

ISO/IEC 9075-13:2008-07 (E)

Information technology - Database languages - SQL - Part 13: SQL Routines and Types Using the Java<(hoch)TM> Programming Language (SQL/JRT)

Contents	Page
Foreword.....	ix
Introduction.....	x
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 [Java].....	5
3.1.2 Definitions taken from [JVM].....	5
3.1.3 Definitions provided in Part 13.....	6
3.2 Conventions.....	6
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.....	12
4.4 SQL result sets.....	13
4.5 Parameter mapping.....	13
4.6 Unhandled Java exceptions.....	14
4.7 Data types.....	15
4.7.1 Host language data types.....	15
4.8 User-defined types.....	15
4.8.1 Introduction to user-defined types.....	15
4.8.2 User-defined type descriptor.....	16
4.8.3 User-defined type comparison and assignment.....	18
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.....	20
4.9 Built-in procedures.....	20

4.10	Privileges.....	21
4.11	JARs.....	21
4.11.1	Deployment descriptor files.....	22
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 elements.....	31
8.1	<Java parameter declaration list>.....	31
8.2	<SQL Java path>.....	32
8.3	<routine invocation>.....	34
8.4	<language clause>.....	43
8.5	Execution of array-returning functions.....	44
8.6	Java routine signature determination.....	51
9	Schema definition and manipulation.....	59
9.1	<drop schema statement>.....	59
9.2	<table definition>.....	61
9.3	<view definition>.....	62
9.4	<user-defined type definition>.....	63
9.5	<attribute definition>.....	67
9.6	<alter type statement>.....	71
9.7	<drop data type statement>.....	72
9.8	<SQL-invoked routine>.....	73
9.9	<alter routine statement>.....	77
9.10	<drop routine statement>.....	78
9.11	<user-defined ordering definition>.....	79
9.12	<drop user-defined ordering statement>.....	80
10	Access control.....	81
10.1	<grant privilege statement>.....	81
10.2	<privileges>.....	82
10.3	<revoke statement>.....	83
11	Built-in procedures.....	85
11.1	SQLJ.INSTALL_JAR procedure.....	85
11.2	SQLJ.REPLACE_JAR procedure.....	87
11.3	SQLJ.REMOVE_JAR procedure.....	89
11.4	SQLJ.ALTER_JAVA_PATH procedure.....	91
12	Java topics.....	93

12.1	Java facilities supported by this part of ISO/IEC 9075.	93
12.1.1	Package java.sql.	93
12.1.2	System properties.	93
12.2	Deployment descriptor files.	94
13	Information Schema.	97
13.1	JAR_JAR_USAGE view.	97
13.2	JARS view.	98
13.3	METHOD_SPECIFICATIONS view.	99
13.4	ROUTINE_JAR_USAGE view.	100
13.5	TYPE_JAR_USAGE view.	101
13.6	USER_DEFINED_TYPES view.	102
13.7	Short name views.	103
14	Definition Schema.	105
14.1	JAR_JAR_USAGE base table.	105
14.2	JARS base table.	107
14.3	METHOD_SPECIFICATIONS base table.	108
14.4	ROUTINE_JAR_USAGE base table.	110
14.5	ROUTINES base table.	111
14.6	TYPE_JAR_USAGE base table.	112
14.7	USAGE_PRIVILEGES base table.	113
14.8	USER_DEFINED_TYPES base table.	114
15	Status codes.	117
15.1	SQLSTATE.	117
16	Conformance.	119
16.1	Claims of conformance to SQL/JRT.	119
16.2	Additional conformance requirements for SQL/JRT.	119
16.3	Implied feature relationships of SQL/JRT.	119
Annex A	SQL Conformance Summary (informative).	121
Annex B	Implementation-defined elements (informative).	127
Annex C	Implementation-dependent elements (informative).	131
Annex D	Deprecated features (informative).	133
Annex E	Incompatibilities with ISO/IEC 9075:2003 (informative).	135
Annex F	SQL feature taxonomy (informative).	137
Annex G	Defect reports not addressed in this edition of this part of ISO/IEC 9075 (informative).	139
Annex H	Routines tutorial (informative).	141
H.1	Technical components.	141
H.2	Overview.	142
H.3	Example Java methods: region and correctStates.	143
H.4	Installing region and correctStates in SQL.	143
H.5	Defining SQL names for region and correctStates.	144

H.6	A Java method with output parameters: bestTwoEmps.	146
H.7	A CREATE PROCEDURE best2 for bestTwoEmps.	147
H.8	Calling the best2 procedure.	148
H.9	A Java method returning a result set: orderedEmps.	148
H.10	A CREATE PROCEDURE rankedEmps for orderedEmps.	150
H.11	Calling the rankedEmps procedure.	151
H.12	Overloading Java method names and SQL names.	152
H.13	Java main methods.	153
H.14	Java method signatures in the CREATE statements.	154
H.15	Null argument values and the RETURNS NULL clause.	155
H.16	Static variables.	157
H.17	Dropping SQL names of Java methods.	158
H.18	Removing Java classes from SQL.	159
H.19	Replacing Java classes in SQL.	159
H.20	Visibility.	160
H.21	Exceptions.	161
H.22	Deployment descriptors.	162
H.23	Paths.	164
H.24	Privileges.	166
H.25	Information Schema.	167
Annex I	Types tutorial (informative).	169
I.1	Overview.	169
I.2	Example Java classes.	169
I.3	Installing Address and Address2Line in an SQL system.	171
I.4	CREATE TYPE for Address and Address2Line.	172
I.5	Multiple SQL types for a single Java class.	173
I.6	Collapsing subclasses.	174
I.7	GRANT and REVOKE statements for data types.	176
I.8	Deployment descriptors for classes.	176
I.9	Using Java classes as data types.	177
I.10	SELECT, INSERT, and UPDATE.	178
I.11	Referencing Java fields and methods in SQL.	179
I.12	Extended visibility rules.	179
I.13	Logical representation of Java instances in SQL.	180
I.14	Static methods.	181
I.15	Static fields.	182
I.16	Instance-update methods.	183
I.17	Subtypes in SQL/JRT data.	184
I.18	References to fields and methods of null instances.	185
I.19	Ordering of SQL/JRT data.	187
	Bibliography.	189
	Index.	191

Tables

Table		Page
1	Standard programming languages.....	43
2	System properties.....	93
3	SQLSTATE class and subclass values.....	117
4	Implied feature relationships of SQL/JRT.....	119
5	Feature taxonomy for optional features.....	137