Lakitu

Runtime Repair of Software Faults using Event-Driven Monitoring

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Is Chess Broken?

Prove to me chess works in all states (informally)

State space is a hard problem
Possible Answers

We can’t all build supercomputers
We can’t test everything
Hiring hundreds of humans doesn’t scale
Assume software bugs are **inevitable**

This makes our problem more tractable
Preview

**Architecture**
How it works

**Runtime efficiency**
Speed of evaluation

**Programmer efficiency**
Easy to implement

**Design efficiency**
Liberating program design
Architecture

System events

System Under Test → Message Broker → Rule Engine

Repair events
Runtime Efficiency

Uses a modified RETE algorithm, making comparisons efficient.
rule "marioJumpTooLong"
  duration(2s)
  when
    $jump : Jump($mario : mario)
    not(Landing(this after[0s,2s] $jump))
  then
    logger.info("Mario jumped too long");
    try {
      send(new MarioMovement(false, null, null));
    } catch (Exception e) {
      ...
    }
end
Design Efficiency

Encourage creativity, not paranoia
Review

**Architecture**
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Conclusion

Bugs are inevitable, but detecting and repairing them is possible

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