Relational Model

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He who loves practice without theory is like the sailor who boards ship without a rudder and compass and never knows where he may cast.

(Leonardo da Vinci)

Edgar F. Codd

1923-2003

Codd invented the relational database while working for IBM.

He revolutionised the way in which data was stored and retrieved.

Learning Outcome

- Relational Model
  - Structural Feature
  - Integrity Feature
  - Manipulative Feature
- Terminology
- Property
- Key
- Integrity Constraint
- Base Relation & View

Relational Model

Structural Feature

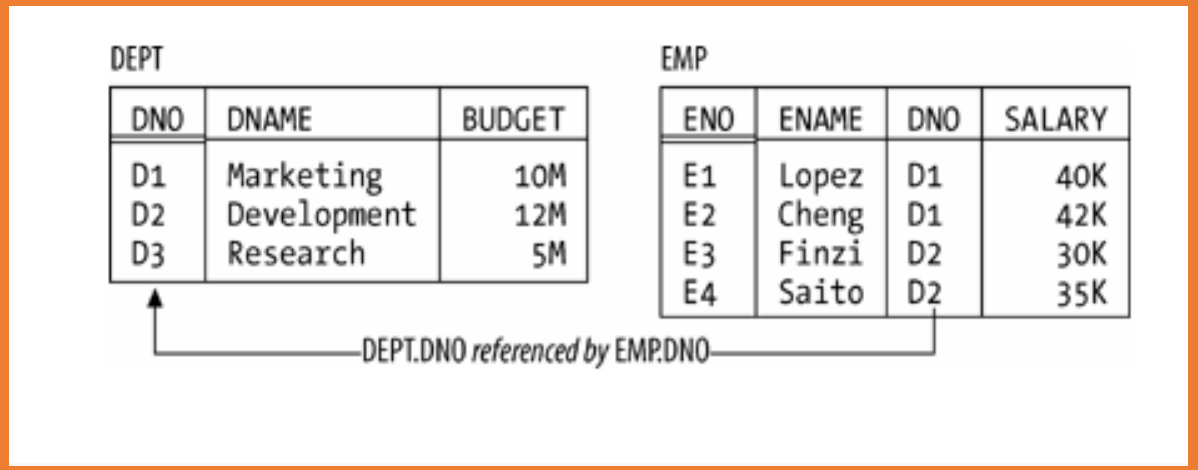
Relations

- Simplified as Table with columns & rows

- Relations are defined over *types*

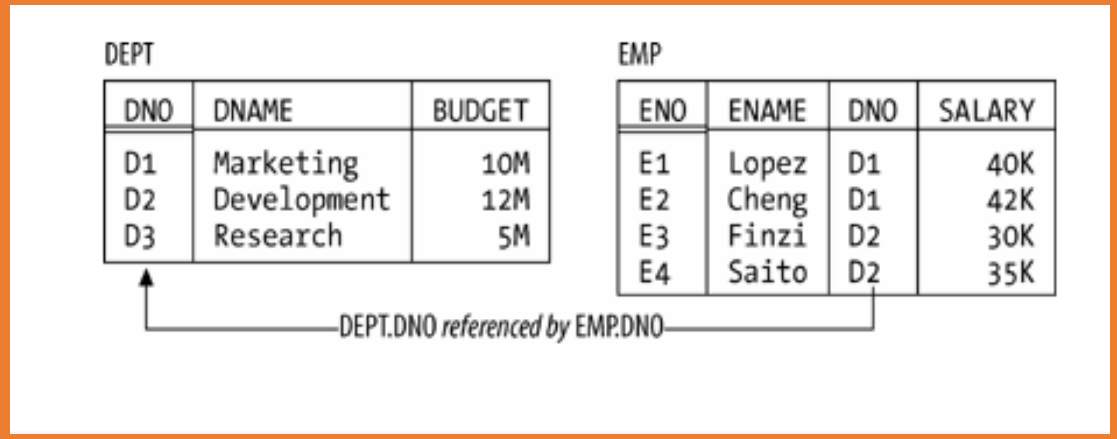
Type / Domains

- type is basically a conceptual pool of values from which actual attributes in actual relations take their actual values.



