

ECU Configuration Management Exam

Automotive Software Engineering

May 1, 2025

Exam Instructions

- Duration: 4 hours
- Implement all features in Qt/C++
- Use XML for data persistence
- Submit: Source code + compiled executable + documentation

1 Technical Requirements (100 points)

1. (20 points) XML Configuration Management
 - Implement XML schema for ECU parameters
 - Create load/save functionality
 - Include validation against schema
2. (25 points) Physical-Functional I/O Mapping
 - Create a GUI table showing:
 - Physical pins (e.g., PA5)
 - Functional names (e.g., Engine_RPM)
 - Signal types (Analog/Digital/PWM)
3. (15 points) Code Generation
 - Simulate Straton® integration
 - Generate C++ header with pin definitions
 - Export to .h/.cpp files
4. (15 points) HMI Preview

- Display a simple widget showing:
 - RPM gauge graphic
 - Throttle position indicator
5. (15 points) Diagnostic Data Management
- Implement DTC input form
 - Store fault codes in XML
 - Include basic search functionality
6. (10 points) Export Functionality
- Package all configurations
 - Generate downloadable .zip file

Submission Format

File	Description
ECUConfig.xml	Sample configuration
PinMapping.csv	Physical-functional mapping
SourceCode.zip	Complete Qt project
Report.pdf	Implementation notes