CS4881 AI – Final Exam Study Guide

Emphasize topics in **BOLD**.

AI Concepts
- Rationality
- Turing test

Intelligent Agents
- Given a class of environments and tasks seek agent with best performance
- PEAS –
  - performance measurement
  - **task environment**
    - Fully/**partially observable**, deterministic/**stochastic**, episodic/**sequential**, static/**dynamic**, discrete/continuous, **single/multi agent**.
  - actuators
  - sensors
- Agent functions, types, architecture
  - Reflex, model based, goal oriented, utility based
  - Learning agents

Uninformed Search
- Problem solving agents, states, actions to consider given a goal
- Tree search algorithms
- completeness, time complexity, space complexity, optimality
- breadth-first, uniform-cost, depth-first, iterative deepening search

Informed Search
- Greedy, best-first, A*, local search, hill climbing, simulated annealing, local bean, genetic algorithms

Constraint Satisfaction
- CSP Problems
- Backtracking search
- Local search for CSPs

Game Playing
- Adversarial search
- Initial State, successor function, terminal test, utility function
- Minimax
- Alpha-beta pruning
- Expectimax
- Resource limitations, cutting off search, singular exclusions

Markov Decision Processes and Reinforcement Learning
- Bellman equations
  - Value function V(s)
  - Action-value function Q(s, a)
- Value iteration
- Policy iteration
- Policy evaluation
- Q-Learning
- Evaluation functions
- Using machine learning for evaluation function

Supervised Machine Learning Concepts

- Supervised Learning concepts
- Linear Regression
- Logistic Regression
- Gradient descent concepts
- Neural Networks and Deep Learning
- Dense networks
- Backpropagation using stochastic gradient descent concepts
- Convolution Networks

Deep Reinforcement Learning

- Deep Q-Learning

Generative Learning Concepts

- Autoencoders
- Generative Adversarial Networks

State of the Art Ideas