

0.0.1 Append

The operation *append* will return a Collection with a Value added at a specified numeric Index.

$ \begin{array}{l} \text{append}[Collection, V, \mathbb{N}] \text{-----} \\ coll?, coll! : Collection \\ v? : V \\ idx? : \mathbb{N} \\ \text{append}_- : Collection \times V \times \mathbb{N} \mapsto Collection \end{array} $
$ \begin{array}{l} \#idx? = 1 \\ coll! = \text{append}(coll?, v?, idx?) \bullet \\ \text{let } coll' == \text{front}(\{i : \mathbb{N} \mid i \in 0..idx?\} \upharpoonright coll?) \cap v? \\ \text{coll}'' == \{j : \mathbb{N} \mid j \in idx?..\#coll?\} \upharpoonright coll? \bullet \\ = coll' \cap coll'' \Rightarrow \\ (\text{front}(coll') \cap v? \cap coll'') \wedge \\ (v? \mapsto idx? \in coll!) \wedge \\ (\#coll! = \#coll? + 1) \end{array} $

where *coll'* is the items in *coll?* up to *idx* but the value at *idx?* is replaced with *v?* and *coll''* is the items in *coll?* from *idx* to *#coll?* and is inclusive of *coll?*_{*idx?*}. The composition of the two Collections results in *coll!* which contains *idx?* \mapsto *v?* and all subsequent *idx* \mapsto *v* \in *coll?* are now *idx* + 1 \mapsto *v*_{*idx*}. The following example illustrates these properties.

$$\begin{array}{l}
X = \langle x_0, x_1, x_2 \rangle \\
x_0 = 0 \\
x_1 = \text{foo} \\
x_2 = \langle a, b, c \rangle \\
v? = \text{bar} \\
\text{append}(X, v?, 0) = \langle \text{bar}, 0, \text{foo}, \langle a, b, c \rangle \rangle \\
\text{append}(X, v?, 1) = \langle 0, \text{bar}, \text{foo}, \langle a, b, c \rangle \rangle \\
\text{append}(X, v?, 2) = \langle 0, \text{foo}, \text{bar}, \langle a, b, c \rangle \rangle \\
\text{append}(X, v?, 3) = \langle 0, \text{foo}, \langle a, b, c \rangle, \text{bar} \rangle
\end{array}$$