Math 69: Logic **Winter '23**

Reading assigned January 13, 2023

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Problem 1.

Assume that we have a language with the following parameters:

- $\forall$, intended to mean "for all things";
- N, intended to mean "is a number";
- I, intended to mean "is interesting";
- $<$, intended to mean "is less than";
- and 0, a constant symbol intended to denote zero.

Translate into this language the English sentences listed below.

If the English sentence is ambiguous, you will need more than one translation.

(b) If any number is interesting, then zero is interesting.

$$\forall x\,(Nx \to Ix) \to I0$$

Questions

I am somewhat confused about free variables. I understand the example and recursive explanation of what free variables are — but I do not understand the context around free variables. Is it "free" because it is singular (i.e. not declared in some way before use, like in y in $\forall x\ x \in xy$)?