Data Modeling Workshop

Duration

2 days.

Participants

Project leaders, systems analysts, data analysts, database administrators, data administrators, end users, and others involved in modeling data.

Objectives

After successfully completing this course, you will be able to:

- Apply data modeling principles to the business requirements of your organization.
- Produce stable, accurate, relational data models.
- Understand and implement the steps involved in building a data model including Entity-Relationship modeling and normalization.
- Describe dimensional techniques used for Data Warehouses (Star and Snowflake Schemas).

Prerequisites

None.

Overview

This course is designed to teach you to use current data modeling principles to organize your data for efficient reporting and maintenance. In the case study, you develop a high-level and detail-level data model using a step-by-step process to refine and normalize the model. You will be able to describe different data stores, from flat files, hierarchial and network to relational and object-oriented databases, data warehouses, and star and snowflake stores. Related topics, such as denormalization, dimensional modeling, Data Warehouses, Star and Snowflake schemas, and UML for data modeling are presented and contrasted with E-R Modeling.

Our DB2 UDB Database Administration course is designed to follow this course and the model developed in this first course is then used to create DB2 tables and indexes in the DB2 UDB DBA course.

Format

Lecture, case study, and classroom exercises. In the case study, you will step through the process of developing a high-level and detail-level data model and refining and normalizing the model.

Topic Outline

Introduction to Logical Database Design

Data modeling concepts
Importance of data modeling
Benefits of data modeling
Data independence
Data-driven systems development
Data modeling and the system development life cycle
Data modeling approaches (top-down / bottom-up)
Iteration in data modeling
High-level to detail-level data modeling

Topic Outline

Entity Relationship (E-R) Data Modeling

- Objectives of E-R data modeling

Discovering Entities

- Entity vs entity occurrence
- Entity classifications
- Naming entities
- Entity definitions

Discovering Relationships

- Relationship vs relationship occurrence
- Recursive relationships
- Parallel relationships
- Relationship cardinality
- Relationship optionality
- Naming relationships
- Relationship definitions

Cardinality

Generalization/Abstraction

- Disjoint ISA
- Non-disjoint ISA
- Subsets/ Supersets

Attributes

- Discovering attributes
- Attribute vs attribute occurrence
- Basic attributes
- Derived attributes
- Designed attributes
- Composite attributes
- Attribute domain
- Naming attributes
  - Attribute naming problems
  - Attribute definitions
- Assigning identifiers
- Identifiers as candidate keys

Data Model Refinement

- Refining relationships
- Relationship redundancy
- Resolving many-to-many relationships

Topic Outline

Data Model Refinement ***(continued)***

- Bill-of-materials structure
- Refining entities
- Entity subtypes
- Entity life cycle analysis

Conceptual Data Modeling

- One-to-One, One-to-Many, Many-to-Many relationships
- Association entity
- Keys: Primary keys, Foreign keys
- Integrity

Normalization

- 1st normal form
- 2nd normal form
- 3rd normal form
- Higher normal forms
- Over normalization
- Denormalization
- Practical guidelines for normalization

Synthesizing User Views

- Local views of data
- Independent data model development
- Elimination of redundancies
- Resolution of conflicts
- Practical guidelines for synthesis

Data Model Confirmation

- Data model completeness
- Data model correctness
- Data model coverage
- Data model consistency

Transition from Data Model to Database

- Quantifying the data model
- Access path analysis
- Denormalization
- Transforming the data model into the DBMS

Data Modeling Workshop *(continued)*

Topic Outline

Success Factors for Data Modeling

Data Warehouses (Overview)

- Dimensional model for Data Warehouses (facts, dimensions)
- Star and Snowflake Schemas

Document Databases / XML (Overview)

UML for Data Modeling (Overview)

Data Modeling Tools (Overview)

- Considerations
- Tools Comparison