Indian Institute of Technology, Indore
Computer Science & Engineering
CS 354N: Assignment I-Prolog
Date- 07-01-2025

Some general instructions:

- Name your file in "Assignment_1_yourRollno.pdf" format.
- Submission of the assignment should be made using the Google Classroom platform only.
- Plagiarism in any form will not be tolerated.
- You are allowed to do only one submission before the deadline. Avoid the multiple submissions. In such case, only the last submitted file will be used for evaluation.
- Last date for submission of the assignment: **14-01-2025**
- Submit a single file (report) containing procedure (screenshot of main procedures/code/Results).

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1) Similarly, solve the following problem
•The British lives in the red House
•The Spanish has a dog.
•In the green House, its owner drinks coffee.
•The Ukrainian drinks some tea.
•The greenhouse is immediately on the right of the white one.
•The sculptor has some snails.
•The diplomat lives in the yellow house.
•In the middle house, its owner drinks milk.
•The Norwegian lives in the first house on the left.
•The doctor lives in a house near one of the fox owner.
•In a house near one of the diplomat there is a horse.
•The violinist drinks some orange juice.
•The Japanese is an Acrobat/
•The Norwegian lives near the blue house.

Find who drinks water and who owns a Zebra.

2) The predicate parent(X,Y) is interpreted as: "X is a parent of Y".
The predicate sister(X,Y) is interpreted as: "X is the sister of Y".
Write prolog rules for following:

a) Everybody who has a child is happy (introduce a one-argument relation **happy**)
b) For all X, if X has a child who has a sister then X has two children (introduce new relation **hastwochildren**)
c) **grandchild** using parent relation.
d) **aunt** using relations parent and sister.

3) female(mary). female(sandra). female(juliet). female(lisa). male(peter). male(paul). male(john). male(bob). male(harry). parent(bob, lisa). parent(bob, paul). parent(bob, mary). parent(juliet, lisa). parent(juliet, paul). parent(juliet, mary). parent(peter, harry). parent(lisa, harry). parent(mary, john). parent(mary, sandra).

After having copied the given program, define new predicates (in terms of rules using male/1, female/1 and parent/2) for the following family relations:

(a) father
(b) sister
(c) grandmother
(d) cousin

You may want to use the operator \=, which is the opposite of =. A goal like X \= Y succeeds, if the two terms X and Y cannot be matched.
Example: X is the brother of Y, if they have a parent Z in common and if X is male and if X and Y don't represent the same person. In Prolog this can be expressed through the following rule:

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brother(X, Y) :-
parent(Z, X),
parent(Z, Y),
male(X), X \= Y.
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4) Prolog program records information about the soldiers of an army and their ranks, such as:
"Peckem is a general."
"Cathcart is a colonel."
"Moodus is a colonel."
Facts are as follows.
soldier (peckem, general). soldier (cathcart, colonel). soldier (moodus, colonel). soldier (towser, sergeant). soldier (knight, sergeant). soldier (aardvark, captain). soldier (dunbar, lieutenant). soldier (flume, captain). soldier (danby, major).
Write rule for the following. "Do Aardvark and Flume hold the same rank?"

5) parent(chester,irvin). parent(chester,clarence). parent(chester,mildred). parent(irvin,ron). parent(irvin,ken). parent(clarence,shirley). parent(clarence,sharon). parent(clarence,charlie). parent(mildred,mary). Try some queries

Some queries:
?- parent(chester,mildred). yes
?- parent(X,ron).
X = irvin yes
Now define rule predicate for "X is an ancestor of Y.