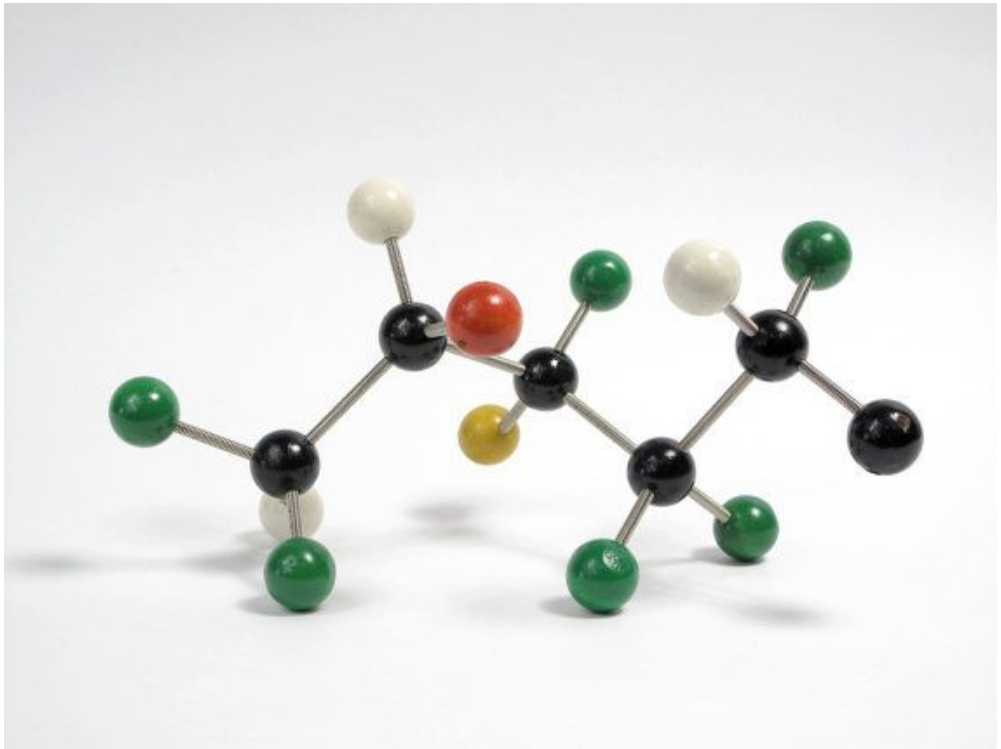
Countermodels

University of Edinburgh | PHIL08004



Something is round,

Something is big,

But both of the following are untrue:

- something is round and big,
- everything is either round or big.

And everything is green just in case its not big.

Is something green but not round and not big?

