Mathematical induction as a higher-order logical principle based on permutations of F>F=T.

From: en.wikipedia.org/wiki/Higher-order_logic

> "First-order logic quantifies only variables that range over individuals; second-order logic, in addition, also quantifies over sets; third-order logic also quantifies over sets of sets, and so on.
>
> For example, the second-order sentence
>
> $$\forall P\,(\,(\,0 \in P \land \forall i\,(\,i \in P \rightarrow i + 1 \in P\,)\,) \rightarrow \forall n\,(\,n \in P\,)\,) \qquad (1.1)$$
>
> expresses the principle of mathematical induction. Higher-order logic is the union of first-, second-, third-, … , *n*th-order logic; i.e., higher-order logic admits quantification over sets that are nested arbitrarily deeply."
>
> **Remark:** The element *n*th-order logic implies it is a permutation.

We evaluate higher-order logic based on the principle of mathematical induction.

We assume the Meth8/VŁ4 apparatus and method.

LET: p q r P i n; # necessity, all, ∀; % possibility, one or some; + Or; - Not Or;
& And; > Imply, →; < Not Imply, less than, ∈; 1 (%p>#p); 0 (p@p) .
The designated proof value is T; F contradiction; C falsity; N truth.
The 16-valued truth tables are row-major and presented horizontally.

Eq. 1.1 is a higher-order logic expression where the entire formula is universally quantified on one set (P) over universally quantified variables (i, n).

Meth8/VŁ4 treats sets and variables as variables. Therefore Eq. 1.1 can be rendered by inserting quantifiers to modify each occurrence of a variable:

(((p@p)<#p)&((#q<#p)>((#q+(%p>#p))<#p)))>(#r<#p) ;
TTTT TTTT TTTT TTTT (1.2)

We examine the antecedent and consequent of Eq. 1.2.

((p@p)<#p)&((#q<#p)>((#q+(%p>#p))<#p)) ;
FFFF FFFF FFFF FFFF (1.3)

#r<#p ; **FFFF** TCTC **FFFF** TCTC (1.4)

The principle of induction in Eq. 1.2 is tautologous as a permutation by way of the generic format of **F**>**F**=T.