Homework 2: Logic Puzzles (40 points)

CS 6364 Artificial Intelligence

Due: 3/12/2021 at 11:59 pm.

1 Puzzle A (15 points) - Solve by hand

1. All babies are irrational
2. Nobody is loathed who can manage an alligator
3. Irrational people are loathed
4. (conclusion) If Alex is a baby then he cannot manage an alligator

Represent these sentences in first order logic, using only these predicates:
Baby(x), Rational(x), Loathed(x), ManageAnAlligator(x).

Convert the logic sentences to clause form, skolemizing as necessary.

Prove whether the conclusion is true by using resolution refutation (i.e. negate the conclusion and show its unsatisfiability with the rest of the knowledge base).

2 Puzzle B (25 points) - Solve using Prover9

1. Anyone who eats a pizza is a happy character
2. Every foodie eats [something that is] either a pizza or a salad
3. Anyone who eats a salad is healthy
4. Every healthy person goes to the gym
5. Any nice girl does not date anyone who is a happy character
6. Ann is a nice girl, and Peter is a foodie
7. (Conclusion) If Peter does not go to gym, then Ann does not date Peter.

Represent these sentences in first order logic, using only these predicates:
Eats(x,y), Pizza(x), Salad(x), Happy(x), Healthy(x), Foodie(x), Gyms(x), Nice(x), Dated(x,y).

Convert the logic sentences to clause form, skolemizing as necessary.

Prove whether the conclusion is true by using resolution refutation (i.e. negate the conclusion and show its unsatisfiability with the rest of the knowledge base).

3 Report

Submit a report with the following details:

1. Puzzle 1:
   - First order logic form of the given sentences
   - Proof of whether the conclusion is true by using resolution refutation
2. Puzzle 2:
   - Assumptions and goal
   - The input and output of prover9. (Paste as plain text in the report)
   - Conclusion

4 Prover9 Helpful Links

1. Installation of GUI tool
   For linux users, install python-wxtools also.
2. Help Manual
3. Simple tutorial

5 Running Prover9 on csgrads1.utdallas.edu

Run the following commands on csgrads1 and finally play around with the sample input file *x2.in*

```
1. wget https://www.cs.unm.edu/~mccune/prover9/download/LADR-2009-11A.tar.gz
2. tar xvzf LADR-2009-11A.tar.gz
3. cd LADR-2009-11A.tar.gz
4. make all
5. make test1
6. bin/prover9 -f prover9.examples/x2.in
```