

### Small Assignment #7

**Due: Wednesday, 11/13/2024 by 11:59 PM**

**Submission:** Submit this to Gradescope as a single PDF. Assign pages to questions. There are points associated with this for some of the questions below.

#### Question 1. (6 points)

Consider the two rules below for sibling where `sibling(X,Y)` means that X and Y share at least one parent.

```
sibling(X,Y) :- parent(P,X), parent(P,Y), not(X=Y).
```

```
sibling(X,Y) :- not(X=Y), parent(P,X), parent(P,Y).
```

One of the rules works correctly and the other does not. Tell which rule is correct and explain why it works and the other one does not.

#### Question 2. (10 points)

Below is the code we wrote in class for the Man-Wolf-Goat-Cabbage problem. Explain the purpose of each predicate in solving the problem. Note that it is not enough to just repeat what is in the comments. You need to show that you understand the code and what each piece is doing.

```
oppositeSides(e,w).
```

```
oppositeSides(w,e).
```

```
bad([S,0,0,_]) :- oppositeSides(S,0).
```

```
bad([S,_,0,0]) :- oppositeSides(S,0).
```

```
move(nothing,[M,W,G,C],[O,W,G,C]) :- oppositeSides(M,0).
```

```
move(wolf,[M,M,G,C],[O,O,G,C]) :- oppositeSides(M,0).
```

```
move(goat,[M,W,M,C],[O,W,O,C]) :- oppositeSides(M,0).
```

```
move(cabbage,[M,W,G,M],[O,W,G,O]) :- oppositeSides(M,0).
```

```
solution([],[[e,e,e,e]]).
```

```
solution([Move|MovesTail], [Start,End|Tail]) :-
```

```
move(Move,Start,End),
```

```
not(bad(End)),
```

```
solution(MovesTail,[End|Tail]).
```