Introdução ao PL/SQL

AULA PL04

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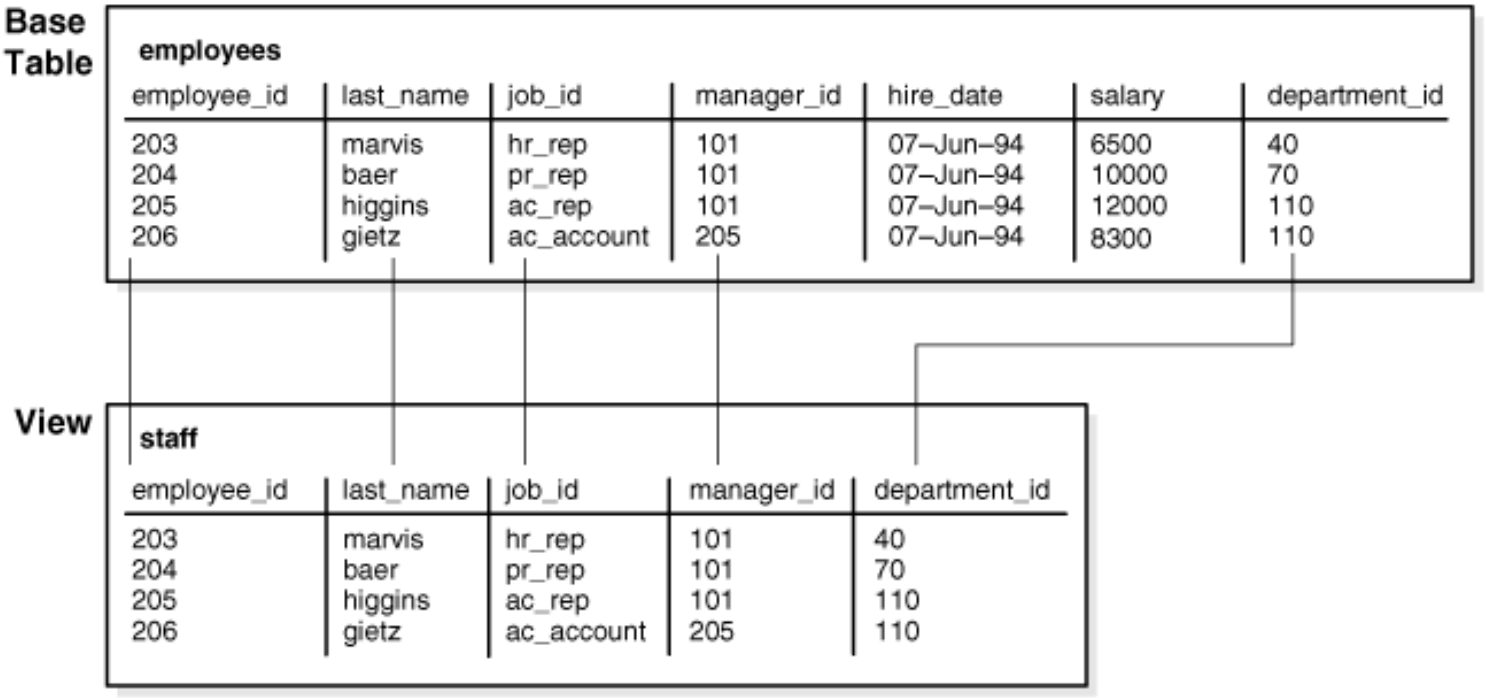
Views


Base Table
employees
employee_id | last_name | job_id | manager_id | hire_date | salary | department_id
203 | marvis | hr_rep | 101 | 07–Jun–94 | 6500 | 40
204 | baer | pr_rep | 101 | 07–Jun–94 | 10000 | 70
205 | higgins | ac_rep | 101 | 07–Jun–94 | 12000 | 110
206 | gietz | ac_account | 205 | 07–Jun–94 | 8300 | 110
View
staff
employee_id | last_name | job_id | manager_id | department_id
203 | marvis | hr_rep | 101 | 40
204 | baer | pr_rep | 101 | 70
205 | higgins | ac_rep | 101 | 110
206 | gietz | ac_account | 205 | 110

