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Information technology — Guidance for the use of database language SQL —

Part 1: XQuery regular expressions

Technologies de l'information — Recommandations pour l'utilisation du langage de base de données SQL —
Partie 1: Expressions régulières de XQuery en SQL

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives or www.iec.ch/members_experts/refdocs).

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This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 32, *Data management and interchange*.

This first edition of ISO/IEC 19075-1 cancels and replaces ISO/IEC TR 19075-1:2011.

This document is intended to be used in conjunction with the following editions of the parts of the ISO/IEC 9075 series:

— ISO/IEC 9075-1, sixth edition or later;

— ISO/IEC 9075-2, sixth edition or later;

— ISO/IEC 9075-3, sixth edition or later;

— ISO/IEC 9075-4, seventh edition or later;

— ISO/IEC 9075-9, fifth edition or later;

— ISO/IEC 9075-10, fifth edition or later;

— ISO/IEC 9075-11, fifth edition or later;

— ISO/IEC 9075-13, fifth edition or later;

— ISO/IEC 9075-14, sixth edition or later;

— ISO/IEC 9075-15, second edition or later;

— ISO/IEC 9075-16, first edition or later.

A list of all parts in the ISO/IEC 19075 series can be found on the ISO and IEC websites.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html and www.iec.ch/national-committees.

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Introduction

The organization of this document is as follows:

1) Clause 1, "Scope", specifies the scope of this document.
2) Clause 2, "Normative references", identifies additional standards that, through reference in this document, constitute provisions of this document.
3) Clause 3, "Terms and definitions", defines the terms and definitions used in this document.
4) Clause 4, "XQuery regular expressions", explains how XQuery regular expressions are formed.
5) Clause 5, "Operators using regular expressions", explains how the SQL operators use regular expressions.

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Information technology — Guidance for the use of database language SQL —

Part 1:
XQuery regular expressions

1 Scope

This document describes the regular expression support in SQL (ISO/IEC 9075-2) adopted from the regular expression syntax of XQuery and XPath Functions and Operators 3.1, which is derived from Perl. This document discusses five operators using this regular expression syntax:

— LIKE_REGEX predicate, to determine the existence of a match to a regular expression.

— OCCURRENCES_REGEX numeric function, to determine the number of matches to a regular expression.

— POSITION_REGEX function, to determine the position of a match.

— SUBSTRING_REGEX function, to extract a substring matching a regular expression.

— TRANSLATE_REGEX function, to perform replacements using a regular expression.

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2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 9075-1, *Information technology — Database languages — SQL — Part 1: Framework (SQL/Framework)*

ISO/IEC 9075-2, *Information technology — Database languages — SQL — Part 2: Foundation (SQL/Foundation)*

ISO/IEC 9075-14, *Information technology — Database languages — SQL — Part 14: XML-Related Specifications (SQL/XML)*

Bray, Tim et al.. *Extensible Markup Language (XML) Version 1.0, W3C Recommendation* [online]. Fifth Edition. Cambridge, Massachusetts, USA: W3C, 26 November 2008 . Available at `http://www.w3.org/TR/xml`

Bray, Tim et al. *Extensible Markup Language (XML) Version 1.1, W3C Recommendation* [online]. Second Edition. Cambridge, Massachusetts, USA: W3C, 16 August 2006 . Available at `http://www.w3.org/TR/xml11`

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Biron, Paul V.; Malhotra, Ashok. *XML Schema Part 2: Datatypes, W3C Recommendation* [online]. Second Edition. Cambridge, Massachusetts, USA: W3C, 28 October 2004 . Available at `http://www.w3.org/TR/xmlschema-2/`

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Malhotra, Ashok et al.. *XQuery and XPath Functions and Operators 3,1, W3C Recommendation* [online]. Cambridge, Massachusetts, USA: W3C, 21 March 2017 . Available at `http://www.w3.org/TR/-xpath-functions/`

The Unicode Consortium. *Unicode Regular Expressions* [online]. 21. Mountain View, California, USA: The Unicode Consortium, 2020-06-17 . Available at `http://www.unicode.org/reports/tr18/-tr18-21.html`

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3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 9075-1 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

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4 XQuery regular expressions

4.1 Context of XQuery regular expressions

The requirements for the material discussed in this document shall be as specified in ISO/IEC 9075-2, ISO/IEC 9075-14, XML 1.0, XML 1.1, XML Schema Part 2: Datatypes, XQuery and XPath Functions and Operators 3.1, and Unicode Technical Standard #18.

4.2 Introduction to XQuery regular expressions

This document explains the manner in which XQuery regular expressions are used by database language SQL in ISO/IEC 9075-2 and in ISO/IEC 9075-14. Both ISO/IEC 9075-2 and ISO/IEC 9075-14 specify requirements for the material discussed in this document.

XQuery regular expression syntax is specified in XQuery and XPath Functions and Operators 3.1, section 5.6.1, “Regular expression syntax”. This paper references the XQuery specification, with two small modifications (required since character strings in an RDBMS are not necessarily normalized according to XML conventions). The following subsections provide an overview of this syntax.

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The XQuery regular expression syntax is itself a modification of another regular expression syntax found in XML Schema Part 2: Datatypes.

This section presents an overview of the capabilities of XQuery regular expression syntax. In the process, this section will illustrate some of the SQL operators. The SQL operators themselves are presented in Clause 5, “Operators using regular expressions”.

The following discussion does not cover every aspect of XQuery regular expressions; for this, XQuery and XPath Functions and Operators 3.1 is the reference (though hardly a tutorial; a variety of popular works contain detailed treatments of regular expressions).

4.3 Matching a specific character

Perhaps the most elementary pattern matching requirement is the ability to match a single character or string. For most characters, this is done by simply writing the character in the regular expression. For example, suppose an application needs to know if a string *S* contains the letters “xyz”. This could be done with the following predicate:

```
S LIKE_REGEX 'xyz'
```

Note that the SQL LIKE predicate would require an exact match for “xyz”. However, the convention with regular expressions is that S need only contain a substring that is “xyz”. For example, all of the following values of S would yield *True* for the immediately preceding predicate:

```
xyz
abcxyz123
1 xyz 2 xyz 3 xyz
```

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