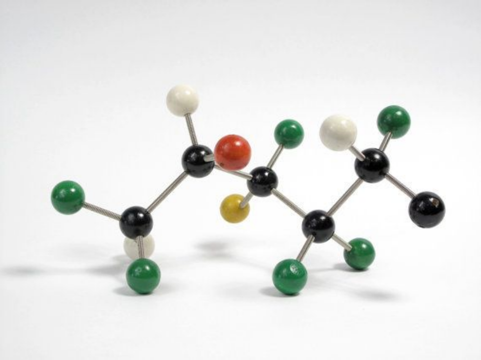
Countermodels

University of Edinburgh | PHIL08004



Something is red,

Something is blue,

But both of the following are untrue:

- something is red and blue,
- everything is either red or blue.

And everything is green just in case its not blue.

Is something green but not red and not blue?

$\exists x Dx$

$\exists x Bx$

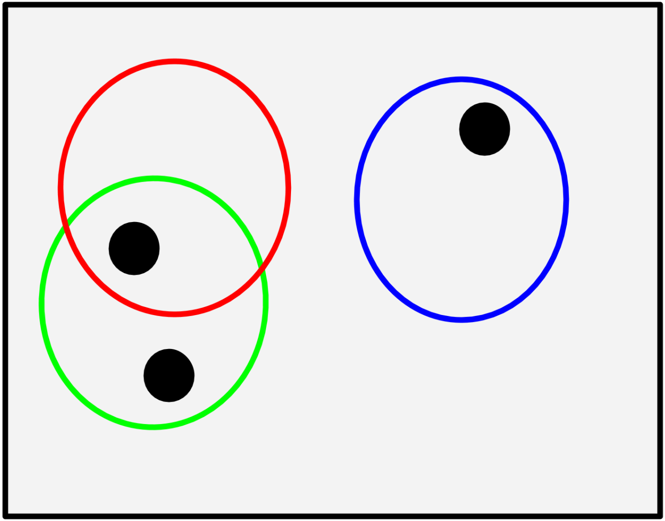
$\neg \exists x (Dx \land Bx)$

$\neg \forall x (Dx \lor Bx)$

$\forall x (Gx \leftrightarrow \neg Bx)$

$\exists x (Gx \land (\neg Bx \land \neg Dx))$?

$\exists x(Gx \wedge (\neg Bx \wedge \neg Dx))$



Construct a model that makes these all true?

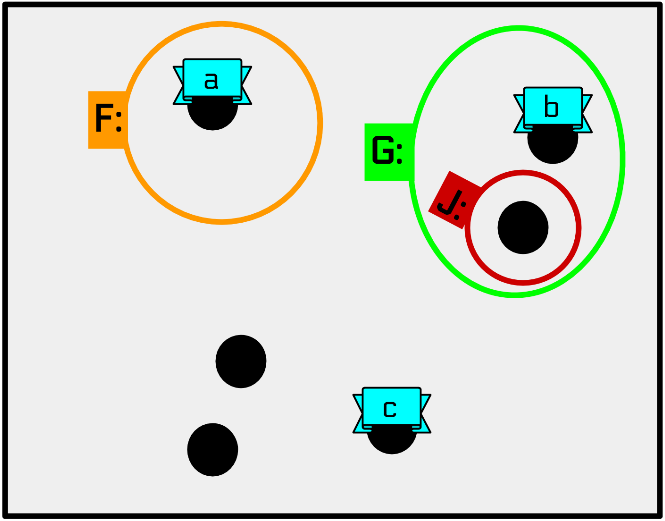
Fa

Gb

$\neg Jc$

$\forall x(Jx \rightarrow Gx)$

Fa. Gb. $\neg Jc$. $\forall x(Jx \rightarrow Gx)$



Construct **the most minimal** model that makes these all true?

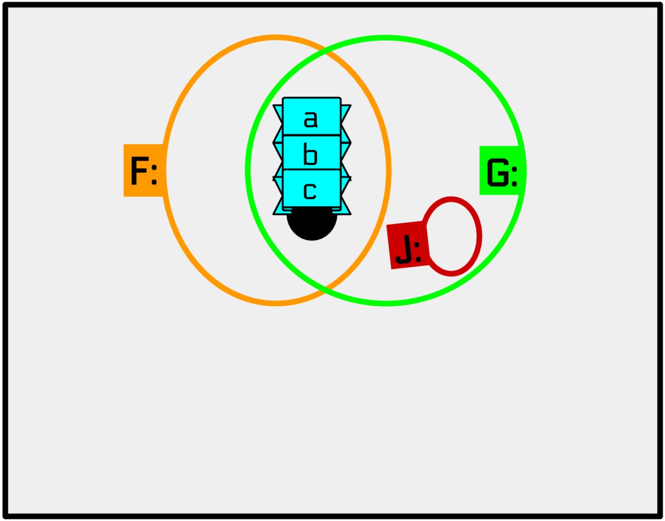
Fa

Gb

$\neg Jc$

$\forall x(Jx \rightarrow Gx)$

$Fa.\quad Gb.\quad \neg Jc.\quad \forall x(Jx \to Gx)$



$(Fa \vee Gb) \wedge \exists x Hx$

MAKE TRUE
U:
F:
G:
H:
a:
b:

MAKE FALSE
U:
F:
G:
H:
a:
b:

A3

Goal: write a derivation OR build a counter model.

Write a derivation | Build a counter model

$\exists x(Fx \land \neg Gx) \rightarrow \forall x(Fx \rightarrow Hx)$

$\exists x(Fx \land Jx)$

$\therefore$ $\forall x(Fx \land \neg Hx) \rightarrow \exists x(Jx \land Gx)$

D = {0}