EXERCISE 1

Human Reasoning and Computational Logic

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European Master’s Program in Computational Logic — winter semester 2016/17

Problem 1.1

Given is the following unary function \( +2 : \mathbb{N} \rightarrow \mathbb{N} \) defined as follows:

\[
+2(N) = \begin{cases} 
  s(s(0)) & \text{if } N = 0, \\
  s(+2(N')) & \text{if } N \text{ is of the form } s(N').
\end{cases}
\]

1. Find a set of Horn clauses and a Prolog program which implements this function for suitable queries.

2. Compute the value which is obtained when \( +2 \) is applied to the number \( 3 = s(s(0)) \)
   (a) by use of the found Horn clauses and the resolutions method, and
   (b) by use of the found Prolog program.

Formulate first the necessary ‘queries’.