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

1 Scope . . . 1

2 Normative references . . . 3

2.1 ISO and IEC standards . . . 3

2.2 Other international standards . . . 3

3 Definitions, notations, and conventions . . . 5

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

4 Concepts . . . 9

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
5 Lexical elements. . . . 23
5.1 <token> and <separator>. . . . 23
5.2 Names and identifiers. . . . 25
6 Scalar expressions. . . . 27
6.1 <method invocation>. . . . 27
6.2 <new specification>. . . . 28
7 Predicates. . . . 29
7.1 <comparison predicate>. . . . 29
8 Additional common rules. . . . 31
8.1 Execution of array-returning functions. . . . 32
9 Additional common elements. . . . 39
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
10 Schema definition and manipulation. . . . 63
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
11 Access control. . . . 85
11.1 <grant privilege statement>. . . . 85
11.2 <privileges>. . . . 86
11.3 <revoke statement>. . . . 87
12 Built-in procedures. . . . 89
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
13 Java topics. . . . 97
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
14 Information Schema. . . . 101
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
15 Definition Schema. . . . 109
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
16 Status codes. . . . 121
16.1 SQLSTATE. . . . 121
17 Conformance. . . . 123
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
Annex A (informative) **SQL Conformance Summary. . . . 125**
Annex B (informative) **Implementation-defined elements. . . . 131**
Annex C (informative) **Implementation-dependent elements. . . . 135**
Annex D (infomative) **Deprecated features. . . . 137**
Annex E (informative) **Incompatibilities with ISO/IEC 9075:2011 and 9075:2008. . . . 139**
Annex F (informative) **SQL feature taxonomy. . . . 141**
Annex G (informative) **Defect reports not addressed in this edition of this part of ISO/IEC 9075. . . . 143**
Bibliography. . . . 145
Index. . . . 147

Tables

Table

Page

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