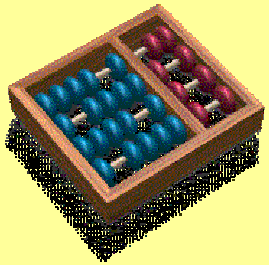

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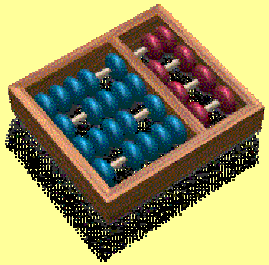

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Architecture-based Strategy for Interface Fault Injection

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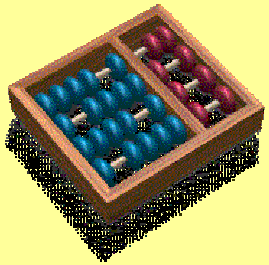

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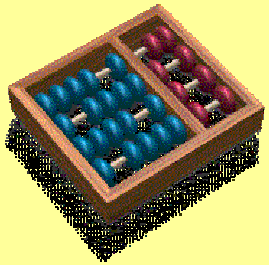
- Architectural View
- The Strategy
- Future Works



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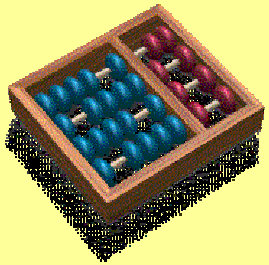
Motivation

- Systems as a combination of several components
- Helps to attend the increasing pressures to reduce time and money
- A good solution for system's architecture increases the system's quality



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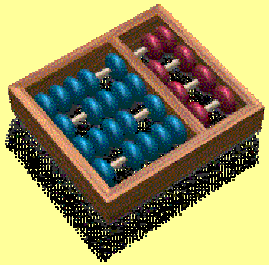
Motivation

- Each component's implementation needs to behave in accordance with its specification
- Malfunctioning in the interaction among components can compromise the overall system's quality
- Fault Injection can be a valuable approach to component-based system's testing



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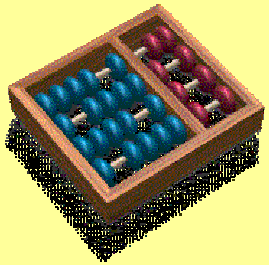
Fault Injection

- Fault Injection
  - faults (or errors) are deliberately introduced into a system
  - useful to validate error-handling mechanisms
  - useful to assess system behavior when its components fails
- We use sw-implemented fault injection
  - faults are introduced during runtime
  - faults represent failure modes of components (internal or external to the system)



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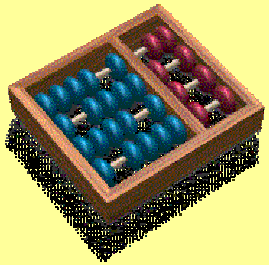
Jaca

- Software Fault Injection Tool
- Written in Java language
- Uses computational reflection implemented by Javassist
- Does not need the source code of the system under test
- Can inject high level faults in an object-oriented system written in Java language



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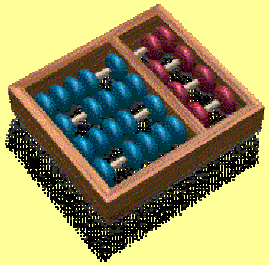
Problems to Solve

- Which components to inject?
- Where to inject the faults?
- Which error models to use?
- When to inject the faults?
- How to inject them?



