

**CMPSC 370**  
**Artificial Intelligence**  
**Spring 2012**  
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**Final Exam Review—Concepts and Terms (Incomplete—more coming)**

## Important Terms

It is not enough simply to be able to define these terms; you must understand how to use them.

- **Chapter 2:** propositional calculus/logic; predicate calculus/logic; well-formed formula (WFF); existential and universal quantifiers; rule of inference; modus ponens; unification; Prolog—facts and rules, variables and constants
- **Chapter 10:** symbol-based learning; concept, concept space; supervised, unsupervised learning; training data; negative, positive examples; general-to-specific concept search; specific-to-general concept search; decision tree; classifier; information content/entropy; inductive bias; cross-validation
- **Chapter 11:** connectionism; artificial neuron; perceptron; threshold function; linearly separable; bias node; multi-layer neural network; sigmoid function; backpropagation; feedforward network; Hopfield networks; outer product; . . .
- **Chapter 12:** stochastic; hill-climbing; evolutionary algorithm; genetic algorithm; genetic programming; tournament selection; mutation; elitism; one-point crossover; population; generation; optimization; NP-complete; Knapsack Problem; Traveling Salesman Problem; . . .
- **Miscellaneous Topics:** probabilistic methods:  $n$ -grams and random sentence construction; “fuzzy sets”; partially-observable Markov decision processes; “game AI” issues;

## Important Problem Types

- **Chapter 2:**
  - Given an expression in propositional logic, construct a truth table for it.
  - Given an expression in propositional logic and a set of assignments to the variables, evaluate it
  - Express simple English statements in the form of quantified predicate logic statements
  - Interpret simple Prolog statements into English
  - Construct sets of facts and rules in Prolog for simple inference problems.
  - “Hand execute” simple Prolog programs.
- **Chapter 10:**
  - Evaluate a decision tree given a set of values for the concept properties represented by the tree

- Construct a simple decision tree given a description of a concept
- Interpret the decision tree output by WEKA in either the J48 or the ID3 classifier
- give the formula for computing the information content of a set of messages; evaluate it in easy cases

- **Chapter 11:**

- evaluate the output of a simple perceptron on a given set of inputs
- apply the perceptron learning rule for a given perceptron, a given training example, and a given learning constant

- **Chapter 12:**

- ...

- **Miscellaneous Topics:**

- ...