

Scalar Data type :

Example

DECLARE

V\_STD\_NAME VARCHAR2(100);

V\_STD\_ADDRESS VARCHAR2(500);

BEGIN

SELECT STD\_NAME , STD\_ADDRESS

INTO V\_STD\_NAME , V\_STD\_ADDRESS

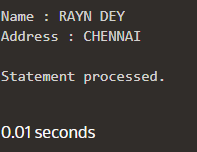
FROM STUDENT

WHERE STUDENT\_ID = 4;

DBMS\_OUTPUT.PUT\_LINE('Name : '||V\_STD\_NAME);

DBMS\_OUTPUT.PUT\_LINE('Address : '||V\_STD\_ADDRESS);

END;



Composite Data type

Record Type

Example

DECLARE

V\_REC\_TYPE STUDENT%ROWTYPE;

BEGIN

SELECT \*

INTO V\_REC\_TYPE

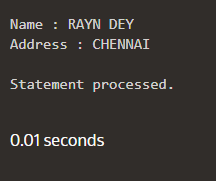
FROM STUDENT

WHERE STUDENT\_ID = 4;

DBMS\_OUTPUT.PUT\_LINE('Name : '||V\_REC\_TYPE.STD\_NAME);

DBMS\_OUTPUT.PUT\_LINE('Address : '||V\_REC\_TYPE.STD\_ADDRESS);

END;



DECLARE

TYPE V\_Array\_Type IS VARRAY(6) OF VARCHAR2(20);

v\_day V\_Array\_Type := V\_Array\_Type(NULL,NULL,NULL,NULL,NULL,NULL);

BEGIN

v\_day(1) := 'MONDAY';

v\_day(2) := 'TUESDAY';

v\_day(3) := 'THURSDAY';

v\_day(4) := 'WEDNESDAY';

v\_day(5) := 'FRIDAY';

v\_day(6) := 'SATURDAY';

FOR I IN 1..6

LOOP

DBMS\_OUTPUT.PUT\_LINE(v\_day(I));

END LOOP;

END;

Collection is an ordered group of logically related elements

-List of employee names

-Address of employee

-------------Below code can hold 1 row of the cursor

DECLARE

CURSOR C1 IS SELECT ENAME ,JOB , SAL FROM EMP;

V\_REC\_TYPE C1%ROWTYPE;

BEGIN

OPEN C1;

FETCH C1 INTO V\_REC\_TYPE;

CLOSE C1;

DBMS\_OUTPUT.PUT\_LINE('Name : '||V\_REC\_TYPE.ENAME);

DBMS\_OUTPUT.PUT\_LINE('Job : '||V\_REC\_TYPE.JOB);

DBMS\_OUTPUT.PUT\_LINE('Sal : '||V\_REC\_TYPE.SAL);

END;

RECORD TYPE DEFINED IN PL/SQL BLOCK IS LOCAL TYPE

DEFINED IN PACKAGE SPECIFICATION IS PUBLIC ITEM

Assigning the value to the record-------------------

DECLARE

TYPE EMP\_REC\_TYPE IS RECORD(ENAME VARCHAR2(100),

SAL NUMBER);

V\_EMP\_REC EMP\_REC\_TYPE;

BEGIN

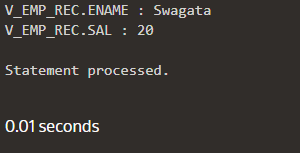
V\_EMP\_REC.ENAME := 'Swagata';

V\_EMP\_REC.SAL := 20;

DBMS\_OUTPUT.PUT\_LINE('V\_EMP\_REC.ENAME : '||V\_EMP\_REC.ENAME);

DBMS\_OUTPUT.PUT\_LINE('V\_EMP\_REC.SAL : '||V\_EMP\_REC.SAL);

END;



Assigning value using constructor-------------------------

DECLARE

TYPE EMP\_REC\_TYPE IS RECORD(ENAME VARCHAR2(100),

SAL NUMBER);

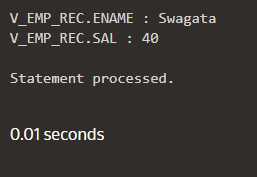
V\_EMP\_REC EMP\_REC\_TYPE := EMP\_REC\_TYPE('Swagata' , 40);

BEGIN

DBMS\_OUTPUT.PUT\_LINE('V\_EMP\_REC.ENAME : '||V\_EMP\_REC.ENAME);

