CA208 Logic

Prolog Lab Exam A
(to be answered by students whose ID ends with either 0, 3, 6 or 9)
24th March 2021

Store all your answers in one file whose name is your student ID number followed by ".pl". For example, if 12345678 is your student ID then your file should be 12345678.pl.

Start each answer with a comment that identified the question being answered. Comments in Prolog begin with a %.

Clearly indicate which version of the Lab Exam (A, B or C) that you are answering.

Preamble:

The following set of facts describe a family tree. The relation parent(A,B) is true if B is a parent of A. The relation male(X) is true if X is a male. The relation female(X) is true if X is a female. An example set of facts is:

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parent(carol, paul).
parent(carol, jane).
parent(harry, tom).
parent(harry, mary).
parent(jim, tom).
parent(jim, mary).
parent(ann, tom).
parent(ann, mary).
parent(tim, harry).
parent(tim, carol).
parent(george, harry).
parent(george, carol).
parent(jenny, harry).
parent(jenny, carol).
parent(david, jim).
parent(david joan).
parent(kate, jim).
parent(kate joan).
parent(susan, dominic).
parent(susan ann).

male(paul).
male(tom).
male(harry).
male(jim).
male(dominic).
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male(tim).
male(george).
male(david).

female(jane).
female(mary).
female(carol).
female(joan).
female(ann).
female(jenny).
female(kate).
female(susan).

Q1. [8 marks]
Using the facts described in the Preamble write the following relations:

- father(X,Y) which is true if X is the father of Y.
- brother(X,Y) which is true if X is the brother of Y.
- uncle(X,Y) which is true if X is the uncle of Y.

Q2. [7 marks]

Using the facts described in the Preamble write the following relations:

- cousin(X,Y) which is true if X is a cousin of Y.
- maternalgrandmother(X,Y) which is true if X is the maternal grandmother of Y (your maternal grandmother is your mother's mother)

Q3. [10 marks]
Write the following relations for lists of numbers:
sum(X, L) which is true if X is the sum of the values in the list L.
minimum(X, L) which is true if X is the smallest value in the list L.