```
 1 ┌─────────────────── MODULE Consensus ───────────────────┐
 2 │ EXTENDS Sets, TLAPS
 3 ├──────────────────────────────────────────────────────────
 4 │ CONSTANT Value    the set of values that can be chosen
 5 │ VARIABLE chosen   the set of values that have been chosen
 6 ├──────────────────────────────────────────────────────────
```

7 $Init \triangleq chosen = \{\}$

9 $Next \triangleq$
10 $\quad \land chosen = \{\}$
11 $\quad \land \exists\, v \in Value : chosen' = \{v\}$

13 $Spec \triangleq Init \land \Box[Next]_{chosen}$

```
14 ├──────────────────────────────────────────────────────────
```

15 $Inv \triangleq$
16 $\quad \land chosen \subseteq Value$
17 $\quad \land IsFiniteSet(chosen)$
18 $\quad \land Cardinality(chosen) \leq 1$

```
19 ├──────────────────────────────────────────────────────────
```

20 THEOREM $Invariance \triangleq Spec \Rightarrow \Box Inv$
21 $\langle 1 \rangle 1. \ Init \Rightarrow Inv$
22 $\quad$ BY $CardinalityZero, SMT$ DEF $Init, Inv$
23 $\langle 1 \rangle 2. \ Inv \land [Next]_{chosen} \Rightarrow Inv'$
24 $\quad$ BY $CardinalityOne, SMT$ DEF $Next, Inv$
25 $\langle 1 \rangle 3.$ QED
26 $\quad$ BY $\langle 1 \rangle 1, \langle 1 \rangle 2, PTL$ DEF $Spec$

```
27 └──────────────────────────────────────────────────────────┘
```