

**CSE 465/565**  
**Fall 2019**  
**Homework #2**  
**100 points**

*Instructions: Submit to Canvas a single zip file that contains an electronic copy of your answers and programs. Your zip file must have the following directory structure, where uniqueID is your Miami University uniqueID:*

<i>uniqueID HW2</i>	<i>; top-level directory containing all of your stuff</i>
<i>uniqueIDHW2.pdf</i>	<i>; contains your answers to exercises 1 and 5</i>
<i>uniqueIDASP</i>	<i>; directory containing your ASP code</i>
<i>problem2.txt</i>	<i>; your ASP code for problem 2 below</i>
<i>problem3.txt</i>	<i>; your ASP code for problem 3 below</i>
<i>problem4.txt</i>	<i>; <b>graduate students only</b>: your ASP code for problem 4 below</i>

*For each exercise, you will see the points in parenthesis. The first number is the number of points for CSE 465 students; the second number is the number of points for CSE 565 students.*

(1) (25/20) What is the English reading for each of the following rules?

```
person(X) :- child(X).  
:- child(X), age(X, Y), Y >= 18.  
-age(X, N) :- age(X, N1), N != N1.  
age(leo, 35) | age(leo, 36).  
adult(X) :- person(X), not child(X).
```

(2). (25/20) Write an ASP program that can determine if one person is a full brother, half-brother, or a step brother of another person.

The program you write should run with the DLV solver and should define three relations:

```
full_brother(X, Y) – X is a full brother of Y, i.e., a brother born of the same mother and father  
half_brother(X, Y) – X is a half-brother of Y, i.e., a brother related through one parent only  
step_brother(X, Y) – X is a step brother of Y, i.e., a son of one's stepparent by another partner
```

To test your program, use the family information provided in the starter file *problem2.txt*. Extend the starter file with your own rules for the three relations above. You may add helper predicates and rules as needed. Your solution may be tested on additional family trees.

(3). (25/20) Write an ASP program to be run with the DLV solver that solves the following problem using the generate-and-test methodology:

*Given a round table with six chairs and a group of six people, some of whom are married and some of whom do not like each other, find a seating assignment for members of this group such that husbands and wives are seated next to each other and no neighbors dislike each other. Marriage is a symmetric relationship, but disliking is not necessarily symmetric (e.g., person A dislikes B, but B may like A).*

Use and extend the starter code provided in the file *problem3.txt*. Make sure to define the relation:

```
seated(P, C) – person P is sitting on chair number C
```

(4). (0/20) **(Only for CSE 565 students)** Write an ASP program to be run with the DLV solver that solves the following problem using the generate-and-test methodology:

*At a recent Pets Anonymous reunion, the attendees were discussing which pets they had recently owned. Four people were attending: James, Kevin, Becky, and Rita. At each point in time (i.e., past and present), each person owned only one pet and each pet was owned by only one person. James used to have a dog. The person who used to own a mouse now owns a cat. The person who used to have a cat does not have a mouse. Kevin now has or used to have a dog, I can't remember which. Becky has never owned a mouse, not now and not in the past. Only one person now owns the pet they previously had and that pet is a hamster.*

Use and extend the starter code provided in the file *problem4.txt*. Define the relations:

had(Person, Pet) – in the past, person Person owned pet Pet  
has(Person, Pet) – right now, person Person owns pet Pet

(5). (25/20) Write a report that evaluates the language of Answer Set Prolog (ASP) using the four main criteria learned in class. Use the table below and write at least one supported idea in each cell.

Criterion	Pros	Cons
Readability		
Writeability		
Reliability		
Cost		