0.0.1 At Index

The operation $atIndex$ will return the Value at a specified index or depth of indices

$$
\begin{array}{|l}
\hline
atIndex[Collection, \mathbb{N} \vee Collection] \\
idx? : \mathbb{N} \\
coll? : Collection \\
idxColl? : Collection \\
atIndex : Collection \times \mathbb{N} \to V \ \vee \ Collection \times Collection \to V \\
\hline
idxColl? = \langle \forall\, i \in idxColl? \bullet i : \mathbb{N} \rangle \\
atIndex(coll?, idx?) = (head(idx? \upharpoonright coll?)) \iff \#(idx? \upharpoonright coll?) = 1 \\
atIndex(coll?, idx?) = (idx? \upharpoonright coll?) \iff \#(idx? \upharpoonright coll?) \geq 2 \\
atIndex(coll?, idxColl?) = \forall i : 0 \,..\, j \in idxColl \bullet \\
\qquad\qquad\qquad\qquad coll! = atIndex((atIndex(atIndex(coll?, i)), i+1), j) \\
\hline
\end{array}
$$

$X = \langle x_0, x_1, x_2 \rangle$

$x_0 = 0$

$x_1 = foo$

$x_2 = \langle a, b, c \rangle$

$atIndex(X, 0) = 0$

$atIndex(X, 1) = foo$

$atIndex(X, \langle 1, 0 \rangle) = f$ [foo $\Rightarrow \langle f, o, o \rangle$]

$atIndex(X, \langle 1, 2 \rangle) = o$ [foo $\Rightarrow \langle f, o, o \rangle$]

$atIndex(X, 2) = \langle a, b, c \rangle$

$atIndex(X, \langle 2, 1 \rangle) = b$

$atIndex(X, 3) = \langle \rangle$

$atIndex(X, \langle 2, 3 \rangle) = \langle \rangle$