$\exists x Nx$

$\exists x Bx$

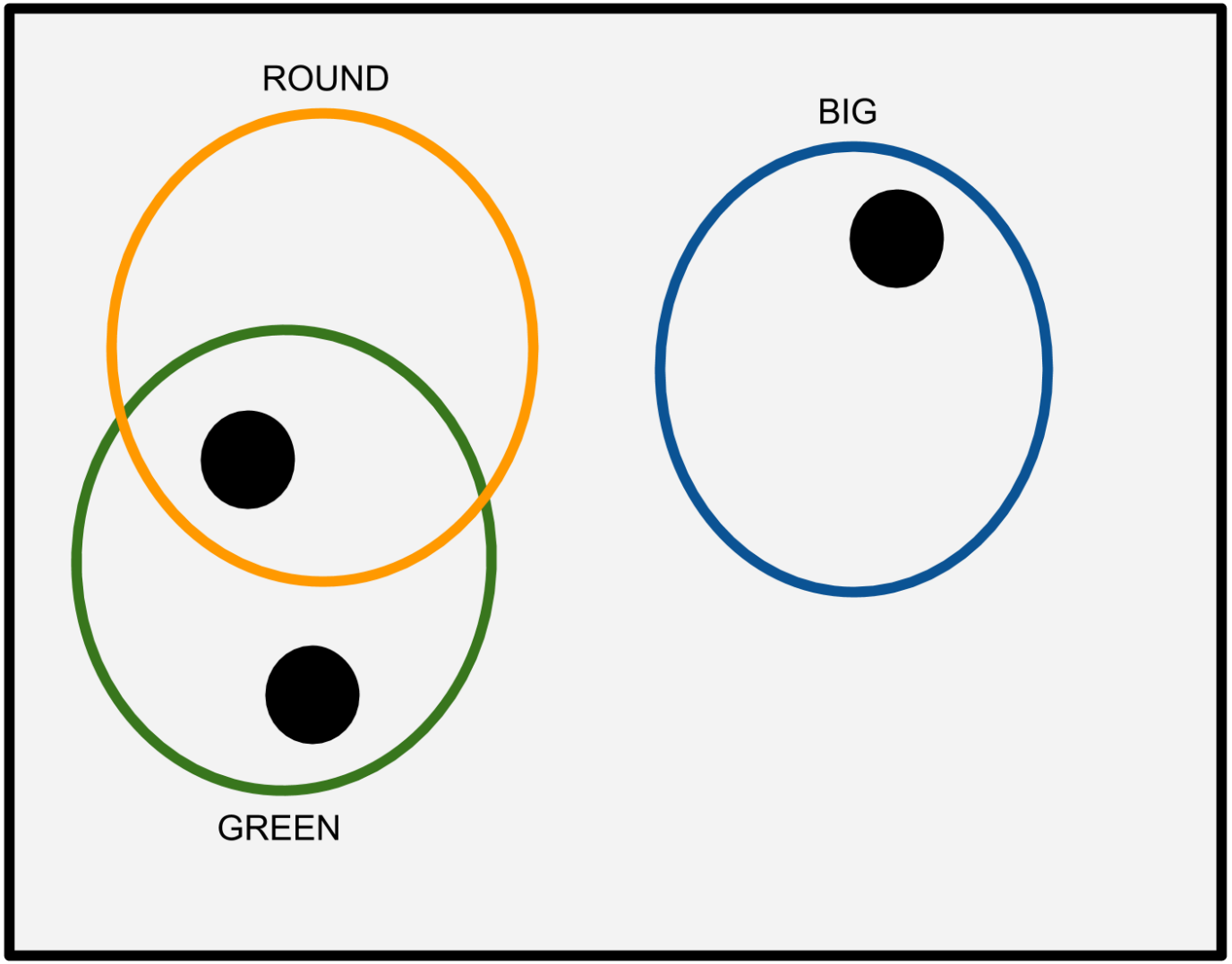
$\neg\exists x(Nx \wedge Bx)$

$\neg\forall x(Nx \vee Bx)$

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

$\exists x(Gx \wedge (\neg Bx \wedge \neg Nx))$?

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



Construct a model that makes these all true?

