Artificial Intelligence – Exam 2 Outline – Fall 2019

The exam will be closed book, closed notes. The exam will cover the following topics.

Logic

- First-order logic
  - Syntax and semantics
  - Properties of quantifiers
  - Closed-world assumption
  - Translate word problems to first-order logic
- Inference in first-order logic
  - Unification (know algorithm, time complexity)
  - Conversion to CNF
  - Resolution proof by refutation (know algorithm, soundness, completeness)
- Application to Wumpus World

Planning

- Understand difference between planning and search/logic
- Know the components of the PDDL planning language
- Know approaches to planning: forward and backward
- Understand planning heuristics
- Know domains: Blocks, Cargo, Vacuum

Uncertainty

- Rational agent maximizes expected utility
- Probability
  - Axioms
  - Unconditional (prior) or conditional (posterior)
  - Random variable
  - Distribution
- Probabilistic inference (be able to execute all below)
  - Using full joint probability distribution
  - Normalization
  - Independence and conditional independence
  - Bayes rule
  - Naïve Bayes
- Application to Wumpus World

Probabilistic Reasoning

- Bayesian networks
  - Nodes, links, conditional probability tables
  - Construction
  - Compute P(X | e)
- Application to Wumpus World