SQL

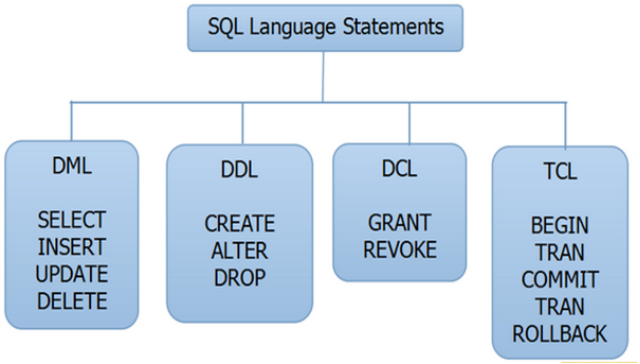
21. Do you know SQL?

- Yes, I am very comfortable with writing SQL Queries and DDL and DML commands.
- Currently working with Oracle database that is running in AMAZON CLOUD SERVER.
- DDL (Data definition language) : CREATE , ALTER, DROP, TRUNCATE
- DML(Data manipulation language): SELECT, DELETE, INSERT, UPDATE

22. SQL?

- Structured Query Language. Used for managing and manipulating data in db.
- Provide statements for a variety of tasks
  - Querying data
  - Inserting, updating ,deleting rows in a table
  - Creating, replacing, altering, and dropping objects
  - Controlling access to the database and its objects
  - Database consistency and integrity

23. What are the categories of SQL statements?



i. DML (Data Manipulation Language)

- DML statements affect records in a table. These are basic operations we perform on data such as selecting a few records from a table, inserting new records, deleting unnecessary records, and updating/modifying existing records.

ii. DDL (Data Definition Language)

- DDL statements are used to alter/modify a database or table structure and schema. These statements handle the design and storage of database objects.

iii. DCL (Data Control Language)

- DCL statements control the level of access that users have on database objects.

iv. TCL (Transaction Control Language)

- TCL statements allow you to control and manage transactions to maintain the integrity of data within SQL statements.

24. Tell me about TCL?

- SQL language is divided into four types of primary language statements: DML, DDL, DCL and TCL.
- Using these statements, we can define the structure of a database by creating and altering database objects, and we can manipulate data in a table through updates or deletions.
- We also can control which user can read/write data or manage transactions to create a single unit of work.

25. Versions

- Java 8 ⟶ 2014 present Java 7 ⟶ 2011 - 2014 Java 6 ⟶ 2006 - 2011
  Selenium 3.5.3

26. Database Schema?

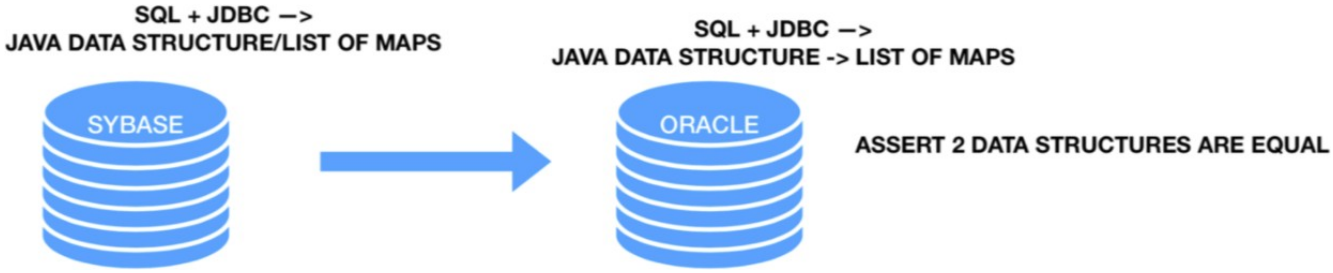
- It is like a diagram with all tables and column names, data types and PK, FK and how tables are related to each other

27. SQL clause?

- SELECT and FROM

28. What kind of Database testing are you doing?

- I am mostly doing Database validations.
- I make changes or insert data (create loan) in the front end and validate in the database. Data in front end matches the DB
- I also make changes using RESTapi and verify that changes are successful in Database as well.
- I also support DB migration process. My code connects to Sybase (legacy database) using JDBC then Connects to Oracle (NEW DB) then compare records to make sure data was migrated



29. RDBMS

- Relational Database Management System
- Data is organized into tables that are related to each other
  - How are they related?
    - Primary Key (unique and not NULL) and Foreign Key (duplicate and NULL)
  - What type of database system you have expertise with?
    - RDBMS, such as SQL and Oracle

