

## ELEC60004/70068 Machine Reasoning

### Tutorial 1 – Introduction to Prolog

#### 1. List Processing – Write Prolog predicates to:

- return the first element of a list
- return the last element of a list
- return the middle of a list
- find if an element is a member of a list
- append two lists together to form a third list
- reverse a list (using append, so 2 arguments)
- reverse a list (*not* using append and 3 arguments instead)
- delete the first occurrence of an element from a list
- delete all occurrences of an element from a list
- substitute all occurrences of one element for another in a list
- test for sub-list
- sieve a list (remove all elements less than a given element)
- partition a list into two lists
- sort a list using quicksort algorithm (hint: partition...)
- subset
- intersection
- union

#### 2. Family Trees

Given the following facts:

```
father( homer, bart ).  
father( homer, lisa ).  
father( homer, maggie ).  
mother( marge, bart ).  
mother( marge, lisa ).  
mother( marge, maggie ).  
married( homer, marge ).  
male( homer ). ...  
female (marge ). ...
```

Adding facts as necessary to test, write Prolog predicates for family relations

- parent
- grandfather, grandmother, grandparent
- brother, sister, sibling
- aunt, uncle, nephew, niece
- cousin
- any other family relation you can think of... (if you want to have a go at first cousin, second cousin, first cousin once removed, go ahead ...)