

0.0.1 Append

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

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

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.

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