Day-5

Agenda

- Other Schema Objects - views, Index & synonyms
- Introduction to PLSQL & Language Features ,Control Structures, Stored Procedure
- Functions and Cursor

Other Schema Objects - views, Index & synonyms

- **Table –** Basic unit of storage; composed rows and columns
- **View –** Logically represents subsets of data from one or more tables
- **Sequence –** Generates primary key values
- **Index –** Improves the performance of some queries
- **Synonym –** Alternative name for an object

Views

- A view is nothing more than a SQL statement that is stored in the database with an associated name. A view is actually a composition of a table in the form of a predefined SQL query.

- A view can contain all rows of a table or select rows from a table. A view can be created from one or many tables which depends on the written SQL query to create a view.

- You can add SQL statements and functions to a view and present the data as if the data were coming from one single table.

- A view is created with the CREATE VIEW statement.

- CREATE VIEW Syntax:-

```
CREATE VIEW view_name AS
SELECT column1, column2, ...
FROM table_name
WHERE condition;
```

- SQL Updating a View
  - SQL CREATE OR REPLACE VIEW Syntax

```
CREATE OR REPLACE VIEW view_name AS
SELECT column1, column2, ...
FROM table_name
WHERE condition;
```

- SQL Dropping a View
  - A view is deleted with the DROP VIEW statement.
  - SQL DROP VIEW Syntax-

```
DROP VIEW view_name;
```

INDEX

- The CREATE INDEX statement is used to create indexes in tables.
- Indexes are used to retrieve data from the database more quickly than otherwise. The users cannot see the indexes, they are just used to speed up searches/queries.
- An **index** contains keys built from one or more columns in the table or view. These keys are stored in a structure (B-tree) that enables **SQL** Server to find the row or rows associated with the key values quickly and efficiently.
- Indexes are **special lookup tables** that the database search engine can use to speed up data retrieval. Simply put, an index is a pointer to data in a table. An index in a database is very similar to an index in the back of a book.

➢CREATE INDEX Syntax

Creates an index on a table. Duplicate values are allowed:

CREATE INDEX *index_name*
ON *table_name* (*column1*, *column2*, ...);

➢DROP INDEX Statement

DROP INDEX *table_name.index_name*;

Synonyms

- A **SYNONYM** provides another name for database object, referred to as original object, that may exist on a local or another server.
- A synonym belongs to schema, name of synonym should be unique.
- A synonym cannot be original object for an additional synonym and synonym cannot refer to user-defined function.
- The query below results in an entry for each synonym in database.
- This query provides details about synonym metadata such as the name of synonym and name of the base object.

