1. **What is SQL, and why is it essential in database management?**

* SQL is Structured Query Language.
* SQL is a standard language for storing, manipulating and retrieving data in databases.
* SQL allows you to access and manipulate the databases.
* Ex: MySQL, SQL Server,orcle.
* It is standard language for relational database system. It a user to create , read , update , and delete relational database and table.

1. **Explain the difference between DBMS and RDBMS.**

RDBMS DBMS

|  |  |
| --- | --- |
| Data stored is in table format | Data stored is in the file format |
| Data in the form of a table are linked together | No connection between data |
| Support distributed database | No support for distributed database |
| Data is stored in a large amount | Data stored is a small quantity |
| RDBMS supports multiple users | DBMS supports a single user |
| The software and hardware requirements are higher | The software and hardware requirements are low |
| Example: Oracle, SQL Server. | Example: XML, Microsoft Access. |

1. **Describe the role of SQL in managing relational databases.**

A relational database stores information in tabular form, with rows and columns representing different data attributes and the various relationships between the data values.

**Its main roles include:-**

1. **Data Definition**: Creating, modifying, and deleting database structures like tables, indexes, and schemas using commands like CREATE, ALTER, and DROP.
2. **Data Manipulation**: Inserting, updating, deleting, and retrieving data from tables using commands like INSERT, UPDATE, DELETE, and SELECT.
3. **Data Control**: Managing access and permissions for users to ensure security and privacy with commands like GRANT, REVOKE, and DENY.
4. **Data Querying**: Extracting specific information from the database, filtering and sorting data using SELECT queries with conditions, joins, and aggregations.
5. **Data Integrity**: Enforcing rules (like primary keys, foreign keys, and constraints) to maintain data accuracy and consistency.
6. **What are the key features of SQL?**
7. **DDL (Data Definition Language)**: Used to create, modify, or delete database structures (e.g., tables).
8. **DML (Data Manipulation Language)**: Used to insert, update, or delete data in the database.
9. **Query Language**: Allows querying data, filtering, sorting, grouping, and joining tables.
10. **Transaction Control**: Enables grouping operations into transactions, which can be rolled back if needed.
11. **Data Integrity**: Ensures data accuracy with constraints and referential integrity.
12. **User Access Control**: Manages user permissions to control who can perform actions in the database.
13. **Portability**: SQL is standardized, making it easy to use across different database systems with minimal changes.
14. **What are the basic components of SQL syntax?**

* **KEY WORD:**SELECT, INSERT, UPDATE, DELETE, FROM, WHERE, GROUP BY, ORDER BY, and JOIN
* **Clauses**: SELECT , FROM , WHERE, ORDER BY.
* **Expressions**: AGE>18 , PRICE \*5.
* **Aggregate function** : count() , max() , min() , sum() , avg().
* **Operators**: **Comparison operators**: =, !=, <, >, <=, >=.
  + - **Logical operators**: AND, OR, NOT.
    - **Arithmetic operators**: +, -, \*, /, %.
* **Data Types**: INT, VARCHAR, DATE, DECIMAL, BOOLEAN.
* **Comments**: Single-line comments start with -- or #, and multi-line comments are enclosed in /\*...\*/.
* **Identifiers**: employees, salary, department\_id.

1. **Write the general structure of an SQL SELECT statement.**

* SELECT \* FROM TABLE\_NAME;
  + ALL RECORD FOR TABLE DISPALY
* SELECT ID,NAME FROM TABLE\_NAME;
  + TABLE FOR ALL RECORD CHOICE USER RECORD DISPLAY
* SELECT DISTINCT \* FROM TABLE\_NAME;
  + SAME RECORD FOR TABLE SKIP AND DISPALY
* SELECT DISTINCT ID,NAME FROM TABLE\_NAME;
  + TABLE FOR SAME RECORD SKIP CHOICE USER RECORD DISPLAY

1. **Explain the role of clauses in SQL statements.**

* **CLAUSES :** clauses is use filter table data
* Mainly three clauses in sql. Order by , group by and having clauses.
* **GROUP BY :** GROUP OF DATA IN COLUM.
* **HAVING :** FILTER GROUP DATA ON CONDITION.
* **ORDER BY :** DATA ASSENDING AND DESENDING.