Views

```
create table EMPLOYEES (
     employee_id number primary key,
     last_name varchar2(50) not null,
     job_id varchar2(50) not null,
     manager_id  number not null,
     hire_date date not null,
     salary number not null,
     department_id number not null
);
```

Views

```
insert into employees values (203, 'marvis’, 'hp_rep',101,to_date('07-06-2004',
'dd-mm-yyyy'), 6500, 40);

´insert into employees values (204, 'baer', 'pr_rep',101,to_date('01-06-2004',
'dd-mm-yyyy'), 10000, 70);

insert into employees values (205, 'higgins', 'ac_rep',101,to_date('21-06-2004',
'dd-mm-yyyy'), 12000, 110);

insert into employees values (206, 'gietz', 'ac_account',101,to_date('24-06-
2004', 'dd-mm-yyyy'), 8300, 110);

insert into employees values (207, 'john', 'hp_rep',205,to_date('12-06-2004',
'dd-mm-yyyy'), 6500, 40);
```

```
create or replace view staff as
    select employee_id, last_name, job_id, manager_id,
department_id from employees;
```

Procedures and Functions

PL/SQL subprograms are named PL/SQL blocks that can be invoked with a set of parameters. PL/SQL provides two kinds of subprograms:

- **Procedures** – These subprograms do not return a value directly; mainly used to perform an action.
- **Functions** – These subprograms return a single value; mainly used to compute and return a value.

Procedures and Functions

Parts & Description
Declarative Part It is an optional part. However, the declarative part for a subprogram does not start with the DECLARE keyword. It contains declarations of types, cursors, constants, variables, exceptions, and nested subprograms. These items are local to the subprogram and cease to exist when the subprogram completes execution.
Executable Part This is a mandatory part and contains statements that perform the designated action.
Exception-handling This is again an optional part. It contains the code that handles run-time errors.

Procedures

Creating a Procedure

```
CREATE [OR REPLACE] PROCEDURE procedure_name
[(parameter_name [IN | OUT | IN OUT] type [,
...])]
{IS | AS}
BEGIN
  < procedure_body >
END procedure_name;
```

Procedures

Where:

[OR REPLACE] option allows the modification of an existing procedure.

procedure_name specifies the name of the procedure.

The optional parameter list contains name, mode and types of the parameters. IN represents the value that will be passed from outside and OUT represents the parameter that will be used to return a value outside of the procedure.

procedure-body contains the executable part.

Procedures

```
CREATE OR REPLACE PROCEDURE greetings AS
        BEGIN
                dbms_output.put_line('Hello World!');
        END;

call greetings;
```

Procedures

```
create table cars (ide number primary key, nome varchar2(10), valor
number);

insert into cars values (1,'Ford',10);
insert into cars values (2,'VW',20);
insert into cars values (3,'BMW',30);

create or replace procedure act_val(ident number, val number) as
       begin
              update cars c1
              set valor = nvl(val + (select valor from cars c2
where c1.ide = c2.ide), valor)
                     where c1.ide = ident;
       end;
```

Procedures

Testar o uso do procedure

Listar todos os carros:

```
select * from cars;
```

IDE	NOME	VALOR
1	Ford	10
2	VW	20
3	BMW	30

Executar o procedure:

```
call act_val(3,50);
```

Listar novamente todos os carros:

```
select * from cars;
```

IDE	NOME	VALOR
1	Ford	10
2	VW	20
3	BMW	80

Functions

A stored function (also called a user function or user-defined function) is a set of PL/SQL statements you can call by name.

Stored functions are very similar to procedures, except that a function returns a value to the environment in which it is called. User functions can be used as part of a SQL expression.

