5.6-5.9 Questions

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1 5.6, p.136

I didn't mark any questions for section 5.6.

2 5.7, p.139

Definition 5.7.1 Suppose we were dealing with variable symbols like x, y, and z, and s is one of these variables. In finding $\ulcorner s \urcorner$ would we have to rename x, y, and z as v_1, v_2, and v_3, respectively, or does this problem never arise because we would just use indexed variable symbols from the start? HETZEL: Actually, many times we use variable symbols such as x, y, and z. However, for the purpose of computing a Godel number, there is always some identification (perhaps behind the scenes) wherein we can associate each such variable with some v_i.

Definition 5.7.1 Is there any reason in particular that the otherwise case, which I believe covers just constant symbols, gives 3? HETZEL: Actually, the way I see it, 3 covers things like function and relation symbols. For the constant symbol 1, for example, you have that $1 = S0$, so that $\ulcorner 1 \urcorner = \langle 11, 9 \rangle = 2^{12}3^{10}$

Definition 5.7.1 I've noticed that this chapter is only applying Gödel Numbering to $\mathcal{L}_{NT}$. It seems that most of the book is applied the $\mathcal{L}_{NT}$. I could understand the authors focusing on number theory because of the results or just to have consistent examples throughout the book, but is the material applicable at all to other theories? HETZEL: It is. It's just that $\mathcal{L}_{NT}$ is a classical context. Moreover, Godel's incompleteness theorems were originally phrased in terms of $\mathcal{L}_{NT}$, in the sense that they dealt with first-order theories that were powerful enough to express $\mathcal{L}_{NT}$.

3 5.8, p.143

I didn't mark any questions for section 5.8.

4 5.9, p.147

p.150 *TermReplace* def. I feel as though mind is glossing over the "bars" over numbers just a little bit. Considering something like "$``e_i = \overline{2}^{\overline{10}}$", I know $\overline{2} :\equiv SS0$ and $\overline{10} :\equiv SSSSSSSSSS0$. So, $\overline{2}^{\overline{10}}$ is saying something like $SS0^{SSSSSSSSSS0}$, but couldn't this be written more technically as $ESS0SSSSSSSSSS0$? It can sometimes be a bit strange working with these symbols that my mind wants to think of as regular old numbers but are actually $\mathcal{L}_{NT}$-formulas. HETZEL: Yes, it can technically be written as $ESS0SSSSSSSSSS0$.