CS181: Programming Languages
Vladimir Vacic, Christos Koufogiannakis
University of California, Riverside

Lab Assignment 3

1.   Given the following database:

    earns([jacqueline, bouvier], 23000).
    earns([patty, bouvier], 23000).
    earns([selma, bouvier], 23000).
    earns([charles, montgomery, burns], 1000000).
    earns([larry, burns], 50000).
    earns([ned, flanders], 40000).
    earns([maude, flanders], 42000).
    earns([rod, flanders], 0).
    earns([barney, gumble], 40000).
    earns([edna, krabappel], 30000).
    earns([herschel, schmoikel, krustofski], 300000).
    earns([helen, lovejoy], 30000).
    earns([jessica, lovejoy], 0).
    earns([timothy, lovejoy], 150000).
    earns([apu, nahasapeemapetilon], 150000).
    earns([jamshed, nahasapeemapetilon], 0).
    earns([manjula, nahasapeemapetilon], 120000).
    earns([pahusacheta, nahasapeemapetilon], 0).
    earns([sanjay, nahasapeemapetilon], 0).

earns([bartholomew, j, simpson], 0).
earns([homer, jay, simpson], 40000).
earns([lisa, marie, simpson], 500).
earns([maggie, simpson], 0).
earns([marge, simpson], 10000).

Write a predicate which would compute the total income for a given family (families are indentified by their last names). For example:

?- family_income(simpson, X).
X = 50500

Hint: In problems 1 and 2, try to break the solution into smaller tasks and then solve those one by one, slowly building towards the final solution. This is of course a general approach to solving problems, however, it makes sense to point it out from time to time.

Also, you will (probably) need to use the predicate **bagof()**, which makes a list of all answers. It behaves like this:

child(bart, homer).
child(lisa, homer).
child(maggie, homer).

all_children(X, C) :-
        bagof(M, child(M, X), C).

?- all_children(homer, C).
C = [bart, lisa, maggie]

2.   Write a predicate contains_min(L1, L2) which is true if L1 contains the smallest number in list L2.

3.   We have talked about consult(), reconsult(), help() and so on – Prolog's built-in predicates. Find a Prolog manual (any Prolog manual would do), get 5 built-in predicates that were not mentioned in the labs and describe each of them with one sentence.