30. What are constraints?

- Properties that table column must comply with.
- Columns have constraints that defined how data can be stored.
  - Primary Key: unique and NOT NULL
  - Foreign Key: duplicate and NULL and cannot add data which is not in PK
  - Unique Key: only unique value
  - Null: can have null
  - Not null: cannot have null

31. Data types in SQL?

- Number
- Integers
- char → char(20): 20 years spaces are taken from memory
- varchar → varchar(30): 5 spaces from memory varchar2
- boolean
- date
- currency

32. Capabilities for SQL select statements

- Projection → Select the columns in a table that are returned by a query
- Selection → Selects the rows in a table that are returned by a query
- Join → Brings together data that is stored in different tables by specifying the link between them

33. DML (Data Manipulation Language) vs DDL (Data Definition Language)

DML command actions can be restored.	DDL command actions **cannot** be restored / undone.
Commands: • **SELECT** from tablename; (read) • **INSERT** into tablename values (…); (add) • **UPDATE** tablename SET value WHERE location; • **DELETE** from tablename WHERE location; (rows) • **MERGE**	**Commands**: • **CREATE** table tablename (column1, column2 …); • **ALTER** table tablename modify value; • **TRUNCATE** table tablename; (delete whole table data) • **DROP TABLE**; (delete whole table with structure) • **RENAME** • **COMMENT**

34. PL / SQL functions and Triggers in Oracle?

- A trigger is triggered automatically when a DML statement is executed.
- There are 2 types of functions:
  - Procedure (like a void method in Java)
  - Function (like a non-void (return) method in Java)

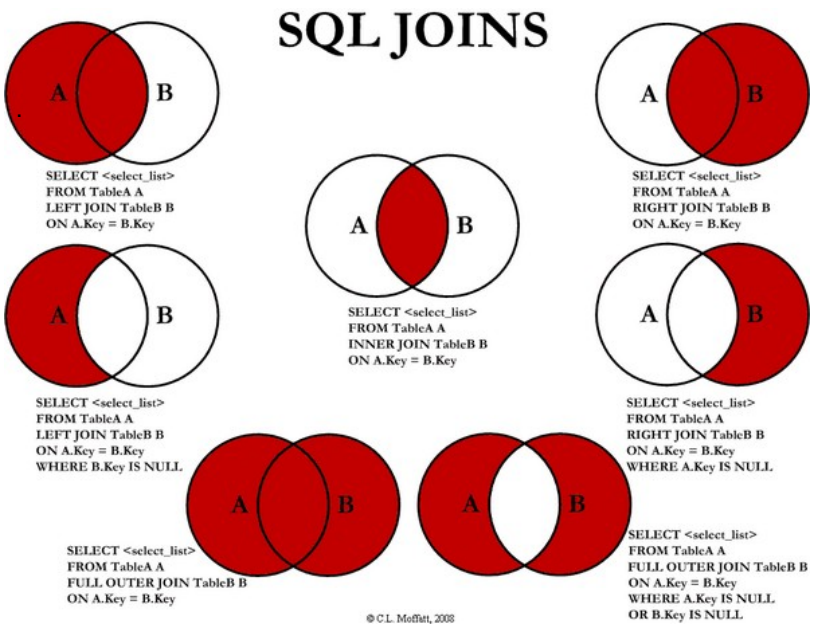
35. SQL JOIN JOINS

JOIN (INNER) JOIN
is used when retrieving data from multiple tables and will return only matching data

LEFT (OUTER) JOIN
is used when retrieving data from multiple tables and will return left table and any matching right table records.

RIGHT (OUTER) JOIN
is used when retrieving data from multiple tables and will return right table and any matching left table records.

FULL (OUTER) JOIN
is used when retrieving data from multiple tables and will return both table records, matching and non-matching



36. UNION

- Union combines the resultSets of two queries

```
select from column_names from table_name {UNION} select column_name from table_name)
```

37. How to find top 3 high paid employees?

- In mySQL **oracle has ROWNUM

```
SELECT salary, first_name, last_name FROM employees
ORDER BY salary DESC LIMIT 3;
```

38. **Find duplicate names in employees**

```
SELECT first_name, COUNT (first_name) FROM employees
GROUP BY first_name
HAVING (COUNT(first_name>1);
```

39. **How to find employees whose salaries are below the average?**

```
SELECT first_name, salary FROM employees
WHERE salary<= (SELECT AVG(salary) FROM employees);
```

40. **How to find maximum salaries in each department?**

```
SELECT first_name, MAX(salary)
FROM department d LEFT OUTER JOIN employee e ON (d.department_id = e.department_id)
GROUP BY department_id;
```

