(M) Colorless Green Concepts Scripting Furiously (1/2)

M1: (E v (D -> ((C -> notB) ^notA)))

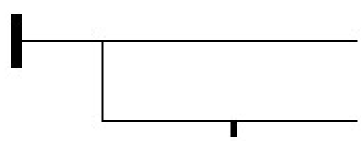
M2: (note that iv and vi are interchangeable, but they shouldn't have the same answer. I.e., you should either have (iv = B and vi = C) or (iv = C and vi = B)

- i = A
- ii = F
- iii = D
- iv = B/C
- v = E
- vi = B/C

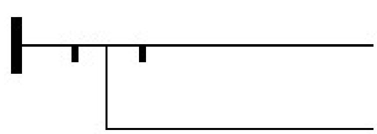
Solution path:

From page 1, we can figure out how the system works. I will do this by determining the representations for AND, OR, NOT, and IF/THEN; in reality, AND and OR can be further broken down, but I find it easier to treat them as atomic.

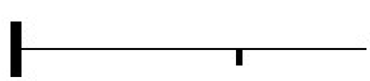
From the first one, we get OR:



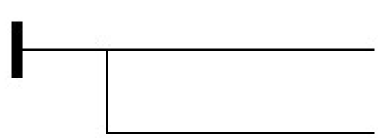
From the fifth one: Given the representation of OR above, we can factor out the (D v C) part to get that the part at the top is B ^ A, to give us AND:



From the 2nd and the 4th ones: We can tell that the bottom part of the 2nd is C -> B, and the bottom part of the 4th is C -> notB. From that minimal pair, we get NOT:



We can finally get IF/THEN from, e.g., the 2nd one:



(M) Colorless Green Concepts Scripting Furiously (2/2)

Now, to solve A: We first label the lines A through E.

Looking at the outermost layer gives us (E v ...), where we need to fill in the ...

The next layer expands it to (E v (D -> ...))

The next layer gives us an AND: (E v (D -> (...^...)))

The bottom part of the AND is C -> notB. The top part is notA (one of the two bars next to each other was part of the AND). So our final answer is: (E v (D -> ((C -> notB) ^notA)))

And to solve B:

They give us this story, so we should first construct a logical statement to represent it.

First, it says “all this only holds true if the polyverse is Groop-normal.” So our formula will be “the universe is Groop-normal” -> (everything else)

All the other ones seem to be about what things are guaranteed to be galactions. So it seems like it should become: “the universe is Groop-normal” -> (... -> “x is a galaction”)

Now, under what conditions is x a galaction? First, all quaxors are galactions: “the universe is Groop-normal” -> (“x is a quaxor” -> “x is a galaction”)

Also, if x is a pulsoid with a sateotrope that is not dingly: “the universe is Groop-normal” -> ((“x is a quaxor” v (“x is a pulsoid” ^ “x has a sateotrope” ^ not”x is dingly”)) -> “x is a galaction”)

Now let’s look at the diagram we are given. To turn it into a logical statement:

Label the lines A through F, from top to bottom

The outmost layer gives an IF/THEN: F -> ...

The next layer is also an IF/THEN, where the IF part is a bunch of stuff and the THEN is A: F -> (... -> A)

The stuff in the dots gives us an OR: F -> ((E v ...) -> A)

The remaining dots give us an AND: F -> ((E v (... ^ B)) -> A)

The final part is notD and C: F -> ((E v (notD ^ C ^ B)) -> A)

So this logical statement from the diagram almost maps nicely to the logical form we generated from the story. We have:

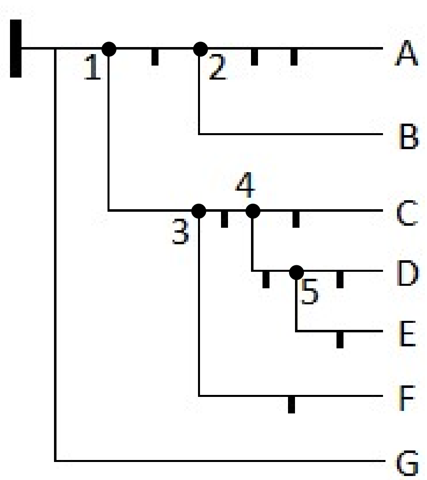
F = “the universe is Groop-normal”

E = “x is a quaxor”

D = ”x is dingly”))

C/B = “x has a sateotrope”/ “x is a pulsoid”

A = “x is a galaction”



5. ~E ^ D

4. (~E ^ D) ^ C

3. F v [(~E ^ D) ^ C]

2. B ^ ~A

1. F v [(~E ^ D) ^ C] -> B ^ ~A

Final: G-> (F v [(~E ^ D) ^ C]) -> (B ^ ~A)