Database Programming with PL/SQL

5-2: Indexing Tables of Records Practice Activities

Vocabulary

Identify the vocabulary word for each definition below.

COLLECTION	A set of occurrences of the same kind of data
INDE BY TABLE	A collection which is based on a single field or column; for example, on the last_name column of EMPLOYEES
INDEX BY TABLE OF RECORDS	A collection which is based on a composite record type; for example, on the whole DEPARTMENTS row

Try It / Solve It

1. PL/SQL collections:

A. In your own words, describe what a PL/SQL collection is.

Una colección es un tipo de variable en la cual puedes almacenar una tabla completa, además se carga en memoria y puedes llamar cada fila conociendo la clave que tiene.

B. Which of the following are collections and which are not?

1. **A list of all employees' last names**
2. The character value "Chang"
3. **The populations of all countries in Europe**
4. **All the data stored in the employees table about a specific employee.**

C. What is the difference between an INDEX BY table and a database table such as EMPLOYEES or COUNTRIES?

La diferencia está en que la clave es diferente, en un index puedes tener como clave una palabra o un número.

D. Describe the difference between an INDEX BY table and an INDEX BY table of records.

El INDEX BY almacena una sola columna y el INDEX BY table of récords almacena las columnas que quieras.

E. Look at the following code. Describe the difference between t_pops and v_pops_tab. Is v_pops_tab an INDEX BY table or an INDEX BY table of records? How do you know?

```
DECLARE
  TYPE t_pops IS TABLE OF countries.population%TYPE
INDEX BY BINARY_INTEGER;   v_pops_tab     t_pops;
```

t_pops es la table of Records y v_pops es la variable que almacena los datos de la columna population.

2. INDEX BY tables of countries in South America:

A. Write and execute an anonymous block that declares and populates an INDEX BY table of countries in South America (region_id = 5). The table should use country_id as a primary key, and should store the country names as the element values. The data should be stored in the table in ascending sequence of country_id. The block should not display any output. Save your code.

```
DECLARE
TYPE t_country_name IS TABLE OF countries.country_name%TYPE
INDEX BY BINARY_INTEGER;
v_country_name t_country_name;

BEGIN
FOR country_rec IN
(SELECT country_id, country_name FROM countries)
LOOP
v_country_name(country_rec.country_id):= country_rec.country_name;
END LOOP;
END;
```


B. Modify the block so that after populating the INDEX BY table, it uses a FOR loop to display the contents of the INDEX BY table. You will need to use the FIRST, LAST, and EXISTS table methods. Execute the block and check the displayed results. Save your code.

```
DECLARE
TYPE t_country_name IS TABLE OF countries.country_name%TYPE
INDEX BY BINARY_INTEGER;
v_country_name t_country_name;
BEGIN
FOR country_rec IN
(SELECT country_id, country_name FROM countries)
LOOP
v_country_name(country_rec.country_id):= country_rec.country_name;
dbms_output.put_line(v_country_name(1).country_name);
END LOOP;
```

```
dbms_output.put_line(v_country_name(v_cpuntry_name.first).country_name);
dbms_output.put_line(v_country_name(v_cpuntry_name.last).country_name);
dbms_output.put_line(v_country_name(v_cpuntry_name.exist).country_name);
END;
```

C. Modify the block again so that instead of displaying all the contents of the table, it displays only the first and last elements and the number of elements in the INDEX BY table. Execute the block and check the displayed results.

```
DECLARE
TYPE t_country_name IS TABLE OF countries.country_name%TYPE
INDEX BY BINARY_INTEGER;
v_country_name t_country_name;
BEGIN
FOR country_rec IN
(SELECT country_id, country_name FROM countries)
LOOP
v_country_name(country_rec.country_id):= country_rec.country_name;
dbms_output.put_line(v_country_name(1).country_name);
END LOOP;
dbms_output.put_line(v_country_name(v_cpuntry_name.first).country_name);
dbms_output.put_line(v_country_name(v_cpuntry_name.last).country_name);
dbms_output.put_line(v_country_name(v_cpuntry_name.exist).country_name);
dbms_output.put_line(v_country_name(v_cpuntry_name.count).country_name);

END;
```

3. INDEX BY tables of records:

A. Write and execute an anonymous block that declares and populates an INDEX BY table of records containing employee data. The table of records should use the employee id as a

primary key, and each element should contain an employee's last name, job id, and salary. The data should be stored in the INDEX BY table of records in ascending sequence of employee id. The block should not display any output.

Hint: declare a cursor to fetch the employee data, then declare the INDEX BY table as *cursorname*%ROWTYPE. Save your code.

B. Modify the block so that after populating the table of records, it uses a FOR loop to display to display the contents. You will need to use the FIRST, LAST and EXISTS table methods. Execute the block and check the displayed results. Save your code.