CS 5200 - Database Management Systems (Fall 2023)

Project Report

Project Roofs

Submitted By:

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1. README

Project Roofs - Shelter Management System

Project Roofs is a Shelter Management System that allows administrators to manage residents, volunteers, donations, and visualize key statistics related to shelters. This command-line interface (CLI) application is designed to provide essential functionalities for efficient shelter administration.

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Introduction

Project Roofs is developed to streamline the management of shelters, making it easier for administrators to perform various tasks such as adding residents, managing volunteers, recording donations, and visualizing key statistics.

Features

- Add and manage residents in shelters along with performing updates on leave date to indicate that residents have left the shelter

- Removal of residents as well as an option available to add new health records for current residents, along with the ability to update employment records to lete data remain up to date

- Adding a resident will ensure that their health record as well as employment record are both stored

- Volunteer management, including addition of new volunteers and changing their preferences (opt out)

- Donation management with the ability to view and add donations

- Visualizations for key statistics related to shelters

Installation

To install and run the Project Roofs CLI, follow these steps:

1. Unzip the ```BelaiDVenkatP_Project.rar``` file.

2. Navigate to Projects Roofs directory: `cd CS5200_Project`

3. Ensure Python along with MySQL is installed in the system in order to carry out smooth functionality of the application.

Note: Latest version of Python and MySQL are recommended but not compulsory.

4. Install dependencies:

`pip install -r requirements.txt`

5. Running the MySQL Database dump file to ensure all tables and programming objects are available on the system.

Usage

1. Run the main script:

`python main_script.py`

2. Follow the on-screen prompts to log in as an administrator and manage shelters.

CLI Commands

There are various on screen commands that will help the user to navigate through the applcation. A lot of typing is not involved unless data is being entered like addition of residents. The commands will not require long strings to be inserted, they will be short strings or numbers for menu driven operations.

Do not worry about entering wrong or blank values, the error handling mechanism will reprompt the same question again.

Conclusion

Creating Project Roofs was an ambition for us, we chose this project after reading multiple articles about homeless people's situation around the country. We aim to develop the GUI for the same through the winter break of 2023 using some library that we are accustomed to (ex. Custom Tkinter). If you think something needs to be fixed then do not hesitate to reach out.

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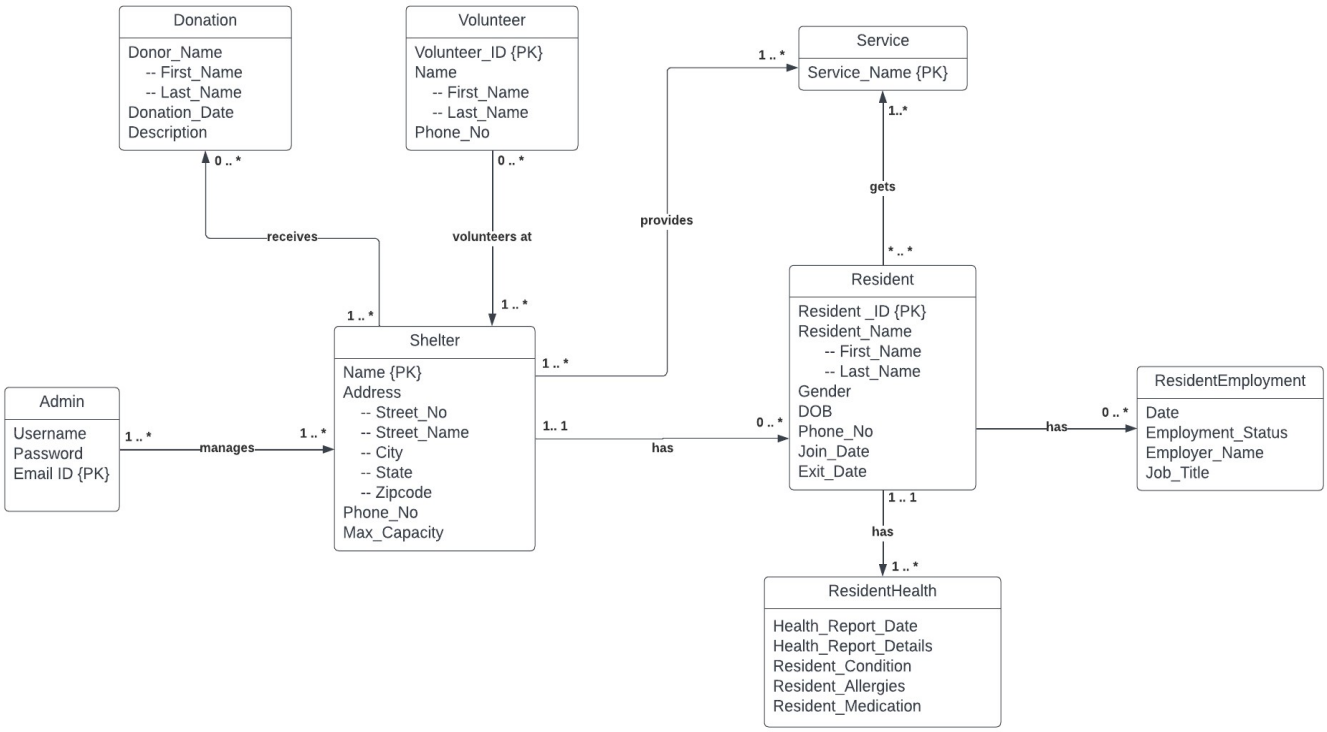
2. INTRODUCTION

