

Relation Databases

Based on CBSE Curriculum

Class -11



Chapter- 16

By-

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Introduction

- A Database System is basically a record keeping system.
- Collected form of data is known as database.
- “Database is actually a collection of interrelated data so that it can be used by various applications.
- Some of the Popular database softwares are-
 - MySQL (open Source)
 - ORACLE Database
 - MS SQL Server
 - SQLite (open Source)
 - MariaDB
 - PostgreSQL (open Source)



PostgreSQL



ORACLE
DATABASE

Aim of DBMS

- Database Management System (DBMS) is a software whose purpose is to store databases, maintaining databases and using databases.
- Its prime purpose is to perform operations on databases and to provide data when required.
- DBMS reduces Data Redundancy.
- It improves data security.
- it stores data in organized and Integrated form.
- Data remains error free.
- Data is available as and when required.
- Database follows a standard.

Relational Database Model

- In Relational Data model, data remains in the form of tables.
- A table is a combination of rows and columns which is also known as *Relation*.
- In a table, a row shows relationship between values. A table is a collection of this relationship.
- Imagine a database has three tables- Suppliers, Items and Shipments :

Suppliers (**SuppNo.**, Supp_name, Status, City)

Items (**ItemNo.**, Item_name, Price)

Shipments (**SuppNo.**, **ItemNo.**, Qty_Supplied)

Colored
columns are
primary keys.

Relational Database Model

Suppliers

SuppNo	Supp_Name	Status	City
S1	Britannia	10	Delhi
S2	New Bakers	30	Mumbai
S3	Mother Dairy	10	Delhi
S4	Cookz	50	Bangalore
S5	Haldiram	40	Jaipur

