MODULE $MinMax2H$

This module defines *SpecH* to be a specification obtained by adding a history variable h to the specification *Spec* of module *MinMax*2. It then shows that *SpecH* implements specification *Spec* of module *MinMax*1 under the refinment mapping $y \leftarrow h$.

EXTENDS $MinMax2$

VARIABLE h

$varsH \triangleq \langle vars, h \rangle$

InitH is the initial predicate of *SpecH* and *NextH* is its next-state action, obtained by adding the history variable h to the subactions *InputNum* and *Respond* of the obvious disjunctive representation of *Next*. (Disjunctive representations are explained in Section 3.2 of the paper "Auxiliary Variables in TLA+".)

$InitH \triangleq Init \quad \land (h = \{\})$

$InputNumH \triangleq \land InputNum$
$\qquad\qquad\quad \land h' = h$

$RespondH \triangleq \land Respond$
$\qquad\qquad\quad \land h' = h \cup \{x\}$

$NextH \triangleq InputNumH \lor RespondH$

$SpecH \triangleq InitH \land \Box[NextH]_{varsH}$

The following statement and theorem assert that *SpecH* implements specification *Spec* of module *MinMax*1 under the refinement mapping $y \leftarrow h$.

$M \triangleq$ INSTANCE $MinMax1$ WITH $y \leftarrow h$

THEOREM $SpecH \Rightarrow M\,!\,Spec$

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