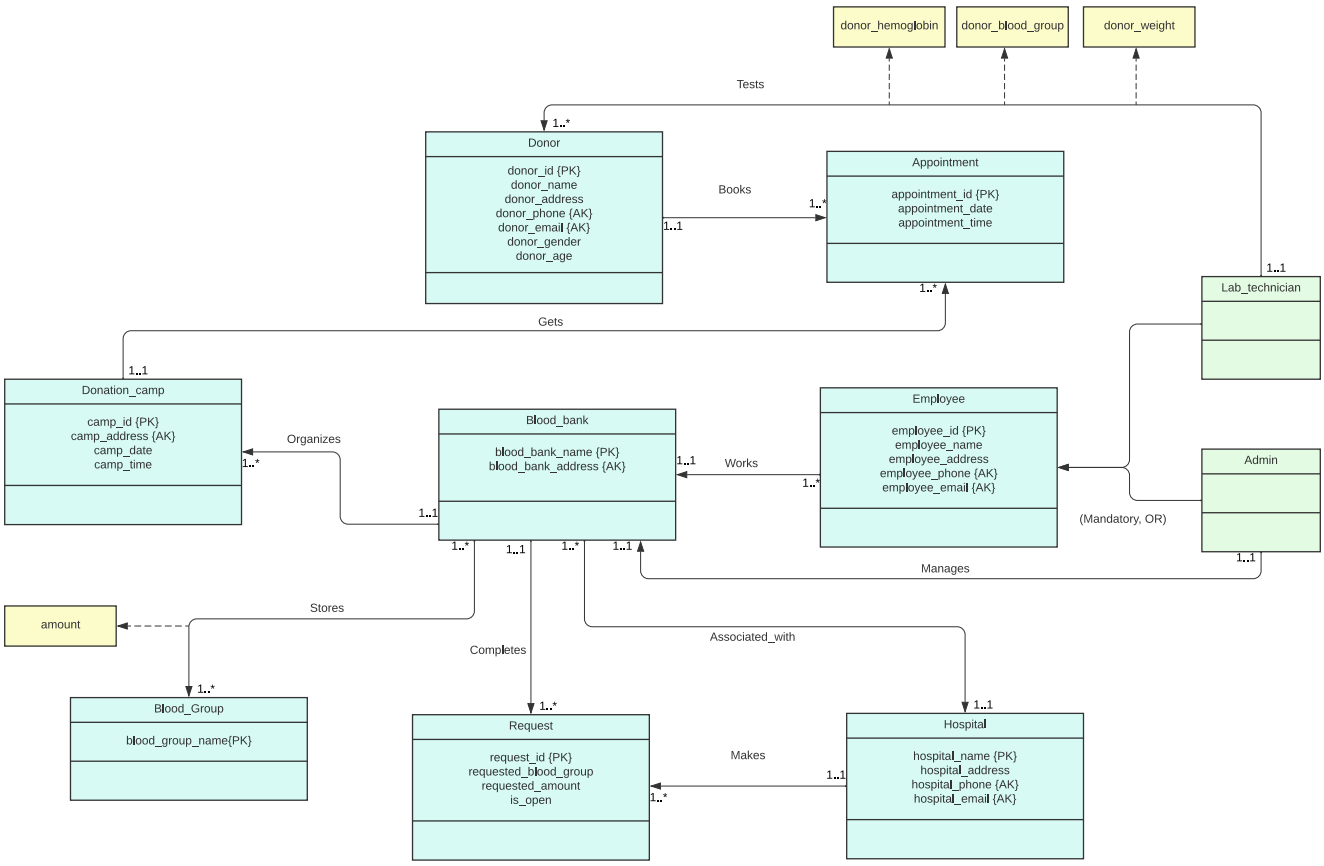
Backend: Python – Python is a popular programming language which can be used to create database applications. We have used Python MySQL-Connector to connect to the database created.

Frontend: Tkinter – Tkinter is a Python binding to the Tk GUI toolkit. It is the standard Python interface to the Tk GUI toolkit and is Python's standard GUI.