41. **How to find lowest salaries?**

```
SELECT first_name, last_name, salary, job_id FROM employees
WHERE salary = (SELECT MIN(salary) From employees);
```

42. **How to find second highest salary of employees?**

```
SELECT MAX(salary) FROM employees
WHERE salary NOT IN (SELECT MAX(salary) FROM employees);
```

43. **SQL Developer**
    - Development environment (manual testing the database using the queries)
        - Release 2.1 -2009 → 3.0 - 2011
        - Release 4.0 - 2013(latest)
    - Has a Migration release(1.2) → provides users with a single point to browse data in third-party DB and to migrate from these DB to Oracle
    - Supports Window, Linux and Mac OS x

44. **Writing SQL Statements**
    - Keywords are uppercased while columns and table names are lowercase
    - Statements are not case sensitive
    - Clauses are usually placed on separate lines
    - Keywords cannot be abbreviated or split across lines

45. **Arithmetic Expressions**
    - You use the operators in any clause (except the From clause)
    - With Date and Timestamp - can only use addition and subtraction
    - Add (+), Subtract (-), Multiply (*), Divide (/)

46. **Working with Dates**
    - Default date display format is DD-MON-RR

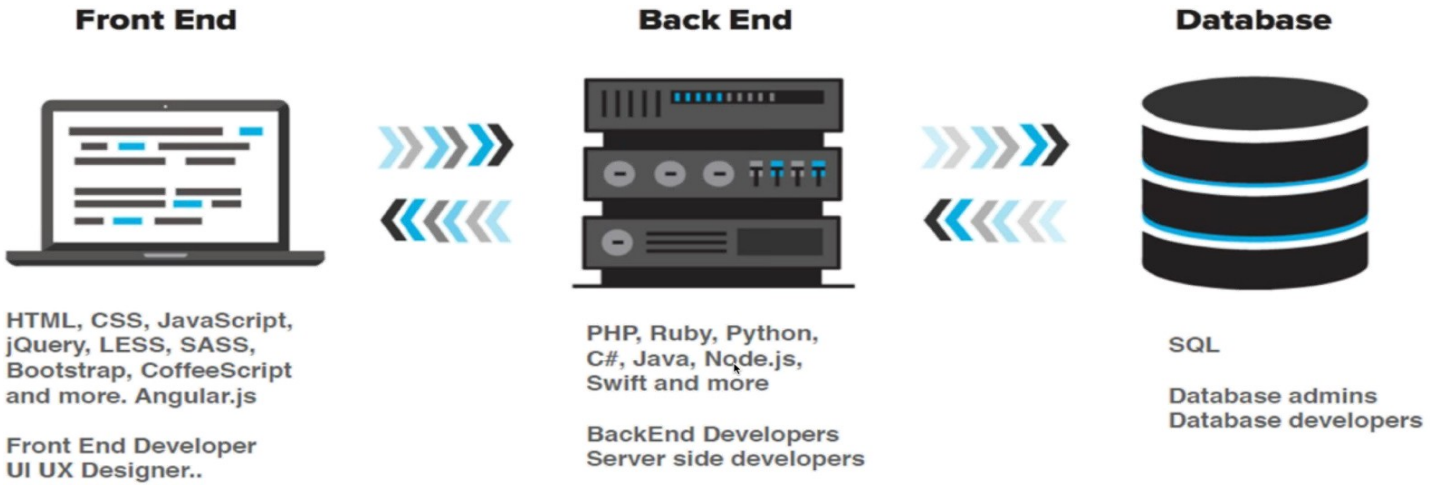
```
Sysdate function
Returns date and time
Select sysdate From dual;
```

47. **Do you have experience with SQL?**
    - Yes, I have worked with relational databases and i am very comfortable with DDL and DML commands

48. Back-end test framework

- Using RESTASSURED in my framework in order for the process of Deserialization and serialization to occur that way you store Json response into a java collection data structure and assert the data with the expected value (also stored in java data structure)
- I use postman for manual testing first BEFORE I INVOKE MY FRAMEWORK

49. Back-end Testing



50. Have you done any backend/database testing?

- Yes, I have lots of experience with working with databases.
- And I am very comfortable with writing SQL queries.
- I have experience with working on Relational Databases like Oracle, MySQL, SQL Server
- Have you worked with non-relational databases?
- I don't have hands on experience, but I know that it is like JSON format
- Database and I have good experience with working with JSON files.
- And I am a quick learner

51. Database testing framework

- For manual testing I use SQL developer for producing SQL queries
- FOR AUTOMATION; I use JDBC library to integrate java by getting a CONNECTION from oracle database then creating STATEMENTS using SQL queries and then storing the data into a RESULTSET object.

