

# ARTIFICIAL INTELLIGENCE

## TOPICS for FINAL REVIEW (21CLC03 – 21CLC04)

---

1. UNINFORMED SEARCH and INFORMED SEARCH
  - a. Tree-search algorithm vs. Graph-search algorithm
  - b. Uninformed search: BFS, DFS, DLS, IDS, and UCS
  - c. Informed search: Greedy Best First Search (GBFS) and A\*
  - d. Admissible heuristic & Consistent heuristic & Dominant heuristic
2. LOCAL SEARCH
  - a. Hill-Climbing
  - b. Genetic Algorithm
3. ADVERSARIAL SEARCH:  $\alpha - \beta$  pruning.
4. CONSTRAINT SATISFACTION PROBLEMS
  - a. Formulation: Variables, Domains, Constraints (Unary/Binary)
  - b. Problems:
    - i. Map coloring
    - ii. Cryptarithmetics
    - iii. N-Queens
    - iv. Timetable scheduling
    - v. Sudoku
  - c. Algorithms:
    - i. Node consistency
    - ii. Arc consistency (AC-3)
    - iii. Backtracking with Forward Checking
    - iv. Heuristics: DH, MRV, LCV
5. PROPOSITIONAL LOGIC
  - a. Syntax, Semantic (Entailment)
  - b. Algorithms:
    - i. CNF conversion
    - ii. Resolution (Contradiction)  $\leftarrow$  KB in CNF
    - iii. Forward and Backward Chaining  $\leftarrow$  KB in Horn Clause
6. FIRST-ORDER LOGIC
  - a. Syntax, Semantic: Predicate, Function, Term, Quantifiers ( $\forall, \exists$ )
  - b. Algorithms:
    - i. Unification, CNF conversion
    - ii. Resolution  $\leftarrow$  KB in CNF
    - iii. Forward and Backward Chaining  $\leftarrow$  KB in Horn Clause
7. MACHINE LEARNING
  - a. Learning Types: Supervised, Unsupervised, Reinforced Learning
  - b. Algorithms:
    - i. ID3: Algorithm, Metrics to evaluate attributes (Entropy, Average Entropy, and Information Gain)
    - ii. Perceptron Learning Rule (both feedforward and weight update)
    - iii. Multi-layer Neural Network (feed forward only)