Chapter 3
Introduction to Database Management System

PART – I
I. Choose The Correct Answer

Question 1.
Which language is used to request information from a Database?
(a) Relational
(b) Structural
(c) Query
(d) Compiler
Answer:
(c) Query

Question 2.
The ……………………….. diagram gives a logical structure of the database graphically?
(a) Entity-Relationship
(b) Entity
(c) Architectural Representation
(d) Database
Answer:
(a) Entity-Relationship

Question 3.
An entity set that does not have enough attributes to form primary key is known as
(a) Strong entity set
(b) Weak entity set
(c) Identity set
(d) Owner set
Answer:
(b) Weak entity set

Question 4.
…………………………. Command is used to delete a database.
(a) Delete database databasename
(b) Delete database_name
(c) drop database database name
(d) drop database name
Answer:
(c) drop database database_name

Question 5.
Which type of below DBMS is MySQL?
(a) Object Oriented
(b) Hierarchical
(c) Relational
(d) Network
Answer:
(c) Relational

Question 6.
MySQL is freely available and is open source.
(a) True
(b) False
Answer:
(a) True

Question 7.
……………………….. represents a "tuple" in a relational database?
(a) Table
(b) Row
(c) Column
(d) Object
Answer:
(b) Row

Question 8.
Communication is established with MySQL using
(a) SQL
(b) Network calls
(c) Java
(d) API's
Answer:
(a) SQL

Question 9.
Which is the MySQL instance responsible for data processing?
(a) MySQL Client
(b) MySQL Server
(c) SQL
(d) Server Daemon Program
Answer:
(b) MySQL Server

Question 10.
The structure representing the organizational view of entire database is known as in MySQL database.
(a) Schema
(b) View
(c) Instance
(d) Table
Answer:
(a) Schema

PART – II
II. Short Answer:

Question 1.
Define Data Model and list the types of data model used?
Answer:
Data models define how the logical structure of a database is modeled.
Data models define how data is connected to each other and how they are processed and stored inside the system. The various data models are;

1. Hierarchical Database Model,
2. Network Model,
3. Relational Model and
4. Object-oriented Database Model.

Question 2.
List few disadvantages of file processing system?
Answer:
Data Duplication – Same data is used by multiple resources for processing, thus created multiple copies of same data wasting the spaces.
High Maintenance – Access control and verifying data consistency needs high maintenance cost.
Security – less security provided to the data.

Question 3.
Define Single and multi valued attributes?
Answer:
A single valued attribute contains only one value for the attribute and they don't have multiple numbers of values. For Example:Age-
Amulti valued attribute has more than one value for that particular attribute. F or Example :Degree

Question 4.
List any two DDL and DML commands with its Syntax?
Answer:
Commands:

1. CREATE
2. DROP

Syntax:

1. CREATE database databasename
2. DROP database databasename

DML COMMANDS List:
Commands:

1. INSERT
2. DELETE

Syntax:

1. Syntax 1: INSERT INTO tablename (column1, column2, column3) VALUES (value 1, value2, value3);
2. Syntax 2: INSERT INTO tablename VALUES (value1, value2, value3);
3. DELETE from tablename WHERE columnname="value";

Question 5.
What are the ACID properties?
Answer:
ACID Properties – The acronym stands for Atomicity, Consistency, Isolation and Durability. Atomicity follows the thumb rule "All or Nothing", while updating the data in database for the user performing the update operation. Consistency ensures that the changes in data value to be constant at any given instance. Isolation property is needed during concurrent action. Durability is defied as the system's ability to recover all committed actions during the failure of storage or the system.

Question 6.
Which command is used to make permanent changes done by a transwer:action?
Answer:
COMMIT

Question 7.
What is view in SQL?
Answer:
Views – A set of stored queries.