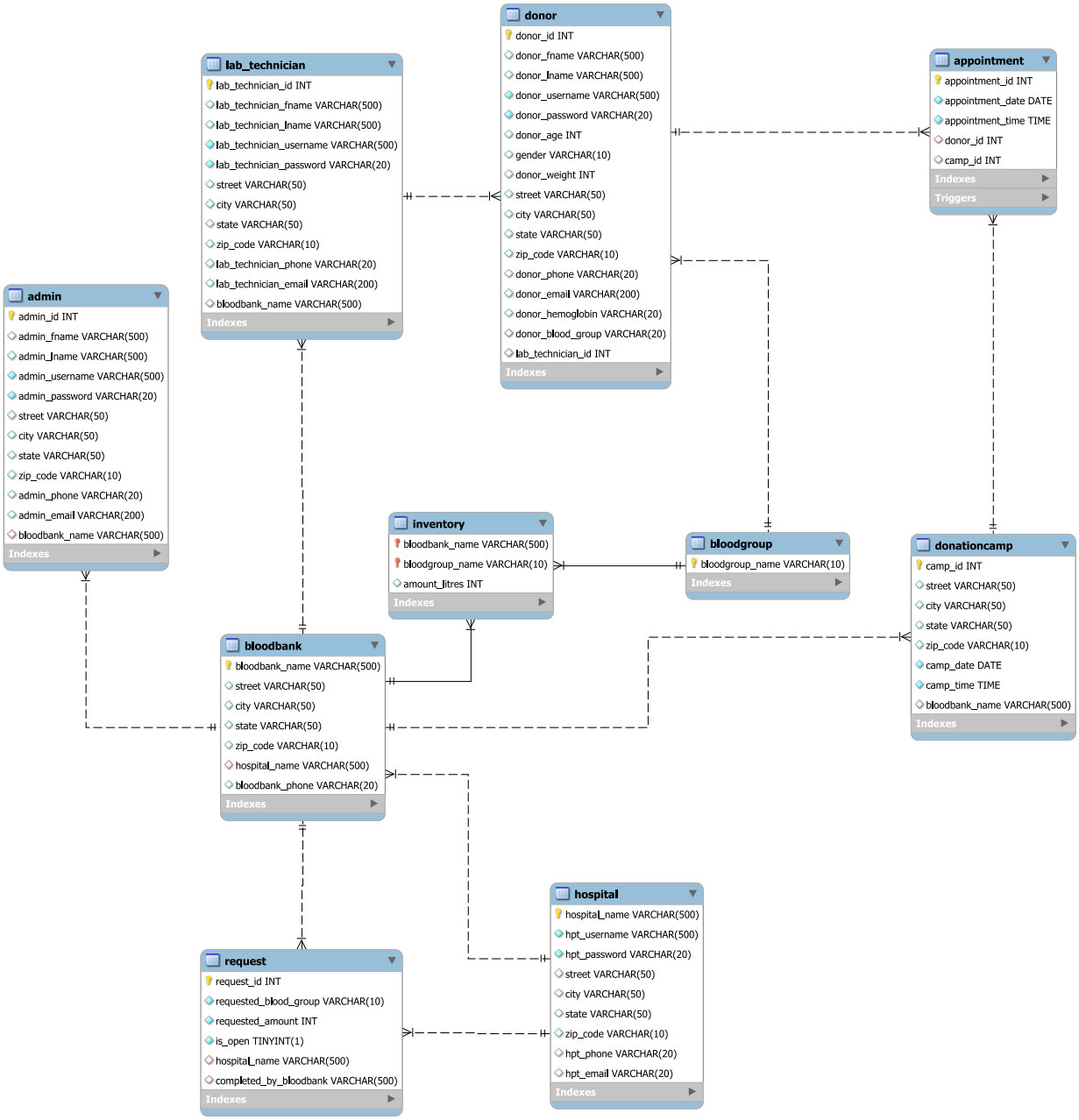
IDE:

1. **MySQL Workbench** - MySQL Workbench is the in-built tool that comes with MySQL which facilitates creating, designing, and building databases.
2. **Spyder** - Spyder, the Scientific Python Development Environment, is a free integrated development environment (IDE) that is included with Anaconda. It includes editing, interactive testing, debugging, and introspection features.

