

HP Education Services

HP NonStop SQL/MX Basics (U4184S)



This 5-day course is an introduction to SQL, relational database principles, and the HP NonStop™ SQL/MX product and serves as a prerequisite to more advanced NonStop SQL/MX courses. Hands-on lab sessions provide practical experience with generating SQL/MX queries to access data and creating database objects (catalogs, tables, indexes, views, and constraints).

Audience

- Anyone requiring an introductory course to SQL and working with the NonStop SQL/MX product

Prerequisites

- Concepts and Facilities course (U4147S)

Course Objective

- Describe relational database concepts and terminology
- Describe the HP NonStop™ SQL/MX processes and objects
- Start a mxci session and use ANSI names SQL/MX database objects
- Describe the basic process to write queries and the tools to evaluate the query performance
- Use the mxci SELECT statement and predicates to retrieve data from single tables
- List the types of functions supported in SQL/MX
- Retrieve data from:
 - multiple tables using joins and union operations
 - from derived tables using query expressions
 - using subqueries
- Create a SQL/MX database (Catalog, Schema, Tables, Indexes, Views and Constraints)
- Modify data in a table using SQL/MX INSERT, UPDATE, and DELETE statements
- Describe the SQL/MX access options and isolation levels
- Describe SQL/MX database management functions

Benefits to You

- Upon completion of this course, you will understand relational database concepts and terminology

Why education services from HP?

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Course Title: HP NonStop SQL/MX Basics

HP Product Number: U4184S

Category/Subcategory: NonStop/Application Design and Development

Course Length: 5 days

Level: Beginning

Delivery Language: English

To Order: You can order this course online at <http://www.hp.com/learn>. At the site, select a country, then choose "registration" or "Book a course" and fill out the online registration form.

Detailed Course Outline

Module 1 Introduction to SQL Relational Databases

- Definition of a relational database
- Components of a relational database table
- Forming relationships in a relational database
- Types of relationships
- Description of Structured Query Language: Data Definition Language, Data Manipulation Language, Data Control Language, and Transaction Control Language
- Characteristics of a Relational Database Management System (RDBMS)
- Lab exercise

Module 2 Overview of SQL/MX Architecture

- SQL/MX Architecture
- SQL/MX System Metadata
- User Metadata (UMD) Tables
- User Catalog and Schemas
- SQL/MX User Tables, Objects, Tables, Indexes, Views, Constraints, Triggers, Object Namespaces-Object Type, Security Model, Process Architecture, Components, Catalog Manager, DDL Operations, Utilities
- NSM/web Architecture
- Lab exercise

Module 3 Introduction to mxci

- SQL/MX Help Facilities
- Starting mxci
- mxci Prompts and Termination Character
- SQL/MX Identifiers
- Logical (ANSI) Names
- Specifying ANSI
- Using Logical Names in an mxci Session
- mxci:
 - SET NAMETYPE Command (ANSI)
 - SET CATALOG Command
 - SET SCHEMA Command
- mxci cd Command, ls Commands
- mxci — LOG Command
- Lab exercise

Module 4 Query Writing Process

- Overview of query execution
- Overview of query development process
- Analyze query objective, Generating the query, Executing the query
- Verifying the results, Assessing performance
- Lab exercise

Module 5 Retrieving Data from a Single Table

- Data Types, Character Data Types, Numeric Data Types-Exact and Approximate, Datetime Data Types, Interval Data Types
- INVOKE Command
- SELECT Statement-Clauses, Syntax, Select List
- SELECT-Select List, ALL or DISTINCT Rows, [ANY N] or [FIRST N]
- FROM and WHERE Clause
- Predicates
- Row-Value-Constructor
- Comparison Predicates-Syntax, Examples
- LIKE, BETWEEN, and IN Predicates
- Boolean Operators and Compound Predicates
- NULL Values
- IS [NOT] Predicate
- ORDER BY, GROUP By, HAVING Clause
- Lab exercise

Module 6 Functions and Expressions

- Aggregate functions
- Character functions
- Datetime functions
- Mathematical functions
- Types of Expressions
- Literal Expressions
- Numeric Expressions
- Lab Exercise

Module 7 Retrieving Data from Multiple Tables

- Generating the following types of joins: CROSS, NATURAL, INNER, EQUI, LEFT, RIGHT, Self
- Correlation Names
- Join with Additional Search Conditions
- UNION Operation
- Union of the CUSTOMER and SUPPLIER Tables
- Lab exercise

