Accompanying document for the list.sol implementation. Contains predicate logic style declarations for the post and pre conditions of the methods.
Is a work in progress and subject to change!

1   list.sol

1.1   Add

requires

(a) *nothing*

ensures

(a) $\text{array}[\text{array.length} - 1] = \text{num}$

(b) $\forall i.((i \leq 0 \land \ i < \text{array.length} - 1) \rightarrow \text{array}[i] = \text{old}(\text{array}[i]))$

(c) $\text{array.length} = \text{old}(\text{array.length}) + 1$

1.2   size

requires

(a) *nothing*

ensures

(a) $\text{ret} = \text{array.length}$

(b) $\forall i.((0 \leq i \land i < \text{array.length}) \rightarrow \text{array}[i] = \text{old}(\text{array}[i]))$

1.3   contains

requires

(a) *nothing*

ensures

(a) $\text{ret} \rightarrow \exists i.(0 \leq i \land i < \text{array.length} \land \text{array}[i] = \text{num})$

(b) $\overline{\text{ret}} \rightarrow \forall i.((0 \leq i \land i < \text{array.length}) \rightarrow \text{array}[i] \neq \text{num})$

(c) $\forall i.((0 \leq i \land i < \text{array.length}) \rightarrow \text{array}[i] = \text{old}(\text{array}[i]))$

1.4 remove

requires

(a) array.length ≥ 1

(b) index $\geq 0 \wedge$ index $<$ array.length

ensures

(a) array.length $=$ old(array.length) $- 1$

(b) $\forall i.((0 \leq i \wedge i < index) \rightarrow \mathrm{array}[i] = \mathrm{old}(\mathrm{array}[i]))$

(c) $\forall i.((index \leq i \wedge i < \mathrm{array.length}) \rightarrow \mathrm{array}[i] = \mathrm{old}(\mathrm{array}[i+1]))$

(d) ret $=$ old(array[$index$])

1.5 get

requires

(a) $0 \geq index \wedge index < \mathrm{array.length}$

ensures

(a) ret $=$ array[$index$]

(b) $\forall i.((0 \leq i \wedge i < \mathrm{array.length}) \rightarrow \mathrm{array}[i] = \mathrm{old}(\mathrm{array}[i]))$