Question 8.
Write the difference between SQL and MySQL?
Answer:
SQL:

1. SQL is a query language
2. SQL is used to query and operate database system.

MySQL:

1. MySQL is DBMS software.
2. MySQL allows data handling, storing, modifying, deleting, etc.

Question 9.
What is Relationship and List its types?
Answer:
In ER Model, relationship exists between two entities.

1. One-to-One relationship,
2. One-to-Many relationship and
3. Many-to-Many relationship.

Question 10.
State few advantages of Relational databases?
Answer:

1. High Availability
2. High Performance
3. Robust Transwer:actions and support
4. Ease of management
5. Less cost

PART – III
III. Explain in Brief Answer

Question 1.
Explain on Evolution of DBMS?
Answer:

1. The concept of storing the data started before 40 years in various formats.
2. In earlier days they have used punched card technology to store the data.
3. Then files were used. The file systems were known as predecessor of database system.
4. Various access methods in file system were indexed, random and sequential access.

5. The file systems has limitations like duplication, less security. To overcome this, DBMS was introduced.

Question 2.
What is relationship in databases? List its types?
Answer:
In ER Model, relationship exists between two entities. The various types of relationships are;

1. One-to-One relationship.
2. One-to-Many relationship.
3. Many-to-Many relationship.

Question 3.
Discuss on Cardinality in DBMS?
Answer:
Cardinality is defined as the number of items that must be included in a relationship, i.e. number of entities in one set mapped with the number of entities of another set via the relationship. Three classifications in Cardinality are one-to-one, one-to-many and Many-to-Many.

In the above example we have two entities Person and Vehicle. If we consider the current vehicle, the driver is operating, then we have one-to-one relationship between Person and Vehicle.
In the above example, Customer places the Order is a one-to-many relationship. Here the customer can place multiple orders and the order is related to only one customer. The example of many-to-many relationship is Students registering the Courses. A student can register more than one courses and A course can be registered by many students. Hence it is many-to-many.

Question 4.
List .any 5 privileges available in MySQL for the User?
List of privileges available in MySQL?
Answer:
Privileges:

1. Select_priv
2. Insert_priv
3. Update_priv
4. Delete_priv
5. Create_priv
6. Alter_priv

Action Performed (If Granted):

1. User can select rows from database tables.
2. User can insert rows into database tables.
3. User can update rows of database tables.
4. User can delete rows of database tables.
5. User can create new tables in database.
6. User can make changes to the database structure.

Question 5.
Write few commands used by DBA to control the entire database.
USE Database – This command is used to select the database in MySQL for working.
Syntax:
mysql > use test;
Database changed
mysql>
SHOW Databases – Lists all the databases available in the database server.
Syntax:
mysql > show databases;

SHOW Tables – Lists all the tables available in the current database we are working in.
mysql > show tables;

SHOW COLUMNS FROM tablename – Lists all the attributes, attribute type, Is Null value permitted, key information, default value and other information for the given table.
Syntax:
mysql > show columns from sports;

SHOW INDEX FROM tablename – The query shows all the indexes for the given table.
Syntax:
mysql > show indexes from sports;

SHOW TABLE STATUS LIKE tablename\G – This command provides with detailed report on the performance of the table.

PART – IV
IV. Explain in detail

Question 1.
Discuss on various database models available in DBMS?
Answer:
DBMS Database Models:

The database technology came into existence in terms of models with relational and object-relational behavior. The major database models are listed below:

(i) Hierarchical Database Model The famous Hierarchical database model was IMS (Information Management System), IBM's first DBMS. In this model each record has information in parent/child relationship like a tree structure. The collection of records was called as record types, which are equivalent to tables in relational model. The individual records are equal to rows.

