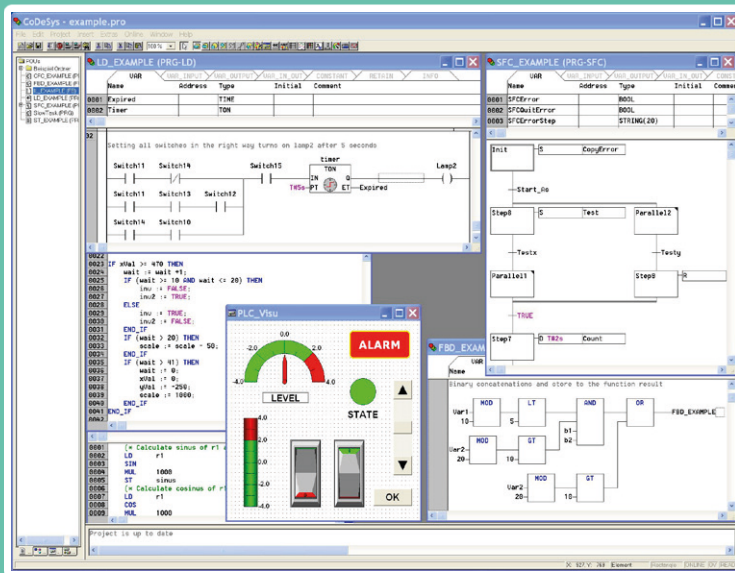


Object-Oriented PLC Programming in CODESYS

Modular and Scalable Control Systems
Using Structured Text



Academy Pro Title by
Majid Pakdel

Object-Oriented PLC Programming with CODESYS



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Preface

The industrial automation landscape is rapidly evolving, demanding more flexible, modular, and maintainable solutions than ever before. As control systems grow in complexity, the traditional approaches to PLC programming—centered around procedural logic and ladder diagrams—begin to show their limitations. This has opened the door to more advanced paradigms, particularly Object-Oriented Programming (OOP), which has long been the standard in mainstream software development.

This book is a practical guide for engineers, programmers, and students seeking to harness the power of OOP in the context of industrial automation using PLCs. The content is focused on the CODESYS development environment and Structured Text (ST), both of which support modern programming techniques while maintaining compatibility with real-time automation requirements. It is based on my personal study notes taken during the Udemy course PLC Object Oriented Programming: Advanced Infrastructure.

This book is my attempt to organize the core principles, demos, and practical techniques into a structured, reference-friendly format. Chapter 1 begins with an introduction to OOP within the PLC domain and an overview of the CODESYS software platform. Chapter 2 covers the foundational elements of Structured Text, including control structures, arrays, loops, and state machines. These are essential before delving into object-oriented concepts.

From Chapter 3 onward, readers are introduced to the building blocks of OOP in PLCs: classes, methods, properties, inheritance, and polymorphism. Each chapter includes real-world examples and demos designed to reinforce learning through practice. Later chapters introduce more advanced topics, such as access control, abstraction via interfaces, delegation, and the implementation of flexible finite state machines using object-oriented design patterns.

Whether you're an automation professional transitioning to modern programming methodologies or a student aiming to Build a solid foundation in control system software architecture, this book offers a hands-on, application-focused approach to mastering object-oriented programming in PLCs. It is my hope that these notes-turned-book will serve you as both a learning tool and a long-term reference, helping you design cleaner, smarter, and more scalable control systems.