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CSC 135

Professor Lu

1.
    a. Logic Programming systems are also called _____**deductive**_____ databases
    b. The process of pattern matching to make statements identical is called ___**unification**___.

2. (12%) G**ive a concise answer to each questions below:**

(a) What are the differences between procedural programming and logic programming?

Four main differences between procedural and logic programming

- architecture

- syntax

- computation

- control

Procedural programming

Von Neumann Machine – multiple steps

Syntax: sequence of statements(a,s,I)

Computation: Sequential statements execution

Control : Logic and Control Mixed together

Logic Programming

Abstract model (dealing with objects and their relationships)

Logic formulas (Horn Clauses)

Deduction of the clauses

Logic and control can be separated

(b) What are the deficiencies of Prolog?

Resolution order control

- Ordering of pattern matching during resolution
- Cut operator

Closed World Assumption

It has only the knowledge of the database

True or fail system rather than true or false

Negation problem

Prolog not operator is **not** equivalent to logical NOT operator

(c) What are the motivations for Logic programming?

Logic is used to represent program

Deductions are used as computation

A higher-level language does more automatically

- Can concentrate more on what is to be done and less on how to do it

Ideal: Algorithm = logic (what) + Control (how) – only specify logic and let system take care of control

3.Use the set notation to describe resolution as a refutation system.

Given a set of clauses S & and goal G,

negate G
*{S} U {¬G}
* existence of contradiction => derivation of empty clause

Based on {S} U {¬G} is only inconsistent if {S} U {G} is also consistent.

4. (25%) Give deduction trees of resolution (a) using (1) and (5); (b) using (2) and (5)

for the following set of clauses. Show each level of unification with instantiation (for example {m|Y}).

(1) anc (X, Y) ∨ ~par (X, Y)

(2) anc(X, Y) ∨ ~par (X, Z) ∨ ~anc (Z, Y)

(3) par (d, b)

(4) par (b, m)

(5) ~anc (X, m)

Deduction trees images posted to website
http://athena.ecs.csus.edu/~jawaidt/prob4a.jpg
http://athena.ecs.csus.edu/~jawaidt/prob4b.jpg

Images won't display in .pdf for some reason.

5. (20%) Conjunctions and Backtracking. Using the example of "Who teaches what" (see LogicProglecture page 19 in Canvas),

(a) try to trace through search process for Query 2;

(b) try to trace through Query 1, but with sub-goals reversed.

Answer posted to website

http://athena.ecs.csus.edu/~jawaidt/prob5a.jpg
http://athena.ecs.csus.edu/~jawaidt/prob5b.jpg

6.

Answer posted to website as requested

http://athena.ecs.csus.edu/~jawaidt/
http://athena.ecs.csus.edu/~jawaidt/prob6code.txt

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