Logical Inference 4 wrap up

Chapter 9

Prolog: logic programming language based on Horn clauses

- Resolution refutation
- Control strategy: goal-directed and depth-first
  - always start from the goal clause
  - always use new resolvent as one of parent clauses for resolution
  - backtracking when the current thread fails
  - complete for Horn clause KB
- Supports answer extraction (can request single or all answers)
- Orders clauses & literals within a clause to resolve non-determinism
  - Q(a) may match both Q(x) <= P(x) and Q(y) <= R(y)
  - A (sub)goal clause may contain >1 literals, i.e., <= P1(a), P2(a)
- Use "closed world" assumption (negation as failure)
  - If it fails to derive P(a), then assume ~P(a)

Summary

- Logical agents apply inference to a KB to derive new information and make decisions
- Basic concepts of logic:
  - Syntax: formal structure of sentences
  - Semantics: truth of sentences wrt models
  - Entailment: necessary truth of one sentence given another
  - Inference: deriving sentences from other sentences
  - Soundness: derivations produce only entailed sentences
  - Completeness: derivations can produce all entailed sentences
- FC and BC are linear time, complete for Horn clauses
- Resolution is a sound and complete inference method for propositional and first-order logic