ASSIGNMENT NO 6

Q.1. Consider the following paragraph:

“ anything anyone eats are called food. Milka likes all kind of food. Bread is a

? food. Mango is a food. Alka eats pizza. Alka eats everything milka eats.”

Translate the following sentences into (WFF) in predicate logic and then into

set of clauses. Using resolution principle answer the following:

1. Does Milka like pizza?

2. what food Alka eats [ Question answering]

Ans:

Steps to draw resolution Tree.

1. Covert all the facts into FOPL.
2. Covert the fopl into CNF
   1. Eliminate implication
   2. Move negation inward
   3. Rename & drop union/Existential quantifier.
3. Negate the conclusion statement
4. Draw the resolution tree.

Step 1:

1. Anything anyone eats are called food.

X,Y eats(X,Y) food(Y)

1. Milka likes all kind of food.

X food(X) likes(Milka,X)

1. Bread is a food.

food(bread)

1. Mango is a food.

Food(mango)

1. Alka eats pizza.

eats(Alka,pizza)

1. Alka eats everything milka eats.

X eats(Milka,X) eats(Alka,X)

Step 2:

1. ~eats(X,Y) V food(Y)
2. ~food(A) V likes(Milka,A)
3. food(bread)
4. Food(mango)
5. eats(Alka,pizza)
6. eats(Milka,B) V eats(Alka,B)

step 3:

1. Does Milka like pizza?

There can be two possibilities that milka likes pizza and milka does not like pizza.

For Like(Mlka,pizza)

~Like(Milka,pizza)

Step 4:

Resolution tree:

~Like(Milka,pizza) ~food(X) V likes(Milka,X)

~food(pizza) ~eats(X,Y) V food(Y)

~eats(X,pizza) eats(Alka,pizza)

conclusion{X=Alka}

2. what food Alka eats [ Question answering]

Ans: Alka eats Pizza as we can see in resolution tree.

Q2. Consider the following axioms:

1. Every child loves Santa.

2. Everyone who loves Santa loves any reindeer.

3. Rudolph is a reindeer, and Rudolph has a red nose.

4. Anything which has a red nose is weird or is a clown.

5. No reindeer is a clown.

6. Scrooge does not love anything which is weird.

7. (Conclusion) Scrooge is not a child.

Represent these axioms in predicate calculus; skolemize as necessary and convert

each formula to clause form. (Note: `has a red nose&#39; can be a single predicate.

Remember to negate the conclusion.) Prove the unsatisfiability of the set of clauses

by resolution.

Ans:

Steps to draw resolution Tree.

1. Covert all the facts into FOPL.
2. Covert the FOPL into CNF
   1. Eliminate implication
   2. Move negation inward
   3. Rename & drop union/Existential quantifier.
3. Negate the conclusion statement
4. Draw the resolution tree.

Step 1:

1. Every child loves Santa.

X child(X) loves(X,Santa)

1. Everyone who loves Santa loves any reindeer.

X Y loves(X,Santa)[ Reindeer(Y) loves(X,Y)]

1. Rudolph is a reindeer, and Rudolph has a red nose.

Reindeer(Rudolph) Has a red nose(Rudolph)

1. Anything which has a red nose is weird or is a clown.

X Has a red nose(X) [Weird(x) V Clown(x)]

1. No reindeer is a clown.

X ~ Reindeer(X) Clown(x)

1. Scrooge does not love anything which is weird.

X ~ [loves (Scrooge, X) Weird(x)]

1. (Conclusion) Scrooge is not a child.

~Child (Scrooge)

Step 2:

1. ~child(X) V loves(X,Santa)
2. ~loves(A,Santa) V [~Reindeer(Y) V loves(A,B)]
3. Reindeer(Rudolph) Has a red nose(Rudolph)
4. ~ Has a red nose(C) V [Weird(C) V Clown(C)]
5. Reindeer(D) VClown(D)
6. ~ [loves (Scrooge, X) Weird(x)]

Step 3:

1. Child (Scrooge)

Step 4: Resolution Tree.

1. Child (Scrooge) ~child(X) V loves(X,Santa)
2. loves(Scoorge,Santa) ~loves(A,Santa) V [~Reindeer(B) V loves(A,B)]
3. ~Reindeer(B) Reindeer(Rudolph) Has a red nose(Rudolph)

conclusion {B=Rudolph}