



## 2. Software Testing – Generalities II

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# Test generation

## Test generation

Test generation deals with the definition of strategies for the selection of appropriate data input and invocation sequences in order to form test sets satisfying given properties

Strategies can be defined for:

- Requirements
- FSM
- Statecharts
- PN
- Timed I/O Automata
- Algebraic and logic specifications
- Code (generally using monitored run-time data)

# Type of testing

Testing can be classified in many different dimensions in some case orthogonal with respect to each other. A classification framework helps in clarifying concepts:

- Source of test generation
- Lyfe cycle phase in which testing takes place
- Goal of a specific testing activity
- Characteristics of the artefact under test
- Test process

# Source of test generation

- Requirements > Black-box testing
- Code > White box testing
- Formal model > Model based testing (BB special case)
- Component interface > Interface testing (BB special case)

# Life cycle phase in which testing takes place

In the software production life-cycle different test are carried on with different objectives:

- Coding > Unit Testing
- Integration > Integration Testing
- System integration > System Testing
- Maintenance > Regression testing
- Pre-release > Beta testing

# Goal of a specific testing activity

Goal oriented testing aims at showing specific properties for the system and then **intends to show specific failures of the system**

- Robustness
- Vulnerability
- Security
- GUI
- Stress
- Performance
- Acceptance
- Compatibility

# Characteristics of the artefact under test

The focus here is on the characteristics of the artefact that is under test:

- OO testing
- Real-time testing
- Software testing
- Web service testing
- ...

# Test process

In this case the focus is on the development process model and its relation to testing activities:

- Testing in the waterfall model
- Testing in the V-Model
- Spiral testing
- Agile testing
- Test driven development
- ...



# The saturation effect

## Confidence vs. Reliability

- Confidence is a subjective assessment of the quality of the software with respect to its “correctness”
- Reliability should be an objective assessment of the quality of the software with respect to its “correctness”

The **saturation effect** warns testers on the efficacy of test generation strategies and suggest **variety**