BAHRIA UNIVERSITY KARACHI CAMPUS

DEPARTMENT OF COMPUTER SCIENCE

Bahria University
Discovering Knowledge

Database Administration & Management

(ITC-424)

TOPIC NAME

Elderly CARE HOME MANAGEMENT

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Submitted On:

Date: 03 June 2025

ACKNOWLEDGE

I am deeply thankful to my respected instructor and mentor for their constant support and guidance throughout the development of this project. Their valuable feedback and encouragement inspired me to explore deeper into database administration concepts and apply them effectively. I would also like to thank my peers for their continuous encouragement and the collaborative environment they fostered during this project.

ABSTRACT

The Elder Care Home Management System is a comprehensive platform designed to automate and streamline the essential functions of elder care facilities. With the rising elderly population and the increasing need for quality care, this system ensures efficient management of residents, rooms, medical records, and visitor scheduling. Developed using PHP and MySQL, it incorporates advanced Database Administration (DBA) concepts like ETL, horizontal fragmentation, stored procedures, and materialized views to deliver optimized performance and data accuracy. The system not only simplifies administrative tasks but also provides scalable and reliable infrastructure suitable for institutional adoption.

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INTRODUCTION

The Elder Care Home Management System is a comprehensive, database-driven application tailored to manage the daily operations of a residential care facility for the elderly. These operations include resident management, room assignment, medical scheduling, visitor tracking, and administrative oversight. With the rise in the global elderly population, the need for efficient, secure, and scalable care home systems is more urgent than ever. This project addresses core management functions while integrating advanced Database Administration (DBA) concepts to ensure optimal performance, data integrity, and future scalability[1].

This system eliminates manual and inefficient processes by offering a centralized platform with a user-friendly web interface. It enables staff to interact easily with resident data and empowers administrators with advanced backend tools, enhancing both operational efficiency and data reliability.

PROBLEM STATEMENT

Managing an elder care home involves complex tasks that require precision and sensitivity. Without a centralized digital system, care homes commonly encounter the following problems:

- Data inconsistency due to manual record-keeping
- Inefficient room allocation and status tracking
- Absence of resident summaries and insights
- Limited data import/export capabilities
- No support for data fragmentation and performance optimization

These issues lead to operational delays, miscommunication, and reduced care quality. A robust, integrated system with both management and administrative features is essential for smooth operation and data-driven decision-making.

EXISTING SYSTEMS

Many care homes still rely on outdated tools such as spreadsheets or manual logs. Some use basic digital solutions, but these are often limited to admissions and billing. Common shortcomings of these systems include:

- No real-time updates or data synchronization
- Lack of automated summaries and analytics
- Difficulty handling large datasets during import/export
- Poor user interface design
- No implementation of DBA techniques like fragmentation or materialized views

This project addresses these limitations by introducing modern database features, intuitive design, and modular architecture[2].

OBJECTIVES AND GOALS

- **Develop a centralized system** to manage residents, rooms, and medical information efficiently.
- **Incorporate DBA concepts** such as ETL, stored procedures, and partitioning to enhance backend operations.
- **Enable CSV-based import/export** for better data handling and portability.
- **Provide data summaries** using materialized views and aggregate queries.
- **Enhance usability** through intuitive design and structured data visibility.
- **Ensure scalability and modularity** for future extensions and improvements.

