

Class 4:
Frameworks & Topics

Class 4
Frameworks and Course Topics

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Four General Requirements for Self-Healing Systems

- **Monitor:** Observe the running system and abstract observed behavior.
 - **Detection:** Continuously check design constraints via explicit run-time models.
 - **Resolution:** Determine the cause of constraint violation and choose a repair strategy.
 - **Adaptation:** Adapt the system using verified change strategies.
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Issues

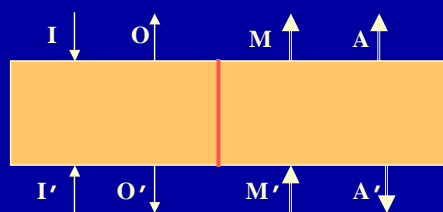
- **Monitor:**
 - » How can we get information out of a running system?
 - » How can we abstract it to make sense of observations?
 - **Detection:**
 - » What kind of models are useful? What kinds of constraints?
 - **Resolution:**
 - » What kind of repair engines are useful, efficient, flexible?
 - **Adaptation:**
 - » How can we verify repair strategies?
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 - » What kind of models are useful? What kinds of constraints?
- **Resolution:**
 - » What kind of repair engines are useful, efficient, flexible?
- **Adaptation:**
 - » How can we cause the repairs to happen safely in a running system
 - » How can we verify repair strategies?

Architectures of Self-Healing Systems

Basic Component



What is its signature?

Is this a general-enough model?

What architectural styles can be used to compose such components?

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Topics Revisited

- User Interfaces
 - Model-based Approaches –
 - » Owen (arch, esp), Bhuricha (arch, reflection)
 - Mobility, Ubiquitous Computing, OS Support, Resource-awareness
 - » Joao, Vahe
 - Alternative Models of Computation
 - » Kevin (bio & evolutionary, esp)
 - Agent-based
 - » Justin (games)
 - Algorithms and Code
 - » Vahe (esp self-stabilizing)
 - Networks, Distributed Systems, and Middleware
 - » Sukanya? (esp. fault-tolerance, etc.)
 - Fault Tolerance, Dependability, Reliability, etc.
 - » Paul?
 - Formal Models
 - » Jung Soo + Model-based
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