

# Dependent Types and Theorem Proving: Proving is programming in disguise

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## 1 Constructive propositional logic: you already know it

- The logic
- Propositions are types, proofs are programs
  - Function types are implications
  - Sum (tagged union) is disjunction
  - Product is conjunction
  - Unit is True
  - Falsity and negation

## 2 First-order logic: you already know it

- Predicates and relations
- Universal quantifier is the dependent function type
- Existential quantifier is the dependent pair type

## 3 Inductive predicates and relations

## 4 Proof relevance

## 5 Equality

- How to define equality
- Undecidability
- Difference between propositions and booleans

## 6 Intrinsic vs extrinsic style

## 7 Axioms and classical logic

