12.6 Week 12 Homework Quiz

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Kevin Offemaria (username: offemakp)

Attempt 16

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Submission View

Your quiz has been submitted successfully.

Question 1 **5 / 5 points**

Which of the choices below represent valid interpretations of:

"Every Martian can fool some of the people all of the time (and these can be different subsets of people for each Martian)"

x, y, and t are variables. There may be multiple correct answers.

- [ ] Forall(x) [Martian(x) → Exists(y)[Person(y) AND ForAll(t)[Time(t) → Fools(x,y,t)]]]
- [ ] Forall(x) [Martian(x) AND Exists(y)[Person(y) AND ForAll(t)[Time(t) → Fools(x,y,t)]]]
- [ ] Exists(y) [Person(y) AND ForAll(x)[Martian(x) → ForAll(t)[Time(t) → Fools(x,y,t)]]]
- [ ] Exists(y) ForAll(x) ForAll(t)[Person(y) AND (Martian(x) → (Time(t) → Fools(x,y,t)))]
- [ ] ForAll(x) Exists(y) ForAll(t) [Martian(x) → (Person(y) AND (Time(t) → Fools(x,y,t))]

Question 2 **6 / 6 points**

Consider the following propositional knowledge base:

1. handEmpty → ~holding-A;
2. handEmpty → ~holding-B;
3. handEmpty → ~holding-C;
4. holding-A → ~handEmpty;
5. holding-B → ~handEmpty;
6. holding-C → ~handEmpty;
7. on-A-B → ~clear-B;
8. on-B-C → ~clear-C;
9. on-C-D → ~clear-D

A single first-order rule to replace propositional rules 1-3 is $\forall_X$ (handEmpty → ~holding(X))

Give a single first-order rule that replaces propositional rules 7-9. Show quantifiers. X and Y are allowable variables. There may be multiple correct answers.

- [ ] $\text{ForAll}_X, \text{ForAll}_Y(\text{on}(X, Y) \rightarrow \sim\text{clear}(Y))$
- [ ] $\text{ForAll}_X, \text{ForAll}_Y(\sim\text{on}(X, Y) \vee \sim\text{clear}(Y))$
- [ ] $\text{ForAll}_X, \text{ForAll}_Y(\sim\text{on}(X, Y) \vee \text{clear}(Y))$
- [ ] $\text{ForAll}_X, \text{ForAll}_Y(\text{on}(X, Y) \vee \text{clear}(Y))$
- [ ] $\text{ForAll}_X, \text{ForAll}_Y(\sim(\text{on}(X, Y) \wedge \text{clear}(Y)))$
- [ ] $\sim(\text{Exists}_X, \text{Exists}_Y(\text{on}(X, Y) \wedge \text{clear}(Y)))$

Question 3 **3 / 3 points**

Given the axioms:

A,B are constants

?x's, ?y's, and ?z's are (universally-quantified) variables

ontable(A)
~clear(A)
~above(?x1, ?y1) or below(?y1,?x1)
~below(?x2, ?y2) or above(?y2, ?x2)
~on(?x3, ?y3) or above(?x3, ?y3)
~on(?x4, ?y4) or ~above(?y4, ?z4) or above(?x4, ?z4)
clear(?x5) or on(B, ?x5)
~ontable(?x6) or ~holding(?x6)
~ontable(?x7) or ~on(?x7, ?y7)

We want to prove **below(A, B)** with a *refutation resolution* proof. But we will just make a start. What is the **resolvent of this first step, shown both graphically and in list format..**

~below(A,B) ~above(?x1, ?y1) or below(?y1,?x1))

???

1. ~below(A,B), ~above(?x1, ?y1) or below(?y1,?x1))

$\vdash$???

- ~below(A,B) and (~above(?x1, ?y1) or below (~y1, ?x1))
- ~below(A,B) and (~above(A, B) or below (B, A))
- ~above(B, A)
- ~above(A, B)

Question 4 **2 / 2 points**

What is the result of resolving (P(y, x, B, y) or Q(x, y, x, A)) with ~P(z, z, w, A). A and B are constants. x, y, and z are variables.

- Q(z,z,w,A)
- Q(y,y,y,A)
- ~P(A,A,A,A)
- ~P(B,B,B,A)
- Q(A,A,A,A)

Attempt Score: 100 %

Overall Grade (last attempt): 83.33 %

Done