Database Management Systems
Unit IV - Introduction to PL/SQL
II BSc CS

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OutLine

- Introduction to PL/SQL
- Features of PL/SQL
- PL/SQL Basic Syntax
- PL/SQL Identifiers
- PL/SQL Comments
- PL/SQL Program Units

Introduction to PL/SQL

- The PL/SQL programming language was developed by Oracle Corporation in the late 1980s as procedural extension language for SQL and the Oracle relational database.

- PL/SQL is a completely portable, high-performance transaction-processing language.

- PL/SQL provides a built-in, interpreted and OS independent programming environment.

Introduction to PL/SQL

- PL/SQL can also directly be called from the command-line SQL*Plus interface.

- Direct call can also be made from external programming language calls to database.

- PL/SQL's general syntax is based on that of ADA and Pascal programming language.

- Apart from Oracle, PL/SQL is available in TimesTen in-memory database and IBM DB2.

Features of PL/SQL

- PL/SQL is tightly integrated with SQL.
- It offers extensive error checking.
- It offers numerous data types.
- It offers a variety of programming structures.
- It supports structured programming through functions and procedures.
- It supports object-oriented programming.
- It supports the development of web applications and server pages.

PL/SQL Basic Syntax

```
DECLARE
    <declarations section>
BEGIN
    <executable command(s)>
EXCEPTION
    <exception handling>
END;
```

Syntax Description

Declarations

- This section starts with the keyword DECLARE.
- It is an optional section and defines all variables, cursors, subprograms, and other elements to be used in the program.

Syntax Description

Executable Commands

- This section is enclosed between the keywords BEGIN and END and it is a mandatory section.

- It consists of the executable PL/SQL statements of the program.

- It should have at least one executable line of code, which may be just a NULL command to indicate that nothing should be executed.

Syntax Description

Exception Handling

- This section starts with the keyword EXCEPTION.
- This optional section contains exception(s) that handle errors in the program.
- Every PL/SQL statement ends with a semicolon (;).
- PL/SQL blocks can be nested within other PL/SQL blocks using BEGIN and END.

PL/SQL Identifiers

- PL/SQL identifiers are constants, variables, exceptions, procedures, cursors, and reserved words.
- The identifiers consist of a letter optionally followed by more letters, numerals, dollar signs, underscores, and number signs and should not exceed 30 characters.
- By default, identifiers are not case-sensitive.
- A reserved keyword cannot be used as an identifier.

PL/SQL Delimiters

- A delimiter is a symbol with a special meaning. Following is the list of delimiters in PL/SQL

Delimiter	Description
+, -, *, /	Addition, subtraction/negation, multiplication, division
%	Attribute indicator
'	Character string delimiter
.	Component selector
(,)	Expression or list delimiter

PL/SQL Delimiters

Delimiter	Description
:	Host variable indicator
,	Item separator
"	Quoted identifier delimiter
=	Relational operator
@	Remote access indicator
;	Statement terminator

PL/SQL Delimiters

Delimiter	Description
:=	Assignment operator
=>	Association operator
||	Concatenation operator
**	Exponentiation operator
<<, >>	Label delimiter (begin and end)
/*, */	Multi-line comment delimiter (begin and end)

PL/SQL Delimiters

Delimiter	Description
--	Single-line comment indicator
..	Range operator
<, >, <=, >=	Relational operators
<>, '=, ~=, ^=	Different versions of NOT EQUAL

PL/SQL Comments

- Program comments are explanatory statements that can be included in the PL/SQL code that helps anyone reading its source code.
- The PL/SQL supports single-line and multi-line comments.
- All characters available inside any comment are ignored by the PL/SQL compiler.
- The PL/SQL single-line comments start with the delimiter -- (double hyphen) and multi-line comments are enclosed by /* and */.

PL/SQL Program Units

- A PL/SQL unit is any one of the following
  - PL/SQL block
  - Function
  - Package
  - Package body
  - Procedure
  - Trigger
  - Type
  - Type body

Thank You