

## Readings Covered on Final Exam Introduction to AI – CISC481/681 – Spring 2012

The following topics/readings will be covered on the final taking place on Tuesday, May 22, 10:30am – 12:30pm, QDH 74. The readings are from the course text, *Artificial Intelligence A Modern Approach, Third Edition*, by Stuart Russell and Peter Norvig (called R&N below).

- R&N, Chapter 7 (up to and including 7.5.2), pp. 234-256, Logical Agents
  - A knowledge-based agent
  - Representation, reasoning, and logic – what is a logic? How does one work with it? etc...
  - Reminder of propositional logic and inferencing
  - Propositional Theorem Proving
- R&N, Chapter 8, pp. 285-314, First-Order Logic
  - Syntax and Semantics of first-order logic
  - Writing sentences in first-order-logic.
- R&N, Chapter 9, pp. 322-357, Inference in First-Order Logic
  - Rules of Inference
  - Unification
  - (Do not spend a lot of time on forward and backward chaining – I am not concerned with the efficiency issues, for example, just the basics.)
  - Resolution Proofs (section 9.5 is especially important) (handout)
- R&N, Chapter 18, Learning from Examples, Sections 1-4 (pp. 693-713).
  - Forms of learning
  - Inductive learning
  - \*Learning Decision Trees – including information theory
    - \* Decision tree definitions
    - \* Algorithm for inducing a decision tree
    - \* Using information theory in decision tree learning
  - Assessing the performance of a learning algorithm
- R&N (**2nd edition**), Chapter 10.3 Knowledge Representation – Actions, Situations, and Events – pp. 328-334.
  - Situation Calculus and the frame problem (used in planning introduction)
- R&N, Chapter 11 (first 4 sections) (**2nd edition**), pp. 375-402, Planning
  - Planning Problem – strips representation
  - Planning with state space search – forward and backward reasoning
  - Partial Order Planner

- Planning Graphs
- R&N, Chapter 13 Quantifying Uncertainty, pp. 480-503, emphasize what was covered in lecture. This is important background for understanding and working with Bayes Nets.
  - Acting under Uncertainty
  - Basic Probability Theory: propositions, atomic events, prior probability, conditional probability
  - Inferencing using full joint distributions
  - independence
  - Bayes' Rule and its use
- R&N, Chapter 14, Probabilistic Reasoning – Bayesian Networks – 14.1, 14.2, 14.4 through and including 14.4.2, pp. 510-518 (figure), 522-528. – NOTE – in 14.2 you should pay particular attention to P. 513-514 (Representing the full joint distribution); in 14.4 you should pay particular attention to p. 523-524 (Inference by enumeration). You should understand the independence relationships so you could construct a Bayes' Net given a description (or tell which network is correct). You should be able to calculate various probabilities given a Bayes' Net.