1. **What are constraints in SQL? List and explain the different types of constraints.**

* **Constraints** : constraints is used to specify the rule of data in table. multiple constraints in sql.
* **Not null**: table value is not emty.
* **Unique:** table value is not dublicate.
* **Primary key :** table value is not emty and dublicate.
* **Foreign key:** two table are link and garneted relationship
* **Unique auto increment :** table are automatic value garneted
* **Check :** used to limit the value range.
* **Default :**used to default value when not insert value.

1. **How do PRIMARY KEY and FOREIGN KEY constraints differ?**

* **PRIMARY KEY :**The primary key is not null and unique identifier within the table.

Only one primary key in table.

* **FOREIGN KEY :**foreign key is reference one table to primary key to another.

Multiple foreign key in table.

1. **What is the role of NOT NULL and UNIQUE constraints?**

* **Not null:** Role of not null constraint create table and insert the record a not null value in table.
* **Unique :** role of unique constraint create table and insert the record a unique value in table.

**1.Define the SQL Data Definition Language (DDL).**

* + DDL quary effect of table structure in sql.
  + Describe DDL create, alter, drop,truncate database object.
  + **Create :**create database ,table , view , procedure , trigger.

create table table name();

* + **Alter :**it is used to filter the column in table

alter table table name add column column name datatype;

alter table table name drop column column name;

alter table table name modify column column name datatype;

* + **drop:** it is used to delete table structure and record.

drop table table name;

* + **truncate :** it is used to delete all record and display the table structure.

truncate table table name;

**2. Explain the CREATE command and its syntax.**

* Create command used database, table, view,procedure,trigger create in sql.
* **Create database:** Crete database database name;
* **Create table :** create table table name(

Id int ,

Name text ,

Salary int

);

* **Create view :** create view view name as column name from table name condition;
  + Select \* from view name;
* **Create procedure :**
* **Without argument:**

Create procedure procedurename ()

Begin

Insert into tablename value (insert value);

End

Call procedurename;

* **With argument:**

Create procedure procedurename (parameter datatype)

Begin

Insert into tablename value (paramater);

End

Call procedurename(argument);

* **Create trigger :** create trigger t1 after insert on tablename for each row

Begin

Insert into tablename (columnname) values(new.tablename)

end

**3.What is the purpose of specifying data types and constraints during table creation?**

* **Data type:** data type id type of data to store the column.
* Datatype is a guideline for sql to understand what type of data is expected inside of each column , and what type data stored in column.
* **Int:** declare the positive value.
* **Float:** declare decimal value.
* **Varchar:** declare string value and declare size.
* **Text:** declare string value and not declare size.
* **Date:** declare date atomatically YYYY-MM-DD.
* **Datetime:** declare date and time YYY-MM-DD and hh-mm-ss.
* **Time:** declare time hh-mm-ss.
* **Constraints:** constraints is used to specify the rule of data in table.
* **Not null**: table value is not emty.
* **Unique:** table value is not dublicate.
* **Primary key :** table value is not emty and dublicate.
* **Foreign key:** two table are link and garneted relationship
* **Unique auto increment :** table are automatic value garneted
* **Check :** used to limit the value range.
* **Default :**used to default value when not insert value.

1. **What is the use of the ALTER command in SQL?**

* it is used to filter the column in table
* Alter table command in sql use add , drop , modify column name within table.

1. **How can you add, modify, and drop columns from a table using ALTER?**

* Add column : alter table tablename add column columnname datatype.
* Drop column: alter table tablename drop column columnname.
* Modify column: alter table tablename modify column columnname datatype.

