Programming Languages

Homework 6
(optional; counted as 10 points in a total of 110 points for the entire course)

Due 2:20 pm, June 17, 2009

Given the relations

```
father(X, Y)          ---   X is the father of Y,
mother(X, Y)          ---   X is the mother of Y,
female(X)             ---   X is female, and
male(X)               ---   X is male.
```

you are asked to define relations for the following:

```
sibling(X, Y)         ---   X is a sibling of Y,
sister(X, Y)          ---   X is a sister of Y,
grandson(X, Y)        ---   X is a grandson of Y,
first_cousin(X, Y)    ---   X is a first cousin of Y, and
descendant(X, Y)      ---   X is a descendant of Y.
```

Furthermore, you are asked to build a complete database of prolog facts from the family trees in the hand–out *Table of family relationships*. (For examples, the database will contain

```
father(adam, doris).
mother(eve, doris).
female(doris).
```

and so on.) Test your definitions of the sibling, sister, grandson, first cousin, and descendant relations on the database by trying at least the following five queries:

(a) sibling(X, Y).

(b) sister(X, cristopher).

(c) grandson(fred, X).

(d) first_cousin(geroge, tom).

(e) descendant(X, eve).

You must hand in

1. a hardcopy of the database from *Table of family relationships*,
2. a hardcopy of your definitions of the five relations, and
3. a transcript of a Prolog execution showing the loading of the family tree database and your definitions of the 5 relations, as well as showing the execution of the five queries described above.

1 PLEASE NOTE, NO EXCEPTION

- Homework is due **before the final examination begins** on June 17, 2008. Late homework will not be accepted.
- For programming assignments, you must hand in **printout of the code, as well as the testing data and result**. Programs must be accompanied by their documentations. For other assignments, you must hand in **typeset hardcopy**.
- You are expected to do the homework by yourself. Discussion among peers is encouraged but **copying from others is a shame**.