

Formal Methods - An Introduction

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- Motivation for Formal Methods
 - Safety-critical and Mission-critical systems
 - Why systems fail
 - Why writing correct software is difficult
 - Organizational and Technical Approaches
- What are Formal Methods?
 - Languages, Tools and Methodologies
 - Application Domains and Environment Assumptions
- Stages of the Formal Process
 - Formal Specification
 - Design and Development

- Formal Specification
 - Specification Styles
 - Declarative vs operational specifications
 - Partial vs Total models
 - Deterministic vs non-deterministic models
 - Abstract vs concrete models
 - Types of Formal Specification Notations
 - Model-Based Specifications
 - Algebraic Specification Languages
 - Process Algebra

- The Z Notation
 - What is a Z Specification?
 - Where did it come from?
 - The Mathematics of Z
- Structuring Specifications
 - Top-level structures
- Limitations of Formal Specifications
- Two short Examples