─────────────────────── MODULE *MapHistory* ───────────────────────

EXTENDS *Naturals*, *FiniteSets*, *Sequences*, *TLC*

The history of history for the client, used by the model checker to verify sequential consistency
VARIABLE *history*

The type invariant checks that the client's history never go back in time
$TypeInvariant \triangleq$
 $\land \forall c \in \text{DOMAIN } history :$
  $\land \forall k \in \text{DOMAIN } history[c] :$
   $\land \forall r \in \text{DOMAIN } history[c][k] :$
    $r > 1 \Rightarrow history[c][k][r] \geq history[c][k][r-1]$

Record a read to the history
$Record(c, k, v) \triangleq$
 $\land \lor \land c \in \text{DOMAIN } history$
   $\land k \in \text{DOMAIN } history[c]$
   $\land history' = [history \text{ EXCEPT } ![c][k] = Append(history[c][k], v)]$
  $\lor \land c \in \text{DOMAIN } history$
   $\land k \notin \text{DOMAIN } history[c]$
   $\land history' = [history \text{ EXCEPT } ![c] = history[c] @@ (k :> \langle v \rangle)]$
  $\lor \land c \notin \text{DOMAIN } history$
   $\land history' = history @@ (c :> [i \in \{k\} \mapsto \langle v \rangle])$

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* Modification History
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