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# BOUNDEDSEMAPHORE SHARED RESOURCE

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**CADT** BoundedSemaphore

**OPERATIONS**

**ACTION** Init:  $\mathbb{N}[i] \times \mathbb{N}[i]$

**ACTION** V: *Void*

**ACTION** P: *Void*

**SEMANTICS**

**DOMAIN:**

**STATE:** *BoundedSemaphore* = (*value* :  $\mathbb{N} \times \text{upperBound}$  :  $\mathbb{N}$ )

**INVARIANT:**  $\text{value} \geq 0 \wedge \text{upperBound} \geq \text{value} \wedge \text{upperBound} > 0$

**INITIAL:** true

**CPRE:**  $v \geq 0 \wedge \text{upperBound} \geq v$

**Init(v)**

**POST:**  $\text{value}^{\text{out}} = v$

**CPRE:**  $\text{upperBound} \geq \text{value}$

**V()**

**POST:**  $\text{value}^{\text{out}} = \text{value}^{\text{in}} + 1$

**PRE:** true

**CPRE:**  $\text{value} > 0$

**P()**

**POST:**  $\text{value}^{\text{out}} = \text{value}^{\text{in}} - 1$