AI Comp Exam
Spring 2007

1. (20 pts) Search algorithms:
   a) Discuss one advantage and one disadvantage of breadth-first search compared to depth-first search.

   b) One problem of hill climbing or greedy search is reaching local minima. Discuss a way that can address the problem.

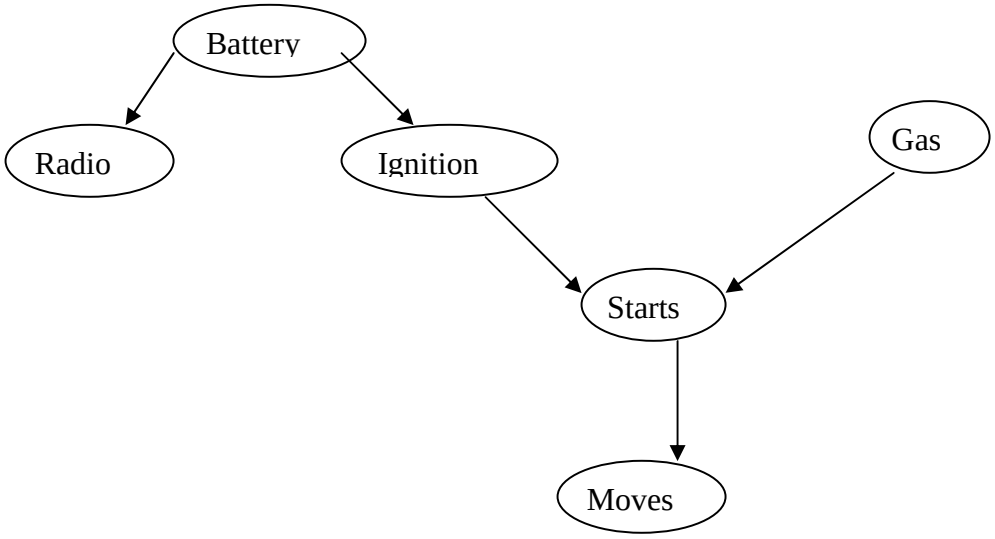
2. (30 pts) The resolution inference rule is sound and complete so we can apply it repeatedly to find an empty clause.

   a. Why do we want to start with negating the sentence we want to prove and try to reach an empty clause?

   b. Consider building an automated resolution system and the input contains clauses from a consistent knowledge base and the clause(s) that we want to prove, we can formulate the resolution system as a search.

      i. list the key components of a search
      ii. map the resolution process into the key components of a search
      iii. considering we want to use an informed search, what would the cost functions *f*, *g*, and *h* mean in the resolution system?
      iv. propose an *h* in the resolution system.

3. (30 pts) Given the following Bayesian Network:
    a) What do the arrows and the ellipses mean?
    b) What rules can you use to decide whether Radio is independent from Gas given Moves. Describe how the rules are used.
    c) Compute symbolically P(Gas | Ignition, ¬Moves)



4. (20 pts) Considering the computation of the next move in the following game:
   a) What algorithms could you use to find the optimal next move assuming a perfect opponent?
   b) Which of them require fewer evaluations of leaf nodes.
   c) Attach to this tree the numbers used in your intermediary computation with the best algorithm.