Discussion 2

● Graded

Student

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Total Points

10 / 10 pts

Question 1

Rule-based Queries **10** / 10 pts

1.1 **Answer a Question** **3** / 3 pts

Click here to replace this description.

✔ **+ 3 pts** Correct. The answer is yes. Applying `has_wings(X) :- can_fly(X)` to the fact `can_fly(supergirl)` yields `has_wings(X)`.

+ 1 pt Said the answer is yes, but did not give an adequate explanation.

+ 0 pts Incorrect or missing answer.

1.2 **Enumerate Matches** **3** / 3 pts

Click here to replace this description.

✔ **+ 3 pts** Correct. The list should be cow, pegasus, unicorn, zebra.

+ 2 pts List was missing 1-2 entries, but no incorrect entries.

+ 1 pt All the correct objects were listed, but an incorrect entry (at most one) was included.

+ 0 pts Incorrect or missing answer.

1.3 **Add a Missing Rule** **4** / 4 pts

Click here to replace this description.

✔ **+ 4 pts** Correct. Identified rule `mammal(X) :- has_hooves(X).`.

+ 2 pts Correct answer included but added other rules that are not required

+ 0 pts Incorrect or missing answer.

Q1 Rule-based Queries

10 Points

Answer the following questions based on the following facts and rules.

Update: There was a missing rule `equine(pegasus)` when this was originally posted.

```
bovine(cow).
can_fly(dragon).
can_fly(pegasus).
can_fly(supergirl).
equine(pegasus).
equine(unicorn).
equine(zebra).
has_hair(unicorn).
has_hooves(X) :- equine(X).
has_hooves(X) :- bovine(X).
has_horn(unicorn).
has_wings(dragon).
has_wings(X) :- can_fly(X).
is_magic(dragon).
is_magic(unicorn).
```

Q1.1 Answer a Question

3 Points

Answer the following question.

```
?- has_wings(supergirl).
```

Explain what facts and rules led to this deduction to support your answer.

The fact that Supergirl can fly is already known.
The has_wings(X) rule: - can_fly(X). implies that something must have wings in order to be able to fly.
Thus, we get has_wings(supergirl) by changing X = supergirl.

Q1.2 Enumerate Matches
3 Points

Enumerate all `X` that make the relation in the following question true.

```
?- has_hooves(X).
```

The rules are:
has_hooves(X) :- equine(X).
has_hooves(X) :- bovine(X).

From the facts:
equine(pegasus).
equine(unicorn).
equine(zebra).
bovine(cow).

All four satisfy the rules, so the answer is: pegasus, unicorn, zebra, cow.

Q1.3 Add a Missing Rule
4 Points

Identify a single rule to add so that the following question's answer true.

```
?- mammal(unicorn), mammal(cow), mammal(pegasus), mammal(zebra).
```

mammal(X) :- has_hooves(X).