In the above model we have many advantages like less redundant data, efficient search, data integrity and security. This model also has few limitations like complex to implement and difficulty in handling many to many relationships.
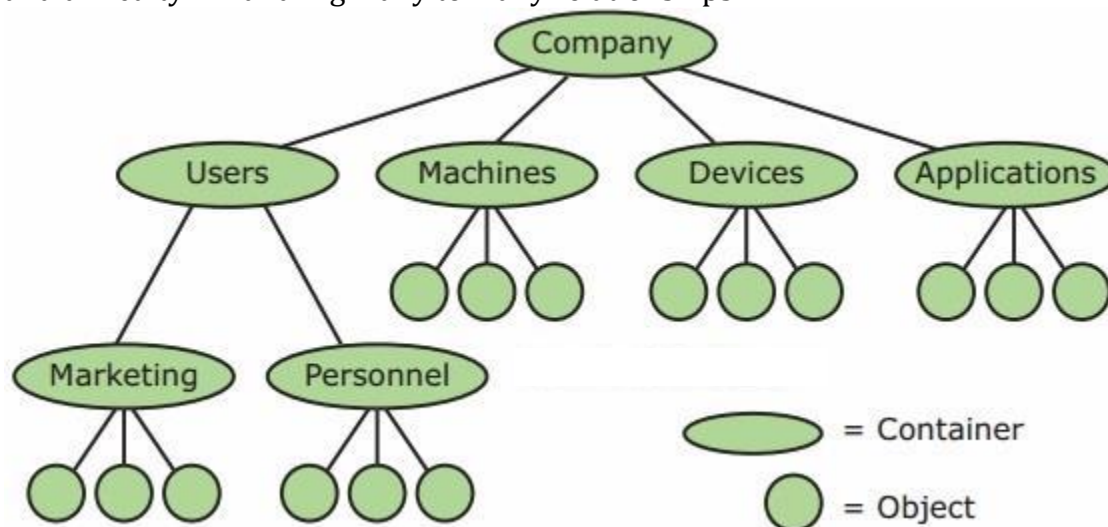
(ii) Network model:
The first developed network data model was IDS (Integrated Data Store) at Honeywell. Network model is similar to Hierarchical model except that in this model each member can have more than one owner. The many to many relationships are handled in a better way. This model identified the three database components Network schema, Sub schema and Language for data management. Network schema – schema defines all about the structure of the database.
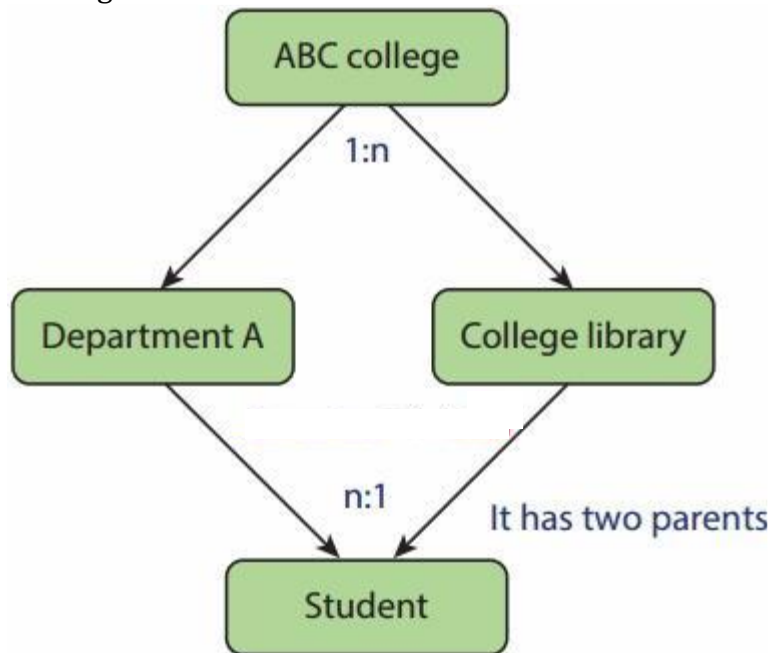Sub schema – controls on views of the database for the user.
Language – basic procedural for accessing the database.
The major advantage of this model is the ability to handle more relationship types, easy data access, data integrity and independence. The limitation of network model is difficulty

in design and maintenance.