1. **What is the function of the DROP command in SQL?**

* it is used to delete table structure and record. drop command used permanently delete for database and table and cannot rollback record.

1. **What are the implications of dropping a table from a database?**

Drop table: Drop table tablename.

1. **Define the INSERT, UPDATE, and DELETE commands in SQL.**

* Insert , update , delete are DML commands. DML is data manipulation language. and DML command filter the table record in sql.
* Insert command insert the value in table.
  + Insert: insert into tablename values .
* Update command update or modify the value in table.
  + Update: update tablename set condition where condition.
* Delete command delete the value in table.
  + Delete: delete from tablename where condition.

1. **What is the importance of the WHERE clause in UPDATE and DELETE operations?**

* Where clause is used to filter the record.
* Update and delete operation execute a specify the condition the use where clause importance.

1. **What is the SELECT statement, and how is it used to query data?**
   * Select command is DQL(data query language).
   * Select stetment is return a result set of row from table.
   * Select \* from tablename where condition;
2. **Explain the use of the ORDER BY and WHERE clauses in SQL queries**.

* Order by is use multiple data are assending or desendinding order.
* Where clauses is use filter the record in table.
* Select \* from tablename where codition order by columnname.
* Select \* from tablename where codition order by columnname desc.

**1.What is the purpose of GRANT and REVOKE in SQL?**

* Grant and revoke command is type of DCL. DCL(data controlling language) grant command is use permitting the user and revoke command is use permitting removing the user.

1. **What is the purpose of the COMMIT and ROLLBACK commands in SQL?**

* Commit command purpose in sql a save change parmenatly in table, and rollback command purpose in sql a one time undo effect in table.

1. **Explain how transactions are managed in SQL databases.**

* Transaction managed in sql database:
* Transaction managed used to TCL(transaction control language) command.
* TCL command is only used DML command insert , update , delete.
* Begin transaction : start a transaction.
* Commit : save change parmenatly in table.
* Rollback : one time undo effect in table.
* Save point : save point within transaction are rollback.

1. **Explain the concept of JOIN in SQL. What is the difference between INNER JOIN, LEFT JOIN, RIGHT JOIN, and FULL OUTER JOIN?**

* The concept of join in sql to combine the table one to more in database.
* And ganret the relationship two or more table.
* **Inner join :** return record that matching value in both table.
* **Left join :** return all record that left table and matching value in right table.
* **Right join :** return all record the right table and matching value in left table.
* **Full join :** return all record in both table.

**2. How are joins used to combine data from multiple tables?**

* **Inner join :** select tablename.columnname from tablename inner join table name on tablename.columnname= tablename.columnname;
* **Left** **join** **:** select tablename.columnname from tablename inner join table name on tablename.columnname= tablename.columnname;
* **Right join** **:** select tablename.columnname from tablename inner join table name on tablename.columnname= tablename.columnname;
* **Full** **join** **:** select tablename.columnname from tablename inner join table name on tablename.columnname= tablename.columnname;

1. **What is the GROUP BY clause in SQL? How is it used with aggregate functions?**

* Rows of items in table the collect into groups is group by clause and group by is use the aggregate function.
* Group by clause that groups all the same column value.
* Group by statement used sql select statement.
* Aggregate function : max(), min(), count(), sum() , avg() etc..
* Ex : max(columnname).
* Select columnname , aggregate function from tablename group by columnname.

1. **Explain the difference between GROUP BY and ORDER BY.**

|  |  |
| --- | --- |
| Group by | Order by |
| Group by is Row of item in table the collect into group. | Order by is multiple data assending and desending order. |
| Group by is use the function | Order by is not use function |
| Effect in data | Change the display |
| Fuction  Ex: select company , count(name) from book group by company; | Sorting and arrange data  Ex: select \* from book order by name desc; |

**1.What is a stored procedure in SQL, and how does it differ from a standard SQL query?**

* SQL procedure is function but it never return any value, procedure is parform the argument(parameter) and with out argument.
* Standard sql query is differ from procedure a Procedure is parform the block of code and call the procedure.
* Procedure is parforam only DML command insert , update , delete.

