

CS 330 Fall 2017, Prolog assignment

Due: November 7, 2017

Professor: Carlotta Domeniconi

Problem 1

Suppose we represent sets of integers as lists of integers with no duplicated elements. Write Prolog rules for the following set operations (do NOT use any pre-defined predicates):

- **subset(A,B)**: returns true if set A is a subset of set B; false otherwise.
- **union(A,B,C)**: returns the union of sets A and B. C is used to store the result.
- **intersection(A,B,C)**: returns the intersection of sets A and B. C is used to store the result.
- **difference(A,B,C)**: returns the set difference of sets A and B. C is used to store the result.

Here are few examples of queries and expected responses of the Prolog interpreter:

?- subset([1, 3, 5], [5, 1, 2, 3]).
yes

?- subset([1, 3, 5], [3, 1, 5]).
yes

?- union([1, 2, 3], [2, 3, 7, 9], U).
yes, U = [1, 2, 3, 7, 9]

?- intersection([1, 2, 3], [2, 3, 7, 9], I).
yes, I = [2, 3]

?- difference([1, 2, 3], [2, 7, 9, 3], D).
yes, D = [1]

Problem 2

Write a Prolog rule for the predicate `elimdup(L1,L2)`, which eliminates duplicate elements from a list. `L1` is a given list of elements, and `L2` is used to store the result.

Here are few examples of queries and expected responses of the Prolog interpreter:

```
?- elimdup([1, 3, 5, 3],R).  
yes, R = [1, 3, 5]
```

```
?- elimdup([1, 3, 5], R).  
yes, R = [1, 3, 5]
```

```
?- elimdup([a, b, a, c, b], R).  
yes, R = [a, b, c]
```

```
?- elimdup([a, b, a, c, b, a], R).  
yes, R = [a, b, c]
```

SUBMISSION: Submit two (ascii) files as attachments to our TA Prakhar Dogra (pdogra@masonlive.gmu.edu). The first file should contain your program which will include your rules for both problem 1 and problem 2. The second file should contain 5 queries for each predicate (25 queries total). The queries should be different from the ones provided here, and should demonstrate that you tested your program on different cases. Your second file should be readable, containing the queries on separate lines. **You must also submit a hardcopy of your code and queries at the beginning of class on Tuesday, November 7.** Deviations from these instructions will be penalized. This assignment must be performed individually. Group work is NOT allowed. Any deviation from this policy will be considered a violation of the GMU Honor Code. Be advised that submitting somebody else's code (including code found on the web) is considered plagiarism, and therefore in violation of the GMU Honor Code. The deadline to submit your code electronically is NOON Tuesday, November 7. **Late submissions will be penalized 10 points a day.**