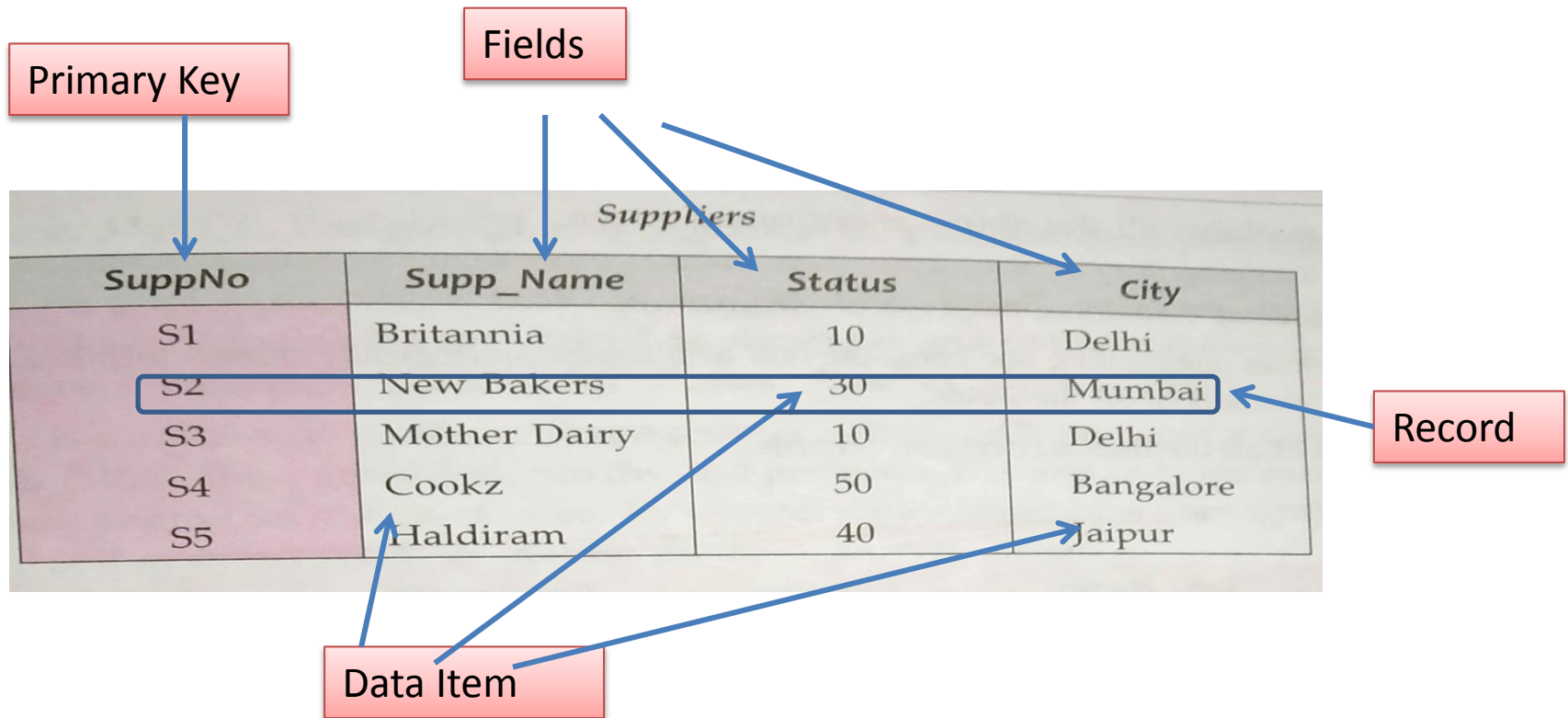
Items

Shipments

ItemNo	Item_Name	Price
I1	Milk	15.00
I2	Cake	5.00
I3	Bread	9.00
I4	Milk Bread	14.00
I5	Plain Biscuit	6.00
I6	Cream Biscuit	10.00
I7	Ice Cream	16.00
I8	Cold Drink	8.00
I9	Namkeen	15.00

SuppNo	ItemNo	Qty_supplied
S1	I2	10
S1	I3	20
S1	I6	20
S2	I4	20
S2	I5	10
S3	I1	10
S3	I7	10
S4	I8	30
S5	I9	30

Components Of a Relation



- Byte:** A group of 8 bits used to store a character is known as byte.
- Data Item:** Smallest unit of data.
- Record:** It is a complete information composed of data item.
- Table:** A table is a collection of logical records.

Relational Model Terminology

- Relational Model was given by *E. F. Codd of IBM*. Terminology of Relation Model is-
- **Relation:** Basically a relation is a table. Its a collection of data in rows and columns. A relation has following features-
 - In a table, data in one column should be of same data type. Different columns can have data of different data types.
 - The value for each row and each column should be stomic. A column in a row can not have multiple values.
 - In a relation, each row is distinct. Any two rows can not have exactly same data.
 - There is no specific order of rows in a relation.
 - In a Relation, there is no specific order of columns.

Relational Model Terminology

- ***Domain***: The pool of values for a column is known as Domain.
- ***Tuple***: rows of a table are known as tuples.
- ***Attribute***: columns of a table are known as attributes.
- ***Degree***: In a relation, number of attributes or columns is known as its Degree.
- ***Cardinality***: In a relation, number of tuples or rows is known as its Cardinality.

Views

- A View is a Virtual table which is based on some or specific data of a table.
- Command for creation of a View is-

Definition of the view

```
CREATE VIEW GoodItems AS      (name of the view)
SELECT * FROM Items          (name of the base table)
WHERE Price > 12 ;            (the condition)
```

GoodItems (A Virtual Table based on **Items** table)

<i>ItemNo</i>	<i>Item_Name</i>	<i>Price</i>
I1	Milk	15.00
I4	Milk Bread	14.00
I7	Ice Cream	16.00
I9	Namkeen	15.00

Keys

- Some attributes has some properties because of that those attributes are known as keys.
- **Primary Key** : It is a group of one or more attributes which are used to uniquely identify records of a relation and can be used to establish relationship with other relation. It is a mixture of unique constraint and not null constraint. Generally all master tables have primary keys. For ex- EmpCode in Employee table.
- **Candidate Key** : Its a group of attributes which have the properties to be selected as a primary key i.e. These attributes shows their candidature to be a Primary Key. For ex- RollNo, EnrollmentNo etc in student table.
- **Alternate Key** : A candidate key which is not a primary key is known as alternate key.
- **Foreign Key** : In a table, a non-key attribute which is derived from primary key of some other table is known as foreign key in present table.

Keys

- ***Referential Integrity***: Referential integrity is a system of rules which is used by a DBMS to ensure that there is a valid relationship between related tables or not. Referential integrity is possible only when following conditions get completed-
 - Primary key should have unique index.
 - Related fields should have same datatype.
 - All tables should be of same database.
 - Primary key of Master table should have a reference with foreign key of transaction table.
 - Entry of that record in transaction table is not possible whose foreign key value does not exist in primary key of master table.
 - Deletion of that record from primary key table is not possible which has a related record in foreign key table.
 - Change in related records of primary key is not possible.