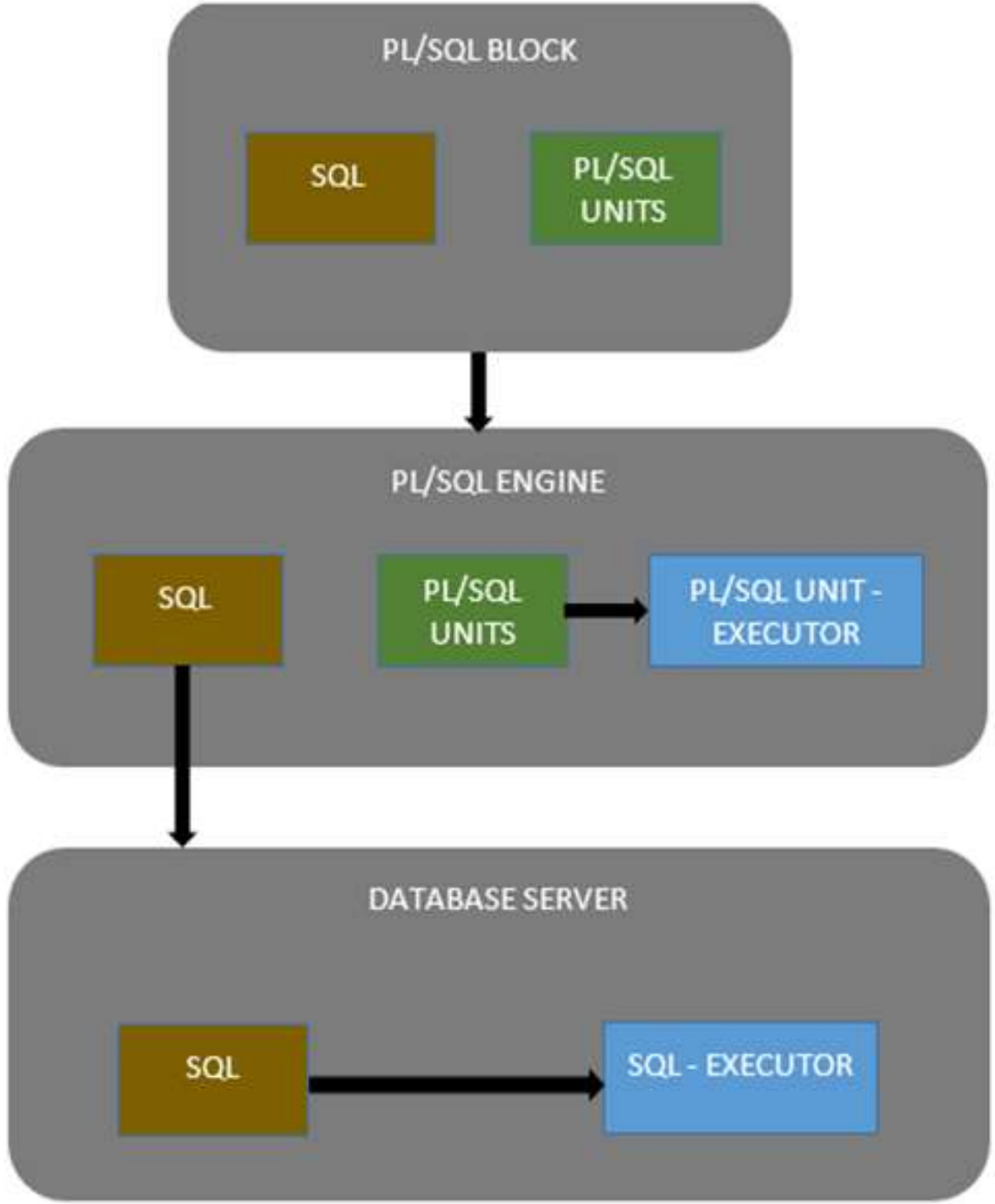
```
select *
from sys.synonyms ;
```

- Syntax –

```
CREATE SYNONYM synonymname
FOR servername.databasename.schemaname.objectname;
```

What is PL/SQL?

- **Oracle PL/SQL** is an extension of SQL language that combines the data manipulation power of SQL with the processing power of procedural language to create super powerful SQL queries.
- PL/SQL ensures seamless processing of SQL statements by enhancing the security, portability, and robustness of the Database.
- PL/SQL means instructing the compiler 'what to do' through SQL and 'how to do' through its procedural way.
- Similar to other database languages, it gives more control to the programmers by the use of loops, conditions and object-oriented concepts. The PL/SQL Full form is "Procedural Language extensions to SQL".
- PL/SQL is a block structured language that enables developers to combine the power of SQL with procedural statements.All the statements of a block are passed to oracle engine all at once which increases processing speed and decreases the traffic.


PL/SQL BLOCK
SQL
PL/SQL UNITS
PL/SQL ENGINE
SQL
PL/SQL UNITS
PL/SQL UNIT - EXECUTOR
DATABASE SERVER
SQL
SQL - EXECUTOR

- PL/SQL Block
- PL/SQL Engine
- Database Server

PL/SQL block:

- This is the component which has the actual PL/SQL code.
- This consists of different sections to divide the code logically (declarative section for declaring purpose, execution section for processing statements, exception handling section for handling errors).
- It also contains the SQL instruction that used to interact with the database server.
- All the PL/SQL units are treated as PL/SQL blocks, and this is the starting stage of the architecture which serves as the primary input.

PL/SQL Engine

- PL/SQL engine is the component where the actual processing of the codes takes place.
- PL/SQL engine separates PL/SQL units and SQL part in the input (as shown in the image below).
- The separated PL/SQL units will be handled by the PL/SQL engine itself.
- The SQL part will be sent to database server where the actual interaction with database takes place.
- It can be installed in both database server and in the application server.

Database Server

- This is the most important component of Pl/SQL unit which stores the data.
- The PL/SQL engine uses the SQL from PL/SQL units to interact with the database server.
- It consists of SQL executor which parses the input SQL statements and execute the same.

Features & Advantages of PL/SQL

- Better performance, as SQL is executed in bulk rather than a single statement
- High Productivity
- Tight integration with SQL
- Full Portability
- Tight Security
- Supports Object Oriented Programming concepts.
- Scalability and Manageability
- Supports Web Application Development
- Supports Server Page Development

Disadvantages of PL/SQL

- Stored Procedures in PL/SQL uses high memory
- Lacks functionality debugging in stored procedures
- Any change in underlying database requires change in the presentation layer also
- Does not completely separate roles of back-end developer and front-end developer
- Difficult to separate HTML development with PL/SQL development

Differences between SQL and PL/SQL:

SQL	PL/SQL
SQL is a single query that is used to perform DML and DDL operations.	PL/SQL is a block of codes that used to write the entire program blocks/ procedure/ function, etc.
It is declarative, that defines what needs to be done, rather than how things need to be done.	PL/SQL is procedural that defines how the things needs to be done.
Execute as a single statement.	Execute as a whole block.
Mainly used to manipulate data.	Mainly used to create an application.
Cannot contain PL/SQL code in it.	It is an extension of SQL, so it can contain SQL inside it.

Features of PL/SQL

1. **Portable:** PL/SQL applications can be executed with all types of operating system where we have oracle installed.
2. **Efficient:** All sorts of calculations can be efficiently performed by PL/SQL without the use of oracle engine. This improves transaction performance.
3. **Error-checking:** PL/SQL allows error-checking and displays user-friendly messages when error occurs.
4. **Development tool:** PL/SQL supports execution of SQL statements along with the functionality of variable declaration, conditional statements, looping and branching, procedures, functions and triggers.
5. **Exception Handling:** PL/SQL code is capable of handling exceptions that can affect the flow of program, hence helps in making the code more reliable.

Control Structures

- CASE Statement
- IF Statement
- ITERATE Statement
- LEAVE Statement
- LOOP Statement
- REPEAT Statement
- RETURN Statement
- WHILE Statement