

A Model-based Development Process for Embedded Systems

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Abstract

I present the model-based development process DePES (Development Process for Embedded Systems), which is tailor-made for the development of embedded systems. DePES starts with a requirements analysis based on Michael Jackson's problem frame approach. For the design, a layered architecture is proposed. Software components are specified using state machines, which supports pattern-based implementation and model-based testing.

DePES consists of a sequence of well-defined steps, in each of which a model (mostly expressed in some UML notation) is developed. Validation is an integral part of the process, as validation conditions are defined for each step, and test cases are generated systematically along the way.

The process emerged from industrial practice and uses well-established languages and techniques. Safety and security concerns can be integrated in DePES, and certification according to safety- and security standards (IEC 61508 and Common Criteria) is supported.