

## CS2104 Programming Language Concepts

### Tutorial 7 : Logic Programming

(week of 12<sup>th</sup> October 2020)

You may use <https://www.swi-prolog.org/>

- 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
  - e. find – find an element in a list of elements
- 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  $\geq$  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]
```