In the vast tapestry of society, the pervasive issue of homelessness casts a stark shadow, affecting countless lives across communities. As cityscapes expand and social dynamics evolve, the scale of this challenge becomes even more pronounced, underscoring the urgent need for innovative solutions. It is against this backdrop of an increasingly complex and widespread problem that Project Roofs emerges as a beacon of hope and change.

Our initiative recognizes that the issue of homelessness extends beyond shelter inadequacy—it permeates the fabric of human well-being and dignity. Project Roofs endeavors to be a transformative force, seeking to address the myriad challenges faced by those experiencing homelessness. By leveraging the power of technology and compassion, our project stands at the forefront of a movement to redefine how we approach and mitigate the impacts of homelessness.

Project Roofs stands as a pioneering endeavor with a distinct focus on innovation through a data-driven approach. Harnessing the power of comprehensive data analytics, our project seeks to not only address the immediate challenges of homelessness but also illuminate a clearer path towards sustainable solutions. By leveraging real-time statistics and visualizations, Project Roofs empowers administrators to make informed decisions, optimize shelter management, and gain deeper insights into the well-being of residents. This commitment to a data-driven paradigm underscores our dedication to not just managing shelters but transforming lives through the strategic use of technology and compassion.

3. UML NOTATION



Admin : The admin table has the admin's email id (primary key), username and password. The admin can use his credentials to login to the database and manage the shelters, and residents, or add other admins.

Shelter : The shelter has a name (primary key), address, phone number, and max occupancy. Our database deals with 3 shelters, Boston Community Shelter, Brigham Shelter and Holy Hearts Shelter.

Residents : Residents have a resident id(primary key), name, date of birth, age and date of joining the shelter. The admin can insert new residents, update existing resident info about their date of leaving the shelter, view current and past residents, and delete resident records.

Resident Employment : This table contains details about whether a resident is employed or not. If he is, details about his employer name, job title, employment start date is stored.