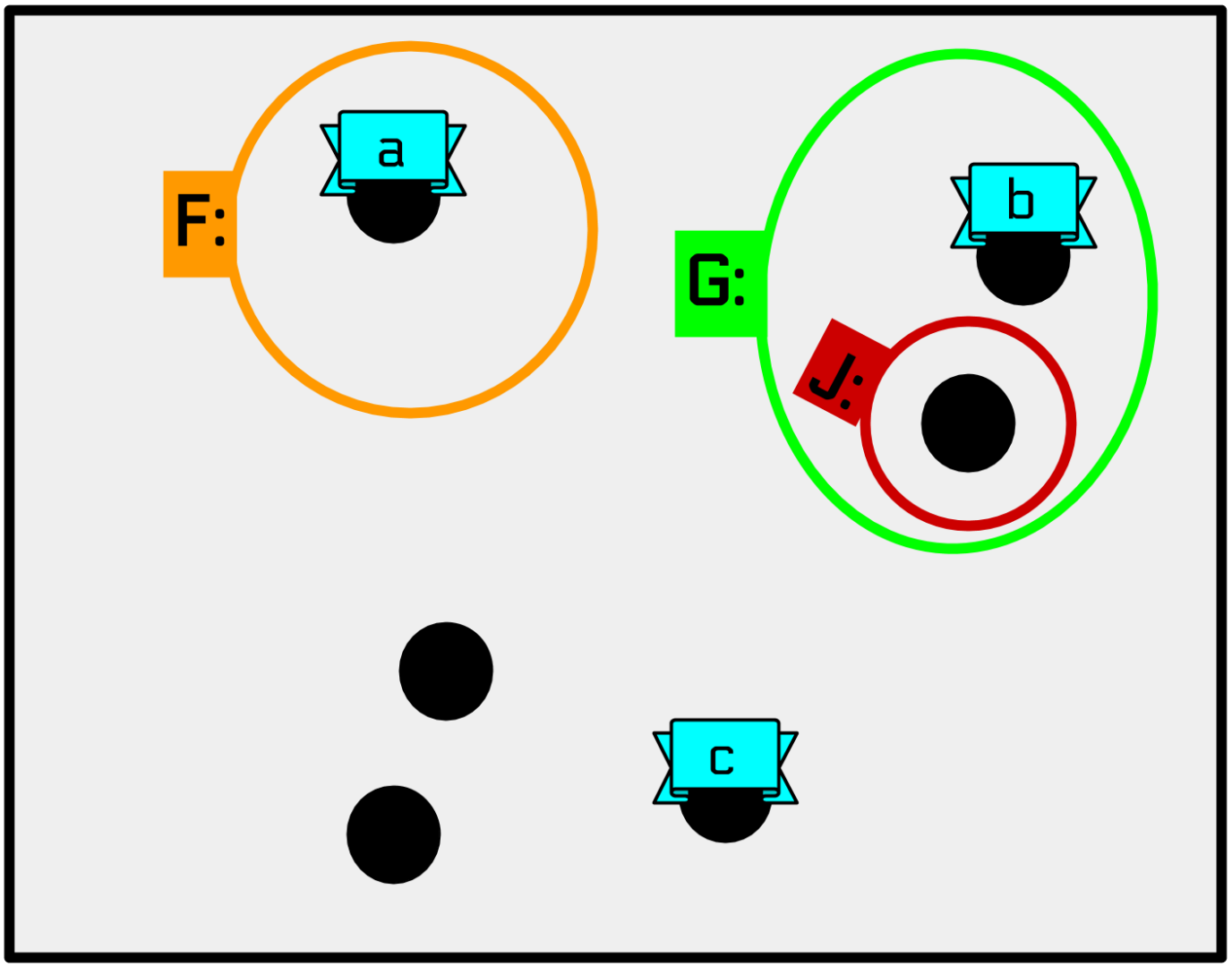
Fa

Gb

$\neg Jc$

$\forall x(Jx \rightarrow Gx)$

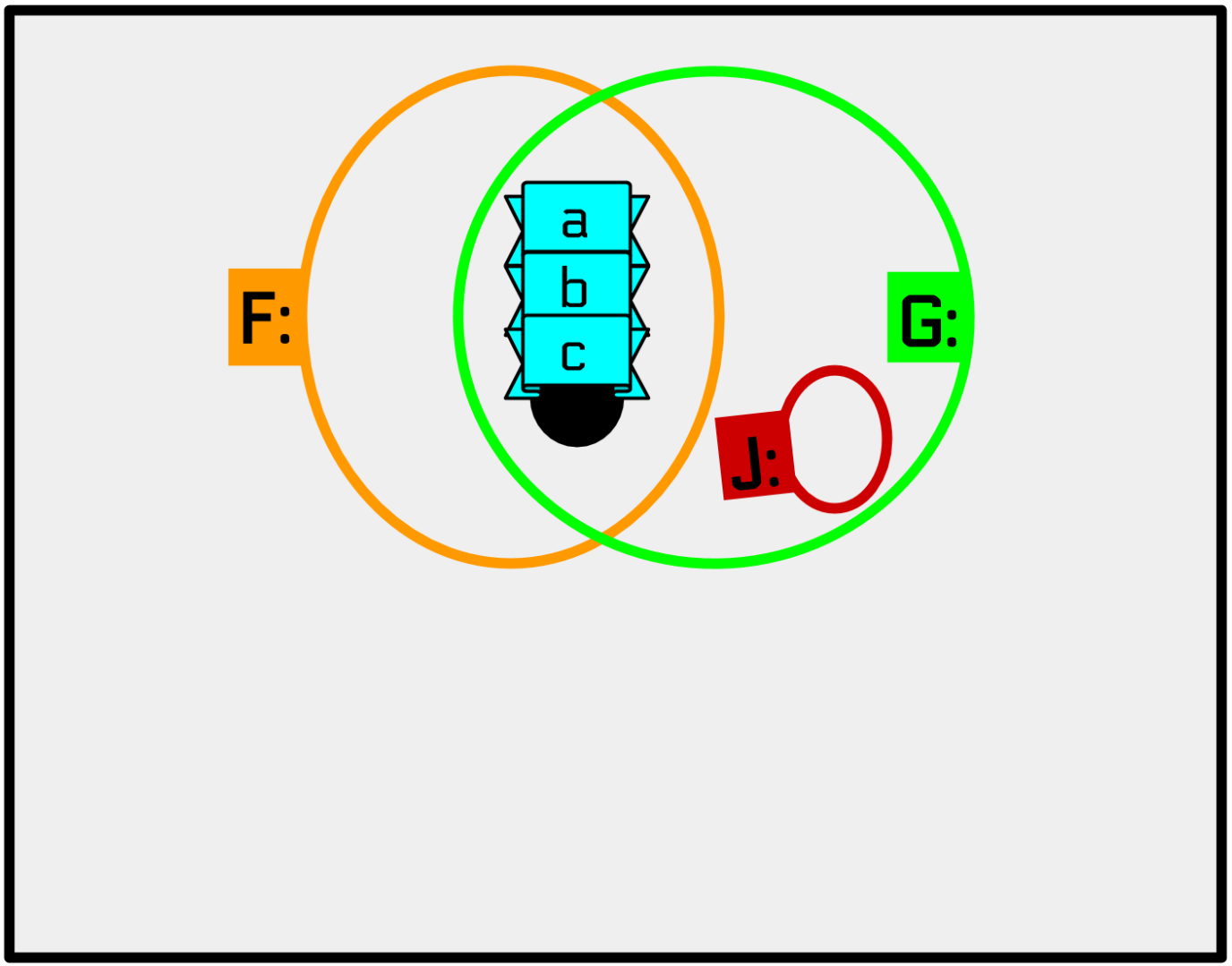
$Fa.\quad Gb.\quad \neg Jc.\quad \forall x(Jx \rightarrow Gx)$



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

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

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



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

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.

