Artificial Intelligence – Exam 2 Outline – Fall 2021

Logic

- Knowledge-based agent
- Syntax, semantics, soundness, completeness
- First-order logic (FOL)
    - Syntax and semantics
    - Properties of quantifiers
    - Closed-world assumption
    - Translate word problems to FOL
- Inference in FOL
    - Logical equivalences
    - Inference rules
    - Clause and Conjunctive Normal Form (CNF)
    - Full resolution
    - Unification
    - Conversion of FOL to CNF
    - Resolution proof by refutation
- Application to Wumpus World

Uncertainty

- Rational agent maximizes expected utility
- Probability
    - Axioms
    - Unconditional (prior) and conditional (posterior)
    - Random variable
    - Distribution
- Probabilistic inference
    - 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)
    - Approximate inference: Direct sampling
- Application to Wumpus World