3. UML



4. Logical Design

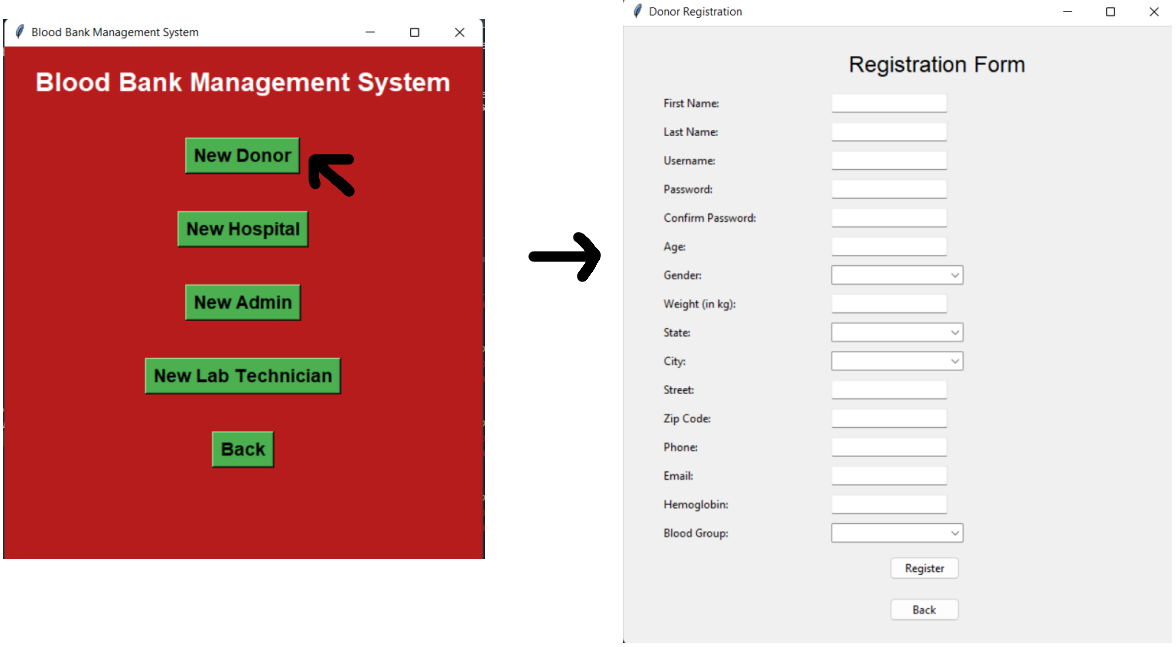


5. User Flow of the System

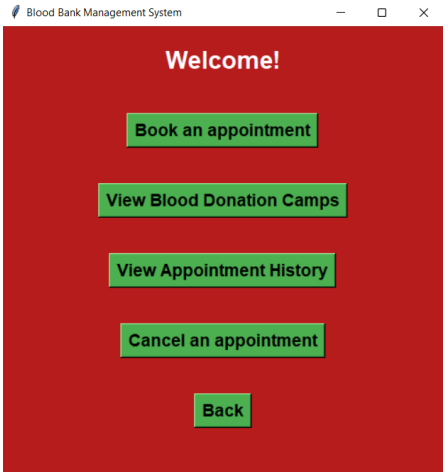
After following the steps in the README file, follow these:

1. When you run the “Main_Page.py” file in Python IDE, a window that looks like this will open.
2. If you already have an account, you can click on “Existing User” button and proceed to the login page. If not, you must select the “New User” button to create new account.

3. If, you click on the “New User” button, you can see 4 options “New Donor”, “New Hospital”, “New Admin” and “New Lab Technician”. Let’s say you chose “New Donor”, then it will take you to a Registration Page, where you must fill your details and register.

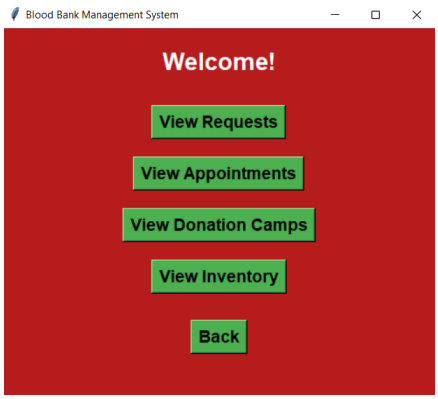


4. This step is same for all other options as well. Only the registration pages change accordingly.
5. Once you register, you will be taken to the respective home page. Since we assume that you have chosen donor, the donor home page looks something like this:

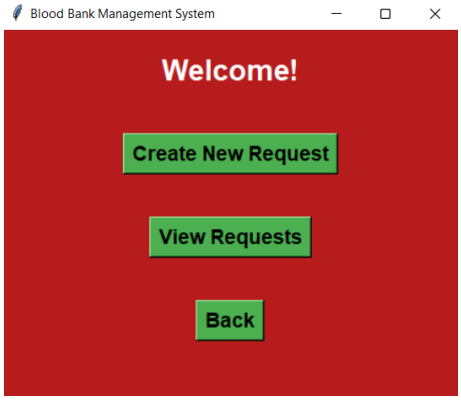


Donor Home Page

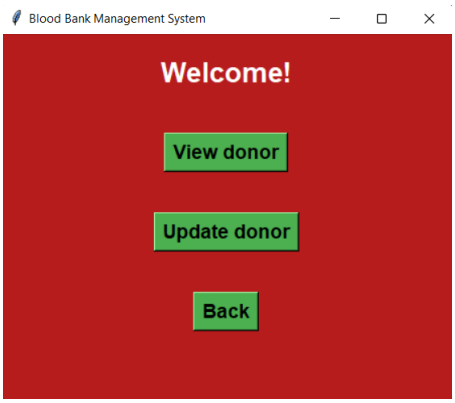
6. Similarly, these are the home pages that open when you register as an admin, hospital, and lab technician:



