شركة تحالف الإمارات للحلول التقنية ذ.م.م.
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Chapter 07

1. PL/SQL
2. Anonymous Block
3. Data Types
4. Variables
5. Comments

PL/SQL

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PL/SQL stands for "Procedural Language extensions to the Structured Query Language".

SQL is a popular language for both querying and updating data in the relational database management systems (**RDBMS**).

PL/SQL

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PL/SQL adds many procedural constructs to SQL language to overcome some limitations of SQL.

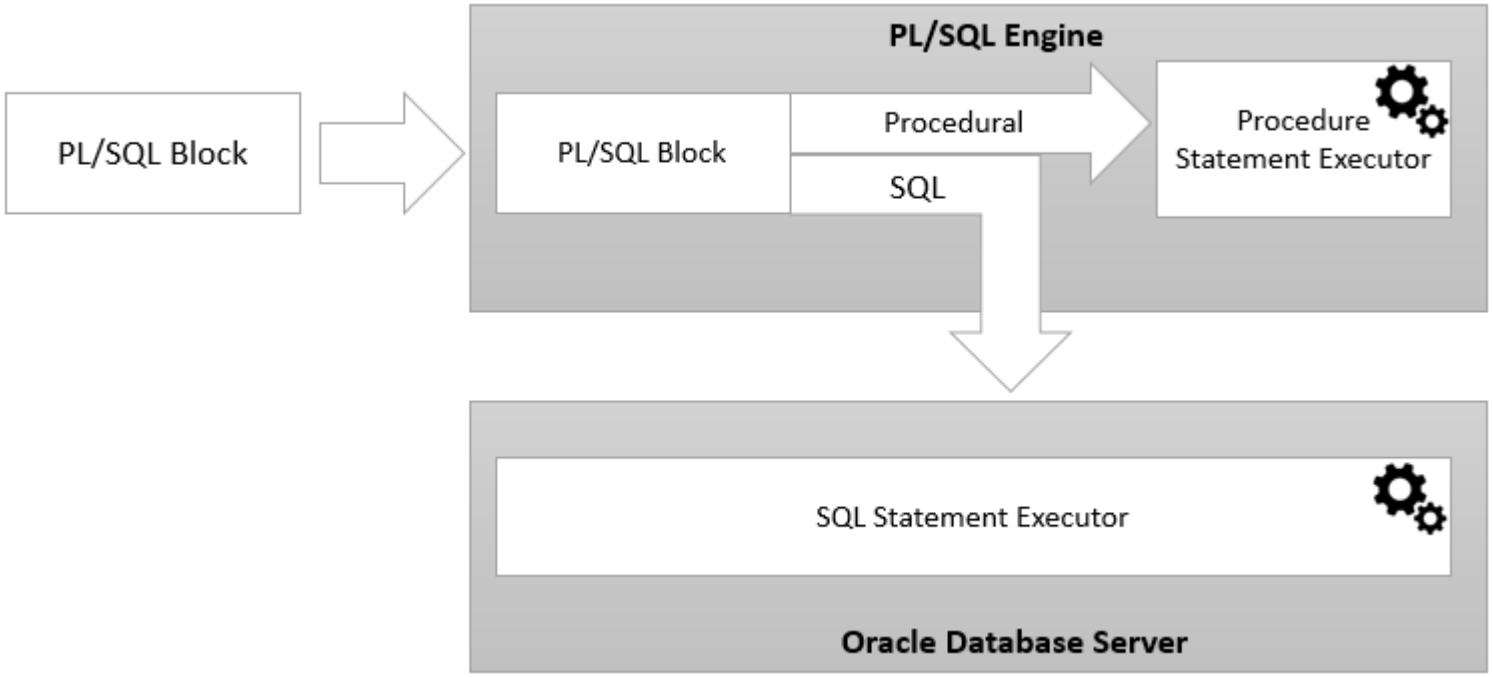
Besides, PL/SQL provides a more comprehensive programming language solution for building **mission-critical applications** on Oracle Databases.

PL/SQL is an embedded language.

PL/SQL only can execute in an Oracle Database. It was not designed to use as a standalone language like Java, C#, and C++.