Functions

```
CREATE [OR REPLACE] FUNCTION function_name
[(parameter_name [IN | OUT | IN OUT] type [, ...])]
RETURN return_datatype
{IS | AS}
BEGIN
   < function_body >
END [function_name];
```

Functions - example

```
create table customers (ide number primary key, nome varchar2(10));

insert into customers values (1,'a');
insert into customers values (2,'b');
insert into customers values (3,'c');


create or replace function customerName(ident number)
        return varchar2 as
                nome varchar2(10);
        begin
                select nome into nome from customers where
customers.ide=ident;
        return nome;
end;
```

Functions - example

Testar o uso da função:

Verificar qual o nome cujo id= 1:

```
select customerName(1) from dual;
```

CUSTOMERNAME(1)
a

Listar todos cujo nome seja igual ao nome do customerName(1):

```
insert into customers values (4,'a');

select * from customers c1 where customerName(1) = c1.nome;
```

IDE	NOME
1	a
4	a

Sequences

Sequence numbers are Oracle integers of up to 38 digits defined in the database.

A sequence definition indicates general information, such as the following:

- The name of the sequence
- Whether the sequence ascends or descends
- The interval between numbers
- Whether Oracle should cache sets of generated sequence numbers in memory

Sequences

Create:

```
create sequence my_sequence start with 1;
```

CURRVAL returns the current value from sequence:

```
select my_sequence.CURRVAL from dual;
```

NEXTVAL increments the sequence and returns the new value:

```
select my_sequence.NEXTVAL from dual;
```

Triggers

Triggers are executed on {INSERT, DELETE and UPDATE} and {BEFORE, AFTER} those actions.

```
CREATE [ OR REPLACE ] TRIGGER trigger_name
  AFTER INSERT
        ON table_name
               [ FOR EACH ROW ]
        DECLARE
               -- variable declarations
        BEGIN
               -- trigger code
        EXCEPTION
        WHEN ...
               -- exception handling
  END;
```

Triggers

FOR EACH ROW, o trigger is row-level; otherwise statement-level.

Row-level triggers::

{ Variables NEW e OLD are available to refer to the field before and after the transactions }

In the trigger body, NEW e OLD must be preceeded by ":",

That is not the case in the WHEN clause.

- REFERENCING: used to make aliases to the NEW, OLD variables.
- Restrictions can be specified in the WHEN clause. This clause can contain subqueries.

Triggers

```
CREATE TABLE T4 (a INTEGER, b CHAR(10));
CREATE TABLE T5 (c CHAR(10), d INTEGER);

CREATE TRIGGER trig1
       AFTER INSERT ON T4
       REFERENCING NEW AS newRow
       FOR EACH ROW
              WHEN (newRow.a <= 10)
       BEGIN
              INSERT INTO T5 VALUES(:newRow.b, :newRow.a);
       END;
```

Triggers

```
CREATE TABLE T1 (a INTEGER, b CHAR(10));
CREATE TABLE T2 (c CHAR(10), d INTEGER);

CREATE TRIGGER trig2
       AFTER INSERT ON T1
       FOR EACH ROW
              WHEN (new.a <= 10)
              BEGIN
                     INSERT INTO T2 VALUES(:new.b, :new.a);
              END;
```

Triggers

The example below creates a table and uses a trigger to populate the primary key :

```
create sequence simple_employees_seq start with 10 increment by 10;

create table SIMPLE_EMPLOYEES (
        empno number primary key,
        name varchar2(50) not null,
        job varchar2(50)
);

create or replace trigger SIMPLE_EMPLOYEES_BIU_TRIG
        before insert on SIMPLE_EMPLOYEES
        for each row
        begin
                if inserting and :new.empno is null
                        then :new.empno := simple_employees_seq.nextval;
                end if;
        end;
```

Triggers

Test sequence and trigger:

```
insert into simple_employees (name, job) values ('Mike', 'Programmer’);
insert into simple_employees (name, job) values ('Taj', 'Analyst’);
insert into simple_employees (name, job) values ('Jill', 'Finance’);
insert into simple_employees (name, job) values ('Fred', 'Facilities’);
insert into simple_employees (empono, name, job) values (null, 'Sabra',
'Programmer’);
1
```

```
select empno, name, jobfrom simple_employees order by empno;
```

PL/SQL Tutorial:

https://www.tutorialspoint.com/plsql/index.htm

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