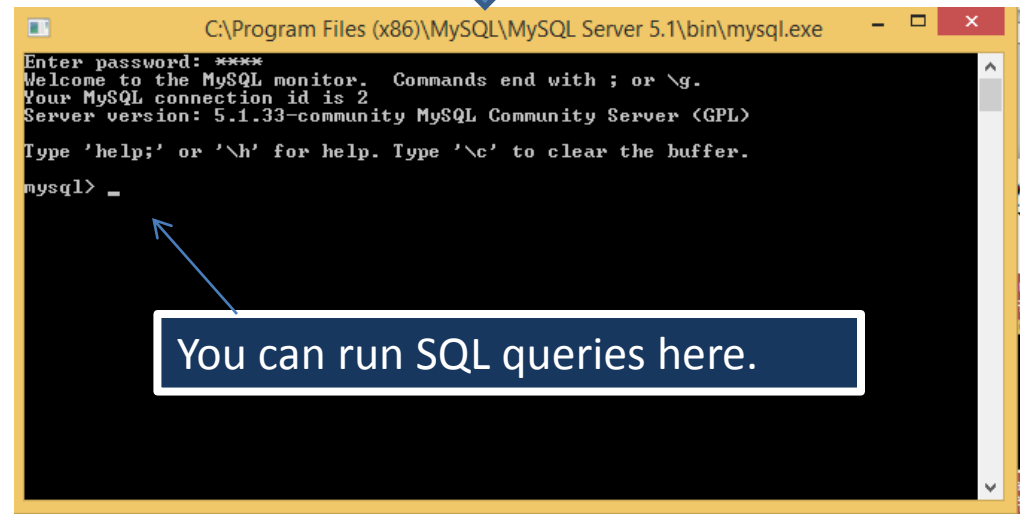
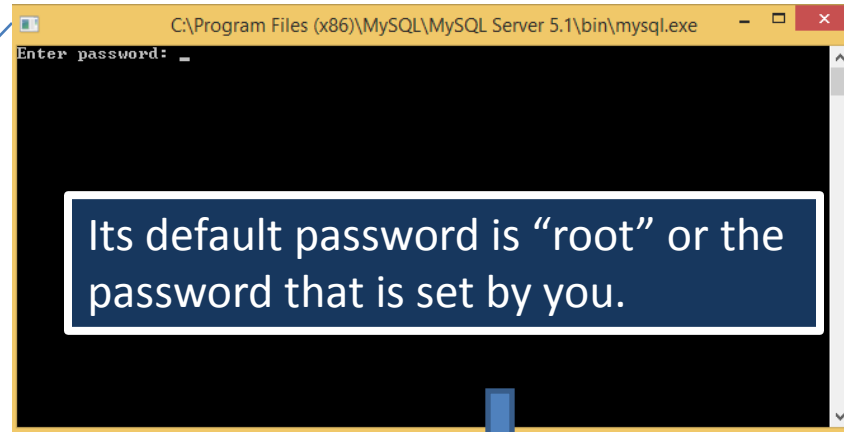
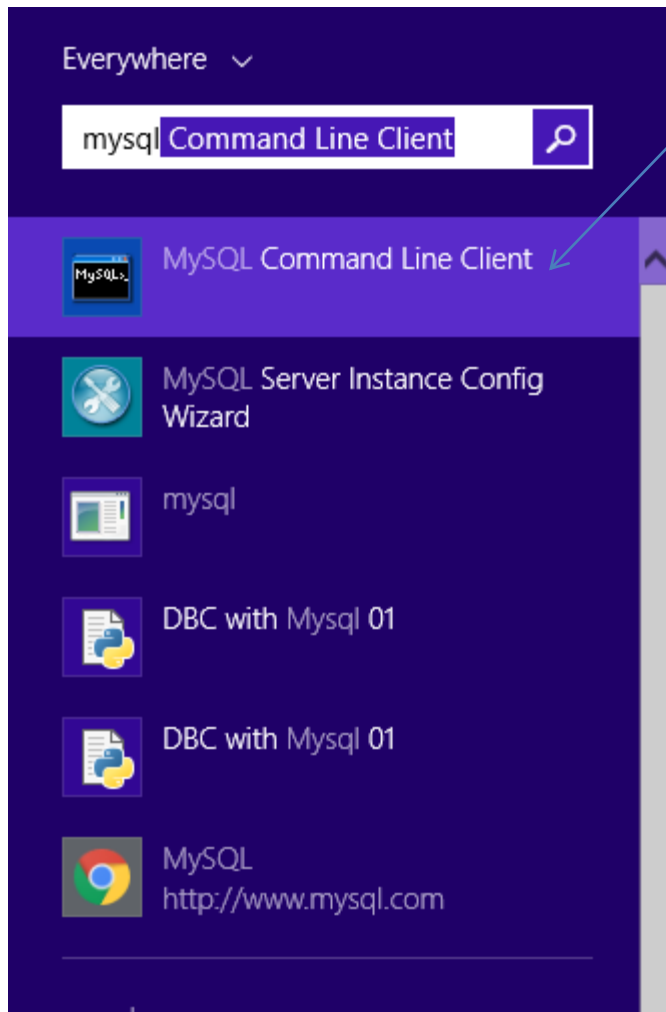
MySQL

