

## PL/SQL

- PL/SQL Stands for “**Procedural Language Extension for Structured Query Language**” SQL is popular for “**Querying**” and “**Updating data**” in relational database management systems (RDBMS).
- It adds many procedural constructs to SQL language to overcome some limitations of SQL. It is a highly structured and readable language.
- PL/SQL is a powerful tool for developing complex applications that require a combination of SQL and Procedural logic.
- It provides a wide range of features such as exception handling, cursors, loops and modular programming, making it essential for working with Oracle database.

### 1. Anonymous Block

- A block without a name is Anonymous block. It is not saved in the oracle database server, so it is just for one-time use.
- PL/SQL anonymous block can be useful for testing purposes.
- A block consists of three sections:
  - Declaration Section
  - Execution Section
  - Exception-Handling Section
- **Declaration Section:**  
Declaration section starts with Declare keyword in which variable, constants, records as a cursors can be declared which stores data temporarily.
- **Execution Section:**  
The Execution section starts with Begin and ends with End keyword.  
This is the important section and here program logic is written to perform any task (like loop and condition).  
This section contains the SQL statement and procedural code.
- **Exception-Handling Section:**  
The Exception-handling section starts with the keyword Exception. This section is executed when a run-time error occurs.

### 2. SQL Commands:

It is used to interact with the database with some operation. It is also used to perform specific tasks, functions, and queries of data.

- **DDL** – Data Definition Language
- **DQL** – Data Query Language

- **DML** – Data Manipulation Language
- **DCL** – Data Control Language
- **TCL** – Transaction Control Language

### **Data Definition Language:**

DDL is a set of SQL commands used to create, modify, and delete database structure but not data.

It simply deals with descriptions of the database.

It consists of the SQL commands that can be used to define the database.

These commands are normally not used by a general user, they should be accessing the database through the application.

### **List of DDL commands:**

1. Create – Create database or its objects (table, index, function, views)
2. Drop – Delete object from the database
3. Alter – Alter the structure of the database
4. Truncate – Remove all records from table, including all spaces allocated for the records are removed
5. Comment – Add comments to the data dictionary
6. Rename – Rename an object existing in the database.

### **Data Manipulation Language:**

It is the component of the SQL statement that controls access to data and the database. Basically, DCL statements are grouped with DML statements.

DML statements access and manipulate data in existing tables.

DML (Data Manipulation Languages) Statements add, change, and delete oracle database table data.

1. Insert – Insert data into the table.
2. Update – Update existing data within a table.
3. Delete – Delete record from a database table.
4. Lock – Table control concurrency
5. Call – Call PL/SQL or JAVA Program
6. Explain Plan – Describe the access path to data.

### **3. Primary Key and Foreign Key:**

**Primary Key:**

A Primary Key uniquely identifies each record in a table. It must contain unique values, and it cannot contain Null Values.

A table can have only one primary key, but it can consist of one or more columns (Composite primary key).

Properties of Primary Key:

- Uniqueness: The Primary cannot be duplicated among two different rows.
- Non-Nullable: A Primary key column cannot contain null values.
- Indexing: To enhance the speed of the query, the primary key index is set to be created as an identity.

**Foreign Key:**

A Foreign Key is column (or set of columns) in a table that creates a link between two tables. It points to a Primary Key or Unique Key in another table.

A table with foreign key is called as child key and the table with primary key is reference or parent table.

Foreign keys ensure that values in at least one of the columns of a given table mirrors the values in at least one of the primary key fields of another table.

Properties of Foreign Key:

- Referential integrity
- Cascading actions
- Preventing invalid data

**4.Create a Table and Insert a data:**

```
CREATE DATABASE PRODUCT;
```

```
USE PRODUCT;
```

```
CREATE TABLE Product_detail (
```

```
Product_id INT,
```

```
Product_name VARCHAR (50),
```

```
Qty INT NOT NULL,
```

```
price INT NOT NULL
```

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);

insert into product\_detail (product\_id , product\_name, Qty, price)

values (1, "mobile", 50, 30000),

(2, "laptop", 30, 45000),

(3, "tab", 15, 50000),

(4, "watch", 30, 5000);

select \* from product\_detail;

Output:

The screenshot displays the MySQL Workbench interface. The 'Query 1' window contains the following SQL code:

```
1 • CREATE DATABASE PRODUCT;  
2 • USE PRODUCT;  
3 • CREATE TABLE Product_detail (  
4   Product_id INT,  
5   Product_name VARCHAR (50),  
6   Qty INT NOT NULL,  
7   price INT NOT NULL  
8 );  
9 • insert into product_detail (product_id , product_name, Qty, price)  
10 values (1, "mobile", 50, 30000),
```

The 'Result Grid' shows the output of the insert statement:

Product_id	Product_name	Qty	price
1	mobile	50	30000
2	laptop	30	45000
3	tab	15	50000
4	watch	30	5000

The 'Output' window shows the execution of the 'CREATE DATABASE PRODUCT' statement, which resulted in an error: 'Error Code: 1007. Can't create database 'product', database exists'. The status bar at the bottom indicates the time as 5:10 PM on 11/19/2024.