Module II

Sony P

Relation

Student

S.Name	Roll No	Class name	Admn No	Age
Bestin Baby	16	S4 A	1244	18
Gopika	22	S4B	1345	18
Indrajith	24	S4B	1232	19
Faheem	27	S4A	1786	19

- Attribute A column header of a table is known as attribute of a relation
- Tuple A row in a table represents the record of a relation and known as a tuple of a relation
- Domain A set of possible values for a given attribute is known as domain of a relation-
- Relation Schema A relation schema represents name of the relation with its attributes -
- Degree The number of attributes in the relation is known as degree of the relation
- Cardinality The number of tuples in a relation is known as cardinality

Informal Names	Formal Names
Table	Relation
Column Header/Fields	Attributes
All Possible column values	Domain
Row	Tuple
Table Definition	Schema of the Definition

Characteristics of a Relational Model

- Each relation in a database must have a distinct or unique name which would separate it from the other relations in a database

- A relation must not have two attributes with the same name Each attribute must have a distinct name

- Duplicate tuples must not be present in a relation
- Each tuple must have exactly one data value for an attribute

- Tuples in a relation do not have to follow a significant order as the relation is not order sensitive

- Similarly the attributes of a relation also do not have to follow certain ordering, it’s up to the developer to decide the ordering of attributes

S.Name	Roll No	Class name	Admn No	Age	PhoneNumber
Bestin Baby	16	S4 A	1244	18	9555898989, 9087987887
Gopika	22	S4B	1345	18	8989789654
Indrajith	24	S4B	1232	19	9897345656
Faheem	27	S4A	1786	19	

S.Name	Roll No	Classname	Admn No	Age	PhoneNumber 1	PhoneNumber 2
Bestin Baby	16	S4 A	1244	18	9555898989,	9087987887
Gopika	22	S4B	1345	18	8989789654	Null
Indrajith	24	S4B	1232	19	9897345656	Null
Faheem	27	S4A	1786	19	Null	Null

Constraints on databases can generally be divided into three main categories:

- Constraints that are inherent in the data model. We call these inherent **model-based constraints or implicit constraints.**
- Constraints that can be directly expressed in the schemas of the data model, typically by specifying them in the DDL . We call these **schema-based constraints or explicit constraints**.
- Constraints that cannot be directly expressed in the schemas of the data model, and hence must be expressed and enforced by the application programs or in some other way. We call **these application-based or semantic constraints or business rules**

Relational Integrity Constraints

- Relational Integrity constraints in DBMS are referred to conditions which must be present for a valid relation

- Constraints on the Relational database management system is mostly divided into four main categories are

- Domain Constraints
- Entity integrity constraints
- Key Constraints
- Referential Integrity Constraints

Domain Constraint

Each attribute in a tuple is declared to be of a particular domain (for example, integer, character, Boolean, String, etc which specifies a constraint on the values that an attribute can take

S.Name	Roll No	Class name	Admn No	Age	PhoneNumber 1	PhoneNumber 2
Bestin Baby	16	S4 A	1244	18	9555898989,	9087987887
Gopika	22	S4B	1345	18	8989789654	Nil
Indrajith	24	S4B	1232	19	9897345656	Nil
Faheem	27	S4A	1786	19	Nil	Nil

Entity Integrity Constraint

- The entity integrity constraint states that primary key value can't be null
- A table can contain a null value other than the primary key field

S.Name	Roll No	Classname	Admn No	Age	PhoneNumber 1	PhoneNumber 2
Bestin Baby	16	S4 A	1244	18	9555898989,	9087987887
Gopika	22	S4B	1256	18	8989789654	Null
Indrajith	24	S4B	1232	19	9897345656	Null
Faheem	27	S4A	1786	19	Null	Null

Key Constraint

- Keys are the entity set that is used to identify an entity within its entity set uniquely

- An entity set can have multiple keys, but out of which one key will be the primary key.

Referential Integrity Constraint

A referential integrity constraint is specified between two tables

In the Referential integrity constraints, if a foreign key in Table 1 refers to the Primary Key of Table 2 then every value of the Foreign Key in Table 1 must be null or be available in Table 2

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Bestin Baby	16	S4 A	1244	18
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Faheem	27	S4A	1786	19

Student

Class Id	Class Location
S4 A	First floor 4th room
S4 B	Third Floor 2nd room

Class

Referential Integrity Constraint

- The referential integrity constraint is specified **between two relations** and is used to maintain the consistency among tuples in the two relations.
- Informally, the referential integrity constraint states that a tuple in one relation that refers to another relation must refer to an existing tuple in that relation.

Referential Integrity Constraint

- A set of attributes FK in relation schema R1 is a foreign key of R1 that references relation R2 if it satisfies the following rules:

1. The attributes in FK have the same domain(s) as the primary key attributes

PK of R2; the attributes FK are said to reference or refer to the relation R2.

2. A value of FK in a tuple t1 of the current state r1(R1) either occurs as a value

of PK for some tuple t2 in the current state r2(R2) or is NULL.

In the former case, we have t1[FK] = t2[PK], and we say that the tuple t1 references or refers to the tuple t2.

In this definition, **R1 is called the referencing relation and R2 is the referenced relation**. If these two conditions hold, a referential integrity constraint from R1 to R2 is said to hold

Another Example

Faculty Name	Faculty Id	DEPARTMENT
Dr.Vinu Thomas	Mec001	ECE
Dr.Binu V P	Mec010	CSE
Dr. Arun Prasad	Mec004	EEE
Dr.Remadevi	Mec002	ASE

Department Name	Dept. ID
Computer Science	CSE
Electronics and Communication	ECE
Electronics and Electrical	EEE
Mechanical Department	ME
Applied Science	ASE