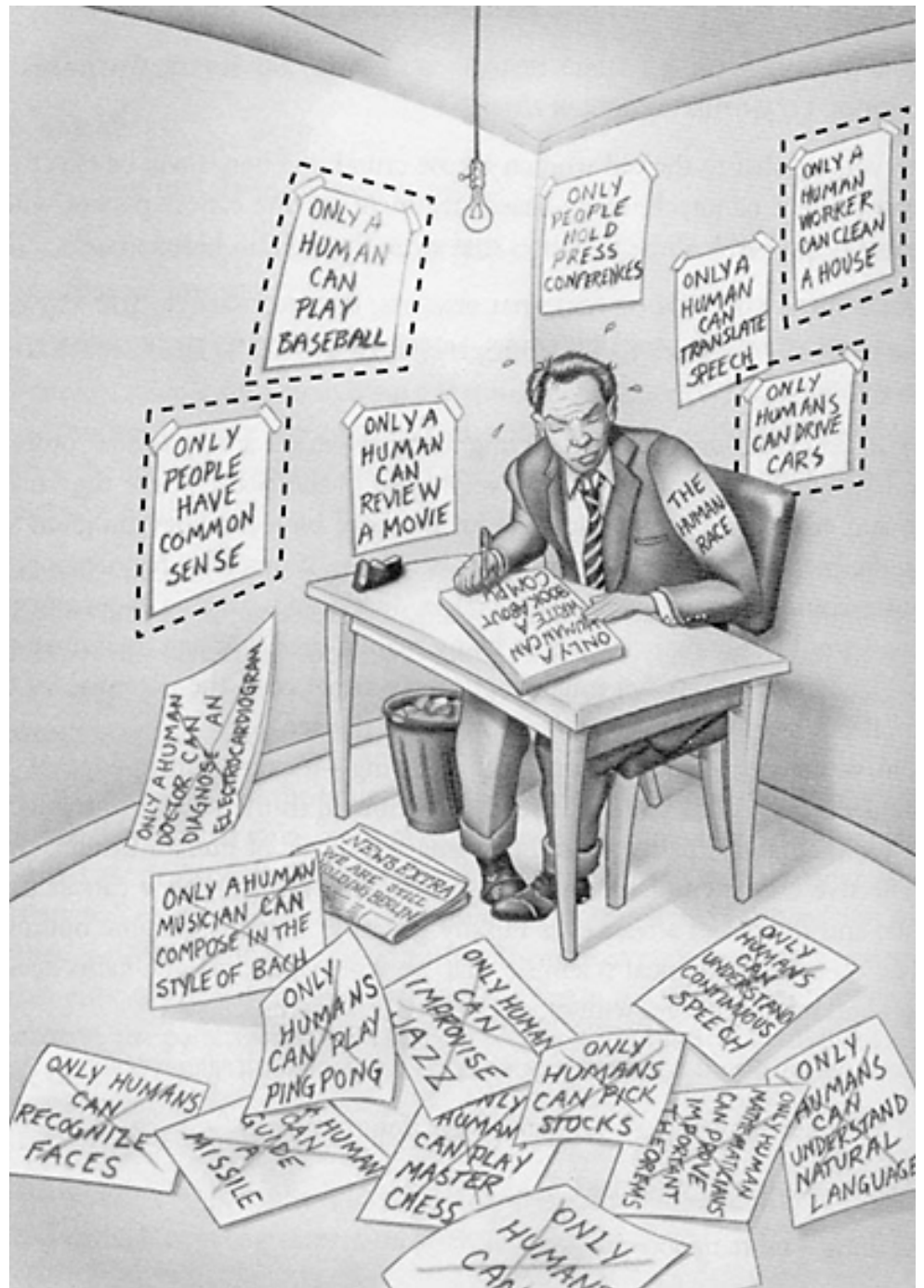# AI Course Summary

Fall 2013
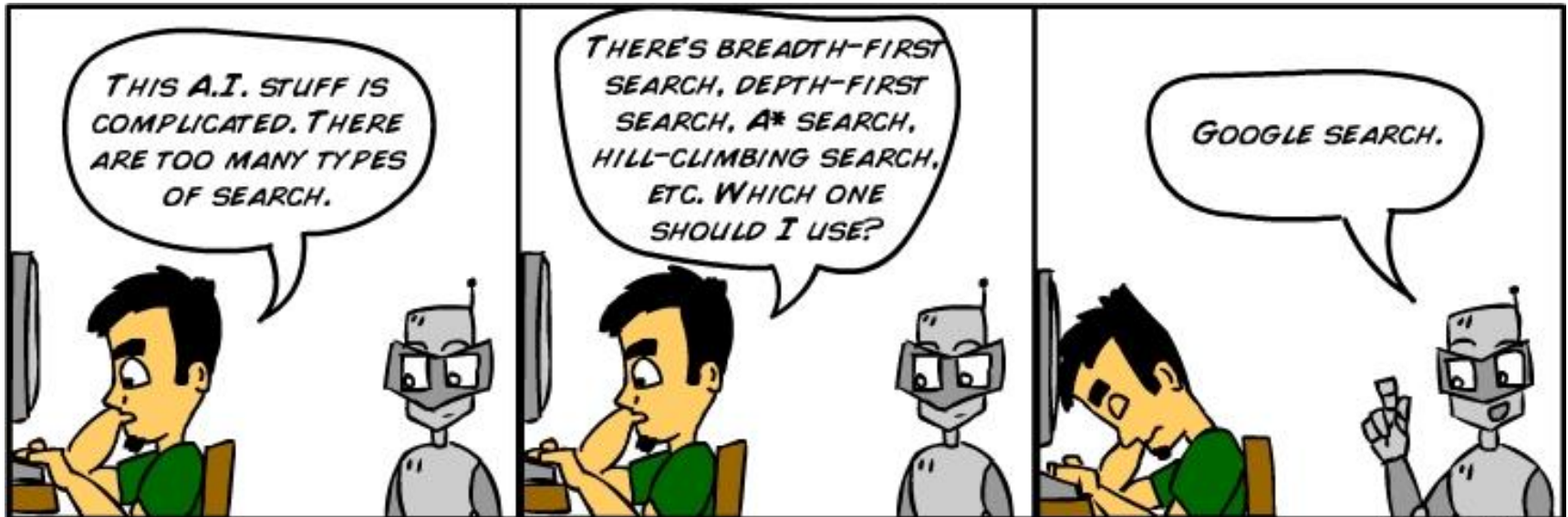
AI Topics we've studied

- History of AI
- Philosophy of AI
- Types of AI systems:
  - Thinking humanly
  - Acting humanly
  - Thinking rationally
  - Acting rationally

AI Topics we've studied (con't.)

- PEAS (Performance, Environment, Actuators, Sensors)
- Properties of task environments
  - Observable: fully, partially, not at all
  - Single vs multi-agent
  - Deterministic vs stochastic
  - Episodic vs sequential
  - Static vs dynamic
 - Discrete vs continuous
