Translating: The Step By Step Method

You don't *have* to use the following step by step method of translating: You won't lose points for not showing your work. But even though it takes a little extra time up front, it does make things a lot easier and probably saves you time overall. You can make your decisions more quickly and methodically, and you will make fewer mistakes you will have to back and correct later on. Plus, if you come to me for help with a translation, I'm *almost always* going to start by asking you (i) whether the sentence fits into one of the Aristotelean categorical types, and (ii) if so, how you would do the step by step method.

Here are the steps in the so-called step by step method of translation:

1. **Type**

   Identify the type of categorical sentence. Is it a total inclusion? partial inclusion? total exclusion? partial exclusion?

2. **Form**

   Based on your answer to step (1), write out the basic, skeletal form for that type of categorical sentence. For instance, if it is a total exclusion sentence, write out $\forall x (\text{SUBJECT}(x) \rightarrow \neg\text{PREDICATE}(x))$

3. **Identify Subject and Predicate**

   Distinguish the Subject of the English sentence and the Predicate of the English sentence. (In general, look for the verb of the sentence to break them apart.)

4. **Translate Subject and Predicate**

   Take the Subject and Predicate and translate them into our FOL language. (Note: as our sentences get more complex in Chapter 11, this might involve repeating the step-by-step method on one or both of these parts!)

5. **Substitute Translations**

   Take your translations of the Subject and Predicate from part (4) and stick them into the Form from step (2).

6. **Read it back**

   Read your FOL sentence back into English and see whether it is equivalent to the original English sentence.

Extra Hints for Applying the Method

"Bending" a sentence to make it fit into one of our forms

Consider a sentence like "*a is in front of every large cube.*" The grammatical subject of this English sentence is "*a.*" But logically it has the structure of a total inclusion sentence. Try paraphrasing the sentence, bending it so that its one quantifier expression in English begins the sentence: "*Every large cube, a is in front of.*" Now you can see that it is a total inclusion sentence, totally including the category of large cubes inside the category of things that a is in front of.

Translating "Nothing" and "Everything"

Here's a way of extending the step by step method to sentences that begin with "thing" phrases: like "Nothing," "Everything."

   Try to treat "thing" as if it were an FOL predicate saying that the object is a thing: "Thing(x)". (We don't really need such a predicate, because everything is a thing!). For example, consider the sentence

<center>*Nothing is a large cube.*</center>

   Try reading this as a total exclusion sentence with "Thing(x)" as the subject class:

<center>*No thing is a large cube.*</center>

   Then translate that using the step by step method, and you'll end up with

$$\forall x \ (\mathsf{Thing}(x) \rightarrow \neg(\mathsf{Large}(x) \land \mathsf{Cube}(x)))$$

   Then, since you don't need Thing(x), you can get rid of the subject class altogether. And since the subject class is gone, you won't need the conditional either. So delete those (and the unnecessary parentheses left behind), and you'll end up with the correct translation:

$$\forall x \ \neg(\mathsf{Large}(x) \land \mathsf{Cube}(x))$$

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