BS ISO/IEC 19075-9:2022

BSI Standards Publication

Information technology — Guidance for the use of database language SQL

Part 9: Online analytic processing (OLAP) capabilities (Guide/OLAP)

Documents
Document Sharing Hub

Full document details: BS ISO/IEC 19075-9:2022

National foreword

This British Standard is the UK implementation of ISO/IEC 19075-9:2022. It supersedes PD ISO/IEC TR 19075-9:2020, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee IST/40, Data management and interchange.

A list of organizations represented on this committee can be obtained on request to its committee manager.

Contractual and legal considerations

This publication has been prepared in good faith, however no representation, warranty, assurance or undertaking (express or implied) is or will be made, and no responsibility or liability is or will be accepted by BSI in relation to the adequacy, accuracy, completeness or reasonableness of this publication. All and any such responsibility and liability is expressly disclaimed to the full extent permitted by the law.

This publication is provided as is, and is to be used at the recipient's own risk.

The recipient is advised to consider seeking professional guidance with respect to its use of this publication.

This publication is not intended to constitute a contract. Users are responsible for its correct application.

© The British Standards Institution 2023
Published by BSI Standards Limited 2023

ISBN 978 0 539 20323 3

ICS 35.060

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 April 2023.

Amendments/corrigenda issued since publication

Date	Text affected

Documents
Document Sharing Hub

Full document details: BS ISO/IEC 19075-9:2022

INTERNATIONAL STANDARD

ISO/IEC 19075-9

First edition
2022-10

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

Part 9: Online analytic processing (OLAP) capabilities (Guide/OLAP)

Langages de bases de données utilisés dans les technologies de l'information — Recommandations pour l'utilisation du langage de base de données SQL —

Partie 9: Capacités de traitement analytique en ligne (OLAP), (Guide/OLAP)

Reference number
ISO/IEC 19075-9:2022(E)

Documents
Document Sharing Hub
© ISO/IEC 2022

Full document details: BS ISO/IEC 19075-9:2022

COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2022

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

© ISO/IEC 2022 – All rights reserved

Documents
Document Sharing Hub

Full document details: BS ISO/IEC 19075-9:2022

Contents

Page

Foreword . . . vii
Introduction . . . ix
1 Scope . . . 1
2 Normative references . . . 2
3 Terms and definitions . . . 3
4 Example data . . . 4
4.1 Introduction to example data . . . 4
4.2 Table sales history . . . 4
4.3 Table stock1 . . . 5
4.4 Table stocks . . . 6
4.5 Table homes . . . 6
5 Windows . . . 8
5.1 Introduction to windows . . . 8
5.2 Window definitions . . . 8
5.2.1 Introduction to window definitions . . . 8
5.2.2 Window partitioning . . . 9
5.2.3 Window ordering . . . 10
5.2.3.1 Introduction to window ordering . . . 10
5.2.3.2 Null ordering and treatment . . . 11
5.2.4 Window frames . . . 12
5.2.4.1 Introduction to window frames . . . 12
5.2.4.2 Physical window frames . . . 13
5.2.4.3 Logical window frames . . . 15
5.2.4.3.1 Introduction to logical window frames . . . 15
5.2.4.3.2 RANGE window frames . . . 15
5.2.4.3.3 GROUPS window frames . . . 16
5.2.4.4 Window frame exclusions . . . 17
5.3 Explicit vs. implicit window definitions . . . 18
5.4 Multiple window definitions . . . 19
6 Window functions . . . 20
6.1 Introduction to window functions . . . 20
6.2 Rank functions . . . 20
6.3 Distribution functions . . . 21
6.4 Row number function . . . 22
6.5 Window aggregate functions . . . 23
6.6 Ntile function . . . 26
6.7 LEAD and LAG functions . . . 27
6.8 FIRST_VALUE and LAST_VALUE functions . . . 29

© ISO/IEC 2022 – All rights reserved

Documents
Document Sharing Hub
Full document details: BS ISO/IEC 19075-9:2022

6.9 NTH_VALUE function. 30
6.10 Null treatment. 32
7 Nested window functions. 33
7.1 Introduction to nested window functions. 33
7.2 Row markers. 34
7.3 Offsets. 35
7.4 FRAME_ROW. 36
7.5 Nested ROW_NUMBER function. 37
7.6 Effects of EXCLUDE. 38
8 Enhanced aggregate functions. 40
8.1 Introduction to enhanced aggregate functions. 40
8.2 Unary statistical aggregate functions. 40
8.3 Binary statistical aggregate functions. 41
8.4 Hypothetical rank and distribution aggregate functions. 44
8.5 Inverse distribution functions. 45
Bibliography. 47
Index. 48

