CSE341 – Programming Languages (Fall 2020)
Homework #5 Report

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This program separates facts, predicates and queries. Then, answers 3 types of queries.

Type 1:
True/False queries. In this type of queries all parameters are given (no Variable) and ask for if the given query is true or not. If answer is true then returns parameters of query. For example, if query is ?-exmpl(berk, 1, 2, jack) and this query is true then returns (berk, 1, 2, jack). If it is not true then returns nil. Reason of this return type will be explained below.

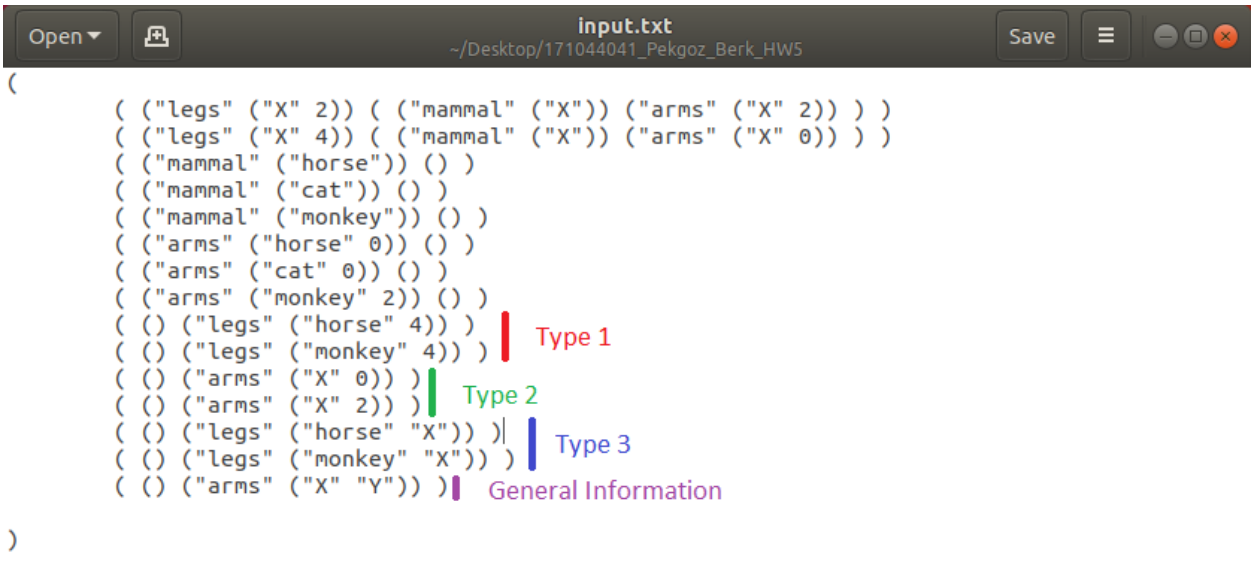
Type 2:
Predicates/facts have all parameters but query is asking for a variable. If query can be provided then returns parameters with replaced variables. If it is not then returns nil. For example, if query is ?-exmpl(berk, X, 2, Y) and exmpl(berk, 1, 2, jack) can be provided by facts/predicates then returns (berk, 1, 2, jack). [X and Y are replaced with 1 and jack here]

Type 3:
Predicate/fact has object of that parameter but query does not and query has object of another parameter but predicate/fact does not. If this situation occurs the query can be provided if all thing goes true. For example, if query is ?-exmp(X, 1, Y, jack) and there is a predicate/fact which is exmpl(berk, Z, 2, Q). If exmpl(berk, 1 , 2, jack) can provided than returns (berk, 1, 2, jack). [X and Y replaced by berk and 2 on query. Z and Q replaced by 1 and jack on predicate/fact.]

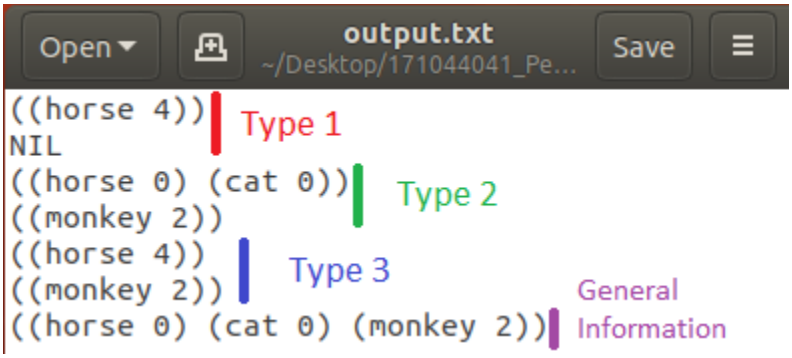
General information:
All parameters of query can be Variable and it can returns values if some facts/predicates are there to provide it. For example, if there are facts legs(horse,4) and legs(monkey, 2) then query ?-legs(X, Y) returns (horse,4) and (monkey, 2).

Test and Type Examples

Input file:



Output file:



Explanation of return type:

In pdf file there is a statement like "You will use resolution and unification methods discussed in class to prove the queries and return the list of values for all variables for which the query is true. An empty list on return means that the query is false.". It wants list of values for all variables for which the query is true and if the query is a true/false query it means there is no variable. So, it was confusing. I found a way and I send an e-mail to Mr. Dede about that and he said it is ok if I specify on my report.

In this way, if a query is false then it returns nil. But it is true then it returns list of parameter list which makes query true.

Example from test above:

legs(horse, 4) , arms(horse, 0) and arms(cat,0) are can be proved by facts/predicates.

If query is true/false query like ?-legs(horse,4) then its returns parameters of itself. > ((horse,4)).

If query is asks for some variables like ?- arms(X,0) then it returns all versions of the parameters replaced by providing value. > ((horse 0) (cat 0)) [here, arms(horse, 0) and arms(cat, 0) can be proved so list have the parameters of these predicates.]

Important note 1: If a query can be proved by multiple facts/predicates and their parameters are same, there can be multiple and same output in list. (Prolog handles this in same way).

Important Note 2: For true result (") must be used in input.txt. Not (“) and (“).