Spring 2020

CSC 419 - PL - Assignment 6

Due date: Tuesday, May 5, 2020, before midnight, upload in home folder of class

We recommend SWI-Prolog for the programming exercises. The latest version can be downloaded here: http://www.swi-prolog.org/. It is also available on lab computers.

Exercise 7.1

(a) Compare the concept of data typing in C with that of Prolog.
[1 points]

(b) What is the main difference between imperative languages and logical programming languages?
[1 points]

(c) Why do you think functional or logic programming have never become as dominant as imperative programming paradigms?

[1 points]

(d) Explain two ways in which the list-processing capabilities of Scheme and Prolog are similar
[1 points]

(e) In what way are the list-processing capabilities of Scheme and Prolog different?
[1 points]

Exercise 7.2

(a) Write a Prolog program that includes a set of facts either about your family relationships, or about another topic of your choice. Include at least five facts and at least two inference rules in the program. Run the program with at least two queries in which the system must make inferences for variables. Report the results.
[5 points]

(b) What is the following Prolog program doing? Explain each line of code. Also, what would the program return for list_op([a,b], [b,c], X). ? What about for list_op(X, Y, [a,b,c]). ? List several answers that you expect to obtain, if relevant (e.g., that you would expect when typing ";" in the Prolog compiler after the first answer is given).

```
list_op([], List, List).
list_op([Head|List_1],List_2,[Head|List_3]) :- list_op(List_1, List_2, List_3).
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[5 points]

(c) Write a Prolog program that returns a list containing the union of the elements of two given lists. For instance, the union of the lists [a, c] and [a, b] should return [a, b, c]. Explain every line of your code, and test it on a few examples.

[5 points]