

# COMP210 –Artificial Intelligence

## Lab Exercise 3 - to be carried out in week 4

1. Create a new prolog program file in your prolog programs directory called lab3.pl. Add to it the definition of member given in lectures. Use member to find whether
  - (a) 3 is a member of the list [1,2,3,4,5];
  - (b) 7 is a member of the list [1,2,3,4,5];
  - (c) a is a member of the list [l,a,b,o,r,a,t,o,r,y]
  - (d) z is a member of the list [l,a,b,o,r,a,t,o,r,y]
2. Try tracing each of the above examples by typing **trace** before entering your query. Pressing return will give you the next line of output. The command **notrace** exits trace mode.

3. Add the definition of append to your program and reload. Try the following queries:-
  - (a) `append([3,4,5],[1,2],X)`
  - (b) `append([1,2],[3,4,5],X)`
  - (c) `append([3,4,5],[],X)`
  - (d) `append([], [3,4,5],X)`

Trace your solutions as before.

4. Add the definition of listlength to your program and reload. Try the following queries:-
  - (a) `listlength([1,2,3,4,5],Y);`
  - (b) `listlength([l,a,b,o,r,a,t,o,r,y],Z);`
  - (c) `listlength([],Z);`
  - (d) `listlength(a,Z);`

Trace your solutions.

5. Write a rule `sumlist(X,Y)` which when a list of numbers X is input Y will contain the sum of that list. Use `sumlist(X,Y)` in queries.
6. Write a rule `deleteone(X,Y,Z)` such that Z is the result from deleting the first occurrence of Y in the list X. If X does not contain Y then just return X. Use `deleteone(X,Y,Z)` in queries.
7. Write a rule `deleteall(X,Y,Z)` such that Z is the result from deleting all occurrences of Y in the list X. Use `deleteall(X,Y,Z)` in queries.
8. Write a rule `reverselist(X,Y)` such that given list X, Y is the result of reversing X. Use `reverselist(X,Y)` in queries.

9. Write a rule `oddeven(X,Y)` that `Y` is set to “odd” if the number of elements in the list `X` is odd and `Y` is set to “even” if the number of elements in the list `X` is even. Hint you need two sets of rules (`oddeven` and `oddeven1`) each calling the other alternately. Use `oddeven(X,Y)` in queries.