**SQL**

Data can be facts related to any object in consideration

Data- name, age, file, pdf, image---random

Database is systamatic collection of data, since data in db is organized it makes

data managament easy.

**Popular Database’s (RDBMS):**

Oracle

Oracle MySQL

Microsoft SQL Server

IBM DB2

MS Access

SQLite

MongoDB - NoSQL DB - stores data in the form of JSON but not tables.

**Purpose of database:**

To store data

To provide organizational structure for data

To provide mechanism for create, retrieve, update and delete data(CRUD operations).

Create – SignUp- When I register as a new user with amazon – Create a record

Read/Retrieve – SignIn – When I uname and pwd they fetch my details –

Update –

Delete

Amazon:

Customers

Products

Orders

**DBMS**- DatabaseManagement System- collection of programs which enables its users to access db, manipulate data and help in representation of data. It also helps control access to the db by various users.

Thus, It acts as a interface between user and database.

**DBMS has several components.**

Some of the major components are external interface, database language engine, query optimizer, database engine, storage engine, DBMS management component, etc..

**External Interface:**

External Interface is the **user interface** which is used to communicate with the DBMS as well as the databases.

**Database Language Engine:**

Database language engine is the one which interprets the query language and do the necessary action supplied using the query language.

**Query Optimizer:**

Query optimizer is used to optimize the supplied query language and identifies the best plan for executing the query and obtaining the result as fast as it could.

**Database Engine:**

Database engine is used to create or manipulate the data in the database objects like table.

DBMS Management Component

DBMS Management Component comprises of several other components. They are used to take database backups, performance monitoring, security management etc.

**Types Of DBMS:**

There are several database management system models. Some of them are Navigational, **RDBMS**, SQL DBMS and object-oriented databases. You can read more about the types of DBMS in my other article (Types of DBMS).

**What Is RDBMS?**

RDBMS is the abbreviated form of Relational DataBase Management System.

Tables – which helps to stores data using rows and columns.

Products, Orders, Customers

**Relational database management system** was introduced in 1970’s by Dr. E.F. CODD. RDBMS avoided the navigation model as in old DBMS and introduced Relational model. **The relational model has relationship** between tables using **primary keys, foreign keys and indexes.** **Thus the** **fetching and storing of data become faster than the old Navigational model**. So RDBMS is widely used by the enterprises and developers for storing complex and large amount of data.

**Database Normalization, or simply normalization, is the process of organizing the columns (attributes) and tables (relations) of a relational database to reduce data redundancy and improve data integrity.** Normalization is also the process of simplifying the design of a database so that it achieves the optimum structure. **It reduces and eliminates redundant(duplicate) data**. In normalization, data integrity is assured. It was first proposed by Dr. Edgar F. Codd, as an integral part of a relational model.

**ER Diagram** – Entity Relationship diagram – pictorial representation of tables, columns and relation between tables.

**Types of Relationships:**

One-One relationship

One-many relationship

many-many relationship

**Normalization**- Database Normalization is a technique of organizing the data in the database.

Normalization is used for mainly two purposes:

Eliminating redundant data.

Ensuring data dependencies make sense i.e data is logically stored.

Constraints:

**Primary Key** is a **column** or **combination of columns** in a table that contain values that uniquely identify each row in the table.

A primary key cannot exceed 16 columns and a total key length of 900 bytes.

**A foreign key (FK)** is a column or combination of columns that is used to establish and enforce a link between the data in two tables to control the data that can be stored in the foreign key table.

In a foreign key reference, a link is created between two tables when the column or columns that hold the primary key value for one table are referenced by the column or columns in another table.

This column becomes a foreign key in the second table.

**SQL** – Structured Query Language - is a standard language for storing, manipulating and retrieving data in databases.

**DDL:**

**DML:**

**DCL:**

**TCL:**

**MySQL :**

Practice queries without local setup:

<http://sqlfiddle.com> – for oracle, MySQl etc

<https://livesql.oracle.com/apex/livesql/file/index.html> - only for oracle

**Local DB setup:**

download-mysql:

Create oracle account:

https://profile.oracle.com/myprofile/account/create-account.jspx

<https://dev.mysql.com/downloads/installer/>

**MySQLWorkbench**- tool/IDE to connect to database, execute queries and analyze results

Other IDE tools:

SQLDeveloper, Toad

* SQL queries are not case sensitive.
* Data in database is case sensitive in oracle but not in mysql.

**DataTypes:**

Integer

Float

Character – fixed length

Varchar – variable length- can differentiate b/n null and empty string

varchar2- cannot differentiate b/n null and empty string

null, ‘’

Date

Time

Timestamp

Boolean – T/F

Blob

**Constraints**:

Primary key- unique + not null

Foreign key

unique

not null

default

**DDL**

**DML**

**What is the difference Drop, Truncate, and Delete?**

Drop and Truncate are DDl statements (we cannot rollback), Delete is DML statement where we can rollback (undo) the changes.

Drop – deletes data and complete table structure

Truncate- delete the data but table structure is not deleted, no triggers fired.

Delete- delete the data but not table structure, we can also limit/filter the rows by using where

clause , It will invoke triggers, Delete is slow in performance when compared to truncate as it caches data before deleting.

DateFunctions manual:

<https://dev.mysql.com/doc/refman/5.7/en/date-and-time-functions.html>

group functions :

min

max

sum

avg

count

group by: group data based on requirement

Useful- when we have to execute group functions after we group data

employee, department(hr, it, admin)

highest salary in employees;

highest salary under each department

min salary under each department

employees whose salary is < avg salary under each department

products

OS companyname model cost

android Samsung glaxy 67

android Samsung glaxy 67

android Google nexus 67

android Google motorola 67

iOS apple 6s

iOS apple 7s

costliest mobile under apple:

select max(cost) from products group by OS, companyname having companyname=’apple’

cheapest mobile under Samsung:

select min(cost) from products group by companyname having companyname=’samsung’

group by:

when you are using group by, IN select query do not use columns which are not part of group by or group functions

**interview**:

joins

group by, group functions

sub queries

ddl, dml syntax

pk, fk

set operators- union, union all

drop, delete, truncate