Alloy: Language & Tool

http://d3s.mff.cuni.cz

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Overview

• Modeling language
• Automated analyzer

• Web: [http://alloytools.org/](http://alloytools.org/)

• Features
  ■ Assertions about models (systems)
  ■ Generating solutions (instances)
  ■ Visualization of counterexamples
Modeling language

• Fully declarative

• Syntax
  ▪ First-order logic, sets, relations
  ▪ Object-oriented programming

• Behind the scenes: relations & join
Alloy IDE

- Text editor
- Messages
- Visualizations of instances
- Custom themes (style)
Syntax & Example

- Entities: signatures, relations, sets

- Properties: facts, assertions
  - Under-constraining
  - Over-constraining

- Commands: run, check
  - Finite scope (*small scope hypothesis*)
Dynamic behavior

- Multiple versions of the system
- Specifying operations
  - Predicates
  - Functions
- Generating execution traces
  - Linear ordering of states
Final notes

- Limitations: integers, sequences

- Additional examples

- Further reading
  - http://alloytools.org/documentation.html