Oracle PL/SQL

PL/SQL: Collections, Object Oriented, and Debugging

Agenda

01 PL/SQL Collections

02 PL/SQL Object Oriented

03 PL/SQL DBMS Output

04 PL/SQL Debugging

PL/SQL Collections

PL/SQL Collections

PL/SQL Collections

Set of elements containing comparable data types

Persistent Collection

Non-persistent Collection

•Nested Table

•An arbitrary number of components that exist in a one-dimensional array

•Variable-size Array (Varrays)

•Contains a number of predefined attributes by default

•Associative Array

•Also called an index-by table, is used for the accumulation of key–value pairs

Collections: Nested Table

An arbitrary number of components that exist in a one-dimensional array is said to be a nested table. Moreover, the nested table will implement some changes with these arrays.

- A Nested table doesn't contain a proclaimed number of elements; whereas, an array contains pronounced number of elements. Also, the nested table size will grow progressively.
- An array is dependably a set of back-to-back subscripts; likewise, the nested table is a set of successive subscripts. When the components are deleted, it becomes spare.

Syntax

```
TYPE type_name IS TABLE OF element_type[NOT NULL];
table_name type_name;

Type_name => Name of the table.

Element_type => Size of the table.

NOT NULL =>Contains a value.
```

Collections: Nested Table

Syntax

```
SQL> DECLARE
  2  TYPE name_table IS TABLE OF VARCHAR2(10);
  3  TYPE grades IS TABLE OF INTEGER;
  4  names names_tables;
  5  marks grades;
  6  total integer;
  7  BEGIN
  8  names:=names_table('Shah','Mike','Maddi','Alex','Peter');
  9  marks:=grades(92,87,98,97,78);
 10  total:=name.count;
 11  dbms_output.put_line('Total'||total||'Students');
 12  FOR i IN 1..total LOOP
 13  dbms_output.put_line('Student:'||names(i)||',Marks:'||marks(i));
 14  end loop;
 15  END;
 16  /
```

Result

```
Total 5 students
Student:Shah,Marks:92
Student:Mike,Marks:87
Student:Maddi,Marks:98
Student:Alex,Marks:97
Student:Peter,Marks:78
PL/SQL procedure successfully completed.
```

Collections: Nested Table

Nested Table

Method Name	Purpose
Count	Returns the number of components that a set contains
Exists	Returns the output as true if the set exists, otherwise, returns false
First	Returns the smallest index number first
Limit	Checks the maximum size of the set
Last	Returns the largest index first
Next	Returns the index number that succeeds the index *n*
Prior	Returns the index number that is followed by the *n*th index
Extend(n)	Affixes *n* null elements to a set
Extend	Affixes one null element to a set
Trim(n)	Deletes *n* elements from the end of a collection
Trim	Deletes *n* components from the end of a set
Delete(n)	Deletes the *n*th component from an associative array
Delete	Deletes all components from the set, setting the count to 0

Collections: Associative Array

- An associative array table is also called the index-by table and is used for the accumulation of key-quality pairs.
- Every key is utilized to trace the related values containing the unique pair of keys.
- The key can be either a string or a whole number.

Syntax

```
TYPE type_name IS TABLE OF element_type[NOT NULL] INDEX BY subscript_type;
table_name type_name;
```

Type_name => Name of the table.

Element_type => Size of the table.

NOT NULL =>Contains a value.

