Qt Database Exam: Pediatric Edition

Database Concepts with Pediatric Examples

Exam Structure

- 5 progressive exercises (30 minutes each)
- Focuses on SQLite with pediatric healthcare examples
- Same difficulty level as previous exam
- Tests identical database concepts in medical context

1 Exercise 1: Pediatric Database Fundamentals (30 minutes)

1. Design a database schema for tracking:
   - Patients (name, birth date, gender, blood type)
   - Vaccinations (vaccine name, date administered, dose)
   - Growth measurements (height, weight, head circumference, date)
2. Write Qt code to:
   (a) Create a SQLite database named "pediatric_clinic.db"
   (b) Implement proper error handling for connection
   (c) Close connection when application exits
3. Explain how you would store a patient's blood type (A+, B-, O+, etc.) in the database

2 Exercise 2: Pediatric Data Operations (30 minutes)

1. Write SQL queries to:
   - Insert a new patient record for a 5-year-old male
   - Update a patient's weight measurement
   - Find all patients due for MMR vaccination this month
2. Create a QSqlQuery to count how many patients are under 2 years old
3. What's the advantage of using prepared statements when recording vaccination data?

3 Exercise 3: Patient Records Viewer (30 minutes)

1. Create a Qt application with:
   - QTableView showing patient growth charts
   - QComboBox to filter by age group
   - Refresh button
2. Implement the age group filter using QSqlTableModel's setFilter()
3. How would you display BMI (Body Mass Index) in a single table column when the database stores height and weight separately?

4 Exercise 4: Pediatric Statistics (30 minutes)

1. Write SQL queries to:
   - Calculate average weight for each age group
   - Find the 3 most common vaccinations

- Count patients by blood type

2. Create a Qt function that displays a patient's complete immunization history using multiple database queries

3. How would you implement a "Vaccination Due" alert system based on patient age?

5 Exercise 5: Pediatric Database Best Practices (30 minutes)

1. How would you handle:

   - Patient transfers between clinics
   - Vaccine lot recalls
   - Historical data archiving for adult patients

2. Design a transaction for recording all measurements during a well-child visit (height, weight, vaccinations)

3. Propose a database schema versioning strategy for when new vaccines or growth standards need to be added

Key Database Concepts Covered

- Database Design: Tables, relationships, sensitive data types
- CRUD Operations: Creating, reading, updating medical records
- Model-View: Displaying patient statistics
- Complex Queries: Medical-specific analytics
- Transactions: Managing patient visits atomically