

INF5390 oblig 2

mathiajj and martinvl

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Task 1

Domain:

Constants:

The domain does not have any known constants.

Functions:

The domain does not have any known constants.

Relations:

The domain has the following relations:

- $\text{Man}(X)$ - (X) exists if X is a man
- $\text{Woman}(X)$ - (X) exists if X is a woman
- $\text{Vegetarian}(X)$ - (X) exists if X is a vegetarian
- $\text{Smart}(X)$ - (X) exists if X is smart
- $\text{Politician}(X)$ - (X) exists if X is a politician
- $\text{Barber}(X)$ - (X) exists if X is a barber
- $\text{Hate}(X, Y)$ - (X, Y) exists if X hate Y
- $\text{Like}(X, Y)$ - (X, Y) exists if X like Y
- $\text{Shaves}(X, Y)$ - (X, Y) exists if X shaves Y
- $\text{CanFool}(X, Y)$ - (X, Y) exists if X can fool Y

All relations has a fixed arity, but we use the paranthesis to define arguments as it is easier to read.

a.

$$\forall X \forall Y ((Vegetarian(Y) \wedge Hates(X, Y)) \rightarrow Smart(X))$$

b.

$$\forall X (Smart(X) \wedge Vegetarian(X) \rightarrow (\forall Y (\neg Like(Y, X))))$$

c.

$$\exists X (Woman(X) \wedge \forall Y ((Man(Y) \wedge vegetarian(Y)) \rightarrow like(X, Y)))$$

d.

$$\exists X (barber(X) \wedge \forall Y (Man(Y) \wedge \neg Shaves(Y, Y) \rightarrow Shaves(X, Y)))$$

e.

$$\forall X (Politician(X) \rightarrow \exists Y \forall T (CanFool(X, Y)) \vee \forall Z \exists T (Time(T) \wedge CanFool(X, Y)))$$