DATABASE QUERYING APP

Functional Requirements:

1. **Data Manipulation:**
- The application should allow users to create new records in the database.
- Users should be able to retrieve existing records from the database based on various search criteria.
- The application must provide the ability to update and modify existing records.
- Users should be able to delete records from the database.

2. **Query Capabilities:**
- Users should be able to perform both simple and complex queries on the data.
- The application should support filtering data based on multiple attributes simultaneously.
- Users should be able to sort query results based on different fields.
- The application must provide support for both basic search and advanced search features.

3. **Data Validation:**
- The application should validate user input to ensure data accuracy and integrity before performing any CRUD operation.
- It should enforce data constraints and business rules during data creation and updates.
- Proper error messages should be displayed to users if validation fails.

4. **Authentication and Authorization:**
- Users must be required to authenticate before accessing the application's CRUD functionalities.
- Different user roles (admin, regular user, etc.) should have varying levels of access and permission to perform CRUD operations.

5. **Concurrency Control:**
- The application should handle concurrent access to data to prevent conflicts during simultaneous updates or deletions.
- Implement mechanisms like locking or optimistic concurrency control to manage conflicts.

Nonfunctional Requirements:

1. **Performance:**

- The application should have acceptable response times for querying and displaying data, even when dealing with large datasets.
- CRUD operations should be optimized for efficiency and responsiveness.

2. **Scalability:**
- The application should be designed to scale horizontally or vertically to handle increased data and user loads over time.

3. **Security:**
- User data should be stored and transmitted securely using encryption techniques.
- The application should be protected against common security vulnerabilities like SQL injection and cross-site scripting (XSS).

4. **Reliability and Availability:**
- The application should have high availability and minimal downtime to ensure users can access it when needed.
- Regular backups of the database should be performed to prevent data loss.

5. **User Experience (UX):**
- The application's user interface should be intuitive, user-friendly, and provide clear feedback on CRUD operations.
- Error messages should be informative and help users understand and resolve issues.

6. **Compatibility:**
- The application should work on a variety of devices, browsers, and operating systems to ensure broad user accessibility.

7. **Audit and Logging:**
- All CRUD operations, including creation, modification, and deletion, should be logged for auditing purposes.

8. **Data Integrity:**
- The application should ensure that data remains consistent and accurate throughout the CRUD process.

9. **Localization and Internationalization:**

- The application should support multiple languages and regional settings if applicable.

10. Compliance:

- If the application deals with sensitive data (e.g., personal information), it should adhere to relevant data protection regulations (e.g., GDPR, HIPAA).