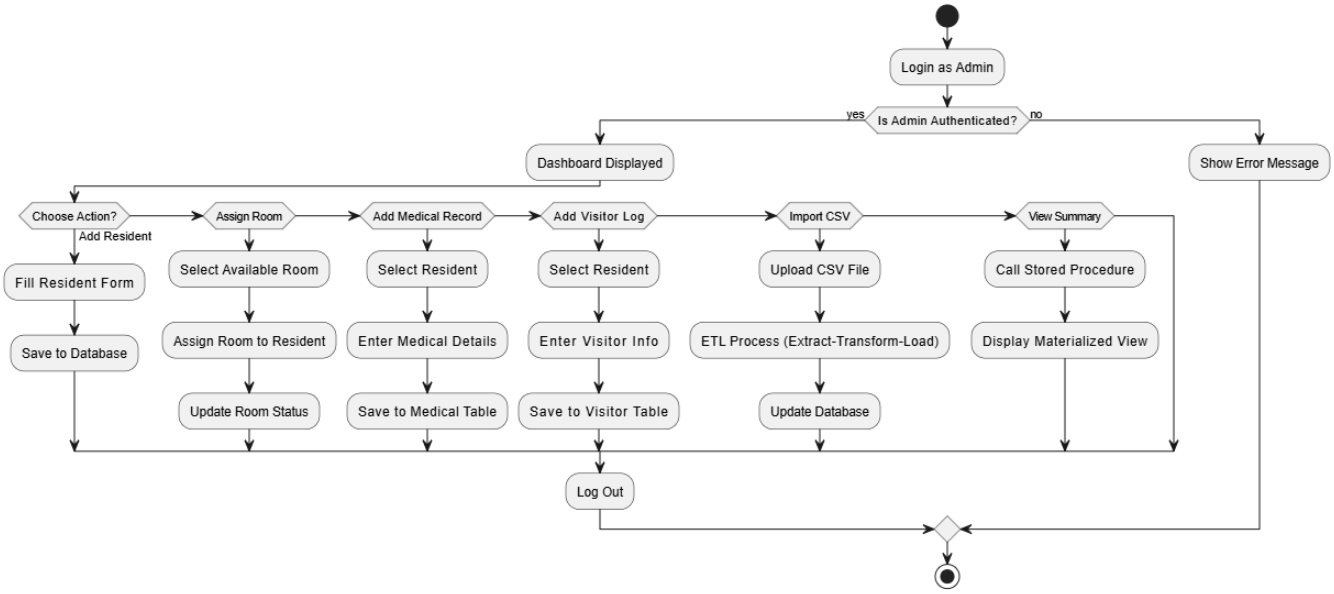
PROJECT SCOPE

This project focuses on automating and streamlining the operations of an elder care facility with a strong MySQL-powered backend. Core functionalities include:

- Resident management (admissions, edits, deletions)
- Room assignment with real-time occupancy status
- Medical records and medication history tracking
- Visitor logs and scheduling
- Admin interface with advanced DBA utilities

Implemented DBA techniques include ETL (CSV handling), horizontal fragmentation, stored procedures, materialized views, and summarized queries to create a balance between usability and backend efficiency.

WORKFLOW (UML REPRESENTATION)



OVERVIEW OF PROJECT

The system is modular, consisting of the following components:

1. **Resident Management Module**: CRUD operations for residents.
2. **Room Management Module**: View and manage room assignments using floor-wise (partitioned) data.
3. **Medical Records Module**: Maintain logs of medical visits and medications.
4. **Visitor Management Module**: Schedule and log family or friend visits.
5. **Admin Panel**: Dashboard for data tools including CSV import/export, partition views, and stored procedure execution.

All modules are connected via a centralized MySQL database.

TOOLS AND TECHNOLOGIES

- **Frontend:** HTML5, CSS3, Bootstrap 5[3]
- **Backend:** PHP 8+
- **Database:** MySQL 5.7/8.0
- **Web Server:** XAMPP (Apache + MySQL)
- **IDE:** Visual Studio Code
- **DBA Concepts Used:** ETL, Fragmentation, Stored Procedures, Materialized Views, UNION/Partition Queries

PROJECT FEATURES

- Resident form with dynamic inputs
- Floor-wise room assignment via partitioned data
- Medical record entry and updates
- Visitor log creation and scheduling
- Summary reports via materialized views
- CSV-based data import/export
- Manual refresh of summaries using stored procedures
- Admin dashboard with DBA utilities

FUNCATIONAL REQUIREMENTS:

- FR1: Admin can manage (add/edit/delete) residents
- FR2: Room availability shown by floor (partitioned view)
- FR3: CSV import to update resident records
- FR4: Export data to CSV for backups
- FR5: Summary generation using materialized view
- FR6: Record and update visitor information

NON-FUNCATIONAL REQUIREMENTS:

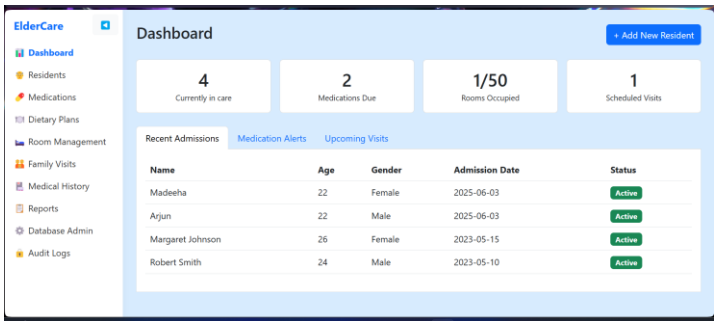
- NFR1: Fast response times (within 2 seconds)
- NFR2: Ensured data integrity via validations and transactions
- NFR3: Responsive design for multiple devices
- NFR4: Secure actions with confirmations and role-based tools
- NFR5: Modular coding structure for easy scalability