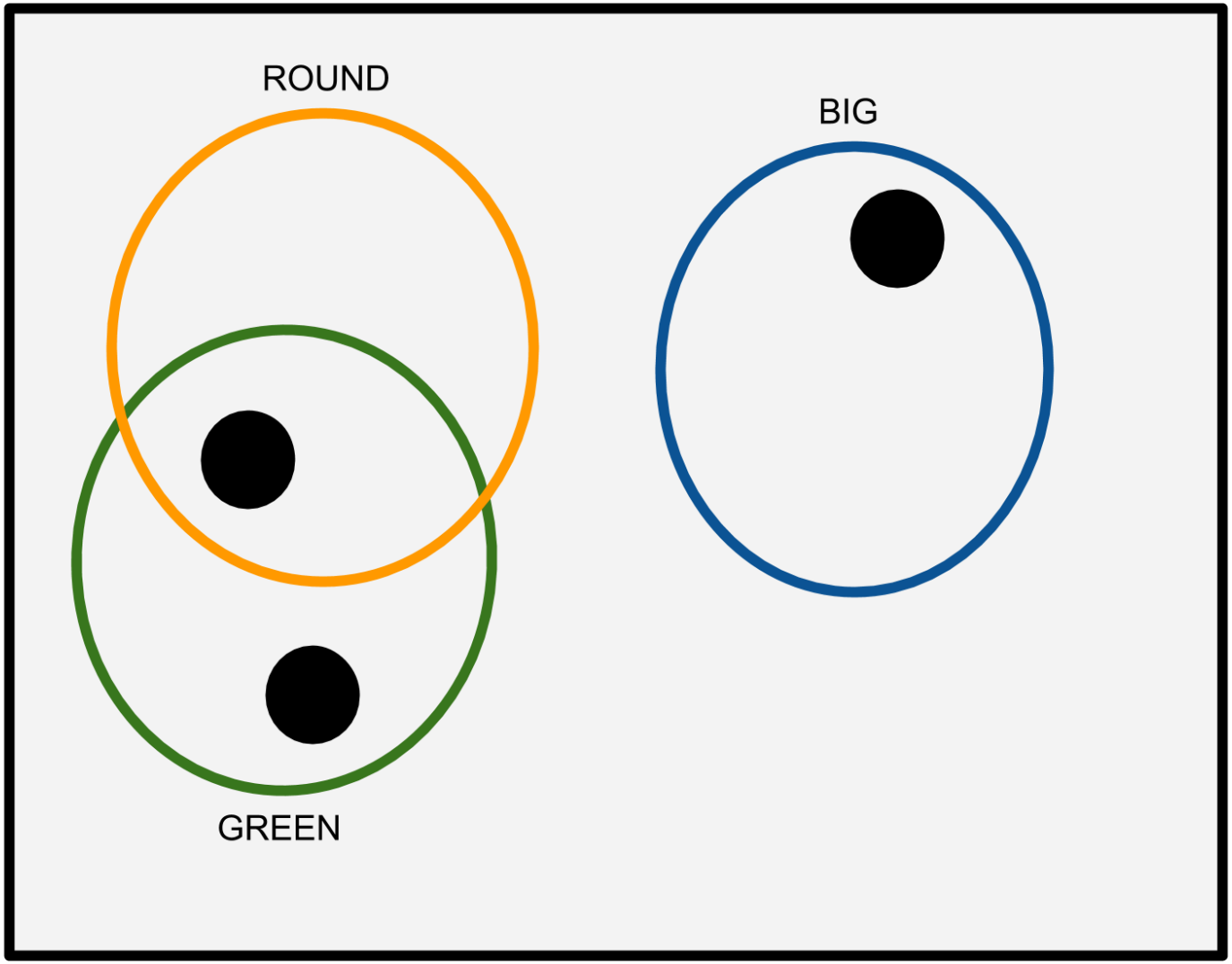
Write a derivation | Build a counter model

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

$\exists x(Fx \wedge Jx)$

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

D = {0}


ROUND
BIG
GREEN