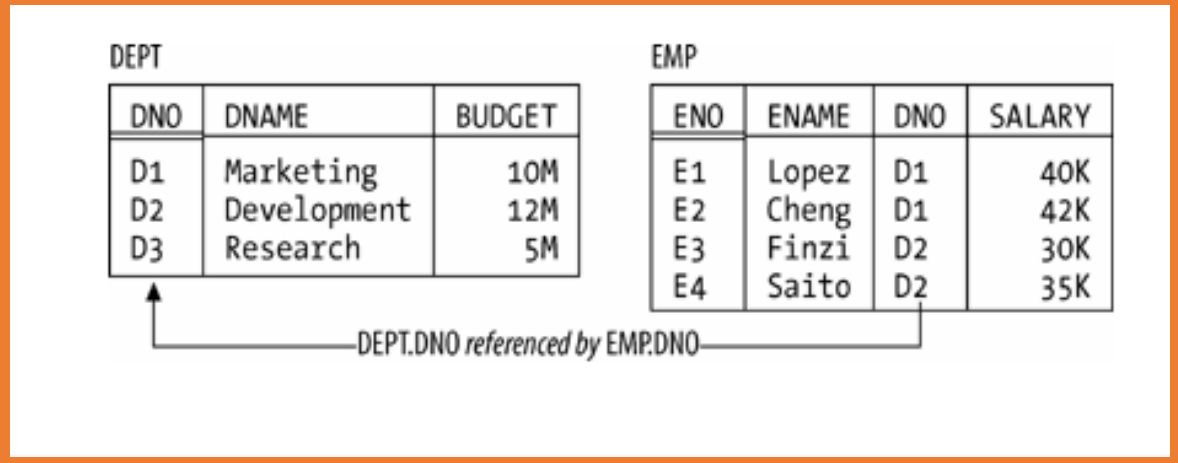
Relations : n-ary relations

- An n-ary relation can be pictured as a table with n columns; the columns in the picture correspond to *attributes* of the relation and the rows correspond to *tuples*.
- Also, the value n can be any nonnegative integer.
- A 1-ary relation is said to be *unary*; a 2-ary relation, *binary*; a 3-ary relation, *ternary*;



Keys

- every relation has at least one *candidate key*.
- a *candidate key* is just a unique identifier; in other words, it's a combination of attributes such that every tuple in the relation has a unique value for the combination in question.
- a *primary key* is a candidate key that's been singled out for special treatment in some way.
- a *foreign key* is a set of attributes in one relation whose values are required to match the values of some candidate key in some other relation (or possibly in the same relation).

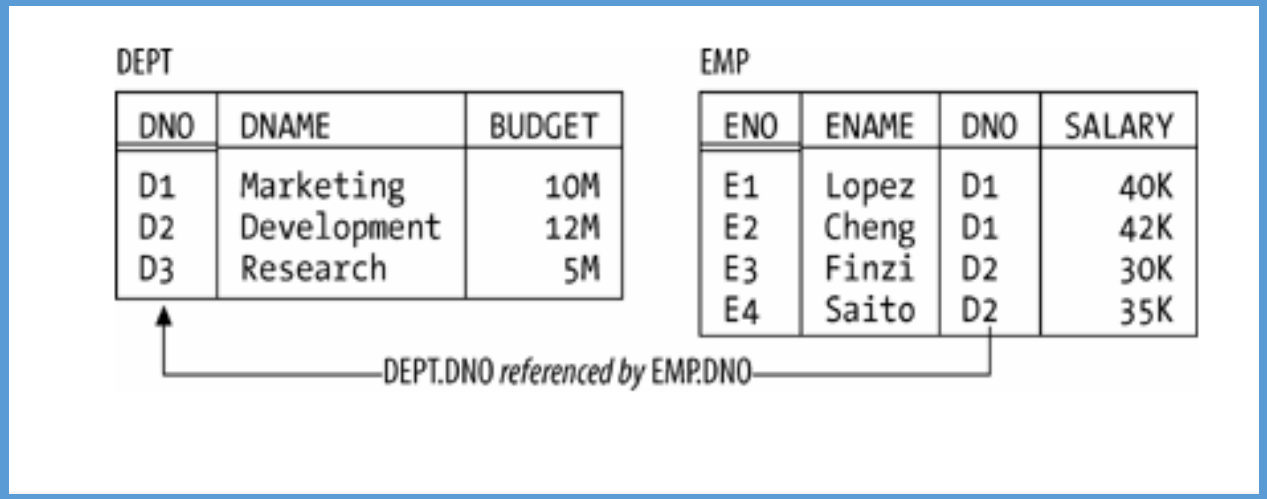


Relational Model

Integrity Feature

Integrity Constraint

- An *integrity constraint* (*constraint* for short) is basically just a boolean expression that must evaluate to TRUE.
- Entity Integrity
  - Primary key attribute dont permit nulls
- Referential Integrity
  - There mustnt be any unmatched foreign key value



Relational Model

Manipulative Feature

Manipulative Feature

- A set of relational operators, such as difference (or MINUS), collectively called the *relational algebra* , together with
- A *relational assignment* operator that allows the value of some relational expression, such as r MINUS s (where r and s are relations), to be assigned to some relation.

Terminology

Terminology

- Relation
  - Table with columns & rows
- Attribute
  - Named column of relation
- Domain
  - Set of allowable values for one/more attributes
- Tuple
  - Row of a relation

Terminology

- Degree
  - Number of attributes it contains
- Cardinality
  - Number of tuples it contains
- Relational Database
  - A collection of normalized relations with distinct relation names

Property

Property

- Unique relation name
- Unique attribute
- No duplication tuples
- No repeating group (single value for an attribute)
- Same domain for an attribute
- Insignificance of the tuples or attributes order

Key

Key

- Superkey
- Candidate key (Alternative key)
- Primary key
- Foreign key

Integrity Constarint

Integrity Constraint

- Null
- Integrity constraint
  - Entity
  - Reference
  - Domain (edit or field)
  - Enterprise (business rule)

Base Relation and View

Base Relation and View

- Base relation
  - A named relation of an entity in conceptual schema
  - Tuples stored in physical database
- View
  - Virtual relation
  - Dynamic generated for end user
  - Not stored in the physical database
- Purpose of views
  - Security
  - User friendly report
  - Performance

referensi

- Thomas Connolly, Carolyn Begg, *Database System*, A Practical Approach to Design Implementation and Management, 4th Edition, Addison Wesley
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Q & A