IMPLEMENTED DBA CONCEPTS

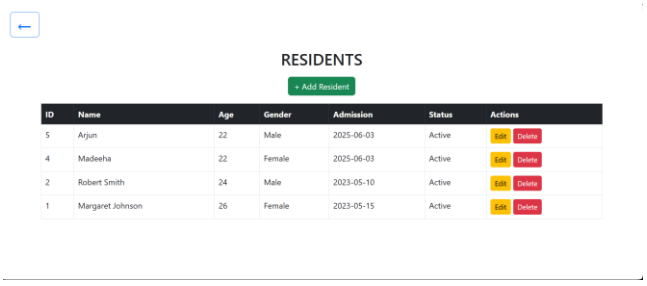
1. **Relational Set Operators:** UNION ALL used to combine room data from multiple floors
2. **Fragmentation:** Horizontal partitioning of room data into separate tables by floor
3. **ETL:** Data loading/unloading via CSV files using PHP scripts
4. **Stored Procedures:** Function RefreshResidentSummary() to update summary data
5. **Materialized Views:** Precomputed summary table for resident statistics
6. **Summarized Queries:** Aggregate SQL used for displaying dashboard data
7. **Simulated Partitioned Tables:** rooms_floor1, rooms_floor2 simulate actual partitioning

OUTPUT

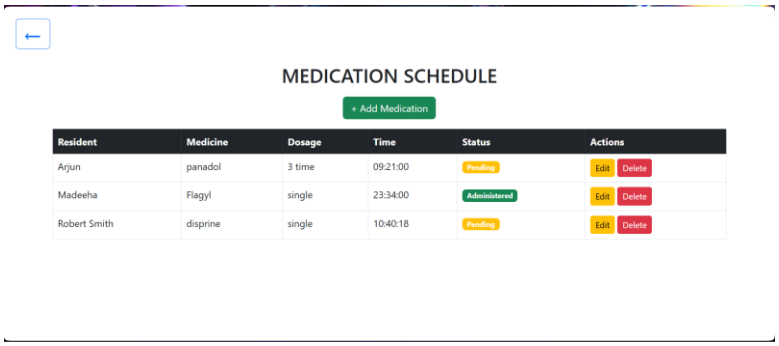
Main Dashboard:



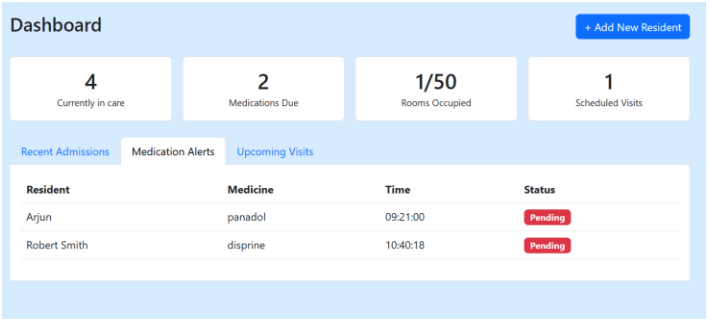
Resident records:



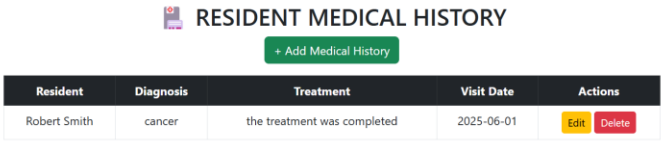
Each resident taking which medication:



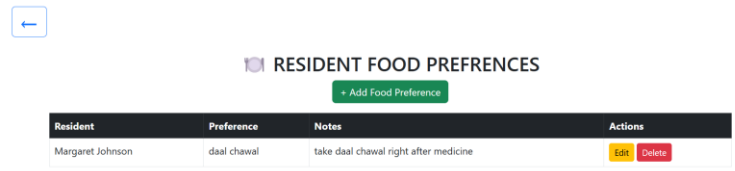
Medication alters:



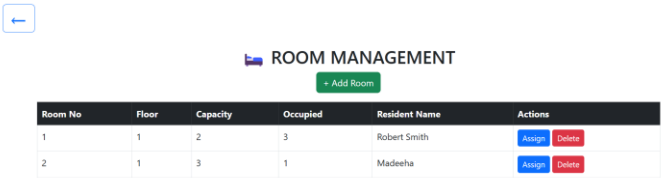
Medical history:



