

Reasoning Table for goToTheRear

Use: $T.Init(x)$ as a predicate to state that variable x has initial value for its type T

```
void goToTheRear(QueueOfT& q);
//! updates q
//! requires |q| > 0
//! ensures q = #q[1,|#q|) * #q[0,1)
```

State	Code	Assume	Confirm
0		A0: $ q_0 > 0$	C0: true This <i>true</i> is requires clause from Type T 's constructor
	$T\ y;$	/ /	/ /
1		A1: $T.Init(y_1) \wedge q_1 = q_0$	C1: $q_1 \neq \langle \rangle$
	$q.dequeue(y);$	/ /	/ /
2		A2: $\langle y_2 \rangle$ is prefix of $q_1 \wedge q_2 = q_1[1, q_1)$	C2: true This <i>true</i> is requires clause from enqueue
	$q.enqueue(y);$	/ /	/ /
3		A3: $q_3 = q_2 * \langle y_2 \rangle \wedge T.Init(y_3)$	C3: $q_3 = q_0[1, q_0) * q_0[0,1)$

VCs written using *A0*, *A1*, *A2*, and *A3* cell labels

VC Format: *antecedent* \rightarrow *consequent*

VC0: $A_0 \rightarrow \text{true}$

VC1: $(A_0 \wedge A_1) \rightarrow q_1 \neq \langle \rangle$

VC2: $(A_0 \wedge A_1 \wedge A_2) \rightarrow \text{true}$

VC3: $(A_0 \wedge A_1 \wedge A_2 \wedge A_3) \rightarrow q_3 = q_0[1, |q_0|) * q_0[0,1)$

Where:

$A_0 = |q_0| > 0$

$A_1 = T.Init(y_1) \wedge q_1 = q_0$

$A_2 = \langle y_2 \rangle$ is prefix of $q_1 \wedge q_2 = q_1[1, |q_1|)$

$A_3 = q_3 = q_2 * \langle y_2 \rangle \wedge T.Init(y_3)$