Collections: Associative Array

Syntax

```
SQL> DECLARE
  2  TYPE salary IS TABLE OF NUMBER  INDEX BY
VARCHAR2(20);
  3  salary_list salary;
  4  name VARCHAR2(20);
  5  BEGIN
  6  --adding elements to the table
  7  salary_list('Shah'):=72000;
  8  salary_list('Mike'):=72500;
  9  salary_list('Maddi'):=80000;
 10  salary_list('Martin'):=85000;
 11  salary_list('James'):=82000;
 12  --printing the table
 13  name:=salary_list.FIRST;
 14  WHILE  name IS NOT  null LOOP
 15  dbms_output.put_line('Salary
of'||name||'is'||TO_CHAR(salary_list(name)));
 16  name:=salary_list.NEXT(name);
 17  END  LOOP;
 18  END;
 19  /
```

Result

```
Salary of Shah is 72000
Salary of Mike is 72500
Salary of Maddi is 80000
Salary of Martin is 85000
Salary of James is 82000
PL/SQL procedure successfully completed.
```

PL/SQL DBMS Output

PL/SQL DBMS Output

Subprogram	Explanation
DBMS_OUTPUT.DISABLE;	Output message will be disabled
DBMS_OUTPUT.GET_LINE(line OUT VARCHAR2, STATUS OUT INTEGER);	Recovers a solitary line of cushioned data
DBMS_OUTPUT.ENABLE(buffer_size IN INTEGER DEFAULT 20000);	Output message will be enabled
DBMS_OUTPUT.GET_LINE(lines OUT CHARARR, numlines IN OUT INTEGER);	Recovers an array of lines from the buffer
DBMS_OUTPUT.PUT(item IN VARCHAR2);	Inserts an incomplete line in the cushion
DBMS_OUTPUT.NEW_LINE;	Puts an end-of-line marker
DBMS_OUTPUT.PUT_LINE(item IN VA1RCHAR2);	Adjusts a line in the buffer

PL/SQL DBMS Output

Example

```
SQL> declare
   line dbms_output.chararr;
   num_line number;
   begin
    -- enable the buffer with default size 30000
   dbms_output.enable;
   dbms_output.put_line('Hi Everyone!');
   dbms_output.put_line('We hope you enjoyed the Intellipaat Course!');
   dbms_output.put_line('Have a great time!');
   num_lines:=3;
   dbms_output.get_lines(lines,num_line);
   FOR i IN 1.. num_lines LOOP
   dbms_output.put_line(lines(i));
   END LOOP;
  END;
 /
```

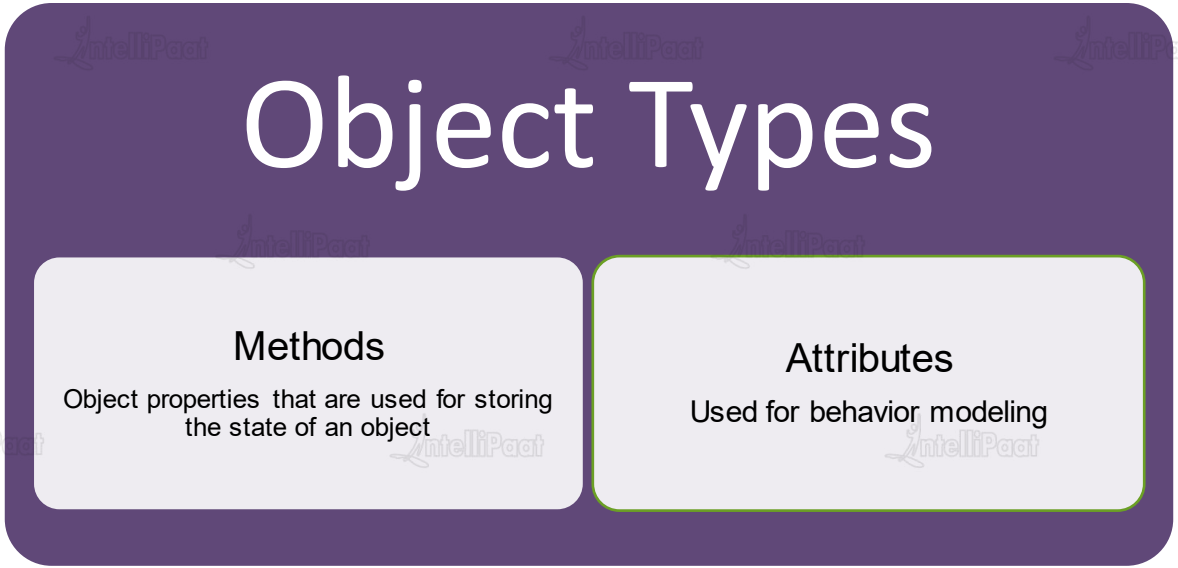
Result

```
Hi Everyone!
We hope you have enjoyed the Intellipaat
Course!
Have a great time!
PL/SQL Procedure successfully completed.
```