52. What is metadata?

- MetaData Data about Data

```
ResultSetMetaData rsmd = rs.getMetaData();
int columNum=rsmd.getColumnCount();
```

53. Data Structures and Why we need it

- Data structures are way of organizing data for efficient
- manipulation: Insertion , searching, reading , deletion of data.
- I always use java data structures for reading data and storing data from our application, database, or API.

54. How can we connect db?

```
Connection connection = DriverManager.getConnection(URL, user, password);
Statement statement = connection.createStatement();
ResultSet resultset = statement.executeQuery("query");

resultset.close();
statement.close();
connection.close();

// After connection;
DatabaseMetaData db = connection.getMetaData();

// After resultSet;
ResultSetMetaData rs = resultSet.getMetaData();
```

- If failure to connect will throw an exception:
  - SQLException (bad URL or credentials)
  - ClassNotFoundException (JDB driver not in classpath)

55. Dependency for JDBC

```
<dependency>
   <groupId>oracle</groupId>
   <artifactId>ojdbc6</artifactId>
   <version>11.2.0.3</version>
</dependency>
```

56. What is the Procedure?

- A stored procedure is a group of SQL statements that has been created and stored in the database.
- A stored procedure will accept input parameters so that a single procedure can be used over the network by several clients using different input data.
- A stored procedure will reduce network traffic and increase the performance. If we modify a stored procedure all the clients will get the updated stored procedure. Sample of creating a stored procedure

```
CREATE PROCEDURE test_display AS
SELECT FirstName, LastName FROM tb_test;
EXEC test_display;
```

57. What is SQL Constraints?

- SQL Constraints are rules used to limit the type of data that can go into a table, to maintain the accuracy and integrity of the data inside table.
- Constraints can be divided into the following two types,
  - **Column level constraints**: Limits only column data.
  - **Table level constraints**: Limits whole table data.
- Constraints are used to make sure that the integrity of data is maintained in the database. Following are the most used constraints that can be applied to a table.
  - **NOT NULL** → constraint restricts a column from having a **NULL** value

```
CREATE TABLE Student(s_id int NOT NULL, Name varchar(60), Age int);
```

  - **UNIQUE** → constraint ensures that a field or column will only have **unique values.**
    - Constraint when creating a table (Table level)

```
CREATE TABLE Student(s_id int NOT NULL UNIQUE, Name varchar(60), Age int);
```

    - Constraint after creating a table (Column level)

```
ALTER TABLE Student ADD UNIQUE(s_id);
```

  - **PRIMARY KEY** → constraint uniquely identifies each record in a database. Unique and not null
    - Constraint at Table level

```
CREATE TABLE Student(s_id int PRIMARY KEY, Name varchar(60) NOT NULL, Age int);
```

    - Constraint at Column level

```
ALTER TABLE Student ADD PRIMARY KEY (s_id);
```

  - **FOREIGN KEY** → is used to relate two tables. **FOREIGN KEY** constraint is also used to restrict actions that would destroy links between tables. Let's see its use, with help of the below tables:

Customer_Detail Table

c_id	Customer_Name	address
101	Adam	Noida
102	Alex	Delhi
103	Stuart	Rohtak

Order_Detail Table

Order_id	Order_Name	c_id
10	Order1	101
11	Order2	103
12	Order3	102

*In Customer_Detail table, **c_id** is the primary key which is set as foreign key in Order_Detail table.*
If you try to insert any incorrect data, DBMS will return error and will not allow you to insert the data.

    - Using FOREIGN KEY constraint at Table Level

```
CREATE table Order_Detail(
    order_id int PRIMARY KEY,
    order_name varchar(60) NOT NULL,
    c_id int FOREIGN KEY REFERENCES Customer_Detail(c_id)
);
```

In this query, c_id in table Order_Detail is made as foreign key, which is a reference of c_id column in Customer_Detail table.

    - Using FOREIGN KEY constraint at Column Level

```
ALTER table Order_Detail ADD FOREIGN KEY (c_id) REFERENCES Customer_Detail(c_id);
```

- **CHECK** → constraint is used to restrict the value of a column between a range. It performs check on the values, before storing them into the database. It's like condition checking before saving data into a column.

    - Using **CHECK** constraint at Table Level

```
CREATE table Student(
    s_id int NOT NULL CHECK(s_id > 0),
    Name varchar(60) NOT NULL,
    Age int
);
```

    The above query will restrict the s_id value to be greater than zero.

    - Using **CHECK** constraint at Column Level

```
ALTER table Student ADD CHECK(s_id > 0);
```

- **DEFAULT**