DBMS\_OUTPUT.PUT\_LINE('V\_EMP\_REC.SAL : '||V\_EMP\_REC.SAL);

END;



Record type using database table----------------

DECLARE

TYPE EMP\_REC\_TYPE IS RECORD (ENAME VARCHAR2(100),

SAL NUMBER);

V\_EMP\_REC EMP\_REC\_TYPE;

BEGIN

SELECT ENAME , SAL

INTO V\_EMP\_REC

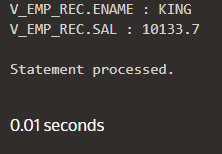
FROM EMP

WHERE EMPNO = 117;

DBMS\_OUTPUT.PUT\_LINE('V\_EMP\_REC.ENAME : '||V\_EMP\_REC.ENAME);

DBMS\_OUTPUT.PUT\_LINE('V\_EMP\_REC.SAL : '||V\_EMP\_REC.SAL);

END;



TYPE ---is use to define a record---custom record definition

%rowtype --- is to define datatype

Varray---------

DECLARE

TYPE V\_ARRAY\_TYPE IS VARRAY(6) OF VARCHAR2(30);

v\_day V\_ARRAY\_TYPE := V\_ARRAY\_TYPE(NULL,NULL,NULL,NULL,NULL,NULL);

BEGIN

v\_day(1) := 'Monday';

v\_day(2) := 'Tuesday';

v\_day(3) := 'Wednesday';

v\_day(4) := 'Thursday';

v\_day(5) := 'Friday';

v\_day(6) := 'Saturday';

dbms\_output.put\_line(v\_day(1));

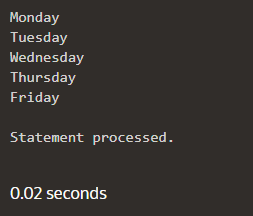
dbms\_output.put\_line(v\_day(2));

dbms\_output.put\_line(v\_day(3));

dbms\_output.put\_line(v\_day(4));

dbms\_output.put\_line(v\_day(5));

END;



Using Extend keyword-------------

DECLARE

TYPE V\_ARRAY\_TYPE IS VARRAY(6) OF VARCHAR2(30);

v\_day V\_ARRAY\_TYPE := V\_ARRAY\_TYPE();

BEGIN

v\_day.extend(2);

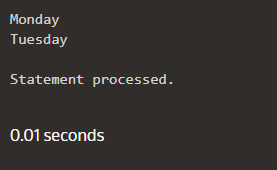
v\_day(1) := 'Monday';

v\_day(2) := 'Tuesday';

dbms\_output.put\_line(v\_day(1));

dbms\_output.put\_line(v\_day(2));

END;



----------END --------------------

**D - 28/5/24**

**Topic : Types of PL/SQL Collections**

**-----------------------------------------Associative Arrays--------------------------------------------------**

***Example 1:==============================***

DECLARE

TYPE ASCT\_DAY\_TYPE IS TABLE OF VARCHAR2(15) INDEX BY VARCHAR2(15 BYTE);

LV\_DAY ASCT\_DAY\_TYPE;

BEGIN

LV\_DAY(1):= 'Tuesday';

dbms\_output.put\_line(LV\_DAY(1));

END;

***Example 2:================================***

DECLARE

TYPE ASCT\_DAY\_TYPE IS TABLE OF NUMBER INDEX BY VARCHAR2(15 BYTE);

LV\_DAY ASCT\_DAY\_TYPE;

BEGIN

LV\_DAY(1):= 52;

dbms\_output.put\_line(LV\_DAY(1));

END;

***Example 3:================================***

DECLARE

TYPE ASCT\_EMP\_TYPE IS TABLE OF VARCHAR2(15) INDEX BY BINARY\_INTEGER;

LV\_EMP ASCT\_EMP\_TYPE;

I NUMBER := 0;

CURSOR EMP\_CUR IS SELECT ENAME FROM EMP WHERE ROWNUM<=12;

BEGIN

FOR J IN EMP\_CUR LOOP

I := I+1;

LV\_EMP(I) := J.ENAME ;

END LOOP;

FOR K IN 1..12 LOOP

DBMS\_OUTPUT.PUT\_LINE(LV\_EMP(K));

END LOOP;

END;

