modular mx

SOFTWARE ARCHITECTURE TRAINING

For embedded Engineers

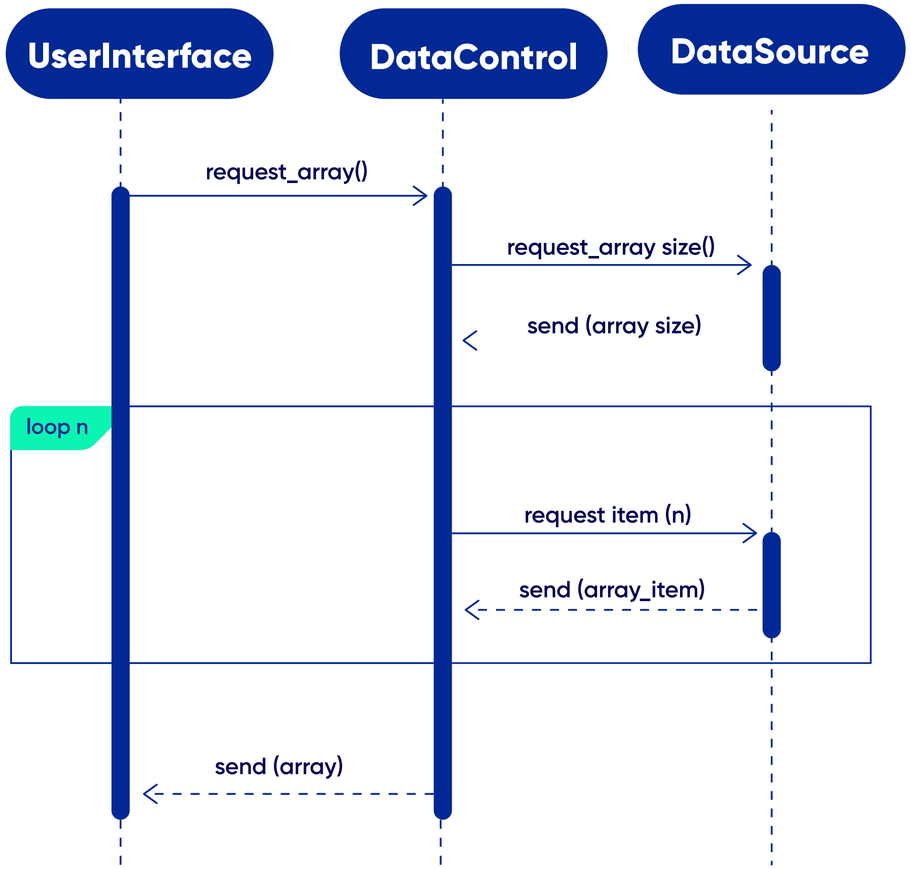
Generación: Caliope

UML & SysML

Program

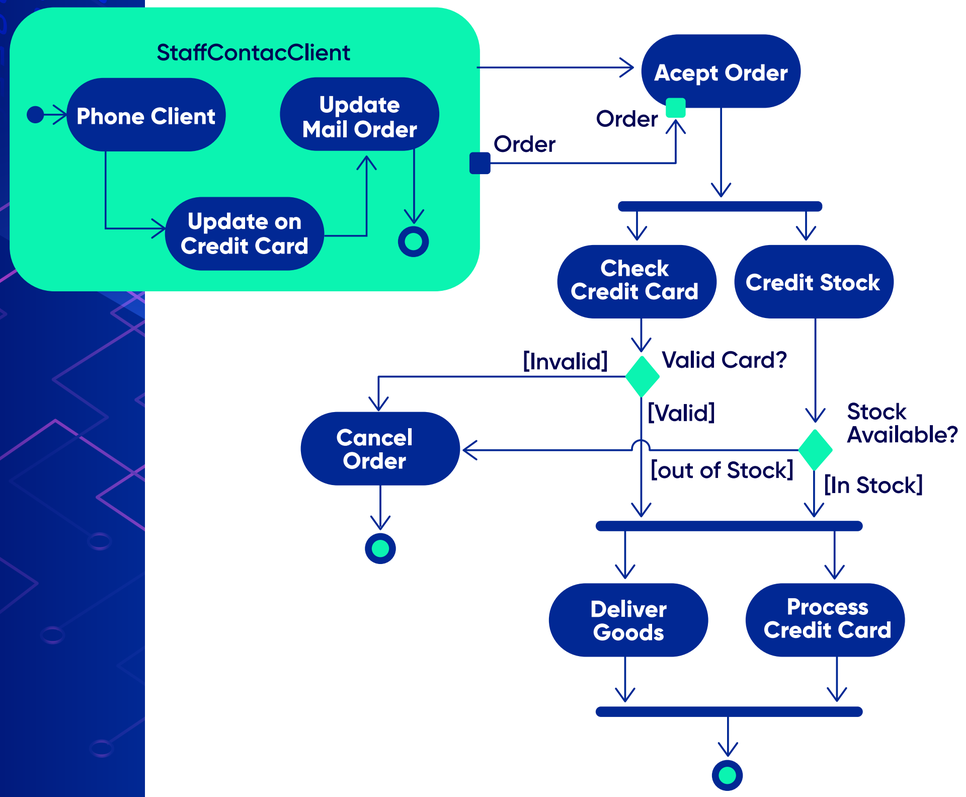
The embedded software architecture course highlights the terminology and the significance of software architects. The course describes the responsibilities and tasks of software architects and their role in the project, and presents state-of-the-art methods and techniques for the development of software architectures in Automotive. Upon completion of this course, you will be able to coordinate software projects with your team, to design and document the software architectures. So, you will master the methods and techniques you have learned and successfully implement them in your projects.

