COMP 304 Assignment 4
(Basic Prolog)

Due Date: 23 September, 2016

Introduction

This project is worth 7.5% of your total course grade. It involves writing Prolog code. All your work must be submitted electronically. Prolog code files must be plain text files with a `.pl` extension. Any other material (which includes any additional descriptions of the way you chose to solve any of the problems) should be in `.pdf` or `.txt` format.

All your code must be properly commented. Use comments extensively to communicate the purpose of each predicate, its variables and clauses, and what the overall design of your program is. There will be a severe marking penalty for programs without comments.

Supply sample queries that demonstrate the functionality of your programs as requested in the following questions. These may derive from queries you have used in your own testing but make sure that your sample queries are not too high in numbers, yet still manage to demonstrate all functionality.

1 Dr. Roberts (50%)

Increasing cost pressure led psychiatrists to replace some of their services with a computer-based system, dubbed "Dr. Roberts". The application should respond to sentences typed in by a client similar to a real psychiatrist would.

For instance, the sentence "I feel bad about my brother." should be answered with "What makes you feel bad about your brother?". Dr. Roberts can form the reply by looking for the keyword "feel" and then inserting a transformed version of whatever follows "feel" in the input to the template "What makes you feel *?". The transformation of the input fragment involves replacing words, e.g., "my → your", "you → me","am → are".

1.1 Representing sentences

It is sufficient to expect input in the form of lists of atoms, such as "`[i, fantasised, about, fast, cars]`" (to which Dr. Roberts should reply "`[have, you, ever, fantasised, about, fast, cars, before, qm]`''). Note that `qm` is used to represent "?".

1.2 Printing sentences

Write a Prolog predicate `printSentence/1` which takes a list of atoms and writes it out to the standard output, using the predefined predicate `write/1`. For instance, `printSentence([Why, you, like, your, mother, qm]).`, should result in "Why do you like your mother ?".

1.3 Answering input

Write a Prolog predicate `answer/2` which succeeds if the first argument is a input list of terms and the second the corresponding reply by Dr. Roberts. For instance, the reply to the input `[i, know, i, am, insecure]` should be `[are, you, sure, you, know, that, you, are, insecure, qm]`. Also see the above examples for two more samples of input and output pairs. Use your own creativity to add a couple of further input and output pairs which are based on keyword matching and transformation of input fragments. *Hint:* Predicate `answer/2` should make use of other predicates like `match/2` (for finding keywords in input lists) and `transform/2` (for transforming input phrases into the corresponding output fragments (see section 1)).

Can your predicate produce an input list, provided that it is given the answer list? If not, why not? Is there anything you can do to help it produce the input list? Provide the answer to these questions in comments added to your code or in accompanying documentation.

1.4 Testing

Write a Prolog predicate `printReply/1` which takes an input list and writes the answer to the standard output. For each keyword your version of "Dr. Roberts" can react to, provide two different input lists that demonstrate that `printReply/1` produces an appropriate answer.