CS 125 LOGIC PROGRAMMING
SAMPLE COURSEWORK

Solutions are to be submitted in pairs.

Question 1. (a) Extend the program FLIGHTS from the lecture by facts saying that there are direct flights from London to Amsterdam and Cardiff.
(b) Extend the programs by facts saying which cities are in Europe.
(c) Ask Prolog from which European cities one can reach Sidney.

Question 2. (a) Write a Prolog program that defines a predicate parent/2 for the following family relationships: Mary is parent of Amanda; Amanda is parent of Chetan, Anne and Edward; Claire is parent of William and Harry; Anne is parent of Peter and Zara; Ron is parent of Chetan and Edward; Chetan is parent of William and Harry; Mark is parent of Peter and Harry.
(b) Define the following predicates:
   females/1 defines the list of all female members of the family.
   female/1 where female(X) should hold iff X is a female member of the family.
   daughter/2 where daughter(X,Y) should hold iff X is a daughter of Y.
(c) Ask a Prolog query that corresponds to the question: Who is daughter of Amanda?

Question 3. Define a predicate dictionary/1 that defines a list containing the words

   aid, ale, ant, ape, ara arm, art, bat, bea, bee boa, but, dad, day, dry ear, eat, eel, egg, end eta, gem, get, got, hen ian, may, met, oat, old our, owe, pad, pie, pig pin, poe, pre, pro, ran rig, row, sam, say, sea see, set, ted, the, try

where each word is represented by the list of its letters.

(b) Write a Prolog program to find those words \( \tilde{w} \) in the dictionary such that all letters of \( \tilde{w} \) are different and the middle of \( \tilde{w} \) is the letter e.

How many solutions do exists?