THE UNIVERSITY OF TEXAS AT DALLAS
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Midterm Study Review

CS-4365: Artificial Intelligence

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Overview

- Artificial Intelligence
  - Chapter 1 – Intro
  - Chapter 2 – Intelligent Agents
- Problem-solving
  - Chapter 3 – Problem Solving by Searching
  - Chapter 4 – Beyond Classical Search
  - Chapter 5 – Adversarial Search

Chapter 1: Intro

- T/F, Multiple Choice, Multiple Answer, Matching, Ordering
- Four categories of defining AI
- Foundations of AI
  - 1.2.1 – Philosophy
  - 1.2.2 – Mathematics ■ etc.
- State of the Art
- Summary

Chapter 2: Intelligent Agents

- T/F, Multiple Choice, Multiple Answer, Matching, Ordering
  - Short Answer
- Agents and Environments
  - Agent Function
- Good Behavior
  - Rationality
- Nature of Environments
  - PEAS Description given English example
  - 2.3.3 – Properties of Task environments

Chapter 2: Intelligent Agents

- Structure of Agents
  - TABLE-DRIVEN-AGENT
  - SIMPLE-REFLEX-AGENT
  - MODEL-BASED REFLEX-AGENT
- Representing States
  - Atomic
  - Factored
  - Structured
- Summary

Chapter 3: Solving By Search

- T/F, Multiple Choice, Multiple Answer, Matching, Ordering, Short Answer
- Well-defined problems and solutions
  - SIMPLE-PROBLEM-SOLVING-AGENT
  - Path cost
  - Optimal solution
- Toy Problems
  - Vacuum Cleaner World
  - *n*-puzzle
  - *n*-Queens

Chapter 3: Solving By Search

- Real-world problems
  - Theoretical questions
- Search
  - TREE-SEARCH
  - Infrastructure for Search
    - STATE
    - PARENT
    - ACTION
    - PATH-COST

Chapter 3: Solving By Search

- Measuring Problem Solving Performance
  - Four ways
    - Completeness
    - Optimality
    - Time complexity
    - Space complexity
- Attributes: Branching factor, Depth, etc.

Chapter 3: Solving By Search

- Uninformed Search
  - Depth-First Search (DFS)
  - Depth-Limited Search (DLS)
  - Iterative Deepening Search (IDS)
  - Bidirectional Search

Chapter 3: Solving By Search

- Informed Search
  - Be able to to work out given problems
    - Greedy Best-First Search
    - A*
    - Recursive Best-First Search (RBFS)
  - Questions about
    - Memory Bounded A* (MA*)
    - Simplified Memory Bounded A* (SMA*)
- Heuristic Functions

Chapter 4: Beyond Classical Search

- Local Search
  - Hill Climbing
  - Simulated Annealing
- Genetic Algorithms
- Complicating the search
  - Searching without percepts (Sensorless)
  - Searching with Non-deterministic actions
  - Searching without percepts AND non-determinism

Chapter 5: Adversarial Search

- Minimax algorithm (work problems)
- Alpha-beta pruning (work problems)
- Search vs. Lookup
- Partially Observable games
  - Cards
- State of the Art Games