Key concepts

1. Database management systems (DBMSs): App that interact with the user
2. Data model: Set of records, XML, graph…
3. Schema: Data types
4. Data: Variables
5. Data definition language (DDL): Set up schema
6. Data manipulation or query language (DML): Querying and modifying

The Relation Model

Database = set of named relations (or tables)

Each relation has a set of named attributes (or columns)

Each tuple (or row) has a value for each attribute

Schema: structural description of relations in database

Instance: actual contents at given point in time

NULL: special value for “unknown” or “undefined”

Key: attribute whose value is unique in each tuple OR set of attributes whose

combined values are unique

Querying Relational Databases

Steps in creating and using a (relational) database:

1. Design Schema; create using DDL
2. “Bulk load” initial data
3. Repeat: execute queries and modifications

Query languages:

Relational Algebra--formal

SQL--actual/implemented

XML Data

Extensible Markup Language:

1. Standard for data representation and exchange
2. Document format similar to HTML (but the tags of HTML describe the content of the data rather than the format)
3. Also streaming format

Three basic components:

1. Tagged elements (nested)
2. Attributes
3. Text

Well-Formed XML

1. Single root element
2. Matched tags, proper nesting
3. Unique attributes within elements

Using “XML Parser” test if it is well-formed----Parsed XML (DOM, SAX)

Displaying XML: using rule-based language to translate to HTML (interpreter)

1. Cascading stylesheets (CSS)
2. Extensible stylesheet language (XSL)

DTDs, IDs & IDREFs

Valid XML:

1. Adheres to basic structural requirements (well-formed)
2. Adheres to content-specific specification:
3. Document Type Descriptor (DTD)
4. XML Schema (XSD) (powerful)

Using a validating XML Parser (with DTD or XSD as rule) to test if well-formed or valid.

Document Type Descriptor (DTD)

1. Grammar-like language for specifying elements, attributes, nesting, ordering, #occurrences
2. Also special attribute types ID and IDREF(s) (untyped pointers)