Qt XML Database Basics Exam

XML Storage with Qt

Exam Guidelines

- Duration: 90 minutes

- Implement solutions using Qt's XML classes

- Assume XML files as the database storage

- Focus on core XML database operations

1 Exercise 1: XML Database Structure (20 minutes)

Design an XML structure for a simple patient database that stores:

- Patient ID (unique identifier)

- Name and birth date

- List of vaccinations with dates

- Growth measurements (height/weight per visit)

Consider:

- How to organize hierarchical data

- What elements should be attributes vs child nodes

- How to ensure patient records are unique

2 Exercise 2: CRUD Operations (30 minutes)

Implement these database operations:

- **Create**: Add new patient to XML "database.xml"

- **Read**: Search patients by ID and display details

- **Update**: Modify a patient's vaccination record

- **Delete**: Remove a patient from the database

Requirements:

- Use QXmlStreamWriter/QXmlStreamReader
- Validate XML structure before operations
- Handle missing file cases

3 Exercise 3: Simple Queries (20 minutes)

Implement these search functionalities:

- Find all patients born after 2015
- List patients missing measles vaccination
- Calculate average weight for age group 2-5 years

Consider:

- How to efficiently traverse XML data
- What information needs to be indexed
- Memory usage with large XML files

4 Exercise 4: Data Integrity (20 minutes)

Handle these scenarios:

- Prevent duplicate patient IDs
- Validate date formats (YYYY-MM-DD)
- Ensure weight/height values are positive numbers
- Create backup before major operations

Implementation:

- Add validation logic
- Implement simple transaction rollback
- Create backup file automatically

Evaluation Criteria

- Correct XML structure design

- Proper use of Qt XML classes

- Complete CRUD implementation

- Basic error handling

- Efficient data querying

Allowed Qt Classes

- QXmlStreamReader/QXmlStreamWriter

- QFile/QFileInfo

- QDateTime for date handling

- QString for data manipulation

Forbidden Shortcuts

- No external XML libraries

- No hardcoded file paths

- No skipping error handling