**Ex:**

* **Without argument:**

Create procedure procedurename ()

Begin

Insert into tablename value (insert value);

End

Call procedurename;

* **With argument:**

Create procedure procedurename (parameter datatype)

Begin

Insert into tablename value (paramater);

End

Call procedurename(argument);

**2.Explain the advantages of using stored procedures.**

* + **Better the parfomance :** create procedure and multi time call value a better parfomance.
  + **Reusability :** one time create procedure and multiple DML command insert , update , delete command reuse.
  + **Security :** procedure is high security and privacy data in sql.
  + **Maintainability :** maintaining a procedure on server to easily maintain the procedure.

**1.What is a view in SQL, and how is it different from a table?**

* + View in sql virtual table created by solve querying data from one or more table in database.
  + View is solve query table save in database .

|  |  |
| --- | --- |
| vIew | Table |
| A virtual table. | A actual table. |
| View table depended original table | Table is independed. |
| Syntex: create view viewname as select \* from tablename where condition;  Select \* from viewname | Syntex: create table tablename(columnname datatype); |
|  |  |

**1.Explain the advantages of using views in SQL databases.**

* **Consistency :-**Seamless to make changes to any underlying table structure.
* Using a view in SQL to return data from the tables allow you to hide WHERE clause or columns
* YOU many write simplified select statements against views , there by handling complicated joins and queries.
* **Security :-** each user can be given permission to access the database only through a small set of views that contain.

1. **What is a trigger in SQL? Describe its types and when they are used.**

A trigger is a special type of stored procedure that automatically runs when an event occurs in the database server.

Trigger use DML events are INSERT, UPDATE, or DELETE statements on a table.

**1) AfterTriggers :-** activated after data is inserted / updated / deleted.

**2)Before Triggers :-** activated Before data is inserted / updated / deleted.

**After Triggers :-** 1) After insert, 2) After Update , 3) After Delete.

**Before Triggers :-** 1)Before insert , 2) Before Update , 3) Before delete.

**2. Explain the difference between INSERT, UPDATE, and DELETE triggers.**

**ANS :-**

**1) INSERT Trigger :-** Insert trigger is used to inserted the new data of the affected rows when an insert statement has been executed.

**Syntax :-**

DELIMITER $$

create TRIGGER tri\_candidate AFTER/BEFORE INSERT on candidate for EACH ROW

BEGIN

insert into test(id, name, action\_performed)VALUES(new.id,new.cname, 'Record inserted');

end

**2) UPDATE Trigger :-** update trigger is used to updated or modify data of the affected rows when an update statement has been executed.

**Syntax :-**

DELIMITER $$

create TRIGGER tri\_candidate AFTER/BEFORE UPDATE on candidate FOR EACH ROW

BEGIN

insert into test(id, name, action\_performed)VALUES(new.id,new.cname, 'Record inserted');

end

**3) DELETE Trigger :-** DELETE trigger is used to delete old data of the affected rows when an DELETE statement has been executed.

**Syntax :-**

DELIMITER $$

create TRIGGER tri\_candidate AFTER/BEFORE UPDATE on candidate FOR EACH ROW

BEGIN

insert into test(id, name, action\_performed)VALUES(old .id, old.cname, 'Record inserted');

end

**1.What is PL/SQL, and how does it extend SQL's capabilities?**

* PL/SQL stands for (procedural Language / Structured Query Lanuage) is a block-structured language developed by oracle.
* PL/SQL is a combination of SQL along with the procedural features and programming languages.
* PL/SQL mainly used to create an application.

