

## Sequence Concatenation

### Example 1 : Simple Concatenation ( ASCII )

The caret operator after a sequence means concatenation:

$$\begin{aligned}\langle a \rangle &\stackrel{\wedge}{=} \langle b \rangle \\ \langle 1, 2 \rangle &\stackrel{\wedge}{=} \langle 3, 4 \rangle \\ \langle x \rangle &\stackrel{\wedge}{=} \langle \rangle\end{aligned}$$

### Example 2 : Concatenation with Variables

Concatenation with sequence variables:

$$\begin{aligned}\langle x \rangle &\stackrel{\wedge}{=} s \\ s &\stackrel{\wedge}{=} t \\ \langle \rangle &\stackrel{\wedge}{=} t\end{aligned}$$

### Example 3 : Cons Pattern

The cons pattern builds sequences incrementally:

$$\begin{aligned}\langle x \rangle &\stackrel{\wedge}{=} \langle \rangle \\ \langle x \rangle &\stackrel{\wedge}{=} \langle y \rangle \stackrel{\wedge}{=} \langle z \rangle \\ \langle 1 \rangle &\stackrel{\wedge}{=} \langle 2 \rangle \stackrel{\wedge}{=} \langle 3 \rangle \stackrel{\wedge}{=} \langle \rangle\end{aligned}$$

### Example 4 : Nested Concatenation

Concatenation is associative:

$$\begin{aligned}(\langle a \rangle \stackrel{\wedge}{=} \langle b \rangle) &\stackrel{\wedge}{=} \langle c \rangle \\ \langle a \rangle &\stackrel{\wedge}{=} (\langle b \rangle \stackrel{\wedge}{=} \langle c \rangle) \\ (s \stackrel{\wedge}{=} t) &\stackrel{\wedge}{=} u\end{aligned}$$