Interaction Diagram



Description

Activity Diagram showing the use of a Sub-Activity

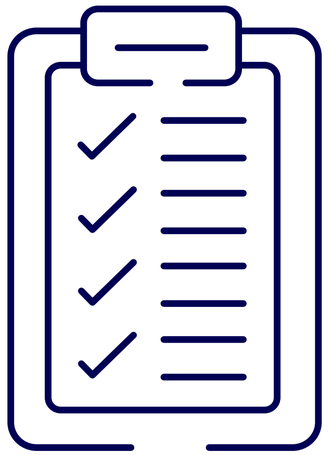


What is Software Architecture?, How to successfully establish effective Architecture in development process? These questions will be answered in this training.

This training defines the foundations of Software Architecture, evaluates the role of a Software Architect in developing projects, follows project initiation and requirements identification, plus implements practices related to the design, documentation, and analysis of software architecture.

Theoretical material is supported with examples from contemporary tools, frameworks, environments, and also the instructor's experience. Always focusing in Automotive domain. The course will provide real scenarios defining real work products.

The course includes both short exercises and comprehensive practice, starting from the problem's background up to actual design of a software system. The training ends with a presentation of the results of final project.



Contents

- **Foundations of Software Architecture**
  -Importance, definition, and objectives of software architecture
  -The software architect role
  -Interactions of software architecture with stakeholders and organization

- **Working with Requirements**
  Woring with SW requirements and And Low Level Requirements

- **Design of software architectures**
  -Design principles
  -SW Architecture Guidelines (ARC42)
  -Architectural patterns and design patterns
  -Dynamic and Static Diagrams (State Machine, Context diagram, Sequence, Activity, Component diagrams)
  -UML profiles

- **Software Architecture Process**
  Deliverables of Software Architecture

- **Documenting and communicating Software Architectures**
  Making the Architecture being used among stakeholders

- **Automotive Standards impacting Software Architecture**
  -Functional Safety – ISO 26262
  -Cyberseguridad – ISO/IEC 21434

- **Quality and Evaluation**
  -Importance of software architecture in achieving quality objectives.
  -Evaluating software architectures.