In other words, you cannot develop a PL/SQL program that runs on a system that does not have an Oracle Database.

PL/SQL


PL/SQL Block
PL/SQL Engine
PL/SQL Block
Procedural
SQL
Procedure
Statement Executor
SQL Statement Executor
Oracle Database Server

Anonymous Block

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PL/SQL is a block-structured language whose code is organized into blocks. A PL/SQL block consists of three sections: **declaration**, **executable**, and **exception-handling** sections.

In a block, the executable section is mandatory while the declaration and exception-handling sections are optional.

Anonymous Block

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A **PL/SQL** block has a name. Functions or Procedures is an example of a named block. A named block is stored into the Oracle Database server and can be reused later.

A block without a name is an **anonymous block**. An anonymous block is not saved in the Oracle Database server, so it is just for one-time use.

However, PL/SQL anonymous blocks can be useful for testing purposes.

Anonymous Block

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```
        Declaration Section
BEGIN
        Execution Section
  EXCEPTION
        Exception Section
END;
```

Anonymous Block

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Anonymous Block

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Example :

```
SET SERVEROUTPUT ON
BEGIN
  DBMS_OUTPUT.put_line ('Hello World!');
END;
/
```

```
Hello World!


PL/SQL procedure successfully completed.
```

Anonymous Block

/
Welcome in Tahluf

