CS2104 Programming Language Concepts

Tutorial 6 : Logic Programming

(week of 14th October 2019)

Q1 Invoke prolog. Then consult(tut6). Test the following:
a. grantparent(G,mary).
b. ancestor(A,mary)
c. sibling(S,mary)
Count the number of solutions for each query, and explain the redundancies, if any.

Q2. Write predicate definitions for the following relationship:
a. aunt
b. cousin
c. nephew

Q3. Implement the following list function:
a. last – to retrieve last element of list
b. len – to compute the length of a list
c. nth – to return the n-th element of a list
d. occurs – to count the occurrences of a given element

Q4. Implement Euclid's algorithm to compute the *greatest common divisor* of two non-negative integers. The GCD of two numbers a and b (with a _ b) can be found by recursively substituting a with b and b with the rest of the integer division of a and b. Make sure you define the right base case(s).
Examples:

```
?- gcd(57,27,X).
X = 3
?- gcd(1,30,X).
X = 1
?- gcd(56,28,X).
X = 28
```

Q5. Write a Prolog predicate `divisors/2` that would compute the entire set of divisors for a given natural number. Example:

```
?- divisors(30,X).
X = [1,2,3,5,6,10,15,30]
```