PL/SQL Object Oriented

PL/SQL Object Oriented

- PL/SQL Object Oriented allows users to define the kind of object that is helpful while designing the object-oriented programming in the Oracle Database.
- Composite type of objects will be created under the object types, and real-world objects containing some particular structure will be implemented using the object operating methods.



PL/SQL Object Oriented

```
SQL> CREATE OR REPLACE TYPE address AS
OBJECT

(house_no varchar2(10),

street varchar2(30),

city varchar2(20),

state varchar2(10),

pincode varchar2(10));
/
```

```
SQL> DECLARE
  residence address;
   BEGIN
   residence :=address('104/A','K.G.Road','Edmold','Texas','201300');
   dbms_output.put_line('House No:'||residence.house_no);
   dbms_output.put_line('Street:'||residence.street);
   dbms_output.put_line('City:'||residence.city);
   dbms_output.put_line('State:'||residence.state);
   dbms_output.put_line('Pincode:'||residence.pincode);
  END;
  /
```

PL/SQL Objects: Methods

•Map Method

•Map functions will completely depend on other attribute values.

Order Method

•Internal logic is implemented to compare two objects.

PL/SQL Debugging

PL/SQL Debugging

- Oracle provides powerful PL/SQL Debugging capabilities with interactive debugging tools.
- Oracle SQL Developer is provided with robust debugging capabilities with an interactive debugger.

•DBMS_OUTPUT

•Allows us to send debug messages from our anonymous blocks and subprograms onto the client applications to the console

DBMS_UTILITY

Helps with PL/SQL Debugging and executes the FORMAT_ERROR_STACK function, which formats the error stack, and the FORMAT_ERROR_BACKTRACE function, which helps in getting the line number where the error has occurred

Quiz

Quiz 1

What SYSTEM VARIABLE is used to refer DATABASE TIME ?

A	$$dbtime$$
B	$$time$$
C	$$datetime$$
D	None of the above

Answer 1

What SYSTEM VARIABLE is used to refer DATABASE TIME ?

A	$$dbtime$$
B	$$time$$
C	$$datetime$$
D	None of the above

Quiz 2

SYSTEM.EFFECTIVE.DATE variable is

A	Read only
B	Read & Write
C	Write only
D	None of the above

Quiz 2

SYSTEM.EFFECTIVE.DATE variable is

A	Read only
B	Read & Write
C	Write only
D	None of the above

Quiz 3

Which physical file contains the name and location of datafiles?

A	Parameter File
B	Redo log file
C	Control File
D	Password File

Answer 3

Which physical file contains the name and location of datafiles?

A	Parameter File
B	Redo log file
C	Control File
D	Password File

Quiz 4

The DBA is creating a new user. Which of the following is NOT defined at user creation?

A	Default role
B	Default tablespace
C	Profile
D	Idle_time

Answer 4

The DBA is creating a new user. Which of the following is NOT defined at user creation?

A	Default role
B	Default tablespace
C	Profile
D	Idle_time

Quiz 5

The collection method LAST

A	Returns the last (largest) index numbers in a collection that uses integer subscripts.
B	Returns the number of elements that a collection currently contains.
C	Checks the Maximum Size of a Collection.
D	None of the above

Answer 5

The collection method LAST

A	Returns the last (largest) index numbers in a collection that uses integer subscripts.
B	Returns the number of elements that a collection currently contains.
C	Checks the Maximum Size of a Collection.
D	None of the above

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