

# ISO/IEC 9075-13:2016-12 (E)

## Information technology - Database languages - SQL - Part 13: SQL Routines and types using the Java<(hoch)TM> programming language (SQL/JRT)

---

Contents	Page
Foreword.....	vii
Introduction.....	viii
<b>1 Scope.....</b>	<b>1</b>
<b>2 Normative references.....</b>	<b>3</b>
2.1 ISO and IEC standards.....	3
2.2 Other international standards.....	3
<b>3 Definitions, notations, and conventions.....</b>	<b>5</b>
3.1 Definitions.....	5
3.1.1 Definitions taken from [JLS].....	5
3.1.2 Definitions taken from [JVM].....	5
3.1.3 Definitions provided in Part 13.....	6
3.2 Conventions.....	7
3.2.1 Specification of built-in procedures.....	7
3.2.2 Specification of deployment descriptor files.....	7
<b>4 Concepts.....</b>	<b>9</b>
4.1 The Java programming language.....	9
4.2 SQL-invoked routines.....	10
4.2.1 Overview of SQL-invoked routines.....	10
4.2.2 Characteristics of SQL-invoked routines.....	10
4.3 Java class name resolution.....	11
4.4 SQL result sets.....	12
4.5 Parameter mapping.....	13
4.6 Unhandled Java exceptions.....	14
4.7 Data types.....	14
4.7.1 Host language data types.....	14
4.8 User-defined types.....	15
4.8.1 Introduction to user-defined types.....	15
4.8.2 User-defined type comparison and assignment.....	16
4.8.3 User-defined type descriptor.....	16
4.8.4 Accessing static fields.....	18
4.8.5 Converting objects between SQL and Java.....	18
4.8.5.1 SERIALIZABLE.....	19
4.8.5.2 SQLDATA.....	19
4.8.5.3 Developing for portability.....	19
4.9 Built-in procedures.....	20

4.10	Basic security model.....	20
4.10.1	Privileges.....	20
4.11	JARs.....	21
4.11.1	Deployment descriptor files.....	21
<b>5</b>	<b>Lexical elements.....</b>	<b>23</b>
5.1	<token> and <separator>.....	23
5.2	Names and identifiers.....	25
<b>6</b>	<b>Scalar expressions.....</b>	<b>27</b>
6.1	<method invocation>.....	27
6.2	<new specification>.....	28
<b>7</b>	<b>Predicates.....</b>	<b>29</b>
7.1	<comparison predicate>.....	29
<b>8</b>	<b>Additional common rules.....</b>	<b>31</b>
8.1	Execution of array-returning functions.....	32
<b>9</b>	<b>Additional common elements.....</b>	<b>39</b>
9.1	<language clause>.....	40
9.2	<Java parameter declaration list>.....	40
9.3	<SQL Java path>.....	42
9.4	<routine invocation>.....	44
9.5	Java routine signature determination.....	54
<b>10</b>	<b>Schema definition and manipulation.....</b>	<b>63</b>
10.1	<drop schema statement>.....	63
10.2	<table definition>.....	65
10.3	<view definition>.....	66
10.4	<user-defined type definition>.....	67
10.5	<attribute definition>.....	71
10.6	<alter type statement>.....	75
10.7	<drop data type statement>.....	76
10.8	<SQL-invoked routine>.....	77
10.9	<alter routine statement>.....	81
10.10	<drop routine statement>.....	82
10.11	<user-defined ordering definition>.....	83
10.12	<drop user-defined ordering statement>.....	84
<b>11</b>	<b>Access control.....</b>	<b>85</b>
11.1	<grant privilege statement>.....	85
11.2	<privileges>.....	86
11.3	<revoke statement>.....	87
<b>12</b>	<b>Built-in procedures.....</b>	<b>89</b>
12.1	SQLJ.INSTALL_JAR procedure.....	89
12.2	SQLJ.REPLACE_JAR procedure.....	91
12.3	SQLJ.REMOVE_JAR procedure.....	93

12.4	SQLJ.ALTER_JAVA_PATH procedure.....	95
<b>13</b>	<b>Java topics.....</b>	<b>97</b>
13.1	Java facilities supported by this part of ISO/IEC 9075.....	97
13.1.1	Package java.sql.....	97
13.1.2	System properties.....	97
13.2	Deployment descriptor files.....	98
<b>14</b>	<b>Information Schema.....</b>	<b>101</b>
14.1	JAR_JAR_USAGE view.....	101
14.2	JARS view.....	102
14.3	METHOD_SPECIFICATIONS view.....	103
14.4	ROUTINE_JAR_USAGE view.....	104
14.5	TYPE_JAR_USAGE view.....	105
14.6	USER_DEFINED_TYPES view.....	106
14.7	Short name views.....	107
<b>15</b>	<b>Definition Schema.....</b>	<b>109</b>
15.1	JAR_JAR_USAGE base table.....	109
15.2	JARS base table.....	111
15.3	METHOD_SPECIFICATIONS base table.....	112
15.4	ROUTINE_JAR_USAGE base table.....	114
15.5	ROUTINES base table.....	115
15.6	SQL_CONFORMANCE base table.....	115
15.7	TYPE_JAR_USAGE base table.....	117
15.8	USAGE_PRIVILEGES base table.....	118
15.9	USER_DEFINED_TYPES base table.....	119
<b>16</b>	<b>Status codes.....</b>	<b>121</b>
16.1	SQLSTATE.....	121
<b>17</b>	<b>Conformance.....</b>	<b>123</b>
17.1	Claims of conformance to SQL/JRT.....	123
17.2	Additional conformance requirements for SQL/JRT.....	123
17.3	Implied feature relationships of SQL/JRT.....	123
<b>Annex A</b>	<b>(informative) SQL Conformance Summary.....</b>	<b>125</b>
<b>Annex B</b>	<b>(informative) Implementation-defined elements.....</b>	<b>131</b>
<b>Annex C</b>	<b>(informative) Implementation-dependent elements.....</b>	<b>135</b>
<b>Annex D</b>	<b>(informative) Deprecated features.....</b>	<b>137</b>
<b>Annex E</b>	<b>(informative) Incompatibilities with ISO/IEC 9075:2011 and 9075:2008.....</b>	<b>139</b>
<b>Annex F</b>	<b>(informative) SQL feature taxonomy.....</b>	<b>141</b>
<b>Annex G</b>	<b>(informative) Defect reports not addressed in this edition of this part of ISO/IEC 9075... </b>	<b>143</b>
	<b>Bibliography.....</b>	<b>145</b>
	<b>Index.....</b>	<b>147</b>

# Tables

<b>Table</b>		<b>Page</b>
1	Standard programming languages.....	40
2	System properties.....	97
3	SQLSTATE class and subclass codes.....	121
4	Implied feature relationships of SQL/JRT.....	123
5	Feature taxonomy for optional features.....	141