



- COURSE CODE:** DZOAPW
- COURSE TITLE:** DB2 Application Programming Workshop
- AUDIENCE:** Would-be application programmers and developers.
- PREREQUISITES:** At least six (6) months of IT mainframe experience.
- DURATION:** 5 days
- SUMMARY:** This 'hands-on' DB2 UDB programming workshop for z/OS details both:
- Interactive SQL and
 - Embedded SQL
- Therefore, after discussing relational terms and concepts, the delegates are required to complete server-based SQL and programming exercises to which solutions are provided.
- OBJECTIVES:** Upon completion of this course, the delegate should be able to use basic SQL via SPUFI on host language (e.g., COBOL) to maintain DB2 UDB data. Additionally, the delegates should feel competent with program preparation steps involving BIND and REBIND.

1. THE DB2 UDB FAMILY

2. DB2 TERMS & CONCEPTS

- Structured Query Language (SQL)
- Schemas
- Tables
- Data types (e.g., decimal, null)
- Indexes
- Keys
- Constraints
- Triggers
- Routines (e.g., stored procedures)
- Large objects
- UNICODE
- 3rd normal form

3. DB2 OBJECTS & DATA INTEGRITY

- Storage groups
- Databases
- Table spaces
- Tables
- Views
- Indexes
- Data integrity (e.g., referential integrity)

4. DB2 ARCHITECTURE OVERVIEW

- Address spaces
- Catalogs
- Recovery facilities
- User interface options (e.g., TSO, applications)
- Security

5. INTRODUCTION TO SQL (DML)

- Syntax conventions
- SQL components
- SQL predicates
- SQL limits

6. INTRODUCTION TO SPUFI

- DB2I primary options menu
- DB2I defaults
- SPUFI primary display
- SPUFI defaults
- SPUFI browse facilities
- SPUFI recovery facilities
- Workshop

7. SELECTING DATA FROM COLUMNS

- All columns
- Some columns
- Derived columns
- Data not in table
- Dates
- Using DISTINCT
- Naming result columns
- FETCH FIRST
- Performance considerations
- Workshop

8. SELECTING USING PREDICATES

- WHERE and comparison operators
- NULLs
- BETWEEN
- IN
- Operators (<, >, >=, <>, etc.)
- Using NOT
- Precedence rules
- Performance considerations
- Workshop

9. SELECTING USING COLUMN FUNCTIONS

- COUNT
- AVG
- MAX
- MIN
- SUM
- Performance considerations
- Workshop

10. SELECTING USING SCALAR FUNCTIONS

- CHAR
- COALESCE
- CONCAT
- DATAs
- INTEGER
- NULLIF
- SUBSTR
- ROUND
- Workshop

11. ORDER BY

- ASC
- DESC
- Multiple columns
- Expressions
- Columns not in SELECT list
- Performance considerations
- Workshop

12. GROUP BY

- Single column
- Multiple columns
- HAVING considerations
- With ORDER BY
- Performance considerations
- Workshop

13. JOINS

- INNER
- OUTER (LEFT, RIGHT & FULL)
- ON vs. WHERE
- COALESCE and NULLs
- Nested table expressions
- Cartesian product
- Performance considerations
- Workshop

14. MERGING LIST OF VALUES (e.g., UNION)

- Eliminating duplicates
- Keeping duplicates
- Performance considerations
- Workshop

15. CASE EXPRESSIONS

- More meaningful value substitution
- NULL considerations
- As alternative to UNION
- Performance considerations
- Workshop

16. SUBQUERIES

- Non-correlated
- Correlated
- Alternative to joins
- Performance considerations
- Workshop

17. MODIFYING DATA

- Logical Units of Work (LUW)
- Units of recovery concepts
- Introduction to locking and concurrency
- Introduction to COMMIT/ROLLBACK
- INSERTs
- UPDATEs
- DELETEs
- Isolation levels and performance
- Workshop

18. APPLICATION PROGRAMMING

- Supported languages
- Static vs. dynamic SQL
- Program preparation (e.g., BIND, REBIND)
- DCLGEN
- Static SQL
 - ⇒ Overview
 - ⇒ Declaring tables and views
 - ⇒ Retrieving rows (single vs. multi-row)
 - ⇒ Error and exception handling (e.g., SQLCA)
 - ⇒ Host variables (e.g., NULLs)
 - ⇒ Ambiguous vs. non-ambiguous cursors
 - ⇒ COMMIT/ROLLBACK
 - ⇒ CURSOR WITH HOLD
 - ⇒ UNICODE considerations (e.g., DECLAREs for CCSIDs)
 - ⇒ Updates, inserts and deletes
 - ⇒ Multi-row FETCH
 - ⇒ Multi-row INSERTs
- Performance considerations
- Workshop

19. BASIC BIND/REBIND PARAMETERS

- ACQUIRE/RELEASE
- CURRENTDATA
- ISOLATION LEVELs
- Packages vs. plans
- UNICODE considerations (e.g., V8 SQL parsing)

20. INTRODUCTION TO LOCKING & CONCURRENCY

- Scope and limits
- Reasons for
- Lock table
- ISOLATION LEVELs
- Timeout
- Deadlocks
- Isolation level scenario and exercise