Projects

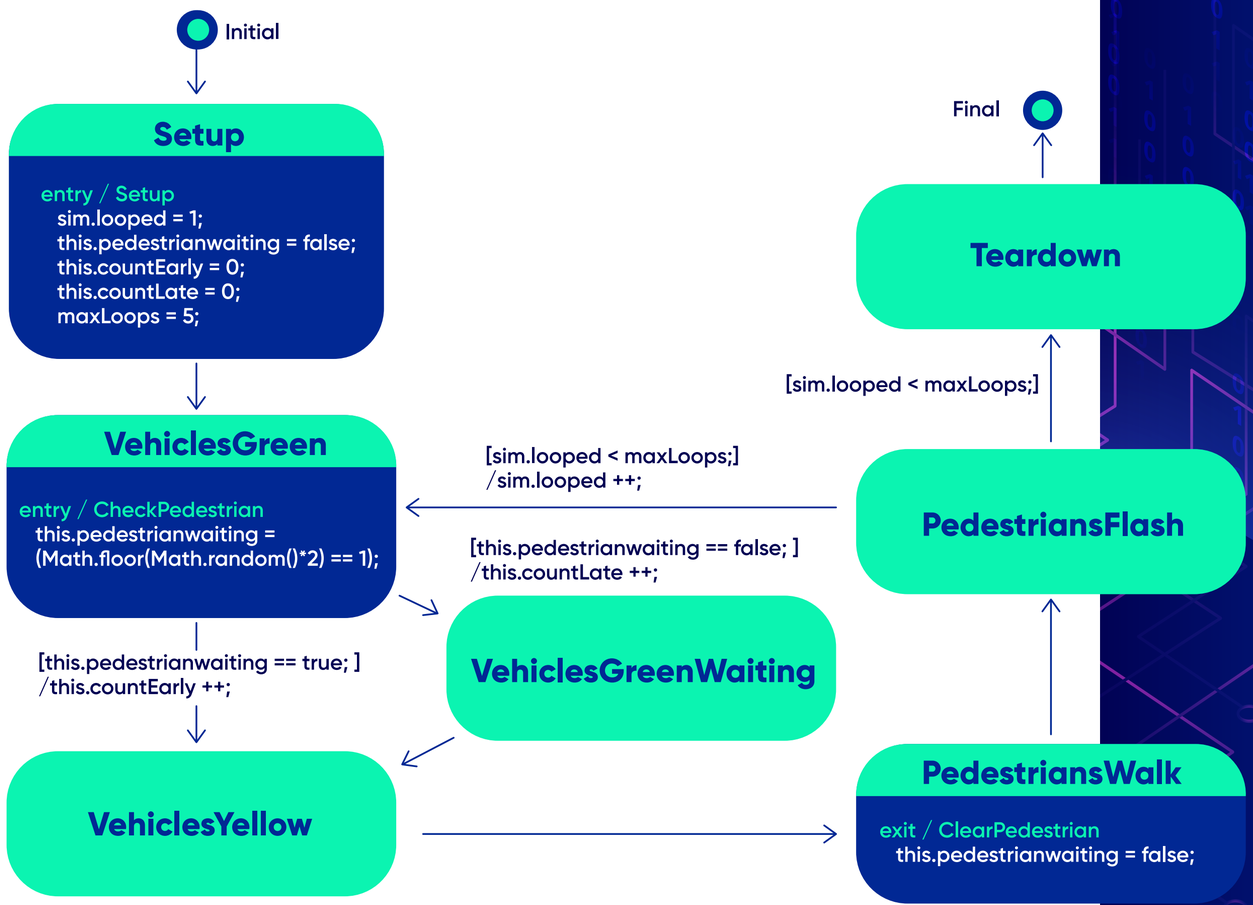
During the training, there will be two projects available for you to choose from, and you will work on one of them throughout the project's duration while acquiring the necessary skills to complete its modeling.

Proyect #1: The Elevator system
Elevator system is a system that is used to move people from one floor to another floor in a building in a given time with minimum number of stops.

Proyect #2: Keyless Door Lock system
Door is controlled with digital key (Smarth Phone or RFID tag). Digital keys are shared with friends and family and keep track of all events with the activity log.

Projects

Both models will be developed [SysML and UML] step by step. Adding each system/software element (i.e. Software Components, Software Interfaces, OS Tasks, Features, HW Components, etc.). The model will define all dynamic and static aspects of the system. More functionalities will be added to the model in each iteration. The model will use a layered architecture as AUTOSAR. Also, Functional Safety and Cybersecurity [Safety and Security Mechanisms] will be introduced. The overall design process will follow ARC42 guidelines.



Material

The Software Architecture course addresses software architects, software developers, software development managers and software technical leads. The course is also useful for those who have experience with embedded systems but have never had any formal training on embedded system architecture and design.

Duration
5 Weeks (10 hours per week)

Two sessions of 2 hour at a week guided with instructor (remote), plus 6 hours each participant must dedicate to complete assigned activities. Training is focus on hands on learning more than theory.

Requirements

Laptop (Windows, Mac or Linux)
Experience in Software development
Enterprise Architect (UML design tool)