```
Error starting at line : 2 in command -
Welcome in Tahluf
Error report -
```

Anonymous Block

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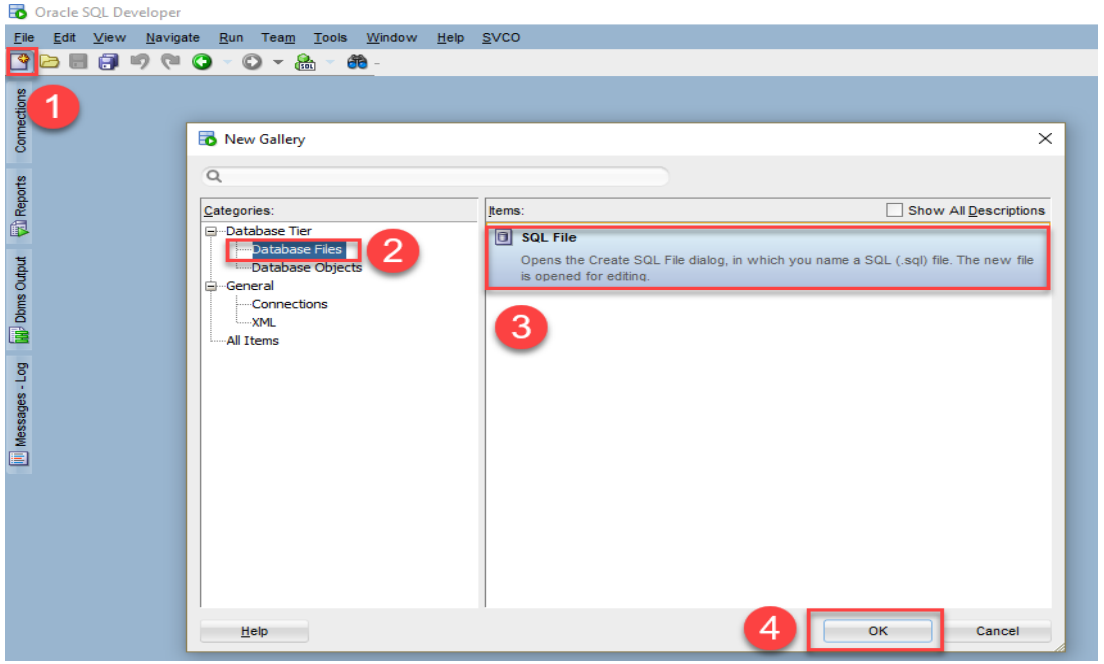
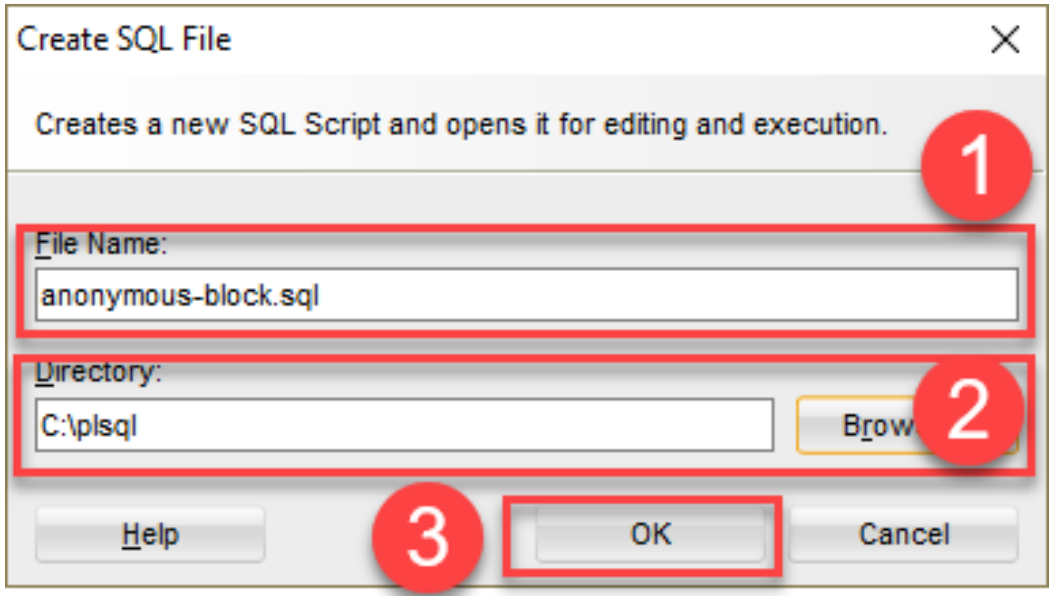
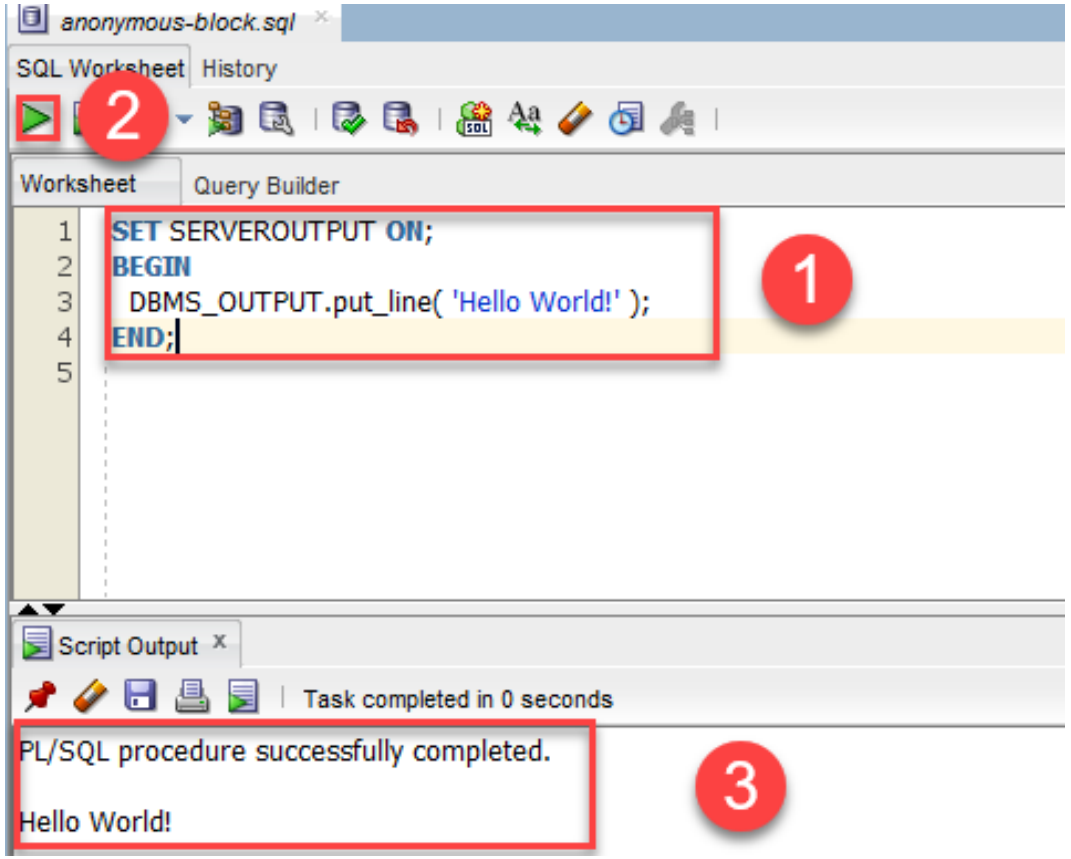
Execute a PL/SQL anonymous block using SQL Developer:



Anonymous Block



Anonymous Block



Anonymous Block

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```
DECLARE
  l_message VARCHAR2( 255 ) := 'Hello World!';
BEGIN
  DBMS_OUTPUT.PUT_LINE( l_message );
END;
```