© ISO/IEC 2022 – All rights reserved
Documents
Document Sharing Hub
Full document details: BS ISO/IEC 19075-9:2022

Tables

Table

Page

1 Table sales_history. 4
2 Table stock1. 5
3 Table stocks. 6
4 Table homes. 6
5 Result of window clause. 10
6 Result of window clause ordering. 11
7 Result of physical window frame, UNBOUNDED PRECEDING to CURRENT ROW. 13
8 Result of physical window frame, 2 PRECEDING to 1 FOLLOWING. 14
9 Result of logical window frame with RANGE. 15
10 Result of logical window frame with GROUPS. 16
11 Result of window frame exclusion 1. 17
12 Result of window frame exclusion 2. 18
13 Result of RANK and DENSE_RANK function. 21
14 Result of PERCENT_RANK and CUME_DIST functions. 22
15 Result of ROW_NUMBER function. 23
16 Result of aggregate function (SUM) ordered. 24
17 Result of aggregate function (SUM) unordered. 24
18 Result of aggregate function (AVG). 25
19 Result of aggregate function (NTILE) with partitioned query. 26
20 Result of aggregate function (NTILE) in non-partitioned query. 27
21 Result of aggregate function (LEAD). 28
22 Result of aggregate function (LAG). 28
23 Result of aggregate function (FIRST_VALUE). 29
24 Result of aggregate function (LAST_VALUE). 30
25 Result of aggregate function (NTH_VALUE). 31
26 Result of row markers. 34
27 Result of row markers (offsets). 35
28 Result of window frames with row markers. 36
29 Result of EXCLUDE. 38
30 Result of hypothetical aggregate functions. 44
31 Result of inverse distribution functions. 45
32 Result of inverse distribution functions with ordering. 46

© ISO/IEC 2022 – All rights reserved

Documents
Document Sharing Hub

Full document details: BS ISO/IEC 19075-9:2022

Examples

Example

Page

1 Window clause. . . . 9
2 Window clause ordering. . . . 11
3 Physical window frame, UNBOUNDED PRECEDING to CURRENT ROW. . . . 13
4 Physical window frame, 2 PRECEDING to 1 FOLLOWING. . . . 14
5 Logical window frame with RANGE. . . . 15
6 Logical window frame with GROUPS. . . . 16
7 Window frame exclusion 1. . . . 17
8 Window frame exclusion 2. . . . 17
9 Explicit window definition. . . . 18
10 Implicit window definition. . . . 19
11 Multiple window definitions. . . . 19
12 Rank functions with explicit window. . . . 20
13 Rank functions with implicit window. . . . 21
14 Distribution functions. . . . 22
15 Row number function. . . . 23
16 Window aggregate function (SUM) ordered. . . . 23
17 Window aggregate function (SUM) unordered. . . . 24
18 Window aggregate moving average. . . . 25
19 NTILE in partitioned query. . . . 26
20 NTILE in non-partitioned query. . . . 26
21 LEAD function. . . . 28
22 LAG function. . . . 28
23 FIRST_VALUE function. . . . 29
24 LAST_VALUE function. . . . 30
25 NTH_VALUE function usage. . . . 31
26 Equivalent NTH_VALUE function usage. . . . 31
27 Null treatment with LEAD function. . . . 32
28 Null treatment with FIRST_VALUE function. . . . 32
29 Null treatment with LAST_VALUE function. . . . 32
30 Q1: CASE expression in a window query. . . . 33
31 Q2: Complex join. . . . 33
32 Q3: VALUE_OF function usage. . . . 34
33 Q4: frame_row and current_row in value_of function. . . . 37
34 Weight function. . . . 38
35 Hypothetical aggregate function. . . . 44
36 Inverse distribution function. . . . 45
37 Inverse distribution function ordered. . . . 46

© ISO/IEC 2022 – All rights reserved
Documents Document Sharing Hub
Full document details: BS ISO/IEC 19075-9:2022

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents) or the IEC list of patent declarations received (see patents.iec.ch).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html. In the IEC, see www.iec.ch/understanding-standards.

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 19075-9 cancels and replaces ISO/IEC TR 19075-9:2020.

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 2022 – All rights reserved

Documents
Document Sharing Hub

Full document details: BS ISO/IEC 19075-9:2022

— 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.

