SIE04 – SISTEM BASIS DATA

Relational Data Model

Sesi 7,8,9,10

Sub - CPMK

Mahasiswa mampu menentukan hubungan basis data pada entitas perusahaan berdasarkan contoh kasus (C3, A3)

Materi

1. Relational Model Terminology
2. Database Relations
3. Relational Integrity
4. Views

1. Relational Model Terminology

Relational Model Terminology

- A relation is a table with columns and rows.
  - Only applies to logical structure of the database, not the physical structure.

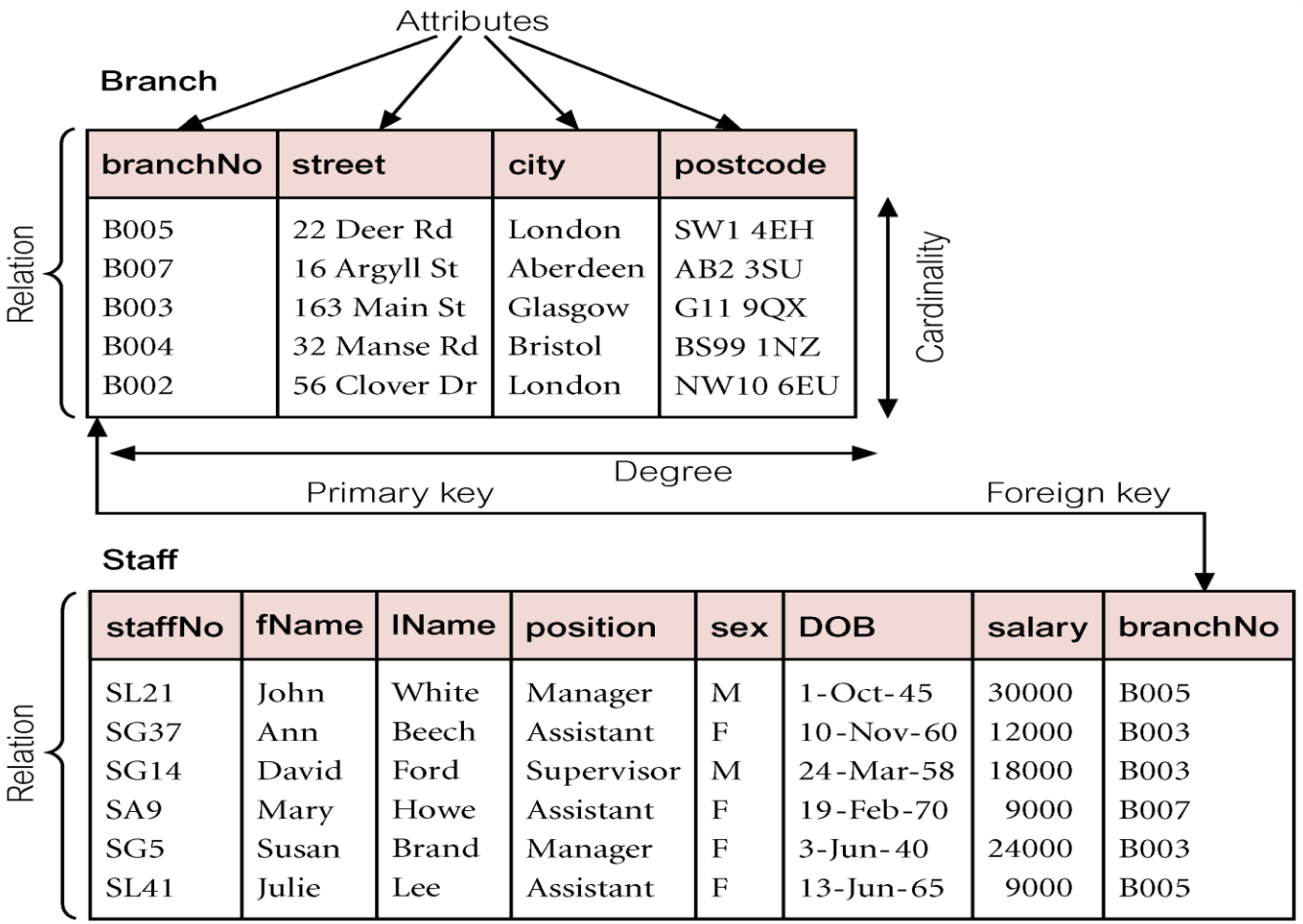
- Attribute is a named column of a relation.

- Domain is the set of allowable values for one or more attributes.

Relational Model Terminology (Cont.)