**D - 29/5/24**

***Example 5:=================================***

-------Using FIRST

DECLARE

TYPE ASCT\_TEST\_TYPE IS TABLE OF NUMBER INDEX BY VARCHAR2(20);

TEST\_LIST ASCT\_TEST\_TYPE;

TEST\_NAME VARCHAR2(20);

BEGIN

TEST\_LIST('A') := 100;

TEST\_LIST('B') := 200;

TEST\_LIST('C') := 300;

TEST\_LIST('D') := 400;

TEST\_LIST('E') := 500;

TEST\_NAME := TEST\_LIST.FIRST;

WHILE TEST\_NAME IS NOT null LOOP

dbms\_output.put\_line

('Salary of ' || TEST\_NAME || ' is ' || TO\_CHAR(TEST\_LIST(TEST\_NAME)));

TEST\_NAME := TEST\_LIST.NEXT(TEST\_NAME);

END LOOP;

END;

***Example 6:==============================***

----Using LAST

DECLARE

TYPE ASCT\_TEST\_TYPE IS TABLE OF NUMBER INDEX BY VARCHAR2(20);

TEST\_LIST ASCT\_TEST\_TYPE;

TEST\_NAME VARCHAR2(20);

BEGIN

TEST\_LIST('A') := 100;

TEST\_LIST('B') := 200;

TEST\_LIST('C') := 300;

TEST\_LIST('D') := 400;

TEST\_LIST('E') := 500;

TEST\_NAME := TEST\_LIST.LAST;

WHILE TEST\_NAME IS NOT null LOOP

dbms\_output.put\_line

('Salary of ' || TEST\_NAME || ' is ' || TO\_CHAR(TEST\_LIST(TEST\_NAME)));

TEST\_NAME := TEST\_LIST.prior(TEST\_NAME);

END LOOP;

END;

***Example 7:====================================***

DECLARE

CURSOR cname is select ename from emp;

TYPE ASCT\_EMP\_TYPE IS TABLE OF EMP.ENAME%TYPE INDEX BY PLS\_INTEGER;

name\_list ASCT\_EMP\_TYPE;

counter number := 0;

BEGIN

For i in cname LOOP

counter := counter +1;

name\_list(counter) := i.ename;

dbms\_output.put\_line('emp ('||counter||') :'||name\_list(counter));

end loop;

END;

**-------------------------------------------Nested Table----------------------------------------------------**

***Example 1:=================================***

DECLARE

TYPE NEST\_NAME\_TYPE IS TABLE OF VARCHAR2(100);

TYPE NEST\_MARKS\_TYPE IS TABLE OF NUMBER;

LV\_NAMES NEST\_NAME\_TYPE;

LV\_MARKS NEST\_MARKS\_TYPE;

TOTAL NUMBER;

BEGIN

LV\_NAMES := NEST\_NAME\_TYPE('BLAKE','CLARK','JONES','SCOTT','FORD','SMITH');

LV\_MARKS := NEST\_MARKS\_TYPE (55,88,77,99,66,89);

TOTAL := LV\_NAMES.COUNT;

FOR I IN 1..TOTAL LOOP

DBMS\_OUTPUT.PUT\_LINE(LV\_NAMES(I) ||' := '||LV\_MARKS(I));

END LOOP;

END;

***Example 2:===================================***

---Using extend

DECLARE

CURSOR C\_EMP IS SELECT ENAME FROM EMP;

TYPE NEST\_NAME\_TYPE IS TABLE OF EMP.ENAME%TYPE;

C\_LIST NEST\_NAME\_TYPE: = NEST\_NAME\_TYPE ();

CNTER NUMBER: = 0;

BEGIN

FOR I IN C\_EMP LOOP

CNTER := CNTER+1;

C\_LIST.EXTEND;

C\_LIST(CNTER) := I.ENAME;

DBMS\_OUTPUT.PUT\_LINE('TEST('||CNTER||')'|| C\_LIST(CNTER));

END LOOP;

END;

***Example 3: ==================================***

----Addition of two nested table

DECLARE

TYPE NEST\_NUM\_TYPE IS TABLE OF NUMBER;

LV\_VAR1 NEST\_NUM\_TYPE := NEST\_NUM\_TYPE(4,2,5);

LV\_VAR2 NEST\_NUM\_TYPE := NEST\_NUM\_TYPE(2,6,9);

LV\_RESULT NEST\_NUM\_TYPE;

BEGIN

LV\_RESULT := NEST\_NUM\_TYPE();