© ISO/IEC 2022 – All rights reserved
Documents Document Sharing Hub
Full document details: BS ISO/IEC 19075-9:2022

Introduction

This document discusses the syntax and semantics for including online analytic processing (OLAP) capabilities in SQL, as defined in ISO/IEC 9075-2.

The organization of this document is as follows:

1) Clause 1, "Scope", specifies the scope of this document.

2) Clause 2, "Normative references", identifies standards that are referenced as part of requirements by this document.

3) Clause 3, "Terms and definitions", defines the terms and definitions used in this document.

4) Clause 5, "Windows", discusses Feature T611, "Elementary OLAP operations" and Feature T612, "Advanced OLAP operations", introducing the concept of a window in an SQL query.

5) Clause 6, "Window functions", further discusses Feature T611, "Elementary OLAP operations" and Feature T612, "Advanced OLAP operations", as well as Feature T614, "NTILE function", Feature T615, "LEAD and LAG functions", Feature T616, "Null treatment option for LEAD and LAG functions", Feature T617, "FIRST_VALUE and LAST_VALUE functions", and Feature T618, "NTH_VALUE function".

6) Clause 7, "Nested window functions", discusses the additional window functionality in Feature T619, "Nested window functions".

7) Clause 8, "Enhanced aggregate functions", discusses Feature T621, "Enhanced numeric functions" and its introduction of enhanced aggregate functions in SQL.

© ISO/IEC 2022 – All rights reserved

Documents
Document Sharing Hub

Full document details: BS ISO/IEC 19075-9:2022

Documents
Document Sharing Hub

Full document details: BS ISO/IEC 19075-9:2022

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

Part 9:
Online analytic processing (OLAP) capabilities (Guide/OLAP)

1 Scope

This document discusses the syntax and semantics for including online analytic processing (OLAP) capabilities in SQL, as defined in ISO/IEC 9075-2.

It discusses the following features regarding OLAP capabilities of the SQL language:

— Feature T611, “Elementary OLAP operations”,

— Feature T612, “Advanced OLAP operations”,

— Feature T614, “NTILE function”,

— Feature T615, “LEAD and LAG functions”,

— Feature T616, “Null treatment option for LEAD and LAG functions”,

— Feature T617, “FIRST_VALUE and LAST_VALUE functions”,

— Feature T618, “NTH_VALUE function”,

— Feature T619, “Nested window functions”,

— Feature T620, “WINDOW clause: GROUPS option”,

— Feature T621, “Enhanced numeric functions”

© ISO/IEC 2022 – All rights reserved

Documents
Document Sharing Hub
Full document details: BS ISO/IEC 19075-9:2022

2 Normative references

There are no normative references in this document.

© ISO/IEC 2022 – All rights reserved
Documents
Document Sharing Hub
Full document details: BS ISO/IEC 19075-9:2022

3 Terms and definitions

No terms and definitions are listed in this document.

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

© ISO/IEC 2022 – All rights reserved

Documents
Document Sharing Hub

Full document details: BS ISO/IEC 19075-9:2022

4 Example data

4.1 Introduction to example data

The examples in this document are based on several tables.

The order in which the rows of all sample tables are displayed is immaterial.

4.2 Table sales history

Table 1, "Table sales_history", contains information on a business spread over several territories with total sales accumulated monthly in each territory. Table 1, "Table sales_history", shows sample data for Subclause 4.2, "Table sales history":

Table 1 — Table sales_history

Territory	Month	Sales
East	199812	11
West	199811	12
West	199901	11
East	199811	4
East	199810	10
West	199810	8
East	199902	10
East	199901	7
West	199812	7
West	199902	6

SQL to create and populate Subclause 4.2, "Table sales history".

```
CREATE TABLE Sales_History
(Territory CHARACTER (10),
 Month INTEGER,
 Sales INTEGER)

INSERT INTO Sales_History VALUES ('East', 199812, 11)
INSERT INTO Sales_History VALUES ('West', 199811, 12)
INSERT INTO Sales_History VALUES ('West', 199901, 11)
INSERT INTO Sales_History VALUES ('East', 199811, 4)
INSERT INTO Sales_History VALUES ('East', 199810, 10)
INSERT INTO Sales_History VALUES ('West', 199810, 8)
INSERT INTO Sales_History VALUES ('East', 199902, 10)
INSERT INTO Sales_History VALUES ('East', 199901, 7)
```


© ISO/IEC 2022 – All rights reserved
Documents Document Sharing Hub
Full document details: BS ISO/IEC 19075-9:2022

```
INSERT INTO Sales_History VALUES ('West', 199812, 7)
INSERT INTO Sales_History VALUES ('West', 199902, 6)
```

4.3 Table stock1

The next examples are two variants of a stock table containing information on stock transactions for a particular account. Columns in Table 2, "Table stock1", include transaction ID, trade day, and type, as well as the share amount and ticker symbol. Subclause 4.4, "Table stocks", covers the columns ticker, tradeday, and price.