- Tuple is a row of a relation.
- Degree is the number of attributes in a relation.
- Cardinality is the number of tuples in a relation.
- Relational Database is a collection of normalized relations with distinct relation names.

1.1. Instances of Branch and Staff (part) Relations



1.2. Alternative Terminology for Relational Model

Table 3.1 Alternative terminology for relational model terms.

Formal terms	Alternative 1	Alternative 2
Relation	Table	File
Tuple	Row	Record
Attribute	Column	Field

2. Database Relations

Database Relations

- Relation schema
  - Named relation defined by a set of attribute and domain name pairs.

- Relational database schema
  - Set of relation schemas, each with a distinct name.

2.1. Properties of Relations

- Relation name is distinct from all other relation names in relational schema.
- Each cell of relation contains exactly one atomic (single) value.

2.1. Properties of Relations (Cont.)

- Each attribute has a distinct name.
- Values of an attribute are all from the same domain.

2.1. Properties of Relations (Cont.)

- Each tuple is distinct; there are no duplicate tuples.
- Order of attributes has no significance.
- Order of tuples has no significance, theoretically.

2.2. Relational Keys

- Superkey
  - An attribute, or a set of attributes, that uniquely identifies a tuple within a relation.

2.2. Relational Keys (Cont.)

- Candidate Key
  - Superkey (K) such that no proper subset is a superkey within the relation.
  - In each tuple of R, values of K uniquely identify that tuple (uniqueness).
  - No proper subset of K has the uniqueness property (irreducibility).

2.2. Relational Keys (Cont.)

- Primary Key
  - Candidate key selected to identify tuples uniquely within relation.

- Alternate Keys
  - Candidate keys that are not selected to be primary key.

- Foreign Key
  - Attribute, or set of attributes, within one relation that matches candidate key of some (possibly same) relation.

2.2. Relational Keys (Cont.)

- In the following example :

  Employee (EID, First Name, Last Name, SIN, Address, Phone, BirthDate, Salary, DepartmentID)

2.2. Relational Keys (Cont.)

- Candidate Key, possible candidate keys are:
  - EID, SIN
  - First Name and Last Name – assuming there is no one else in the company with the same name
  - Last Name and DepartmentID – assuming two people with the same last name don't work in the same department

2.2. Relational Keys (Cont.)

- Primary Key

  For example : EID

- Alternate key

  for example : Phone and Last Name.

- Foreign Key

  for example : DepartmentID

3. Relational Integrity

Relational Integrity

- Null
  - Represents value for an attribute that is currently unknown or not applicable for tuple.
  - Deals with incomplete or exceptional data.
  - Represents the absence of a value and is not the same as zero or spaces, which are values.

Relational Integrity (Cont.)

- Entity Integrity
  - In a base relation, no attribute of a primary key can be null.

- Referential Integrity
  - If foreign key exists in a relation, either foreign key value must match a candidate key value of some tuple in its home relation or foreign key value must be wholly null.

Relational Integrity (Cont.)

- Enterprise Constraints
  - Additional rules specified by users or database administrators.

4. Views

Views

- Base Relation
  - Named relation corresponding to an entity in conceptual schema, whose tuples are physically stored in database.

- View
  - Dynamic result of one or more relational operations operating on base relations to produce another relation.

Views (Cont.)

- A virtual relation that does not necessarily actually exist in the database but is produced upon request, at time of request.
- Contents of a view are defined as a query on one or more base relations.
- Views are dynamic, meaning that changes made to base relations that affect view attributes are immediately reflected in the view.

4.1. Purpose of Views

- Provides powerful and flexible security mechanism by hiding parts of database from certain users.
- Permits users to access data in a customized way, so that same data can be seen by different users in different ways, at same time.
- Can simplify complex operations on base relations.

4.2. Updating Views

- All updates to a base relation should be immediately reflected in all views that reference that base relation.

- If view is updated, underlying base relation should reflect change.

4.2. Updating Views (Cont.)

- There are restrictions on types of modifications that can be made through views:

  - Updates are allowed if query involves a single base relation and contains a candidate key of base relation.

  - Updates are not allowed involving multiple base relations.

  - Updates are not allowed involving aggregation or grouping operations.

4.2. Updating Views (Cont.)

- Classes of views are defined as:
  - theoretically not updateable;
  - theoretically updateable;
  - partially updateable.

Summary

- Relational Model Terminology : A relation is a table with columns and rows. Only applies to logical structure of the database, not the physical structure.

- Database Relations : Relation schema and Relational database schema.

Summary (Cont.)

- Relation schema, Named relation defined by a set of attribute and domain name pairs.

- Relational database schema, Set of relation schemas, each with a distinct name.

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Thank You