

Principles of Data Design, Modeling and Management Course Summary

Description

This course introduces the student to the principles and process of data modeling through the modeling cycle from modeling business object, through logical modeling and into the specific features of relational data modeling. The course presents topics such as the techniques of logical and business data modeling, how to incorporate business requirements into a logical data model, how to diagram the data models using ER diagrams and UML, how to normalize data and handle complex relationships within a relational model, and some considerations for transforming the logical design into a physical design.

Objectives

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

- Describe the process of logical data modeling and identify the benefits of using data modeling.
- Document business requirements and use them as input to the data modeling process.
- Explain how to move from business data requirements to logical data models.
- Explain the distinction between logical data modeling and physical database design.
- Identify the components of a data model, including entities, relationships and attributes.
- Explain the basic concepts of the relational model.
- Explain normalization, the use of nulls and identifiers.
- Model complex relationships such as many-to-many, sub-types and super-types, and recursive types.
- Document the data model with an entity/relationship diagram.
- Plan and execute a data model validation.

Topics

- Introduction to Modeling Concepts
- Business Data Modeling
- The Conceptual Model
- Relationships
- Attributes and Normalization
- Resolving Many-to-Many Relationships
- Subtypes and Supertypes
- Recursive Relationships
- Moving to the Relational Model

Audience

This course is designed for Business Analysts, Application Developers/Analysts, Business Analysts, Project Leaders and Data/Database Administrators.

Prerequisites

Students must have a general understanding of information technology and database concepts.

Duration

Three days

Principles of Data Design, Modeling and Management Course Outline

I. Introduction to Modeling Concepts

- A. Why we model data.
- B. Modeling principles.
- C. ANSI-SPARC three level data model architecture
- D. External Level – Modeling business data
- E. Conceptual Level – Logical Modeling
- F. Internal Level – Relational and other model types.
- G. Workshop

II. Business Data Modeling

- A. Understanding stakeholders and business requirements
- B. Procedures, policies, processes and business rules.
- C. Business objects
- D. External views of data – stakeholder models & point of view
- E. Business modeling and requirements gathering
- F. Workshop

III. The Conceptual Model

- A. How the conceptual model is different
- B. ER diagrams and UML class diagrams
- C. Identifying entities
- D. Validating entities
- E. Documenting “instances” of entities
- F. Distinguishing entities from attributes
- G. Naming entities
- H. Starting an entity/relationship model
- I. Workshop

IV. Relationships

- A. Identifying significant relationships
- B. Determining the “cardinality” or “degree” of a relationship
- C. One-to-one
- D. One-to-many
- E. Many-to-many
- F. Determining whether a relationship is optional or mandatory

- G. Giving a relationship a name
- H. Documenting the relationships in the E/R diagram
- I. Walking people through an E/R diagram
- J. Workshop

V. Attributes and Normalization

- A. Defining and categorizing attributes
- B. Domains and integrity rules
- C. Unique identifiers/primary keys
- D. Foreign keys
- E. Occurrence population
- F. Normalization: validating the placement of each attribute
- G. Attribute does not repeat (first normal form)
- H. Attribute is dependent on entire UID (second normal form)
- I. Attribute is dependent only on its UID (third normal form)
- J. Workshop

VI. Resolving Many-to-Many Relationships

- A. Real-world examples of many-to-many relationships
- B. Why many-to-many relationships are broken down
- C. Identifying “association” or “intersection” entities
- D. Documenting the new relationships in the E/R diagram
- E. Workshop

VII. Subtypes and Supertypes

- A. Identifying subtypes: examples of subtypes and supertypes
- B. Determining when entities are similar
- C. UIDs
- D. Attributes
- E. One-to-one relationships
- F. Creating subtypes and supertypes

Principles of Data Design, Modeling and Management Course Outline (cont'd)

- G. "Type" entities
- H. Using subtypes in apply fourth normal form
- I. Establishing the relationships of the sub- and super-entities
- J. Mutually exclusive vs. Non-mutually exclusive subtypes
- K. "Role" entities
- L. Workshop

VIII. Recursive Relationships

- A. Real-world examples of recursive relationships
- B. Discovering recursive relationships
- C. Determining optional or mandatory relationships
- D. Documenting the new relationships in the E/R diagram
- E. Hierarchical vs. Network recursive relationships
- F. "Structure" or "Bill of Materials" entities: fifth normal form
- G. Workshop

IX. Moving to the Relational Model

- A. The Relational Model
- B. Relational database objects: tables, views, indexes, etc.
- C. Mapping logical objects to relational objects
- D. Normalization and Denormalization in the relational model
- E. Identifiers and Keys
- F. Relationships and foreign keys
- G. Validating the model
- H. Referential integrity
- I. Workshop