(iii) Relational model:
Oracle and DB2 are few commercial relational models in use. Relational model is defined with two terminologies Instance and Schema.
Instance – A table consisting of rows and columns
Schema – Specifies the structure including name and type of each column.
A relation (table) consists of unique attributes (columns) and tuples (rows).
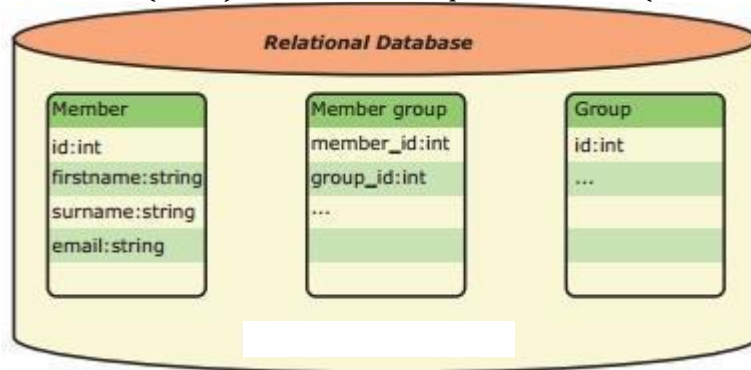

(iv) Object-oriented database model:
This model incorporates the combination of Object Oriented Programming (OOP's) concepts and database technologies.
Practically, this model serves as the base of Relational model. Object oriented model uses small, reusable software known as Objects.
These are stored in object oriented database.
This model efficiently manages large number of different data types. Moreover complex

behaviors are handled efficiently using OOP's concepts.
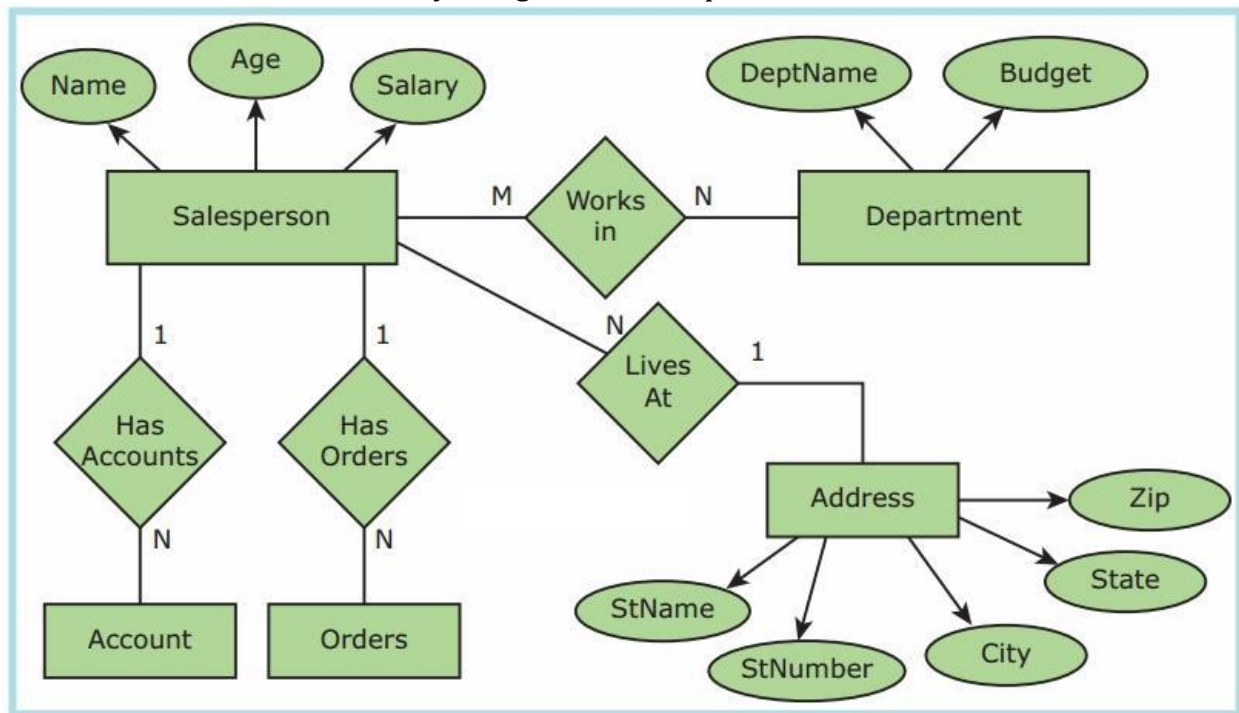
Question 2.
List the basic concepts of ER Model with suitable example?
Answer:
ER Modeling basic concepts
The basic concepts of ER model consists of

