Function

```
CREATE OR REPLACE
FUNCTION function_name
(param eter_1 data_type,
Parame ter_2 data_type)
RETURN data_type
{ IS | AS }
[decla rat ion _se -
ction]
BEGIN
execut abl e_s ection
[EXCEPTION
except ion _se ction]
END [funct ion _name];
```

Procedures

```
Create [ or REPLACE ]
PROCEDURE procedure_name
(
parame ter _name_1
data_type,
parame ter _name_2
data_type
)
{ IS | AS }
pl_sql _block
Parameter
By position
By name
```

Packages

```
CREATE PACKAGE
package_name { IS | AS }
proced ure _or _fu nct -
ion _sp eci fic ati -
on_1;
```

Packages (cont)

> procedure_or_function_specification_2;
END [package_name];
Package body
CREATE PACKAGE BODY
package_name { IS | AS }
procedure_or_function_body_1;
procedure_or_function_body_2;
END [package_name];

Bind variable

Need to specify type

Need to wrap around quote when assign string value

No need quote when reference the variable

Value can only be assigned in a PL, via exec or Begin / End block

Use PRINT to list out bind variable

Conditional and Loops

```
Declare and use of
variable
%TYPE %ROWTYPE
VARCHAR2 NUMBER DATE
Assignment operator :=
Nested block variable
scope
DECLARE
myvar number;
BEGIN
myvar:=1;
```

Conditional and Loops (cont)

> dbms_output.put_line(myvar);
DECLARE
myvar number;
BEGIN
myvar:=2;
dbms_output.put_line(myvar);
END;
dbms_output.put_line(myvar);
END;
IF THEN ELSE END IF
DECLARE
v_number NUMBER;
BEGIN
IF v_number<=0 THEN
dbms_output.put_line('it is less than 0');
ELSIF v_number>=0 THEN
dbms_output.put_line('it is greater than 0');
ELSE
dbms_output.put_line('not either of the case');
END IF;
END;
Loops
FOR IN .. LOOP
{statements};
END LOOP;
WHILE condition
LOOP

Conditional and Loops (cont)

> {statements};
END LOOP;
LOOP
{statemens};
EXIT WHEN condition;
CONTINUE WHEN condition;
END LOOP;
Loops
DECLARE
i NUMBER :=10;
BEGIN
FOR i IN 1..5 LOOP
dbms_output.put_line(i);
END LOOP;
dbms_output.put_line(i);
END;
CASE – Simple Case
CASE expression
WHEN value_1 THEN
..
WHEN value_2 THEN
ELSE
END CASE;
CASE – Searched Case
WHEN boolean_expression
THEN
ELSE
END CASE;

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Function vs Procedures

Function must return a value. Procedure can not return a value

Function and procedure can both return data in OUT and IN OUT parameters

Function can be called from SQL, but not for procedure

Can not perform a DML DDL within function, while allowed in procedure

Trigger

```
CREATE [OR REPLACE]
TRIGGER trigger_name
BEFORE | AFTER
[INSERT, UPDATE, DELETE
[COLUMN NAME..]
ON table_name
Refere ncing [ OLD AS
OLD | NEW AS NEW ]
FOR EACH ROW | FOR EACH
STATEMENT [ WHEN
Condition ]
DECLARE
[decla rat ion _se -
ction]
BEGIN
[execu tab le_ sec tion]
EXCEPTION
[excep tio n_s ection]
END;
```

Substitution variable

No need to specify type, as it is always character type

No need to wrap around quote when assign value

Need quote when reference the variable

ACCEPT implicitly defined a substitution type variable

Use DEFINE to list out substitution variable

Procedures Parts

S.N.	Parts & Description
1	**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.
2	**Executable Part** This is a mandatory part and contains statements that perform the designated action.

Procedures Parts (cont)

3	**Exception-handling** This is again an optional part. It contains the code that handles run-time errors.

Parameter Modes in PL/SQL Subprograms

S.N.	Parts & Description
1	**IN** An IN parameter lets you pass a value to the subprogram. It is a read-only parameter. Inside the subprogram, an IN parameter acts like a constant. It cannot be assigned a value. You can pass a constant, literal, initialized variable, or expression as an IN parameter. You can also initialize it to a default value; however, in that case, it is omitted from the subprogram call. It is the default mode of parameter passing. Parameters are passed by reference.

Parameter Modes in PL/SQL Subprograms (cont)

2	**OUT** An OUT parameter returns a value to the calling program. Inside the subprogram, an OUT parameter acts like a variable. You can change its value and reference the value after assigning it. The actual parameter must be variable and it is passed by value.
3	**IN OUT** An IN OUT parameter passes an initial value to a subprogram and returns an updated value to the caller. It can be assigned a value and its value can be read. The actual parameter corresponding to an IN OUT formal parameter must be a variable, not a constant or an expression. Formal parameter must be assigned a value. Actual parameter is passed by value.

Packages Code Example

```
CREATE OR REPLACE
PACKAGE roppkg AS
  PRO CEDURE ropmall
(pi_city varchar2
default 'Missi ssa uga',
```


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Packages Code Example (cont)

```
> pi_mall varchar2,
 pi_city_code out varchar2) ;
FUNCTION roppop
(pi_city varchar2 default'Mississ-
auga')
RETURN NUMBER ;
END;
CREATE OR REPLACE
PACKAGE BODY roppkg AS
 PROCEDURE ropmall
(pi_city varchar2 default 'Missi-
ssauga',
 pi_mall varchar2,
 pi_city_code out varchar2)
AS
 l_cnt NUMBER;
 l_cid number;
BEGIN
 SELECT count(1) INTO l_cnt
from
 mall a
 WHERE
 a.mall_name=pi_mall
  ;
 IF l_cnt = 0
 THEN
  SELECT cid into l_cid
  FROM rop
  WHERE CITY=pi_city;

  INSERT INTO mall VALUES
(l_cid, pi_mall);
```

Packages Code Example (cont)

```
> END IF;
 COMMIT;
 pi_city_code:=l_cid;
END;
FUNCTION roppop
(pi_city varchar2 default'Mississ-
auga')
RETURN NUMBER AS
 l_pop NUMBER;
BEGIN
 SELECT population INTO l_pop
from
 rop WHERE city=pi_city;
 RETURN l_pop;
END;
END;
```

Function Example

```
CREATE or REPLACE
FUNCTION roppop
(pi_city varchar2 )
RETURN NUMBER AS
  l_pop NUMBER;
BEGIN
  SELECT population INTO
l_pop from
 rop WHERE city=p -
i_city;
  RETURN l_pop;
END;
```

Procedures Example

```
CREATE or REPLACE
PROCEDURE ropmall
(pi_city varchar2
default 'Missi ssa uga',
  pi_mall varchar2,
  pi_ cit y_code out
varchar2)
AS
  l_cnt NUMBER;
  l_cid number;
BEGIN
  dbm s_o utp ut.p ut -
_li ne( nvl (pi _ci -
ty_ cod e,' NUL L'));

  SELECT count(1) INTO
l_cnt from
 mall a
  WHERE
  a.m all _na me= -
pi_mall
   ;
 IF l_cnt = 0
 THEN
      SELECT cid into
l_cid
     FROM rop
      WHERE CITY=p -
i_city;

      INSERT INTO mall
VALUES (l_cid, pi_mall);
 END IF;
  COMMIT;
  pi_ cit y_c ode :=l -
_cid;
END;
```


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