Admin Home Page



Hospital Home Page

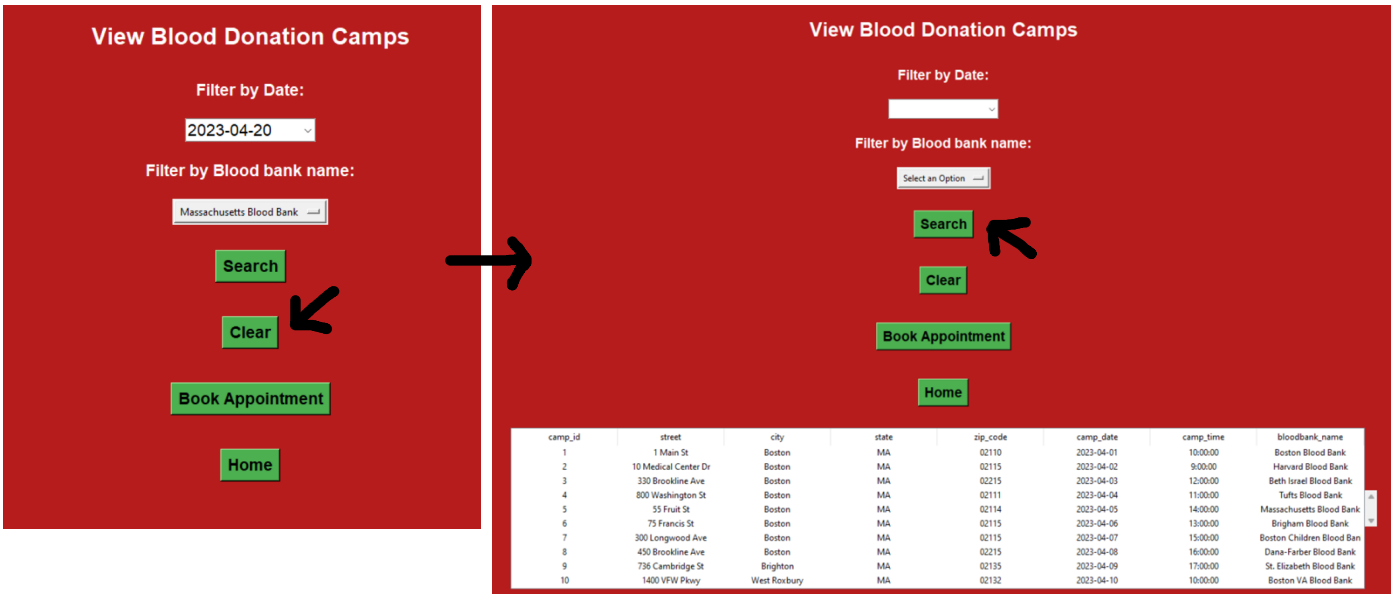


Lab Technician Home Page

- The Donor can book appointments, cancel appointments, view the donation camps happening, and track his/her appointment history by clicking the respective buttons.
- Admin can view/update the requests made by the hospital, appointments made by the donors, donation camps being organized, and inventory.
- The Hospital can create new requests when it needs blood and view the existing requests.
- Lab Technician, have the rights to view and update the donor details like blood group, etc.

7. For all the view operations that are present in the application, the user has the option to search by filters or without them as well.

8. If a user wants to search without filters, they can click on the clear button, and then click on the search button to get all the records.



6. Learned Lessons

1. **Technical expertise gained:**

   We were able to enhance our Python knowledge and get to learn how design a user interface in using Tkinter library in Python. Also, we were able to advance our proficiency in MySQL.

2. **Insights, time management insights, data domain insights etc.:**

   Insights: We gained understanding about how the whole blood bank donation system works in the real world.

   Time Management insights: With a group project that involves multiple technologies, time management can be challenging. But we have worked on the tasks simultaneously by sharing the tasks giving importance to all the parts. For example, we have four user roles, so, we have divided the UI designing equally, not only, the UI but we have done the whole backend (SQL) related to the roles as well.

Data Domain Insights: With the use of MySQL, we were easily able to manage the data involved in a blood bank management system. We have divided the tasks related to data management among the team.

3. **Realized or contemplated alternative design / approaches to the project:**

   Using a different database management system: Instead of MySQL, we could have considered using MongoDB.
   Using a web-based UI: Instead of a desktop-based UI, we could have considered building a web-based UI using a web framework like Django or Flask.

7. Future Work

1. The project includes creating and managing a database system for a fixed set of blood banks present throughout the city of Boston. This can be scaled in future to include blood banks from other cities or even states.
2. The system can also be integrated with a hospital management system to increase the scope of the project.
3. Currently only hospitals can request blood from blood banks. In future we can extend this functionality to individual patients as well.
4. Currently in our inventory, we are keeping track of the total blood amount for the specific blood types. In the future, we can keep track of blood amount donated by the individual donors as well.