

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 $3 = s(s(s(0)))$
 - (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'.