Introduction to Semantics and Pragmatics

Roman Numerals and their Interpretation

Problem Set 1 — Due: 19 September, 2014
Points: 10 — Value: 2%

Let RN be the set of Roman numerals which can be expressed in terms of the symbols in the set N, that is, the set $\{I, V, X, L, C, D, M\}$, and which include the expressions *IIII*, *VIIII*, *XXXX*, *LXXXX*, *CCCC* and *DCCCC*, but exclude the expressions *IV*, *IX*, *XL*, *XC*, *CD* and *CM*. (Indeed, the replacement of the former expressions by the latter was a late innovation in the Roman numeral notation.)

1. (2 points)
Describe in your own words the pattern of the Roman numerals.

2. (2 points)
Now consider the following formation rule.

(1.1) If $x \in$ N, then $x \in$ RN;
(1.2) If $y \in$ RN and $z \in$ RN, then $yz \in$ RN;
(1.3) Nothing else is a member of RN.

It generates all the sequences of symbols in RN, but it also generates sequences of symbols which are not. There are two kinds of sequences of symbols which are not Roman numerals but which the formation rule includes in RN. Identify the two kinds.

3. (2 points)
Change the formation rule given above of RN so that RN does not contain sequences of symbols which are not Roman numerals. Use your answer to the first question to guide your correction of the previous rule.(hint: conditions

have to be added to the protasis, the if-clause, in (1.2); one of these conditions may have to use a ranking of the symbols in N.)

4. (2 points)
State a valuation rule for the formation rule you have just devised so that each member of RN, as generated by your formation rule, receives its usual value.

5. (2 points)
Is there a positive integer which is not the value of any member of RN, as generated by your formation rule and interpreted by your valuation rule? If so, what is the least such positive integer?