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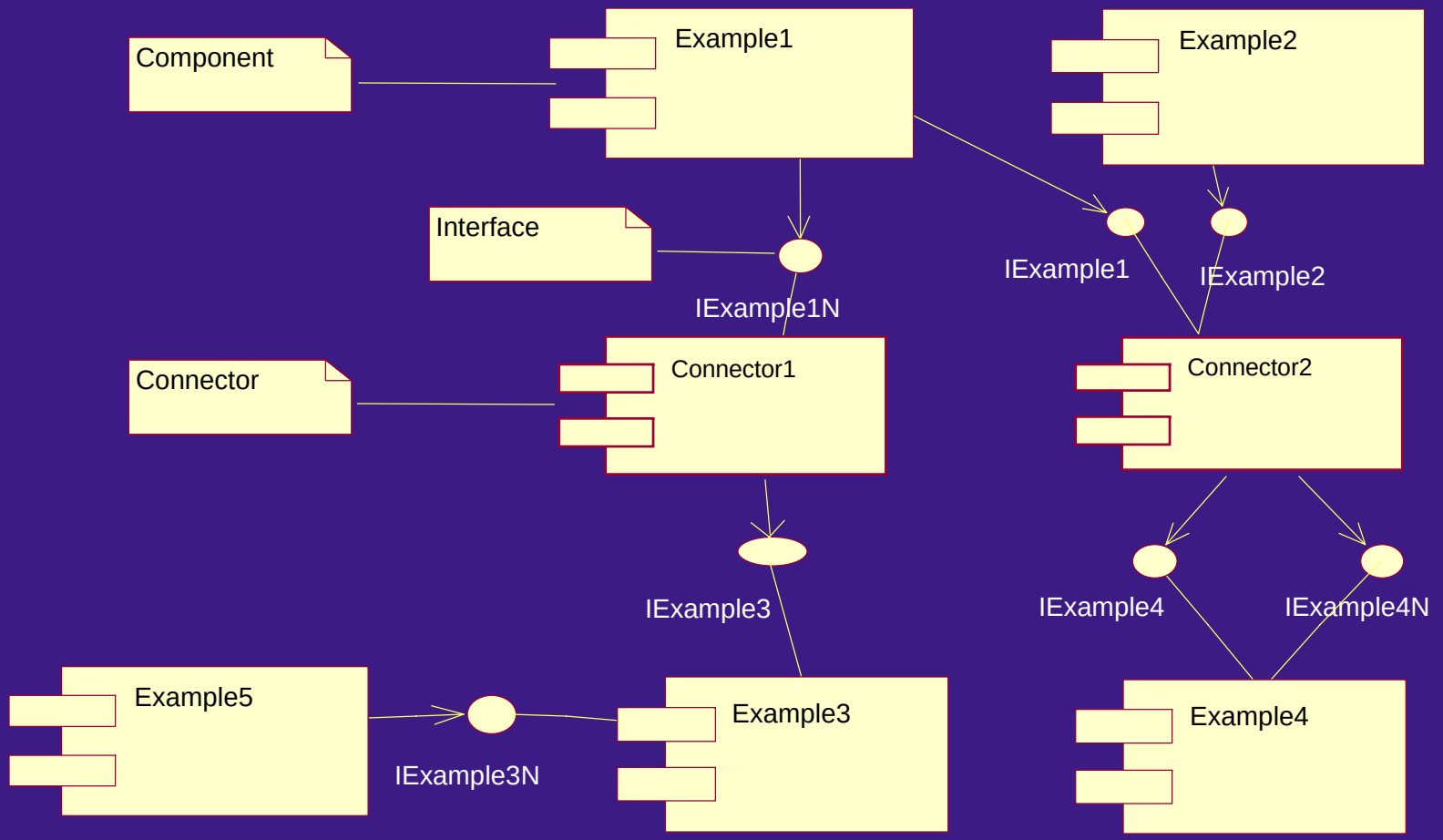
Architectural View



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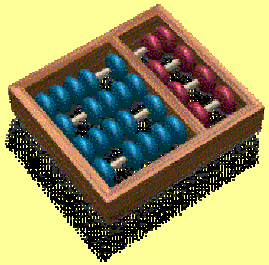

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The Strategy

A Strategy based on Risk

- Aimed to answer the following questions:
  - Which components to injec
  - Where to inject

New Component

Changed Component

Upstream Dependency

Downstream Dependency

Critical

Popular

Strategic

Third Party

Distributed

Not Understandable

3. Select Op

4. Generate

nts

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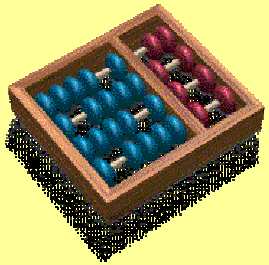

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The Strategy

➢Other questions:

- Which error models to use

5. Define Error Model

- **Ballista's Robustness Testing**
- **Integration Faults**

- When to inject the faults

6. Decide Temporal Characterization

- **Randomly selected among permanent, transient and intermittent faults**

- How to inject

Jaca Tool

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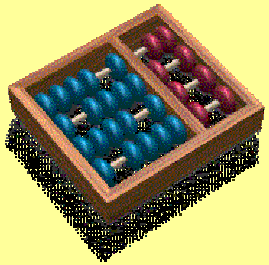

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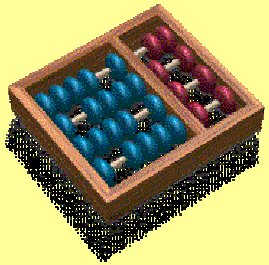
Future Works

Open Problems

- How many criteria must be satisfied?
- How should these criteria be weighted?
- How should each factor be quantified?
- How should successors and predecessors be determined?
- What error model should be selected?
- How can good controlability and observability be achieved?



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Thank You for Coming!

Questions and Suggestions

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