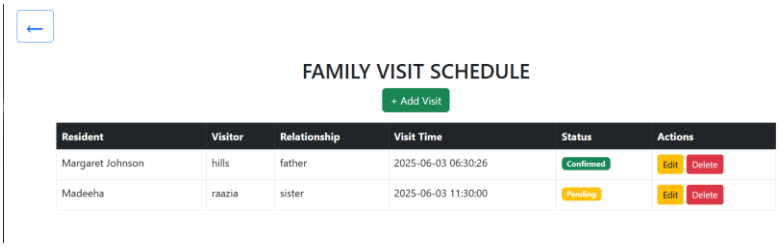
Dietary plans:

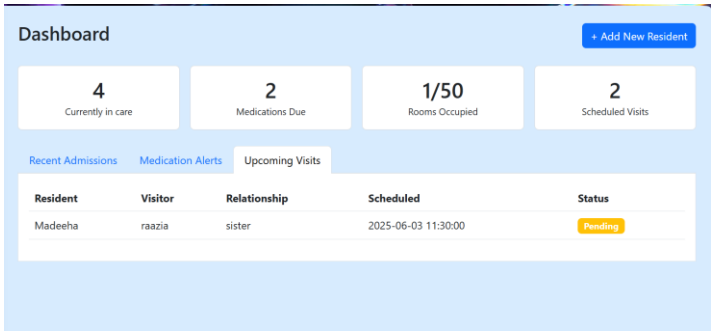


Room management:

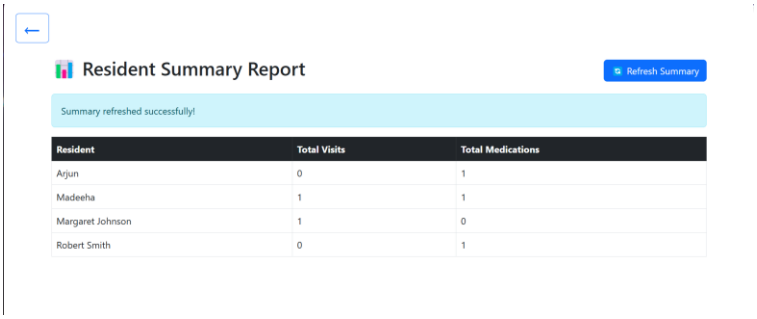


Family visits:

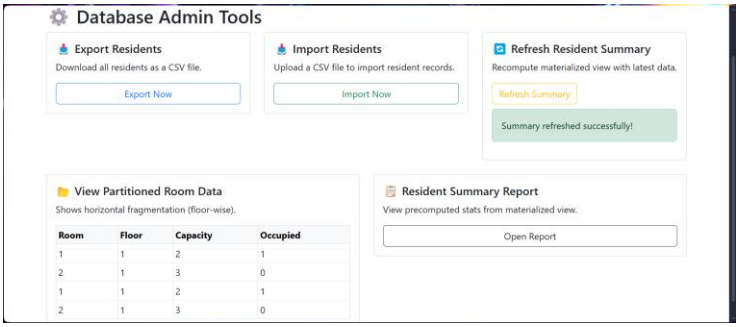




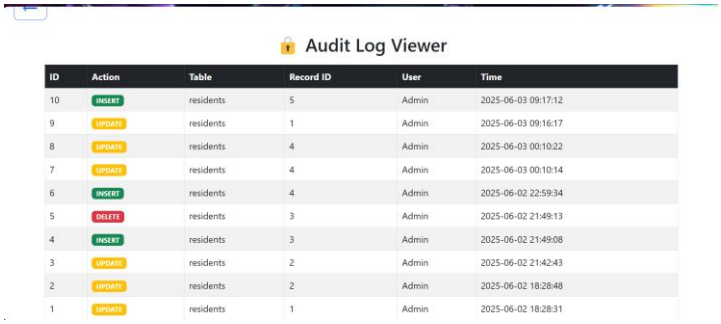
Reports:



Database admin:



Audits logs:



FUTURE WORK

- Add authentication and user role-based access
- Implement MySQL native partitioning techniques
- Develop real-time room vacancy monitoring
- Integrate data visualization (charts and graphs)
- Add audit logs using database triggers
- Enable cloud backup and remote database restore

CONCLUSION

The Elder Care Home Management System provides a full-stack solution to streamline elderly care facility management. By integrating modern DBA practices such as ETL, fragmentation, stored procedures, and materialized views, it ensures both operational excellence and backend efficiency. The project demonstrates a real-world application of advanced database principles and presents a solid foundation for further development or institutional deployment.

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[3] W3Schools, "PHP and MySQL Tutorial," [Online]. Available: https://www.w3schools.com. [Accessed: Jun. 3, 2025].

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