

## DB1040 – DB2 for z/OS Advanced SQL

<b>Course Synopsis</b>	<b>Duration:</b>	Five (5) days
	<b>Audience:</b>	Experienced SQL end users, application developers, database administrators who require advanced knowledge of SQL.
	<b>Prerequisites:</b>	This course is designed for persons that have experience coding and executing basic SQL statements. Prior completion of SQL Fundamentals and/or DB2 & SQL Application Programming is suggested.
	<b>Delivery Method:</b>	Instructor led, Hands-on workshops

<b>Brief Description</b>	<i>This course covers advanced and complex SQL coding strategies for DB2 for z/OS. Hands-on workshops give students the opportunity to apply the topics discussed.</i>
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<b>Course Objectives What You'll Learn</b>	<p>Upon successful completion of this course, the student will be able to:</p> <ul style="list-style-type: none"> <li>• Advanced Data Type Usage which includes Distinct Types, Casting, ROWID, and Datetime Arithmetic</li> <li>• Sophisticated use of CASE Expressions</li> <li>• Creation and exploitation of Views</li> <li>• Complex Inner and Outer Joins including self-joins</li> <li>• Utilize subqueries for advanced processes such as quota queries and relational division</li> <li>• Take advantage of the capabilities of Unions using UNION Everywhere</li> <li>• Code flexible SQL by utilizing Nested Table Expressions</li> <li>• Declare, fetch, and manipulate data through Scrollable Cursors</li> <li>• Utilize by both declared and created Temporary Tables</li> <li>• Control the granularity of Isolation Level using the WITH clause</li> <li>• Make use of new SQL features</li> </ul>
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<b>Topics Covered</b>	<table style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> <p><b>I. DB2 &amp; SQL in Review</b></p> <ul style="list-style-type: none"> <li>• DB2 Physical Database Structures                             <ul style="list-style-type: none"> <li>– DB2 Object Dependencies</li> <li>– DB2 Naming Conventions</li> <li>– Unqualified Object Names</li> <li>– Schema and the SQL Path</li> </ul> </li> </ul> </td> <td style="width: 50%; vertical-align: top;"> <p><b>II. Advanced Data Types &amp; Functions</b></p> <ul style="list-style-type: none"> <li>• Data Types</li> <li>• ROWID Format</li> <li>• Distinct Data Types</li> <li>• Casting</li> <li>• Column Functions</li> <li>• Summarization with GROUP BY</li> <li>• The HAVING Clause</li> </ul> </td> </tr> </table>	<p><b>I. DB2 &amp; SQL in Review</b></p> <ul style="list-style-type: none"> <li>• DB2 Physical Database Structures                             <ul style="list-style-type: none"> <li>– DB2 Object Dependencies</li> <li>– DB2 Naming Conventions</li> <li>– Unqualified Object Names</li> <li>– Schema and the SQL Path</li> </ul> </li> </ul>	<p><b>II. Advanced Data Types &amp; Functions</b></p> <ul style="list-style-type: none"> <li>• Data Types</li> <li>• ROWID Format</li> <li>• Distinct Data Types</li> <li>• Casting</li> <li>• Column Functions</li> <li>• Summarization with GROUP BY</li> <li>• The HAVING Clause</li> </ul>
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## DB1040 – DB2 for z/OS Advanced SQL

### III. Date/Time Arithmetic

- Special Registers
- DATE-Related Scalar Functions
- TIME/TIMESTAMP-Related Scalar Functions
- Durations
  - Labeled Durations
- Datetime Arithmetic – Addition
- Datetime Arithmetic – Subtraction
- Datetime Arithmetic Nuances
- DATE/TIME Guidelines

### IV. CASE Expressions

- CASE Expression Usage
- CASE Expression Syntax
- Simple WHEN Clause
- Searched WHEN Clause
- CASE for Alternate Column Selection
- CASE for Code Translation
- CASE to Avoid Divide by Zero
- CASE to Adjust WHERE Clause
- CASE in an UPDATE Statement
- CASE used to Pivot Result Sets
- Testing Multiple Columns with CASE
- RAISE\_ERROR Function

### V. Views

- What is a View?
- CREATE VIEW Syntax
- View Example
- View Hierarchy
- Read-only Views
- Data Modification Through Views
  - Considerations
  - WITH CHECK OPTION
  - CASCADED vs. LOCAL

### VI. JOIN

- FROM Clause Syntax
- Joined-table Syntax
- Join-condition Syntax
- Joined Table Expressions
- Inner Joins of 3 or More Tables
- Self Join
- Inner Natural Join
- Outer Natural Join
- Outer Joins of More than 3 Tables

### VII. Subqueries

- Basic Subselects
- Row Value Expressions
- Relational Difference
- Quota Queries
- Restricted Quotas
- Divide
- Additional Predicates with Divide

### VIII. UNION

- UNION Syntax
  - UNION Vs. UNION ALL
- UNION Everywhere
  - UNION and Views
  - UNION and Table Expressions
  - UNION and Basic Predicates
  - UNION and EXISTS Predicate
  - UNION and IN Predicate
  - UNION and INSERT
  - UNION and UPDATE

### IX. Nested Table Expressions

- What is a Nested Table Expression?
- Why use Nested Table Expressions
- NTE Using Host Variables
- Inner Join Using NTE
- Outer Join Using NTE
- Inner and Outer Join Using NTE
- Join Using Derived Data

### X. Scrollable Cursors

- Cursor SQL Statements
- Declare Cursor
  - Select Statement
  - Scrollable Cursor Example
- Open Cursor
- Scrollable Cursor Fetch
  - Sensitive vs. Insensitive Cursors
  - Moving the Cursor
  - Scrollable Cursor Fetch Example
- Positioned UPDATE and DELETE
  - Update and Delete Holes
  - Insensitive Scrolling and Holes
  - Maintaining Holes
- Close Cursor
  - Cursor Processing Return Codes
  - Locking and Scrollable Cursors

**DB1040 – DB2 for z/OS Advanced SQL****XI. Isolation Override; The WITH Clause**

- Isolation Level in Review
- The WITH Clause
- Rules for WITH Clause Usage
- WITH Clause and SELECT
- WITH Clause and INSERT
- WITH Clause and UPDATE
- WITH Clause and DELETE

**XII. Global Temporary Tables**

- What is a Global Temporary Table
  - Created Temporary Tables
  - Declared Temporary Tables
  - Created vs. Declared
  - Temporary Tables to Hold Result Sets

**XIII. V8 SQL Enhancements**

- Long Names
- Multiple DISTINCTs in One SQL Statement
- Expressions in GROUP BY
- Qualified Columns in INSERT and UPDATE
- Scalar Fullselect
- Common Table Expressions
- Recursive SQL
- Sequences
- Sequences vs. Identity Columns
- SELECT from INSERT
- DISTINCT FROM Comparison Operator
- New Built-in Functions
- New Special Registers

**XIV. Embedded Programming Features (Optional)**

- Embedded SELECT with Order By
- Dynamic Scrollable Cursors
- Multi-row FETCH and INSERT
- GET DIAGNOSTICS