Table 2 — Table stock1

Acno	Tid	Tradeday	TType	Amount	Ticker
123	1	1	buy	1000	csco
123	2	1	buy	400	inpr
123	3	2	buy	2000	symc
123	4	2	buy	1200	csco
123	5	2	buy	500	inpr
123	6	4	buy	200	csco
123	7	4	buy	100	csco
123	9	5	buy	400	inpr
123	10	5	buy	200	goog
123	11	5	buy	1000	inpr
123	12	5	buy	4000	inpr
123	13	8	buy	2000	hpq

SQL to create and populate Table 2, "Table stock1".

```
CREATE TABLE Stock1
(Acno INTEGER,
 Tid INTEGER,
 Tradeday INTEGER,
 TType CHARACTER (10),
 Amount INTEGER,
 Ticker CHARACTER (10))

INSERT INTO Stock1 VALUES (123, 1, 1, 'buy', 1000, 'csco')
INSERT INTO Stock1 VALUES (123, 2, 1, 'buy', 400, 'inpr')
INSERT INTO Stock1 VALUES (123, 3, 2, 'buy', 2000, 'symc')
INSERT INTO Stock1 VALUES (123, 4, 2, 'buy', 1200, 'csco')
INSERT INTO Stock1 VALUES (123, 5, 2, 'buy', 500, 'inpr')
INSERT INTO Stock1 VALUES (123, 6, 4, 'buy', 200, 'csco')
INSERT INTO Stock1 VALUES (123, 7, 4, 'buy', 100, 'csco')
INSERT INTO Stock1 VALUES (123, 9, 5, 'buy', 400, 'inpr')
INSERT INTO Stock1 VALUES (123, 10, 5, 'buy', 200, 'goog')
INSERT INTO Stock1 VALUES (123, 11, 5, 'buy', 1000, 'inpr')
INSERT INTO Stock1 VALUES (123, 12, 5, 'buy', 4000, 'inpr')
INSERT INTO Stock1 VALUES (123, 13, 8, 'buy', 2000, 'hpq')
```

© ISO/IEC 2022 – All rights reserved

Documents
Document Sharing Hub
Full document details: BS ISO/IEC 19075-9:2022

4.4 Table stocks

Table 3 — Table stocks

Ticker	Tradeday	Price
ZYX	1	10
ZYX	2	11
ZYX	3	12
ZYX	4	12
ZYX	5	12
ZYX	6	11
ZYX	7	12
ZYX	8	12

SQL to create and populate Table 3, "Table stocks".

```
CREATE TABLE Stocks
(Ticker CHARACTER (10),
 Tradeday INTEGER,
 Price INTEGER)

INSERT INTO Stocks VALUES ('ZYX', 1, 10)
INSERT INTO Stocks VALUES ('ZYX', 2, 11)
INSERT INTO Stocks VALUES ('ZYX', 3, 12)
INSERT INTO Stocks VALUES ('ZYX', 4, 12)
INSERT INTO Stocks VALUES ('ZYX', 5, 12)
INSERT INTO Stocks VALUES ('ZYX', 6, 11)
INSERT INTO Stocks VALUES ('ZYX', 7, 12)
INSERT INTO Stocks VALUES ('ZYX', 8, 12)
```

4.5 Table homes

The final example is Table 4, "Table homes", containing data concerning house prices and locations.

Table 4 — Table homes

Area	Address	Price
Uptown	15 Peekaboo St.	456000
Uptown	27 Primrose Path	341000
Uptown	44 Shady Lane	341000
Uptown	23301 Highway 61	244000
Uptown	34 Desolation Rd.	244000
Uptown	77 Sunset Strip	102000

© ISO/IEC 2022 – All rights reserved
Documents Document Sharing Hub
Full document details: BS ISO/IEC 19075-9:2022

Area	Address	Price
Downtown	72 Easy St.	509000
Downtown	29 Wong Way	201000
Downtown	45 Diamond Lane	201000
Downtown	76 Blind Alley	201000
Downtown	15 Tern Pike	199000
Downtown	444 Kanga Rua	102000

