TERM 2 INDIVIDUAL SUBMISSION

Golden Connect

Submitted by: Mzuvukile Joninga

Student Number: 219006989

Role: Backend Developer

Project II - PRT262S

Cape Peninsula University of Technology

**EXECUTIVE SUMMARY**

As the Backend Developer for Golden Connect, this submission documents my contribution to developing a desktop application that will connect elderly residents with volunteers. Our system utilises Java with Three-Tier Architecture, focusing on creating an accessible and secure platform for our elderly users.

**Key Responsibilities:**

* Database design and implementation
* Backend system architecture
* API development and integration
* Security implementation
* Performance optimisation

**WIREFRAME DESIGNS and UI/UX IMPLEMENTATION**

**Colour Scheme Selection**:

Primary: #2E5077 (Deep Blue - Trust & Stability)

Secondary: #F9F9F9 (Off-White - Clarity)

Accent: #4CAF50 (Soft Green - Growth & Health)

Text: #333333 (Dark Gray - High Readability)

Alert: #E57373 (Soft Red - Clear Warnings)

**Wireframes &UI/UX design**

A white board with writing on it

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**DATABASE ARCHITECTURE**

**ERD Diagram**

*A diagram of a company

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**ATTRIBUTES/DATA REQUIREMENTS**

**User Entity:**

* UserID (Integer, Primary Key)
* Username (VARCHAR(50), NOT NULL)
* Password (VARCHAR(255), Encrypted)
* Email (VARCHAR(100), Unique)
* UserType (ENUM: 'Volunteer', 'Elder', 'Admin')
* ContactInfo (JSON)

**Session Entity**:

* SessionID (Integer, Primary Key)
* UserID (Foreign Key)
* DateTime (TIMESTAMP)
* Status (ENUM: 'Scheduled', 'Completed', 'Cancelled')
* ActivityType (VARCHAR(50))

**Activity Entity:**

* ActivityID (Integer, Primary Key)
* Name (VARCHAR(100))
* Description (TEXT)
* Duration (INTEGER)
* Category (VARCHAR(50))

**Health Tracking Entity:**

* TrackingID (Integer, Primary Key)
* UserID (Foreign Key)
* Metrics (JSON)
* DateTime (TIMESTAMP)
* Reminders (TEXT)

**ER Diagram**

A diagram of a health records

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**BUSINESS RULES & SYSTEM INTEGRATION**

**User Management Rules:**

* Passwords must be at least 8 characters long.
* Email addresses must be unique.
* User sessions expire after 30 minutes of inactivity.
* Failed login attempts are limited to 3 before temporary lockout.

**Health Monitoring Rules:**

* Vital signs recorded daily.
* Automatic alerts for abnormal readings.
* Health data accessible only to admins/authorised personnel only.
* Historical data maintained for 12 months to conserve the database.

**Activity Management Rules:**

* Maximum 10 participants per session.
* 24-hour cancellation policy on activities booked.
* Activities categorised by difficulty level.
* Volunteer-elder matching based on preferences.

**PROJECT PROGRESS & REFLECTION**

**Implementation Status:**as the backend developer I have completed the database schema design and its’ implementation. I have also coded the User authentication system and some basic CRUD operations. I have also done some security configurations. Although I have completed these, the health monitoring system, activity booking system, emergency alert system and real-time notifications are still in progress. I am yet to start with the advanced reporting features, analytics dashboard and still need to do more research and learning in machine learning integration before even starting on it.

**Challenges & Solutions**

While building my database, I faced a lot of difficulty with the database performance. The query response time was too slow with increasing data. I struggles for quite some time with this, and I did some research on how to solve these kinds of problems. The solution to my problem was implementing database indexing, optimising the query structures and I added caching mechanisms.

When I was building my security configurations, I had a problem ensuring secure data transmission, since our application will have sensitive information. To maximise my security to the best of my knowledge, I implemented encryption for sensitive data. I also added prepared statements, to handle security protocols/instructions. To enhance security, I created comprehensive access control system to give all users appropriate access.

I am still having trouble connecting frontend and backend systems, although I have all the systems, I am just not able to link them together. I tried developing clear API documentation, implemented standardised data formats with no luck.

**Technical Skills Gained:**

Ever since I have started on the project my understanding and skill of Java programming has improved considerably. I learnt different techniques for database optimisation, and I can confidently say that I can do basic security implementation protocols and API development.

APPENDICES

Repository: https://github.com/kleinworthfx/GoldenConnectProject2

**Recent Commits:**

I could not complete my commits to GitHub as I do not have access to the repository to push commits, the following still needs to be pushed to the repository:

* Implemented health monitoring system.
* Added security features.
* Optimized database queries.
* Created emergency alert system.

**Future Implementation Plans**

**Short-term Goals (1-2 months)**:

* Complete health monitoring system.
* Implement advanced security features.
* Optimize database performance.
* Add comprehensive error handling.

**Long-term Goals (3-6 months):**

* Implement analytics dashboard.
* Add machine learning capabilities.
* Develop mobile application.
* Create automated reporting system.

**Personal Development Reflection**

This project has significantly enhanced my technical skills and understanding of enterprise application architecture, Database design and optimisation but what I was most interested was security implementation. It has also improved my team collaboration skills and project management. The experience of working on Golden Connect has taught me valuable lessons about creating accessible applications for elderly users and the importance of robust error handling. I now understand the value of clear documentation and the benefits of agile development. Most importantly the significance of user-centred design

**CONCLUSION**

As the Backend Developer for Golden Connect, I have successfully implemented core functionality while maintaining focus on security, performance, and accessibility. The system architecture provides a solid foundation for future enhancements and scaling. Moving forward, I will continue to optimise and enhance the system based on user feedback and technological advancements.