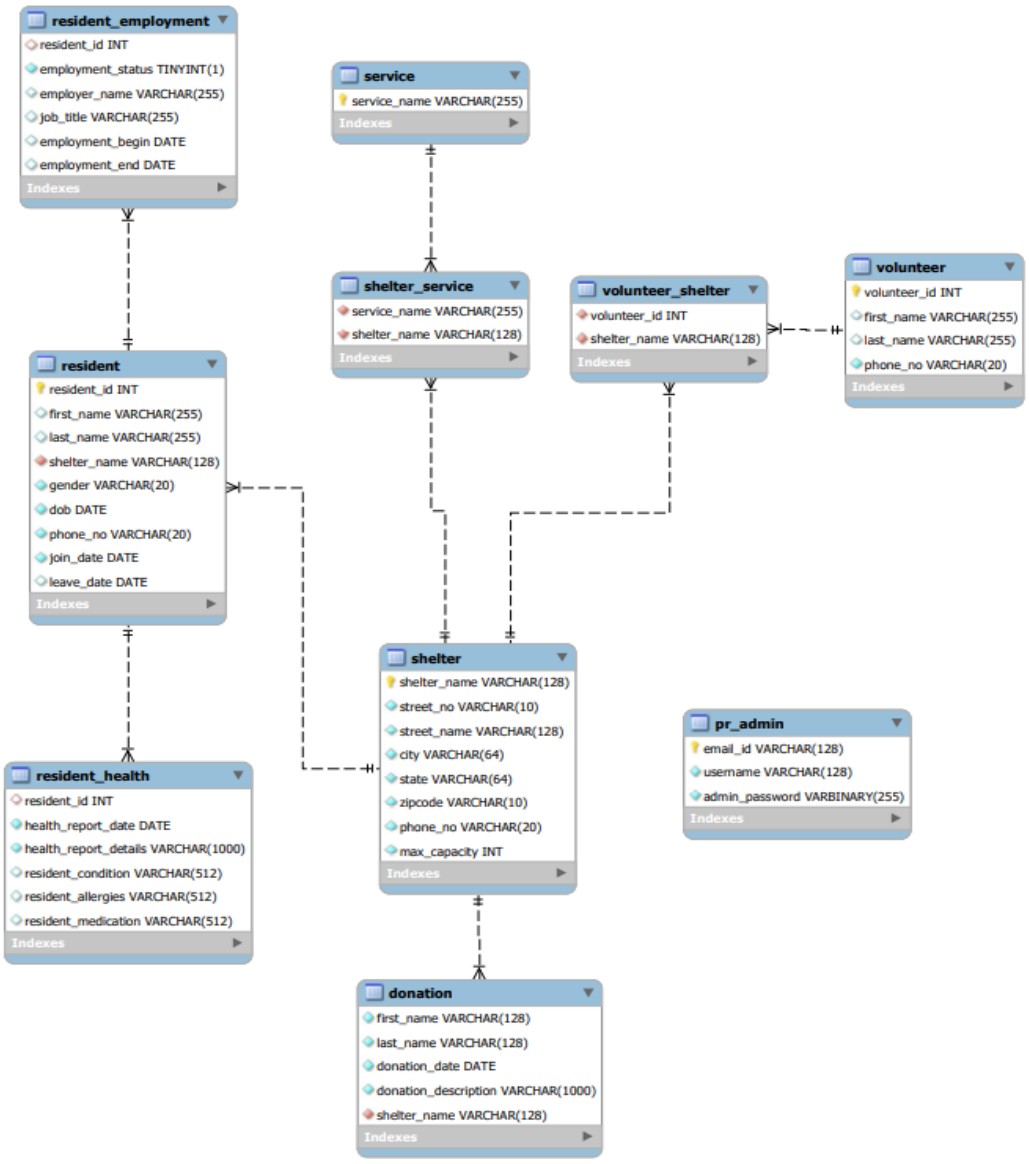
Resident Health : This table contains all details about any health conditions that a resident has. The resident's medication history, allergy information, additional report details, and the date of report are stored in this table.

Services : This table stores the name of services (primary key) provided by the shelter.

Volunteer : This table contains data about the volunteers who volunteer at the shelters. Volunteers have a volunteer id (primary key), name, and phone number.

Donation : This stable stores data about all the donations that a shelter receives. Donations are identified by the name of the donor, date of donation, and a description.

4. LOGICAL DESIGN



5. TECHNICAL SPECIFICATIONS

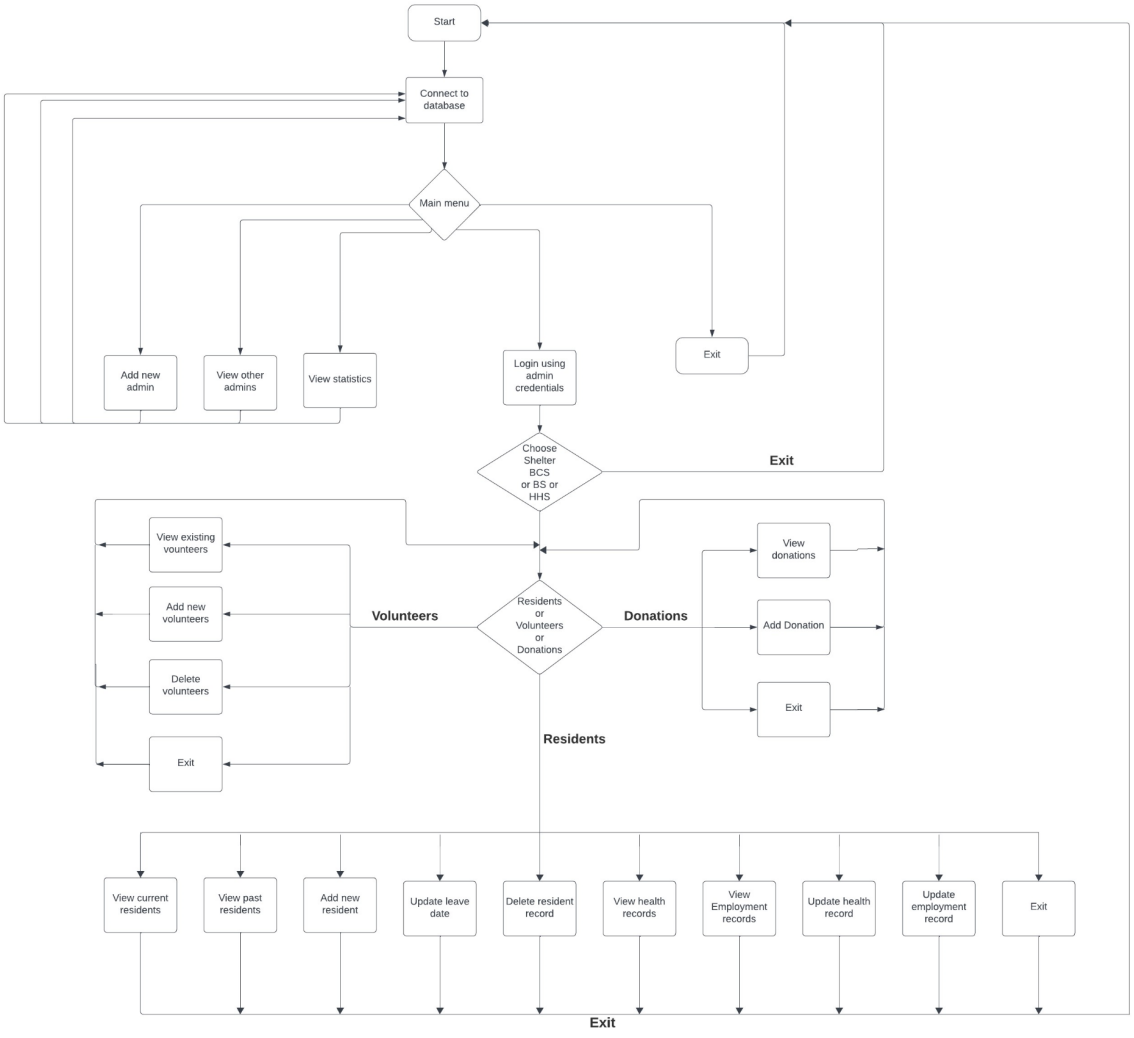
Hardware specification :

