MODULE *max*

EXTENDS *TLC*, *Sequences*, *Integers*

CONSTANT *ListLength*
ASSUME $ListLength \geq 1$

$Numbers \triangleq -5 \,..\, 5$

$Seqs \triangleq \text{UNION } \{[1 \,..\, m \to Numbers] : m \in 1 \,..\, ListLength\}$

$Max(seq) \triangleq$
  LET $set \triangleq \{seq[i] : i \in 1 \,..\, Len(seq)\}$
  IN CHOOSE $max \in set : \forall\, rest \in set : max \geq rest$

VARIABLES
  seq,
  max,
  pc

$Init \triangleq$
  $\land\, seq \in Seqs$
  $\land\, max = 0$
  $\land\, pc =$ "start"

$GetMax \triangleq$
  $\land$ $pc =$ "start"
  $\land$ $max' = Max(seq)$
  $\land$ $pc' =$ "done"
  $\land$ UNCHANGED *seq*

$Done \triangleq$
  $\land\, pc =$ "done"
  $\land$ UNCHANGED $\langle seq, max, pc\rangle$

$Next \triangleq GetMax \lor Done$

$Maxed \triangleq (pc =$ "done") $\Rightarrow \neg\exists\, i \in 1 \,..\, Len(seq) : seq[i] > max$