Anonymous Block

```
DECLARE
    v_result NUMBER;
BEGIN
  v_result := 1 / 0;
  EXCEPTION
    WHEN ZERO_DIVIDE THEN
      DBMS_OUTPUT.PUT_LINE( SQLERRM );
END;
```

```
PL/SQL procedure successfully completed.

ORA-01476: divisor is equal to zero
```

Data Types

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Each value in **PL/SQL** such as a constant, variable and parameter has a data type that determines the storage format, valid values, and allowed operations.

PL/SQL has two kinds of data types: **scalar** and **composite**.

Data Types

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The **scalar** types are types that store single values such as **number**, **Boolean**, **character**, and **datetime** .

composite types are types that store multiple values, for example, **record** and **collection**

Numeric data types

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The numeric data types represent real numbers, integers, and floating-point numbers. They are stored as NUMBER, IEEE floating-point storage types (**BINARY_FLOAT and BINARY_DOUBLE**), and **PLS_INTEGER**.

The data types NUMBER, BINARY_FLOAT, and BINARY_DOUBLE are SQL data types.

The PLS_INTEGER datatype is specific to PL/SQL. It represents signed 32 bits integers that range from **-2,147,483,648** to **2,147,483,647**.

Numeric data types

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Because **PLS_INTEGER** datatype uses hardware arithmetic, they are **faster** than NUMBER operations, which uses software arithmetic.

In addition, **PLS_INTEGER** values require **less storage** than NUMBER.

Hence, you should always use PLS_INTEGER values for all calculation in its range to increase the efficiency of programs.

Numeric data types

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The **PLS_INTEGER** datatype has the following predefined subtypes:

PLS_INTEGER subtypes	Description
NATURAL	Represents nonnegative PLS_INTEGER values
NATURALN	Represents nonnegative PLS_INTEGER values with NOT NULL constraint
POSITIVE	Represents positive PLS_INTEGER values
POSITIVEN	Represents positive PLS_INTEGER value with NOT NULL constraint
SIGNTYPE	Represents three values -1, 0, or 1, which are useful for tri-state logic programming
SIMPLE_INTEGER	Represents PLS_INTEGER values with NOT NULL constraint.

Boolean data type

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The **BOOLEAN** datatype has three data values: TRUE, FALSE, and NULL. Boolean values are typically used in control flow structure such as IF-THEN, CASE, and loop statements like LOOP, FOR LOOP, and WHILE LOOP.

Boolean data type

SQL does not have the **BOOLEAN** data type, therefore, you cannot:

- Assign a BOOLEAN value to a table column.
- Select the value from a table column into a BOOLEAN variable.
- Use a BOOLEAN value in a SQL function.
- Use a BOOLEAN expression in a SQL statement.
- Use a BOOLEAN value in the **DBMS_OUTPUT.PUTLINE** and **DBMS_OUTPUT.PUT** subprograms.

Character data types

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The **character** data types represent alphanumeric text.

PL/SQL uses the SQL character data types such as **CHAR**, **VARCHAR2**, **LONG**, **RAW**, **LONG RAW**, **ROWID**, and **UROWID**.

- **CHAR(n)** is a fixed-length character type whose length is from 1 to 32,767 bytes.
- **VARCHAR2(n)** is varying length character data from 1 to 32,767 bytes.