- Processor : i5 Core Processor
- Clock speed : 2.5GHz
- Monitor : 1024 * 768 Resolution Color
- RAM : 1 GB

Software specification :

- MySQL Libraries
- MySQL Workbench 6.3 CE
- Operating system : Windows10

6. USER FLOW



7. LESSONS LEARNED

7.1. Technical Expertise Gained : Throughout the course of the project, we acquired invaluable technical expertise. Developing the shelter management system using a relational database necessitated a deep understanding of database design, optimization, and implementation. Additionally, the integration of real-time data analytics and visualization tools demanded proficiency in relevant technologies. The team's enhanced technical skills now

encompass database management, data analytics, and software development, contributing to a holistic understanding of complex information systems.

7.2. Insights and Time Management : The project provided insights into the critical importance of efficient time management. Balancing the demands of database development, system testing, and iterative improvements required meticulous planning. We learned to prioritize tasks effectively, allocating time for both technical challenges and collaborative discussions. The iterative nature of the project emphasized the significance of adaptability and flexibility in project timelines, teaching us to navigate unforeseen challenges without compromising overall project goals.

7.3. Data Domain Insights : Engaging with the data domain of homeless shelter management revealed the multifaceted nature of the issue. Beyond technical aspects, a deep appreciation for the human-centric approach emerged. Understanding the diverse needs of homeless individuals underscored the importance of designing the system not only for administrative efficiency but also for the improved well-being of residents. These insights influenced the design choices, emphasizing user experience and the integration of support services into the database system.

7.4. Alternative Design/Approaches : The project journey prompted reflection on alternative design and approaches. We realized the necessity of a user-friendly interface, prompting adjustments to ensure accessibility for both administrators and shelter residents. Contemplation also led to the exploration of decentralized database architectures to enhance scalability and resilience. Additionally, the consideration of alternative data visualization techniques offered opportunities for more impactful communication of resident well-being metrics.

8. FUTURE ENHANCEMENTS

8.1. Planned Uses of the Database : The future trajectory of our homeless shelter database involves a strategic expansion aimed at facilitating comprehensive reporting and in-depth analysis. Our planned initiatives include the implementation of data-driven decision-making processes tailored for both shelter administrators and policymakers. Furthermore, we aspire to seamlessly integrate the database into wider municipal or regional databases, fostering heightened collaboration and augmenting the efficiency of resource allocation.

8.2. Potential Areas for Added Functionality : To enhance the database's utility, several potential areas for added functionality can be explored. Implementation of a user-friendly and secure web portal can facilitate direct engagement with residents, allowing them to access information related to services, upcoming events, and personalized support plans. Integration with external databases or social services platforms can broaden the scope of support available to residents, fostering a more holistic approach.