



INTRODUCTION TO DATABASE MANAGEMENT SYSTEM

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WHAT IS DATABASE?



- Database is organized collection of related information that is stored in particular order for one or more multiple uses.
- Database Is a repository for information or data.
- Database may contains text, images, video, or any other type of object within it.
- In technical term database is collection of related tables.

WHAT IS TABLE?

- a **table** is a set of data elements (values or cell) that is organized using a model of vertical columns (which are identified by their name) and horizontal rows.
- Each table in database has specific structure which is given at the time of creation table.
- A table has a specified number of columns, but can have any number of rows.

WHAT IS ROW/RECORD?

- Collection of fields/column/attributes is known as row.
- In the context of a database, a **row** also called a **record** or **tuple** that represents a single structured data item in a table.
- Each row in a table represents a set of related data, and every row in the table has the same structure.
- For example, in a table that represents companies, each row would represent a single company.

WHAT IS COLUMN/FIELD/ATTRIBUTE?

- A smallest piece of meaningful information in record is called field or column or attribute.
- Each field has specific data type which specify which type of value field can hold for each row.
- All the fields in table has unique name.

WHAT IS PRIMARY KEY?

- **Primary key is unique key** used to identify each row uniquely in a table.
- There can be only one primary key in table.
- Primary key has two main attributes.
 - It cant accept null value
 - It cant accept duplicate value.
- Primary key makes two record of same table different from each other.

PRIMARY KEY EXAMPLE

Primary Keys



<u>StudentId</u>	firstName	lastName	courseld
L0002345	Jim	Black	C002
L0001254	James	Harradine	A004
L0002349	Amanda	Holland	C002
L0001198	Simon	McCloud	S042
L0023487	Peter	Murray	P301
L0018453	Anne	Norris	S042

INTRODUCTION TO NORMALIZATION?

- Normalization simplifies relationship among data elements in record.
- It basically reduces unnecessary repetition of data.

Why we need normalization?

1. Redundancy is unnecessary repetition of data which can be reason for problem with storage and retrieval.
2. We may repeat same fact in our information system which is known as inconsistency.
3. Insertion, deletion, updation may become cause for problem of inconsistency Because one may forgot to make corresponding changes in other relations

Un-normalized table (before normalization)

Sales person				sales		
Empno	Name	Branch	Department	Item no	Description	Price
201	Anand	Delhi	Production	Tr10	Router	35.00
201	Anand	Delhi	Production	Tr201	Saw	19.00
201	Anand	Delhi	Production	Tr201	Drill	21.00
201	Anand	Delhi	Production	Tr201	Lawn mover	245.00
301	Samir	Bombay	Research	Tt01	Mouse	250
301	Samir	Bombay	Research	Tt02	Keyboard	145
301	Samir	Bombay	Research	Tt03	Pen drive	650
401	Jay	Puna	Marketing	S10	Cd	25
401	Jay	Puna	Marketing	S20	Dvd	35

CONTINUE..

- One can identify dependency during the normalization which is the main reason for any anomalies.
- It also helps in simplifying the relationship of table.
 - Characteristic of full normalized table are
 - A primary key that identify the record.
 - A set of attribute that describe that entity.
- In normalization data are grouped in simple manner so that we can made changes in the database at later stage with minimum impact on other relations.

FIRST LEVEL NORMAL FORM (1NF)

- A table is in the first normal form when it contains no repeating groups.
- The repeating columns or fields in an normalized tables are removed from the table and then put into the separate table.
- These tables are dependent on the parent table from which it is derived.
- The primary key in child table must be the primary key in parent table so that relationship can be established between parent and child table.

First level normalized tables

Sales person table

Empno	Name	Branch	department
201	Anand		Production
301	Samir		Research
401	Jay	Puna	Marketing

Item table

Empno	Itemno	Description	Price
201	Tr10	Router	35.00
201	Tr201	Saw	19.00
201	Tr201	Drill	21.00
201	Tr201	Lawn mover	245.00
301	Tt01	Mouse	250.00
301	Tt02	Keyboard	145.00
301	Tt03	Pen drive	650.00
401	S10	Cd	25.00
401	S20	DVD	35.00

SECOND LEVEL NORMAL FORM (2NF)

- A Table is in the second normal form if all non key attribute fields fully depend on primary key only.
- This means that all the field which are not fully depending on primary key should be moves to another table with the field on which they depend.

SECOND LEVEL NORMALIZE TABLES

Sales person table

Empno	Name	Branch	department
201	Anand		Production
301	Samir		Research
401	Jay	Puna	Marketing

Item table

Itemno	Description
Tr10	Router
Tr201	Saw
Tr201	Drill
Tr201	Lawn mover
Tt01	Mouse
Tt02	Keyboard
Tt03	Pen drive
S10	Cd
S20	Dvd

Item description

Empno	Itemno	Price
201	Tr10	35.00
201	Tr201	19.00
201	Tr201	21.00
201	Tr201	245.00
301	Tt01	250.00
301	Tt02	145.00
301	Tt03	650.00
401	S10	25.00
401	S20	35.00

WHAT IS FOREIGN KEY?

- The foreign key identifies a column or a set of columns in one (referencing) table that refers to a set of columns in another (referenced) table.
- The referencing table is called child table and referenced table is called parent table
- The columns in the referencing table must be the primary key.
- The values in one row of the columns of child table must occur in a single row in the parent table columns.
- Thus, a row in the child table cannot contain values that don't exist in the parent table.
(except potentially NULL).