SQL to create and populate Table 4, "Table homes".

```
CREATE TABLE Homes
(Area CHARACTER (10),
 Address CHARACTER (20),
 Price INTEGER)

INSERT INTO Homes VALUES ('Uptown', '15 Peekaboo St.', 456000)
INSERT INTO Homes VALUES ('Uptown', '27 Primrose Path', 341000)
INSERT INTO Homes VALUES ('Uptown', '44 Shady Lane', 341000)
INSERT INTO Homes VALUES ('Uptown', '23301 Highway 61', 244000)
INSERT INTO Homes VALUES ('Uptown', '34 Desolation Rd.', 244000)
INSERT INTO Homes VALUES ('Uptown', '77 Sunset Strip', 102000)
INSERT INTO Homes VALUES ('Downtown', '72 Easy St.', 509000)
INSERT INTO Homes VALUES ('Downtown', '29 Wong Way', 201000)
INSERT INTO Homes VALUES ('Downtown', '45 Diamond Lane', 201000)
INSERT INTO Homes VALUES ('Downtown', '76 Blind Alley', 201000)
INSERT INTO Homes VALUES ('Downtown', '15 Tern Pike', 199000)
INSERT INTO Homes VALUES ('Downtown', '444 Kanga Rua', 102000)
```

© ISO/IEC 2022 – All rights reserved

Documents
Document Sharing Hub
Full document details: BS ISO/IEC 19075-9:2022

5 Windows

5.1 Introduction to windows

SQL in Feature T611, "Elementary OLAP operations" and Feature T612, "Advanced OLAP operations" of ISO/IEC 9075-2 adds support for online analytical processing (OLAP). The extensions are parts of the SELECT command.

OLAP is concerned with data aggregation across grouping criteria to generate values such as subtotals and totals on multiple levels. Grouping criteria are often called dimensions. OLAP is based on the concept of multiple dimensions and navigation across the aggregation levels as well as the accumulated data. OLAP is used in applications such as analytics and reporting. It may be used in iterative fashions trying out different grouping criteria and different subsets of the data to be analyzed.

To deal with these requirements, the features mentioned above introduce a "WINDOW" facility that may present aggregated content as a rolling window, ordered and grouped by the specified criteria. See the example in Subclause 5.2.2, "Window partitioning", Table 5, "Result of window clause".

The data may be treated like other result sets, and/or may be used for further processing.

A query contains a select list and a table expression. The table expression produces a result set; call it *RT*. The select list is evaluated by applying its expressions to each row in *RT*. Without the OLAP features, the select list expressions may only "see" that one current row, making it impossible to compute values that rely on values from other rows in *RT*. Such computations may be simulated only by arranging for the necessary values to be included as additional columns in *RT*, which may be inconvenient or impossible.

The concept of the windowed table alleviates this limitation by adding windows to the result of the table expression. One way to think of a window is to imagine that it is a transient copy of *RT*, including an indication of the current row. (This is just a conceptual device; an SQL-implementation need not actually copy *RT*.) This transient copy may be logically re-arranged according to a sort ordering, a partitioning, or both; it may also be limited to a subset of rows, via window framing. These rearrangements of the window's rows take place without affecting *RT* itself. Multiple windows may exist, each with its own independently applied ordering, partitioning, and/or framing specifications. Windows may be defined either in the new window clause, or in-line in individual window function specifications in the select list.

Partitioning and/or ordering may be used to compute such results as ranking, Ntiles, and other analytic functions. The frame specifies which rows of a partition, relative to the current row, should participate in the calculation of an OLAP function. Through frames, windows support such important OLAP capabilities as cumulative sums and moving averages.

Ordering in windows is specified with the same sort specification list used by cursors and elsewhere in the SELECT statement, and with the same semantics. Ordering as enhanced for the OLAP capabilities of SQL also includes user specified control of the ordering of nulls. Although ordering of rows may be non--deterministic within a window, the same non-deterministic ordering is used in windows that have equivalent partitioning and ordering clauses specified.

5.2 Window definitions

5.2.1 Introduction to window definitions

The <window clause> is an additional syntax element of the query expression and, if specified, follows the <from clause>, <where clause>, <group by clause>, and <having clause>. As with the other clauses of the query expression, the window clause applies to the result of the preceding clauses. The window clause consists of a comma separated list of window definitions. Each of these has a name, for reference

© ISO/IEC 2022 – All rights reserved
Documents Document Sharing Hub
Full document details: BS ISO/IEC 19075-9:2022