1. Entity or Entity type
2. Attributes
3. Relationship

These are the general concepts which help to create an ER diagram and produce an ER model. With the help of these any database design can be created and viewed to know the concept in that database design.

(i) Entity or Entity type
An Entity can be anything a real-world object or animation which is easily identifiable by anyone even by a common man. Eg: In a company's database Employee, HR, Manager are considered as entities, where each of these entity will be having their own attributes . An entity is represented by a rectangular box.
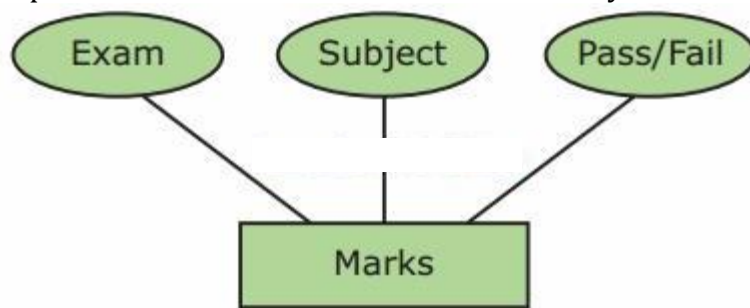
Types of Entity:

1. Strong Entity
2. Weak Entity
3. Entity Instance

1. Strong Entity:

A Strong entity is the one which doesn't depend on any other entity on the schema or database and a strong entity will have a primary key with it (i.e. a unique id which other entities will not have in their attributes).It is represented by one rectangle. In the above example it is a strong entity because it has a primary key(a unique id) as the roll no because for every one roll no varies and it will not be same.

2. Weak Entity:

A weak entity is dependent on other entities and it doesn't have any primary key like the Strong entity. It is represented by double rectangle. For Example: Here the marks is the weak entity and there are no unique id or primary – key for that entity. So they are dependent on the existence of the other entity.

(ii) Attributes

An attribute is the information about that entity and it will describe, quantify, qualify, classify, and specify an entity. An attribute will always have a single value, that value can be a number or character or string.

Types of attributes:

1. Key Attribute
2. Simple Attributes
3. Composite Attributes
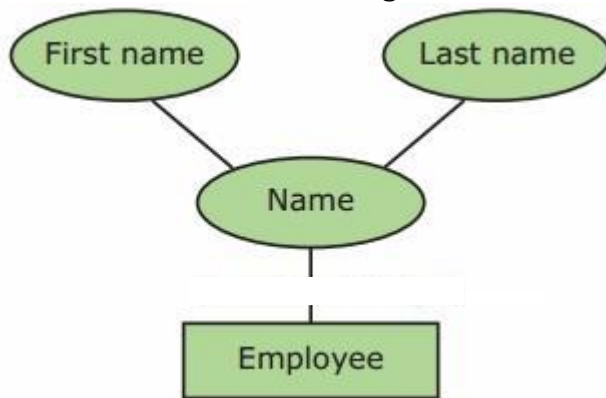4. Single Valued Attribute
5. Multi Valued Attribute

1. Key Attribute:

Generally a key attribute describes a unique characteristic of an entity.