- MySQL is an open source Relational Database Management System (RDBMS) which makes use of SQL (Structured Query Language).
- It can be downloaded from www.mysql.org.
- In MySQL, information is stored in the form of tables.
- A MySQL database can have multiple tables and thousands of records simultaneously.
- It is a better option to store fast, reliable and big amount of data.
- MySQL was developed by MySQL AB company which is now a part of Sun Microsystems.
- **SERVER**: which responds to the requests of clients.
- **CLIENTS**: these are the programs which are attached to database server and send requests to server.

MySQL Features

- *Fast Speed*
- *Easy to use.*
- *Free of cost.*
- *Support of SQL.*
- *Portability.*
- *Various Data types.*
- *Secure.*
- *Can handle large data (Scalability and limits).*
- *Connectivity* : uses various protocols to get connected with clients.
- *Localization* : server can send error messages to clients in different languages.
- *Clients and Tools.* It provides various client and utility programs.

Starting MySQL



SQL

- Structured Query Language (SQL) is used to access any database.
- SQL stores the commands that are to be used in databases which are generally accepted by all RDBMS.
- SQL is a language which provides interface to create relational database and to operate upon them.
- Various versions of SQL are available. First version was developed in 1970 by San Jose Research Laboratory of IBM.
- In 1992, 2003, 2008 some updates were added.
- SQL is being used by beginners and skilled users.

Processing Capabilities of SQL

1. Data Definition Language (DDL)
2. Interactive Data Manipulation Language(DML)
3. Embedded Data Manipulation Language: these are developed to be used in some programming languages
4. View Definition
5. Authorization
6. Integrity
7. Transaction Control

Data Definition Language (DDL)

- Command under this category are used to create or modify scheme of database. It is used to create data dictionary.
- Data Dictionary is a kind of metadata means Data about Data. A standard DDL should have following functions-
- It should identify the types of data division.
- It should give a unique name of each data item.
- It should specify the proper data type.
- It may define the length of data items.
- It may define the range of values of Data items.
- It may specify means of checking for errors.
- It may specify privacy locks for preventing unauthorized reading or modification of the data.

DDL Commands

Following commands are under this category-

– Create, alter and drop schema Objects

- Create table, create view, create database,
- Alter Table
- Drop Table
- Drop View
- Create Index
- Alter Index

– Grant and Revoke privileges and rolls

- Grant
- Revoke

– Maintenance Commands

- Analyze Table
- Check Table
- Restore Table etc

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DML Commands

- DML (Data Manipulation Language) is a kind of language used to access data, insert data and delete data from a data model.
- **Data manipulation means-**
 - Accessing the stored data from a Database.
 - Insertion of new information into the Database.
 - Deletion of information from the Database.
 - modification of information in the Database.
- **DMLs are basically of two types-**
 - Procedural : specifies what data is needed and how to get it.
 - Non- Procedural: specifies what data is needed without specifying how to get it.

TCL Commands

- A transaction is one complete unit of work for ex- withdrawl of 2000 Rs. From a bank Account.
 - Following commands are used to successfully complete a transaction-
1. ***COMMIT***: it makes all the changes permanent.
 2. ***ROLLBACK***: undoes all the changes.
 3. ***SAVEPOINT***: it marks a point upto which all earlier statments have been successfully completed.
 4. ***SET TRANSACTION*** : it establishes properties for the current transactions.

Thank you

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