LV\_RESULT.EXTEND(LV\_VAR1.COUNT);

FOR i IN 1..LV\_VAR1.LAST LOOP

LV\_RESULT(i) := LV\_VAR1(i) + LV\_VAR2(i);

DBMS\_OUTPUT.PUT\_LINE('Result of '||i || ' is ' ||LV\_RESULT(i));

END LOOP;

END;

***Example 4:==========================================***

DECLARE

CURSOR C\_EMP IS SELECT ENAME,SAL FROM EMP;

TYPE NEST\_NAME\_TYPE IS TABLE OF EMP.ENAME%TYPE;

TYPE NEST\_SAL\_TYPE IS TABLE OF EMP.SAL%TYPE;

C\_LIST NEST\_NAME\_TYPE := NEST\_NAME\_TYPE();

C\_SAL\_LIST NEST\_SAL\_TYPE := NEST\_SAL\_TYPE();

CNTER NUMBER := 0;

BEGIN

FOR I IN C\_EMP LOOP

CNTER := CNTER+1;

C\_LIST.EXTEND;

C\_SAL\_LIST.EXTEND;

C\_LIST(CNTER) := I.ENAME;

C\_SAL\_LIST(CNTER) := I.SAL;

DBMS\_OUTPUT.PUT\_LINE('NAME ('||CNTER||') := '|| C\_LIST(CNTER)||', SALARY := '|| NVL(C\_SAL\_LIST(CNTER),0));

END LOOP;

END

**-------------------------------------------VArray----------------------------------------------------**

***Example 1:==============================***

DECLARE

TYPE V\_TEST\_TYPE IS VARRAY(4) OF VARCHAR2(100);

V\_TEST V\_TEST\_TYPE := V\_TEST\_TYPE();

BEGIN

V\_TEST.EXTEND(4);

V\_TEST(1) := 'Monday';

V\_TEST(2) := 'Tuesday';

V\_TEST(3) := 'Wednesday';

V\_TEST(4) := 'Thursday';

FOR i IN 1..4 LOOP

DBMS\_OUTPUT.PUT\_LINE(V\_TEST(i));

END LOOP;

END;

***Example 2:======================================***

DECLARE

TYPE V\_TEST\_TYPE IS VARRAY(4) OF VARCHAR2(100);

V\_TEST V\_TEST\_TYPE := V\_TEST\_TYPE(NULL,NULL,NULL,NULL);

BEGIN

-- V\_TEST.EXTEND(4);

V\_TEST(1) := 'Monday';

V\_TEST(2) := 'Tuesday';

V\_TEST(3) := 'Wednesday';

V\_TEST(4) := 'Thursday';

FOR i IN 1..4 LOOP

DBMS\_OUTPUT.PUT\_LINE('Day '||i||' : '||V\_TEST(i));

END LOOP;

END;

***Example 3:========================================***

DECLARE

TYPE V\_EMP\_TYPE IS VARRAY(10) OF VARCHAR2(10);

V\_ENAME V\_EMP\_TYPE := V\_EMP\_TYPE();

counter NUMBER := 0;

BEGIN

FOR i IN (SELECT ENAME FROM EMP WHERE ROWNUM<10)

LOOP

counter := counter + 1;

V\_ENAME.EXTEND();

V\_ENAME(counter) := I.ENAME;

DBMS\_OUTPUT.PUT\_LINE(counter||V\_ENAME(counter));

END LOOP;

END;

**========================================================**

**\*\*\*\*\*\*\*\*Record type with nested table\*\*\*\*\*\*\*\*\*\***

DECLARE

TYPE REC\_TYPE IS RECORD (ENAME VARCHAR2(200), JOB VARCHAR2(200));

TYPE NEST\_TEST\_TYPE IS TABLE OF REC\_TYPE;

LV\_TEST NEST\_TEST\_TYPE;

counter NUMBER;

BEGIN

LV\_TEST := NEST\_TEST\_TYPE(REC\_TYPE('A' , 'JOB A'),

REC\_TYPE('B' , 'JOB B'),

REC\_TYPE('C' , 'JOB C'));

counter := LV\_TEST.COUNT;

FOR i IN 1..counter

LOOP

DBMS\_OUTPUT.PUT\_LINE('ENAME : '||LV\_TEST(i).ENAME||' , JOB : '||LV\_TEST(i).JOB);

END LOOP;

END;

Swagata