2. Simple Attribute:

The simple attributes cannot be separated it will be having a single value for their entity. For Example: Let us consider the name as the attribute for the entity employee and here
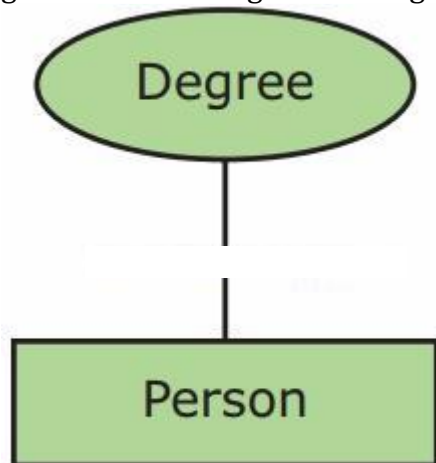
the value for that attribute is a single value.

3. Composite Attributes:
The composite attributes can be sub-divided into simple attributes without change in the meaning of that attribute. For Example: In the above diagram the employee is the entity with the composite attribute Name which are sub-divided into two simple attributes first and last name.

4. Single Valued Attributes:
A single valued attribute contains only one value for the attribute and they don't have multiple numbers of values. For Example: Age- It is a single value for a person as we cannot given number of ages for a single person,therefore it is a single valued attribute.

Arrtibute:

1. Age
2. Roll no

Values:

1. 3

2. 85

In the above table are the some examples for single valued attributes.

5. Multi Valued Attributes:
A multi valued attribute has more than one value for that particular attribute. For Example:
Degree – A person can hold n number of degrees so it is a multi-valued attribute.

Attributes and Values:

Attributes:

1. Degree
2. BankAccount

Values:

1. B. Tech, MBA
2. SBI, HDFC

(iii) Relationship Type:
In ER Model, relationship exists between two entities. Three types of relationships are –
available and the Entity-Relationship(ER) diagram is based on the three types listed below.

(iv) One-to-One relationship:
Consider two entities A and B. one-to-one (1:1) relationship is said to exist in a relational
database design, if 0 or 1 instance of entity A is associated with 0 or 1 instance of entity B,
and 0 or 1 instance of entity B is associated with 0 or 1 instance of entity A.

(v) One-to-Many relationship:
Consider two entities A and B. one-to-many (1:N) relationship is said to exist in a relational
database design, for 1 instance of entity A there exists 0 or 1 or many instances of entity B,
but for 1 instance of entity B there exists 0 or 1 instance of entity A.

(vi) Many-to-Many relationship:
Consider two entities A and B. many-to-many (M:N) relationship is said to exist in a
relational database design, for 1 instance of entity A there exists 0 or 1 or many instances of
entity B, and for 1 instance of entity B there exists 0 or 1 or many instance of entity A.
In reality one-to-one are in less usage, where as one-to-many and many-to-many are
commonly used. However in relational databases, many-to-many are converted into one-
to- many relationships.

Question 3.
Discuss in detail on various types of attributes in DBMS?

Answer:
Types of attributes:

1. Key Attribute
2. Simple Attributes
3. Composite Attributes
4. Single Valued Attribute
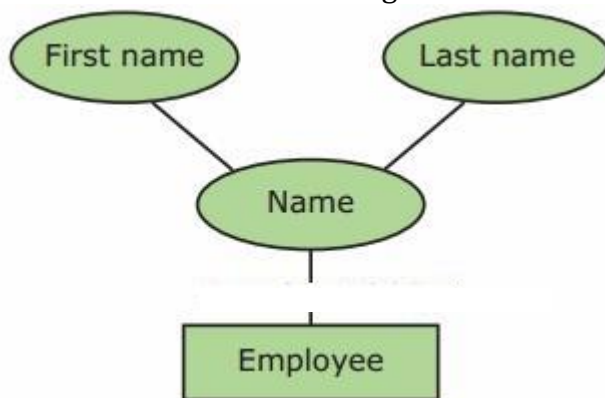5. Multi Valued Attribute