Module 8

- Query Expression: Definition, Types, Joined Table, Syntax
- Non-Joined Query Expression Table: VALUES Statement, TABLE Statement, SELECT Query Specification
- Simple Table - SELECT Expression
- Subquery: Definition, Non-Correlated, Correlated, Evaluation of a Correlated Subquery, Classification, SELECT Form of a subquery
- Predicates: Subquery, Comparison, BETWEEN, IN, and EXISTS, and EXISTS Examples
- Subqueries using the Comparison, BETWEEN, and IN Predicates
- Subquery Key Points
- Lab exercise

Module 9 Creating SQL/MX Objects

- Creating SQL/MX Objects
- SQL/MX Object Naming
- CREATE CATALOG Command — Syntax, REGISTER CATALOG Command — Syntax, UNREGISTER CATALOG Command — Syntax, Catalog Considerations
- CREATE SCHEMA Command — Syntax
- Rules for Naming SQL/MX Schema Subvolumes, Schema Considerations, Creating a User Schema
- Creating a SQL/MX Table — Topics
- Column Definitions, Column Name Rules, Character Sets, Default Value, ISO88591 Character Set Examples

- SYSTEM_DEFAULTS Table — NOT_NULL_CONSTRAINT_DROPPABLE_OPTION
- Constraints, Constraints Names, Table Constraints
- Specifying Physical Location and Name for the Underlying Guardian File
- Specifying a Clustering Key, Specifying a Clustering Key — STORE BY Clause, Terminology
- Clustering Key — No STORE BY Clause and No Primary Key Specified, Clustering Key — STORE BY PRIMARY KEY: Primary Key Specified As DROPPABLE
- Specifying Guardian File Attributes
- CREATE INDEX — Syntax, CREATE VIEW — Syntax, CREATE VIEW — Example, Considerations for Creating a View
- Lab exercise

Module 10 Inserting Data and Updating Statistics

- Methods for Loading Multiple Rows of Data
- Inserting Data into the Database, INSERT Statement — Syntax, Inserting a Single Row, Inserting Multiple Rows, INSERT Considerations
- SQL/MX Histogram Statistics, Statistics Tables, mxci UPDATE STATISTICS Utility, Examples of mxci UPDATE STATISTICS
- Lab exercise

Module 11 Modifying Data

- Maintaining Database Consistency
- Transaction Management Statements
- Explicit Transaction: User-Defined Transaction, INSERT, UPDATE, DELETE,
- Implicit Transaction: System-Defined Transactions, SELECT, INSERT, UPDATE, DELETE
- Modifying Existing Data
- UPDATE Statement — Syntax, Updating a Single Row, Updating Multiple Rows, UPDATE Statement — Scalar Subquery, UPDATE Considerations
- Removing Data from the Database

- DELETE Statement — Syntax, Deleting Data, DELETE Considerations
- Lab exercise

Module 12 Access Options and Isolation Levels

- Concurrency Control and Contention
- Locking Considerations, Locking Considerations, Dirty Reads, Non-Repeatable Reads, Phantoms,
- Access Options and Isolation Levels, READ UNCOMMITTED Access Option, READ COMMITTED Access Option, READ COMMITTED Considerations, SERIALIZABLE or REPEATABLE READ Access Option
- Lock Modes, Access Options and Lock Modes
- SET TRANSACTION Statement, SET TRANSACTION Statement — Example, Transaction Isolation-Level Rules
- DEADLOCK, Viewing Locks on a Table
- Lab exercise

Module 13 Management Functions

- SQL/MX Object Dependencies
- SQL Authorization ID
- Object Ownership and Security Rules
- Granting Privileges to Users — Example
- Altering SQL/MX Objects in a SQL/MX Database
- Authorization Requirements for Altering Database Object
- Altering TABLE or INDEX FILE Attributes, Adding Columns to a Table, Altering Considerations
- Removing SQL/MX Database Objects, Dropping SQL/MX Objects From a SQL/MX Database, Removing Your Database Objects
- Managing Data

- mxtool VERIFY Utility, mxtool VERIFY Utility — Security Considerations, mxtool VERIFY Utility —Syntax
- Performance, Monitoring Performance
- Using the EXPLAIN Function with a Prepared Query, DISPLAY_EXPLAIN Command with OPTION 'f'
- NSM/web Connectivity Services Visual Query Planner DISPLAY STATISTICS
- Lab exercise

Module 14 Advanced Topics

- Referential Integrity (RI)
- Trigger Definition
- Partitioning — Range Partitioning, Hash Partitioning
- Publish and Subscribe Services
- Rowsets
- Compound Statements
- SELECT statement — TRANSPOSE Clause, SAMPLE Clause,
- Sequence Function

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