

Db2 for z/OS SQL & Application Programming

Course Summary

Description

Db2 SQL and Application Programming is a 5 day course targeting the needs of programmers and developers writing applications that access data stored in the Db2 environment. The presentation is an integrated mixture of lecture and workshop activities that introduce and reinforce the basic techniques and approaches to relational database technology as implemented in Db2. Topics covered include structure and manipulation of Db2 data, operational considerations in both on-line and batch environments; integrity; embedded programming techniques and preparation; and an introduction to performance analysis.

The workshop activities follow the classroom material and are designed for both topic reinforcement and practice. Programming topics are supported by workshops in both the on-line and batch environment, this includes precompiling, compiling, linking, and the various options of the Db2 BIND.

This course is a combination of Db2 SQL for Everyone and Db2 for z/OS Embedded SQL Programming

Objectives

At the end of this course, students will be able to:

- Describe the overall purpose of, and the approaches to manipulating data in a database management system.
- Describe the major objects used by Db2 for data manipulation.
- Translate and code business problems in Structured Query Language.
- State the internal approaches utilized by Db2 for accessing data.
- Describe the major objects used by Db2 for data manipulation.
- Embed SQL in COBOL programs.
- Prepare COBOL programs containing embedded SQL statements for execution in the z/OS batch environment.
- Process multi-row tables with Db2 cursors.
- State the internal approaches utilized by Db2 for accessing data.

Topics

- | | |
|----------------------------------|--------------------------------|
| • Relational Database Concepts | • SQL Subqueries |
| • Basic Data Manipulation | • Set Operations |
| • Intermediate Data Manipulation | • Db2 on the z/OS Platform |
| • Built-in Functions | • Introduction to Embedded SQL |
| • Aggregation | • Program Preparation |
| • Joins | • Cursors |
| • Data Modification | • Performance |
| • Complex Joins | |

Audience

Programmers, application developers and computer analysts who are exposed to, or are required to perform the activities associated with application development and implementation in a Db2 environment.

Prerequisites

Basic programming skills in the COBOL environment and familiarity with the z/OS environment and TSO/ISPF.

Duration

Five days

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Course Outline

- I. *Relational Database Concepts*
 - A. The Relational Model
 - B. Domains
 - C. Integrity and Relationships
 - D. Structured Query Language (SQL)
 - E. Unknown Values (NULL)
 - F. Basic Datatypes
- II. *Basic Data Manipulation*
 - A. SELECT Statement
 - B. Using SELECT
 - C. Projecting Columns Onto the Result
 - D. Basic Predicates
 - E. Expressions in the SELECT Clause
 - F. Expressions in the WHERE clause
- III. *Intermediate Data Manipulation*
 - A. Compound Conditions
 - B. Other WHERE Clause Operators
 - C. BETWEEN
 - D. IN
 - E. LIKE
 - F. IS NULL
 - G. Using DISTINCT
 - H. ORDER BY Clause
- IV. *Built-in Functions*
 - A. Working with Datatypes and Casting
 - B. Functions Involving NULLs
 - C. CASE Statements
- V. *Aggregation*
 - A. SUM, AVG, MIN, MAX & COUNT Functions
 - B. Grouping Results with GROUP BY
 - C. Filtering Groups with HAVING
- VI. *Joins*
 - A. Inner Equi-Join
 - B. Join Classification
 - C. Cartesian Products
 - D. Inner Joins of More than 2 Tables
- VII. *Data Modification*
 - A. INSERT
 - B. UPDATE
 - C. DELETE
 - D. COMMIT and ROLLBACK
- VIII. *Complex Joins*
 - A. LEFT / RIGHT / FULL Outer Joins
 - B. Self-Joins
- IX. *SQL Subqueries*
 - A. Non Correlated Subqueries
 - B. Correlated Subqueries
 - C. Scalar Fullselects
- X. *Set Operations*
 - A. Union / Union ALL
 - B. Intersect / Intersect ALL
 - C. Except / Except ALL
- XI. *Db2 on the z/OS Platform*
 - A. The Db2 Family
 - B. The Db2 Environment on z/OS
 - C. Stored Procedures
 - D. Databases and Schemas
 - E. Tablespaces
 - F. Indexes
 - G. The Db2 Catalog
 - H. Structured Query Language
- XII. *Introduction to Embedded SQL*
 - A. Program Preparation Overview
 - B. SQL Program Development Steps
 - C. Retrieving Data with SELECT...INTO
 - D. Indicators in UPDATE and INSERT
 - E. The SQL Communications Area
 - F. SQLCODE and SQLSTATE
 - G. Error Handling
- XIII. *Program Preparation*
 - A. Program Preparation Steps
 - B. DCLGEN
 - C. Program Preparation with Precompiler
 - D. Program Preparation with Coprocessor
 - E. The TSO Terminal Monitor Program
 - F. The DSN RUN Subcommand
 - G. TSO Batch Attachment
 - H. Program Execution
 - I. Multi-Threaded Attach
 - J. BIND
 - K. Debugging
 - L. Generated Code
 - M. Catalog Tables for Packages and PLANS

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Course Outline (cont'd)

XIV. Cursors

- A. Cursor Processing Overview
- B. DECLARE Cursor
- C. OPEN Cursor
- D. FETCH
- E. CLOSE Cursor
- F. A Complete Example
- G. Positioned UPDATE and DELETE
- H. Updating with a Read-Only Cursor
- I. Logical Unit of Work Overview
- J. COMMIT
- K. ROLLBACK and SAVEPOINT
- L. Two-Phase Commit Protocol

XV. Performance

- A. The Db2 Optimizer
- B. Tuning SQL
- C. Access Path Choices
- D. Index Processing
- E. Prefetch
- F. Predicate Evaluation
- G. Coding SQL for Performance