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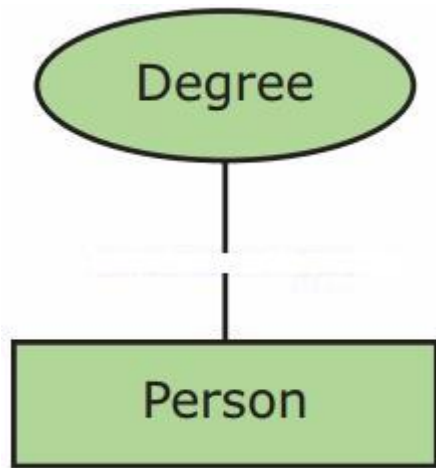

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Attribute:

1. Degree
2. Bank_Account

Values:

1. 3
2. 85

5. Multi Valued Attributes:
A multi valued attribute has more than one value for that particular attribute. For example:
Degree – A person can hold n number of degrees so it is a multi-valued attribute.
In the below table are some examples for multi valued attributes.

Attribute:

1. Degree
2. Bank_Account

Values:

1. B.TEch, MBA
2. SBI, HDFC

Question 4.
Write a note on open source software tools available in MySQL Administration?
MYSQL Administration open source software tools:
Answer:
Types of software tools:
Many open source tools are available in the market to design the database in a better and
efficient manner. PhpMyAdmin is most popular for Web Administration. The popular
Desktop Application tools are MySQL Workbench and HeidiSQL.

PHPMYADMIN (Web Admin):

1. This administrative tool of MySQL is a web application written in PHP.
2. They are used predominantly in web hosting.
3. The main feature is providing web interface, importing data from CSV and exporting data to various formats.
4. It generates live charts for monitoring MySQL server activities like connections, processes and memory usage.
5. It also helps in making the complex queries easier.

MySQL Workbench (Desktop Application):

1. It is a database tool used by developers and DBA's mainly for visualization.
2. This tool helps in data modeling, development of SQL, server configuration and backup for MySQL in a better way.
3. Its basic release version is 5.0 and is now in 8.0 supporting all Operating Systems.
4. The SQL editor of this tool is very flexible and comfortable in dealing multiple results set.

HeidiSQL (Desktop Application):

1. This open source tools helps in the administration of better database systems.
2. It supports GUI (Graphical User Interface) features for monitoring server host, server connection, Databases, Tables, Views, Triggers and Events.

Question 5.
Explain in detail on Sub Queries with suitable examples?
Answer:
Sub queries:
The SQL query is written within a main Query. This is called as Nested Inner/SubQuery.The sub query is executed first and the results of sub query are used as the condition for main query.
The sub query must follow the below rules:

- Subqueries are always written within the parentheses.
- Always place the Subquery on the right side of the comparison operator.
- ORDER BY clause is not used in sub query, since Subqueries cannot manipulate the results internally.

Consider the Employee table with the fields EmpID, Name, Age and Salary.

ID	NAME	AGE	SALARY
1	Alex	26	22,000
2	Divya	25	20,000
3	Tulsi	28	30,000

In the below Query, we use sub query in an SELECT statement.
SELECT * from Employee
where EmpID IN (SELECT EmpID from Employee WHERE Salary < 20000);
First, the inner query is executed. As a result EmpID 101 and 103 are retrieved. Now the external or outer query is executed. Internally the query is SELECT * from Employee where EmpID IN(101,103) and the output is drawn below.
Select Record List

ID	NAME	AGE	SALARY
1	Alex	26	22,000

Similarly the subqueries are used with INSERT, UPDATE and DELETE.