#### Relational Programming in miniKanren

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For my H211 students: Indiana University, Fall 2010 & 2011.

 $Learning\ with\ always\ trumps\ learning\ from.$ 

—Woodie Flowers

# Acknowledgments

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# Introduction to Relational Programming

#### Introduction to miniKanren

- 2.1 Core miniKanren
- 2.2 Constraint Logic Programming

# Translating from Scheme to miniKanren

- 3.1 A-Normal Form
- 3.2 Defunctionalization
- 3.3 Pattern Matching

## Exploring the Chomsky Hierarchy

- 4.1 Regular Expression Matching
- 4.2 Deterministic Finite Automata

## Relational Exploration of Programming Languages Fundamentals

- 5.1 Lexical Scope
- 5.2 Relational Program Transformations
- 5.2.1 Continuation-Passing Style

## Relational Interpreters

- 6.1 Relational Scheme Interpreter
- 6.1.1 Generating Quines
- 6.2 Relational CESK Machine
- 6.2.1 Static Analysis using the Relational CESK Machine

## Type Inference

7.1 Type Inhabitation

## Probabilistic Logic Programming

## Implementing miniKanren

- 9.1 Unification
- 9.2 An Embedding in Scheme
- 9.3 A miniKanren Interpreter
- 9.4 A Meta-circular miniKanren Interpreter
- 9.5 An Abstract Machine for miniKanren
- 9.6 A Relational miniKanren Interpreter

# The Future of Relational Programming

- 10.1 Open Problems
- 10.2 Projects
- 10.2.1 Tool Support

Automatic Scheme-to-miniKanren Translation

**Debugging Support** 

10.2.2 Interpreters

Relational Concatenative Interpreter

10.2.3 Fun Projects

Relational 6502 Emulator

Relational Atari 2600 Emulator

# Bibliography