

COMP219: Artificial Intelligence, October 2015

Lab Exercise 1 - To be carried out in Week 2

1. You can run Prolog under either the Unix/Linux or Windows systems, whichever you prefer.

Under Linux. Log in to the Unix/Linux system. Make a directory to put your Prolog programs in and move to that directory. Download from the family tree program from the COMP219 website. Save the program as `familyTree.pl` in your Prolog directory.

Run Prolog (from this directory) by typing `swipl`

Load the `familyTree.pl` file by typing `consult(familyTree).` (An alternative is to type `['familyTree.pl']`).

Under Windows. Log in to the Windows system. Make a directory to put your Prolog programs in and move to that directory. Download from the family tree program from the COMP219 website. Save as `familyTree.pl` in your Prolog directory.

Run

Start→All programs→SWI-Prolog→Prolog. In the console window type `['h:\\familyTree.'].` making sure you specify the correct path to the location of the `familyTree` program within your filestore.

2. Try querying the file as shown in Lecture 3, i.e. see what happens when you input the following queries.

```
parent(ian,lucy).
```

```
parent(ian,pauline).
```

```
parent(cathy,peggy).
```

```
female(peggy).
```

```
female(lisa).
```

Try some queries of your own.

3. Formulate queries to find

- (a) all the children of ian;
- (b) all the parents of ian;
- (c) all the males;
- (d) all the people who are parents.

Remember, typing `;` gives you further solutions (if there are any). Note, `_` can be used as an anonymous variable, i.e. you won't get any answers for it.

4. Use any text editor to edit the family tree program to give some facts such as: peggy is the parent of phil and grant (note, you require two rules to do this); phil and cathy are parents of ben; lisa is the parent of louise; peggy, lisa and louise are female; phil, grant, and ben are male. Note that you must save and reload the family tree program after you have finished making the additions. Revisit the queries you tried in question 2 to see whether you get the same answer. Why do we get a different answer for the following queries?

```
female(peggy).
```

```
parent(lisa,louise).
```

5. Add the grandparent and sibling rules discussed in Lecture 3 to the *familyTree.pl* program. Use these to find:
 - (a) all the siblings of grant;
 - (b) all the siblings of lisa;
 - (c) all the grandparents of lucy;
 - (d) all the people who are grandparents.
6. Add to the *familyTree.pl* program a rule to define when someone is a brother (discussed in Lecture 3). Use this rule to find people who have a brother.
7. Assume that an aunt is the sister of a parent. Add a rule for aunt (note you will first have to define that someone is a sister) to the *familyTree.pl* program and use it in queries.
8. Define other useful family relationships and add them to the program. Test their usage.

Note, to quit prolog type `halt` (`<ctrl>+D` will also work). If you get stuck in a loop and want to force a break `<ctrl>+C` gives you some options.