Data Abstraction

conceptual model: the logical structure of the entire database

conceptual schema: another term for logical schema

data model: a collection of concepts or notations for describing data, data relationships, data semantics and data constraints

data modelling: the first step in the process of database design

database logical design: defines a database in a data model of a specific database management system

database physical design: defines the internal database storage structure, file organization or indexing techniques

entity relationship diagram (ERD): a data model describing the database showing tables, attributes and relationships

external model: represents the user's view of the database

external schema: user view

internal model: a representation of the database as seen by the DBMS

logical design: where you create all the tables, constraints, keys, rules, etc.

logical schema: a conceptual design of the database done on paper or a whiteboard, much like architectural drawings for a house

operating system (OS): manages the physical level of the physical model

physical model: the physical representation of the database

schema: an overall description of a database

Data Independence

data independence: the immunity of user applications to changes made in the definition and organization of data

logical data independence: the ability to change the logical schema without changing the external schema

physical data independence: the immunity of the internal model to changes in the physical model

Relational Data Model

atomic value: each value in the domain is indivisible as far as the relational model is concerned

attribute: principle storage unit in a database

column: see attribute

degree: number of attributes in a table

domain: the original sets of atomic values used to model data; a set of acceptable values that a column is allowed to contain

field: see attribute

file: see relation

record: contains fields that are related; see tuple

relation: a subset of the Cartesian product of a list of domains characterized by a name; the technical term for table or file

row: see tuple

structured query language (SQL): the standard database access language

table: see relation

tuple: a technical term for row or record

Entity Relationship (ER) Data Model

alternate key: all candidate keys not chosen as the primary key

candidate key: a simple or composite key that is unique (no two rows in a table may have the same value) and minimal (every column is necessary)

characteristic entities: entities that provide more information about another table

composite attributes: attributes that consist of a hierarchy of attributes

composite key: composed of two or more attributes, but it must be minimal

dependent entities: these entities depend on other tables for their meaning

derived attributes: attributes that contain values calculated from other attributes

derived entities: see dependent entities

EID: employee identification (ID)

entity: a thing or object in the real world with an independent existence that can be differentiated from other objects

entity relationship (ER) data model: also called an ER schema, are represented by ER diagrams. These are well suited to data modelling for use with databases.

entity relationship schema: see entity relationship data model

entity set: a collection of entities of an entity type at a point of time

entity type: a collection of similar entities

foreign key (FK): an attribute in a table that references the primary key in another table OR it can be null

independent entity: as the building blocks of a database, these entities are what other tables are based on

kernel: see independent entity

key: an attribute or group of attributes whose values can be used to uniquely identify an individual entity in an entity set

multivalued attributes: attributes that have a set of values for each entity

n-ary: multiple tables in a relationship

null: a special symbol, independent of data type, which means either unknown or inapplicable; it does not mean zero or blank

recursive relationship: see unary relationship

relationships: the associations or interactions between entities; used to connect related information between tables

relationship strength: based on how the primary key of a related entity is defined

secondary key: an attribute used strictly for retrieval purposes

simple attributes: drawn from the atomic value domains

SIN: social insurance number

single-valued attributes: see simple attributes

stored attribute: saved physically to the database

ternary relationship: a relationship type that involves many to many relationships between three tables.

unary relationship: one in which a relationship exists between occurrences of the same entity set.

Cardinality and Connectivity Rules

cardinality: expresses the minimum and maximum number of entity occurrences associated with one occurrence of a related entity.

connectivity: the relationship between two tables, e.g., one to one or one to many.

identifying relationship: where the primary key contains the foreign key; indicated in an ERD by a solid line

mandatory relationship: one entity occurrence requires a corresponding entity occurrence.

non-identifying relationship: does not contain the foreign key in the primary key; indicated in an ERD by a dotted line

optional relationship: the FK can be null or the parent table does not need to have a corresponding child table occurrence

relational database management system (RDBMS): a popular database system based on the relational model introduced by E. F. Codd of IBM's San Jose Research Laboratory

relationship type: the type of relationship between two tables in an ERD (either identifying or non-identifying); this relationship is indicated by a line drawn between the two tables.

Integrity Rules

business rules: obtained from users when gathering requirements and are used to determine cardinality

constraints: the rules that force DBMSs to check that data satisfies the semantics

entity integrity: requires that every table have a primary key; neither the primary key, nor any part of it, can contain null values

integrity constraints: logical statements that state what data values are or are not allowed and which format is suitable for an attribute

orphan record: a record whose foreign key value is not found in the corresponding entity – the entity where the primary key is located

referential integrity: requires that a foreign key must have a matching primary key or it must be null