  - Known vs unknown

AI Topics we've studied (con't.)

- Uninformed search
  - BFS, DFS, Uniform-cost, Depth-limited, Iterative deepening
- Informed search:
  - Greedy best-first, A*, memory-bounded A*, iterative deepening A*
- Heuristic functions
- Search with non-deterministic actions (And/Or trees)
- Search with partial observations (Belief states)
- Online search

AI Topics we've studied (con't.)

- Adversarial search (games)
- Minimax trees
- Alpha-beta pruning
- Evaluation functions
- Stochastic games
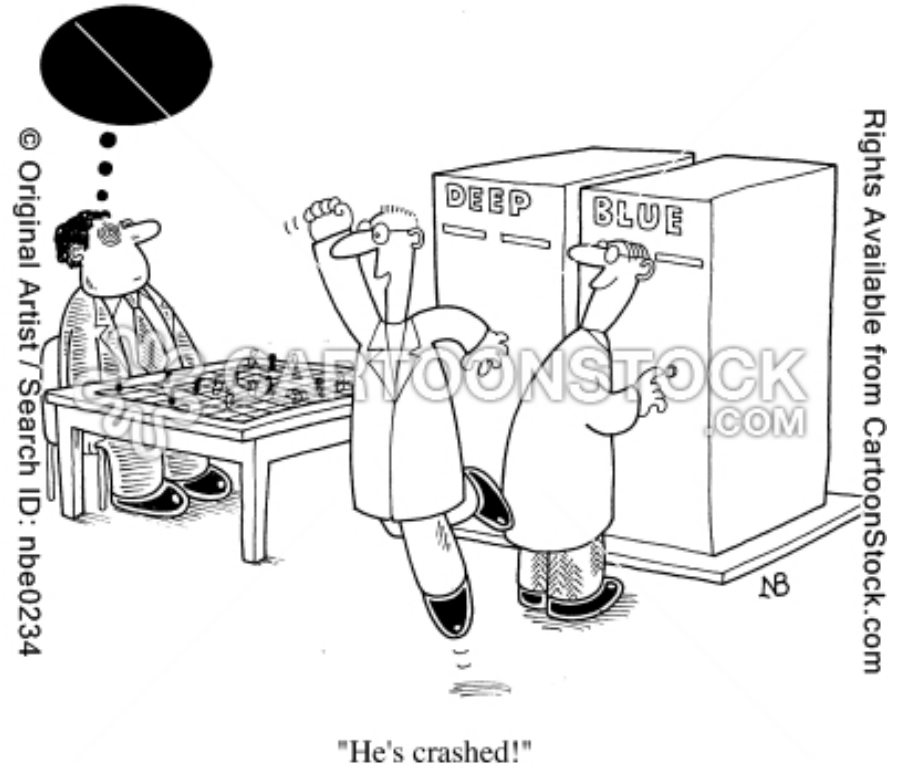
AI Topics we've studied (con't.)

