Data Models

Robert C. Nickerson
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Topic 05

Data Model
- A way of conceptualizing the organization of data and relationships in a database
- A way of presenting the data and relationships in a database to users
- Basis for conceptual view and external views of the database
- Internal view of database is not based on data model
- DBMS is dependent on data model

Legacy Data Models
- Hierarchical data model
  - Database viewed as tree (hierarchy) (no many-to-many relationships or multiple parent children)
  - First systems developed (1960s) were hierarchical DBMSs
  - Example: IMS (Information Management System from IBM)
- Network data model
  - Database viewed as network
  - One common network data model (CODASYL model) only permitted networks with one-to-many relationships (no many-to-many relationships)
  - Systems developed in 1970s were network DBMSs
  - Example: IDMS (Integrated Data Management System from Computer Associates)

Relational Data Model
- Database viewed as tables with implied relationships (details later)
- Hierarchies and networks are not explicitly part of model
- Systems developed in 1980s were relational DBMSs
- Examples: Oracle, DB2, Sybase, SQL Server

Object-Oriented Data Model
- Not viewed as a database
- Viewed as an object base consisting of objects
- Object is data stored together with methods (procedures) for processing data
- Some systems developed in 1990s were object-oriented DBMSs
- Examples: GemStone, ObjectStore, Poet, Versant, Jasmine

Object-Relational “Data Model”
- Not a single data model
- Combines object-oriented data model with relational data model
- Allows storing of objects in relational databases
- Relational DBMSs modified in 1990s to allow storage of objects
- Example: Oracle
XML "Data Model"

- Data stored as XML documents
- Two types:
  - XML-enabled databases: relational database with the capability of storing XML documents along with other types of data (example: Oracle)
  - Native XML databases: stores data only as XML documents (example: Tamino from Software AG)