**2.List and explain the benefits of using PL/SQL.**

**List the benefits of Using PL/SQL :-**

* Object-oriented programming
* Portability
* High performance
* Manageability
* security
* **High performance**: PL/SQL can send large blocks of statements to a database at once, which reduces network traffic and improves performance.
* **Portability**: PL/SQL applications can be used on multiple systems.
* **Security**: PL/SQL has built-in security features.
* **Object-oriented programming**: PL/SQL supports object-oriented programming.
* **Manageability**: PL/SQL features that make it easy to manage.

**1.What are control structures in PL/SQL? Explain the IF-THEN and LOOP control structures.**

* Control structures in programming are used to control the flow of execution in a program.
* Conditional statement , looping statement , Sequential statement are control structures.

**1) IF – THEN Conditional statement :-**

The only one statements is executed only if the condition is TRUE.

**Syntax**:-

If condition then

-- do something

End if;

**Example :-**

Declare

Num1 number=10;

Num2 number=20;

BEGIN

If num1<num2 then

Dbms\_output.put\_line(‘num1 is small’);

End if;

**2)LOOP statement in PL/SQl :-**

* The loop statement is a PL/SQL that allows you to repeatedly execute a block of code use looping statement.
* In SQL two types of LOOP :-

1) For Loop

2) While Loop

**Syntax :-**

LOOP

--code block

IF condition THEN

EXIT;

END IF;

END LOOP;

**2.How do control structures in PL/SQL help in writing complex queries?**

In SQl , write Complex queries to Control Structure in PL/SQL use to three Statement .

1. Conditional Statements
2. Iteration Loop statements
3. Sequential statement

**1) Condtional statements :-**

It includes various conditional statements that allow developers to execute different blocks of code based on specific conditions.

1. **IF THEN**
2. **IF THEN ELSE**
3. **NESTED-IF-THEN**
4. **IF THEN ELSIF-THEN-ELSE Ladder**

**2) Iteration Loop statements:-**

The loop statement is a PL/SQL that allows you to repeatedly execute a block of code use looping statement.

In SQL two types of LOOP :-

1) For Loop

2) While Loop

**Syntax :-**

LOOP

--code block

IF condition THEN

EXIT;

END IF;

END LOOP;

**3) Sequential statement :-**

**1) GO TO statement :-** The GOTO statement performs unconditional branching to another executable statement in the same execution section of a PL/SQL block.

**Syntax :-** GOTO label\_name;

**2) NULL statement:-** Usually when you write a statement in a program, you want it to do something.

**Syntax :-** NULL;

**1.What is a cursor in PL/SQL? Explain the difference between implicit and explicit cursors.**

* Cursor is a pointer to the query. (points to query)

**There are two types of Cursors.**

1) Implicit Cursor

2) Explicit Cursor

Implicit Cursor is created & used when it executes SELECT INTO, INSERT, UPDATE ..and all tasks on the cursor is performed transparently by Oracle. (Open, Close, Fetch etc.). It also throws NO\_DATA\_FOUND and TOO\_MANY\_ROWS as Oracle handles implicit cursor in the standard way.

Explicit cursor is the one which is declared by us in PL/SQL block's declaration section.

We need to control the cycle of the cursor Open, close, fetch from the cursor. Explicit Cursor need to be declared.

**2. When would you use an explicit cursor over an implicit one?**

Use an explicit cursor when you need more control over how you handle data. It is helpful for the complex tasks where you want to move through the data in a specific way or do the special operations on the each item.

**1. Explain the concept of SAVEPOINT in transaction management. How do ROLLBACK and COMMIT interact with savepoints?**

**SAVEPOINT:**- It is used to roll the transaction back to a certain point without rolling back the entire transaction.

**Syntax:-** SAVEPOINT SAVEPOINT\_NA ME;

* Savepoints name released when the transaction is committed or rolled back.
* The commit and rollback statement releases all savepoint name established within the transactions.

**Syntax :-** ROLLBACK to SAVEPOINT\_name ;

**2. When is it useful to use savepoints in a database transaction?**

* savepoint is used to stored in large transaction to manages transactions in nesting processes.
* Savepoints are useful for complex transaction that require undoing only part of the transaction.