

---

[\[Homepage\]](#)

---

## Study Guide for First Midterm Exam T 21 SEP

**This guide is now (1728 R 16 SEP) more or less final.**

---

1. Russell & Norvig (RN) Chapters 1-2, 3.1 to 3.3 (plus small parts of 7-9 for the logic)
2. Introduction to Artificial Intelligence
  - Engineering focus vs. Psychology focus: tool building vs. modeling human intelligence
  - Thinking/acting rationally vs. thinking/acting like humans
  - The "Laws of Thought"
  - The Turing Test
  - Representation and reasoning as the basis for all AI
  - Overlaps with other disciplines
  - Facets of AI: types of applications
3. Agents, Intelligent and Otherwise
  - PEAS
    - Performance measure (P)
    - Environment knowledge (E)
    - Action set (A)
    - Percept sequences (S)
  - Agents, environments, percepts, actions, sensors, effectors
    - Varieties of environments
    - Agent architecture: table-driven, simple reflex, model-based, goal-based, utility-based agents
    - Learning agents
4. Logical Representation and Reasoning
  - Logical Representation 1: Propositional Logic
    - Syntax:
      - Propositional symbols
      - Propositions
      - Other logical symbols
      - Literals, clauses, empty clause
    - Semantics:
      - Interpretation (truth value assignment)
      - Validity, satisfiability, unsatisfiability
      - Logical entailment, double-turnstile notation
    - Conjunctive normal form
  - Logical Reasoning 1: Propositional Resolution
    - Rules of inference: *modus ponens* and *modus tollens*
    - Above-the-line-below-the-line, single turnstile notation
    - Propositional resolution, resolvents

- Knowledge base, conclusion, automated deduction via resolution
    - Resolution as a search problem, possible heuristics
  - Logical Representation 2: First-Order Predicate Logic (FOPL)
    - Syntax:
      - Constant, variable, function, and predicate symbols
      - Universal and existential quantifiers and other logical symbols
      - Terms
      - Atoms, literals, clauses, ground clauses, empty clause
      - Well-formed formulas (WFFs)
    - Semantics:
      - Universe of discourse
      - Interpretations
      - Validity, satisfiability, unsatisfiability
      - Logical entailment, double-turnstile notation
    - Conjunctive normal form
  - Logical Reasoning 2: FOPL Resolution
    - Substitution, unification, unifying substitution, most general substitution
    - FOPL resolution, resolvents
    - Knowledge base, conclusion, automated deduction in FOPL
    - Resolution as a search problem, possible heuristics
5. Logic Programming and Prolog
- Horn clauses, syntax for rules and facts
  - The heuristic used in Prolog search (resolve most-recent vs. least-recent, left-to-right)
  - Declarative vs. procedural views of logic programs
  - Basic operation of a Prolog interpreter, simple programs
  - The 4-port (CALL, EXIT, FAIL, REDO) execution model
  - Recursion, backtracking, cut
  - Basic design patterns in Prolog programs
  - Prolog example implementations for all material below
6. Basic Representation+Reasoning 3: State Spaces and Search
- State spaces and search spaces
  - State graphs and search graphs
  - Labeled graphs, weighted graphs, edge weights
  - Successor, predecessor, ancestor, descendent, path, path cost
  - Branching factor, solution depth
  - Asymptotically estimating graph size
  - Successors and operators/actions
  - Enabled operators
  - Successor generation
  - Node expansion
  - Initial and goal states
  - Uninformed Search
    - For all methods: time/space complexities, difficulties, advantages/disadvantages
    - Depth-first search
    - Breadth-first search

[Top of Page](#)

This page has been accessed **111** times since 17 AUG 10.