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MODULE *IndexedMap*

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

An empty value

CONSTANT *Nil*

The set of possible keys

CONSTANT *Key*

The number of possible indexes

CONSTANT *MaxIndex*

The set of possible values

CONSTANT *Value*

The map state

VARIABLE *map*

A sequence of map events

VARIABLE *mapEvents*

The *log* state

VARIABLE *log*

A sequence of *log* events

VARIABLE *logEvents*

$vars \triangleq \langle map, mapEvents, log, logEvents \rangle$

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*TypeInvariant*  $\triangleq$  TRUE

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This section of the spec models map primitive operations.

Get the value of index 'i' from the map

*GetIndex*(*i*)  $\triangleq$  TRUE

Get the value of key 'k' from the map

*GetKey*(*k*)  $\triangleq$  TRUE

Set key 'k' value to 'v'

*PutKey*(*k*, *v*)  $\triangleq$  TRUE

Remove the entry at index 'i'

*RemoveIndex*(*i*)  $\triangleq$  TRUE

Remove the entry with key 'k'

*RemoveKey*(*k*)  $\triangleq$  TRUE

Receive an event  
 $ReceiveEvent \triangleq \text{TRUE}$

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$Init \triangleq$   
 $\wedge map = [k \in \{\} \mapsto [value \mapsto Nil, version \mapsto Nil]]$   
 $\wedge mapEvents = \langle \rangle$   
 $\wedge log = \langle \rangle$   
 $\wedge logEvents = \langle \rangle$

$Next \triangleq$   
 $\vee \exists i \in 1 \dots MaxIndex : GetIndex(i)$   
 $\vee \exists k \in Key : GetKey(k)$   
 $\vee \exists k \in Key : \exists v \in Value : PutKey(k, v)$   
 $\vee \exists i \in 1 \dots MaxIndex : RemoveIndex(i)$   
 $\vee \exists k \in Key : RemoveKey(k)$   
 $\vee ReceiveEvent$

$Spec \triangleq Init \wedge \Box [Next]_{vars}$

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\\* Modification History  
\\* Last modified *Wed Feb 12 13:05:39 PST 2020* by *jordanhalterman*  
\\* Created *Wed Feb 12 11:20:15 PST 2020* by *jordanhalterman*