- Logical agents

- Propositional logic
  - Theorem-proving
  - Inference
  - Model-checking
  - Conjunctive Normal Form
  - Horn and definite clauses
  - Forward & backward chaining

AI Topics we've studied (con't.)

- First-order logic
  - Existential quantification
  - Universal quantification
  - Inference
  - Unification & lifting
  - Forward & backward chaining
  - Resolution

AI Topics we've studied (con't.)

- Planning
  - Planning graphs
  - GraphPlan algorithm
  - Real-world issues:
    - Time, schedule, resources
    - Hierarchical planning
    - Planning/acting in nondeterministic domains

AI Topics we've studied (con't.)

- Uncertainty
- Basic probability
- Joint probability distributions
- Prior and conditional probabilities
- Inference
- Bayes' rule

"We're looking for someone with your exact qualifications, but a mechanical version."

AI Topics we've studied (con't.)

- Probabilistic reasoning over time
- States and observations
- Transitions and sensor models
- Filtering and prediction
- Smoothing
- Hidden Markov Models

AI Topics we've studied (con't.)

- Natural language for communication
  - Language models
  - N-gram character and word models
  - Grammars
  - Probabilistic context-free grammars
  - Parsing
  - Lexicalized PCFGs
  - Complications

- Machine translation
- Speech recognition
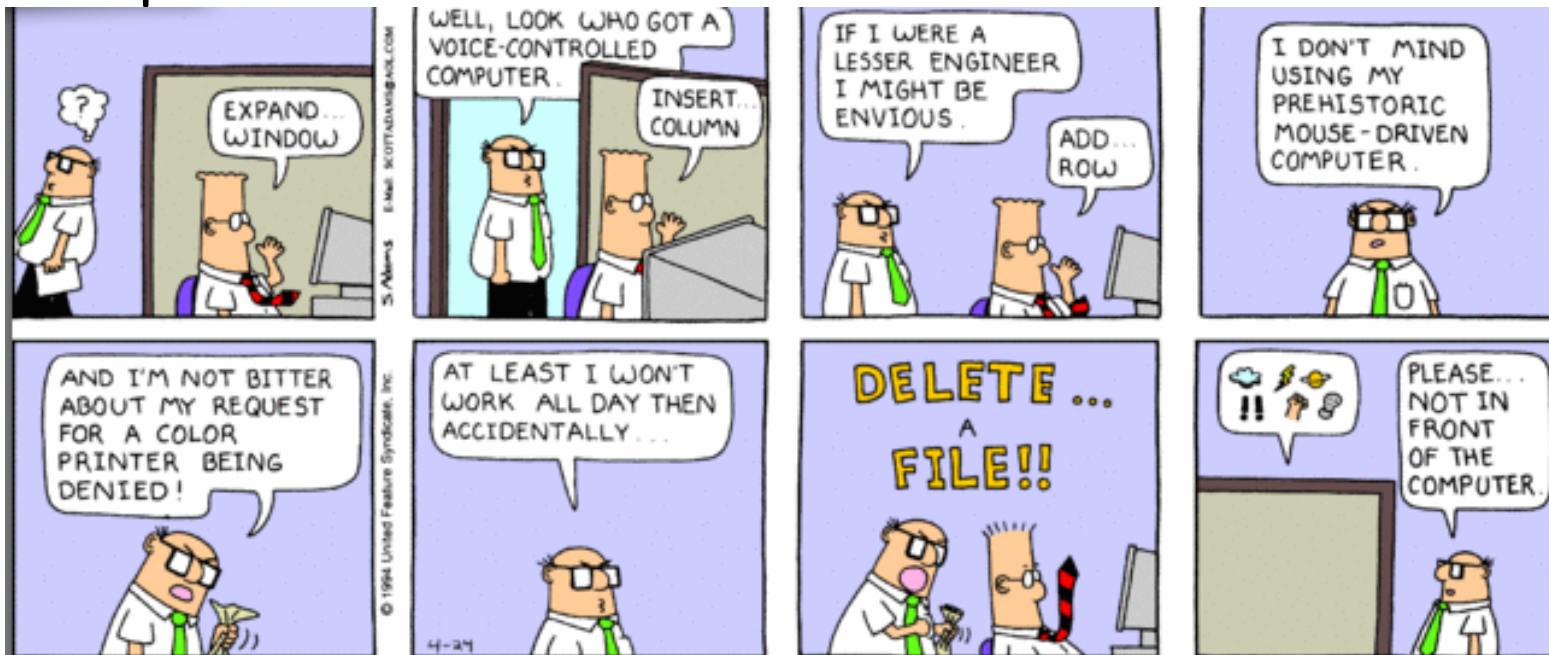
Go forth and be (artificially) intelligent!