*** XalanJ, XSL 3.0 family of languages (XSLT 3.0, XPath 3.1, XPath 3.1 F&O [functions and operators]) implementation status, as on 2024-01-30 ***

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Following are details of "XalanJ, XSL 3.0 family of languages" features, whose working implementation is available on XalanJ XSLT 3.0 development repository branch,

(1) XSLT 3.0 features

XSLT 3.0 language home page: https://www.w3.org/TR/xslt-30/

- 1.1 xsl:for-each-group instruction
- 1.2 xsl:analyze-string instruction
- 1.3 xsl:iterate instruction
- 1.4 xsl:for-each instruction implementation is modified, to handle few XSLT 3.0 requirements.
- 1.5 xsl:function instruction
- 1.6 xsl:sequence instruction
- 1.7 xsl:attribute element can now have "select" attribute as well in addition to mutually exclusive child content as well, as specified by XSLT 3.0 spec.
- 1.8 xsl:import-schema instruction

Currently, the XML Schema simple types imported via xsl:import-schema instruction within an XSLT stylesheet, can be used with "as" attribute of XSLT xsl:variable elements to enforce schema type constraints on xsl:variable data contents.

- 1.9 xsl:variable instruction evaluation to node set instead of result tree fragment (RTF). This is a XSLT spec change first introduced within XSLT 2.0 language, as compared to XSLT 1.0.
- 1.10 The sequence type expression "as" attribute on XSLT elements xsl:variable, xsl:template, xs:function, xsl:param, xsl:with-param.
- 1.11 Function implementations: fn:current-grouping-key, fn:current-group, fn:regex-group

(2) XPath 3.1 features

XPath 3.1 language home page: https://www.w3.org/TR/xpath-31/

- 2.1 Range "to" expression
- 2.1 Value comparison operators eq, ne, lt, le, gt, ge

- 2.3 Function item "inline function expression"
- 2.4 Dynamic function calls
- 2.5 "if" expression
- 2.6 "for" expression
- 2.7 Quantified expressions 'some', 'every'
- 2.8 "let" expression
- 2.9 Sequence constructor expression, using comma operator

For e.g, XPath expressions like (1, 2, 3) etc.

- 2.10 String concatenation operator "||"
- 2.11 Node comparison operators "is", "<<", ">>>"
- 2.12 Simple map operator '!'
- 2.13 'instance of' expression
- 2.14 Implementation of various new XML Schema data types for use within XSLT 3.0 stylesheets and XPath 3.1 expressions. Implementation of, XPath constructor function calls for supported XML Schema data types.

Currently, following XML Schema data types are supported, for this work: xs:boolean, xs:string, xs:normalizedString, xs:token, xs:date, xs:dateTime, xs:duration, xs:dayTimeDuration, xs:yearMonthDuration, xs:time, xs:decimal, xs:double, xs:float, xs:int, xs:integer, xs:long.

2.15 Collation support

As specified by XPath 3.1 F&O spec, following collation implementations are supported,

- 1) The Unicode Codepoint Collation
- 2) The Unicode Collation Algorithm

Support for following collation uri query parameters is available: 'fallback', 'lang', 'strength'

For the collation's query "lang" parameter, all languages as supported by Java's Locale class are available within XalanJ's XSLT 3.0 implementation (ref, https://docs.oracle.com/javase/8/docs/api/java/util/Locale.html).

For the collation's query "strength" parameter, following values are supported: 'primary', 'secondary', 'tertiary', 'identical'.

3) The HTML ASCII Case-Insensitive Collation

2.16 Sequence type expressions

(3) XPath 3.1 functions

XPath 3.1 F&O home page: https://www.w3.org/TR/xpath-functions-31/

Implementation of built-in functions namespace uri: http://www.w3.org/2005/xpath-functions

Implementation of built-in math functions namespace uri: http://www.w3.org/2005/xpath-functions/math

3.1 String functions that use regular expressions

fn:matches fn:replace fn:tokenize

3.2 Functions on numeric values

fn:abs

fn:round (implementation of an optional second argument, that's used to specify 'precision')

3.3 Functions giving access to external information

fn:doc

fn:unparsed-text

3.4 Functions on strings

fn:string-join fn:upper-case

fn:lower-case

fn:codepoints-to-string

fn:string-to-codepoints

fn:compare

(with support for collation argument)

fn:codepoint-equal

fn:contains-token (with support for collation argument)

3.5 Context functions

fn:current-dateTime fn:current-date fn:current-time fn:implicit-timezone

3.6 Functions that compare values in sequences

fn:distinct-values fn:index-of

fn:deep-equal (with support for collation argument)

3.7 Trigonometric and exponential functions

math:pi

math:exp

math:exp10

math:log

math:log10

math:pow

math:sqrt

math:sin

math:cos

math:tan

math:asin

math:acos

math:atan

math:atan2

3.8 Component extraction functions on durations

fn:years-from-duration

fn:months-from-duration

fn:days-from-duration

fn:hours-from-duration

fn:minutes-from-duration

fn:seconds-from-duration

3.9 Constructing xs:dateTime value

fn:dateTime

3.10 Component extraction functions on dates and times

fn:year-from-dateTime

fn:month-from-dateTime

fn:day-from-dateTime

fn:hours-from-dateTime

fn:minutes-from-dateTime

fn:seconds-from-dateTime

fn:timezone-from-dateTime

fn:year-from-date

fn:month-from-date

fn:day-from-date

fn:timezone-from-date

fn:hours-from-time

fn:minutes-from-time fn:seconds-from-time fn:timezone-from-time

3.11 Basic higher-order functions

fn:for-each fn:filter

fn:fold-left

fn:fold-right

fn:for-each-pair

fn:sort

(with support for collation argument)

The function implementations for these, yet doesn't support type declarations on parameters and return type.

3.12 Functions on sequences

fn:empty

fn:exists

fn:head

fn:tail

fn:insert-before

fn:remove

fn:reverse

fn:subsequence

fn:unordered

fn:avg

fn:max

fn:min

3.13 Parsing and serializing

fn:parse-xml

fn:parse-xml-fragment

3.14 Accessors

fn:node-name

fn:data

Other than the above mentioned newly implemented XPath 3.1 functions, all the functions that are already available within XPath 1.0 (all of them are common with XPath 3.1 function library as well) are available within XalanJ's XPath 3.1 implementation as well.

XalanJ home page: https://xalan.apache.org/xalan-j/index.html

XalanJ contact information: https://xalan.apache.org/xalan-j/contact_us.html

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