Quantified Expressions

XQuery provides full first-order logic support for building expressions. In particular, XQuery contains expressions for existentially quantified and universally quantified boolean statements.

Existential quantification. The format of the existentially quantified expression is:

\[
\text{some } \text{Var} \text{ in } \text{Expression}_1 \text{ satisfies } \text{Expression}_2
\]

This expression is evaluated as follows:

- \text{Expression}_1 \text{ is evaluated.}
- for each value of variable \text{Var} taken from the result of evaluating \text{Expression}_1, \text{Expression}_2 \text{ is evaluated.}
- If \text{Expression}_2 \text{ is satisfied on least for one value of } \text{Var}, \text{true} \text{ is returned. Otherwise, } \text{false} \text{ is returned.}

Universal quantification. The format of the universally quantified expression is:

\[
\text{every } \text{Var} \text{ in } \text{Expression}_1 \text{ satisfies } \text{Expression}_2
\]

This expression is evaluated as follows:

- \text{Expression}_1 \text{ is evaluated.}
- for each value of variable \text{Var} taken from the result of evaluating \text{Expression}_1, \text{Expression}_2 \text{ is evaluated.}
- If \text{Expression}_2 \text{ is satisfied on all values of } \text{Var}, \text{true} \text{ is returned. Otherwise, } \text{false} \text{ is returned.}
Examples. Consider the following XML document "cafes.xml":

```
<root>
  <cafe name="SubJoint">
    <item><n>salad</n><p>3.95</p></item>
    <item><n>hot dog</n><p>1.50</p></item>
  </cafe>
  <cafe name="Pizza haven">
    <item><n>salad</n><p>3.75</p></item>
    <item><n>garlic bread</n><p>2.50</p></item>
  </cafe>
</root>
```

The following expression

```
some $c in doc("cafes")//cafe satisfies $c/item/p > 2
```

returns true on the "cafes.xml" input. Indeed, the XML file does describe both cafes as having at least one item which is priced about $2.

At the same time, its universal equivalent:

```
every $c in doc("cafes")//cafe satisfies $c/item/p > 2
```

returns false, because not all dishes in the cafes are priced above $2.