Lab 7. PL/SQL Packages

Point Distribution:

Question Number	Points
1a, 1b, 1c, 1d, 1f, 2a, 2b, 2c, 2d, 2e, 2f, 2i	4 pts x 12
1e, 2g, 2h, 3c, 3f	4.8 pts x 5
3a, 3b, 3d, 3e	7 pts x 4
Total	**100 pts**

Objectives:

- Practice implementing PL/SQL Packages
- Practice implementing overloaded subroutines within PL/SQL packages

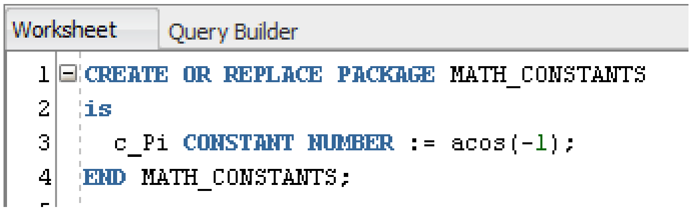
Questions

Specification-only Packages

Some Packages do not contain a body. Instead, they possess only a specification section.

These packages are typically used to hold values for constants.

1a Using the code provided below, create the MATH_CONSTANTS specification-only package.



```
CREATE OR REPLACE PACKAGE MATH_CONSTANTS
is
   c_Pi CONSTANT NUMBER := acos(-1);
END MATH_CONSTANTS;
```

1b What is the acos() function? What is the value of acos(-1)? What is this value typically referred to?

NOTE: acos stands for arc-cosine

1c What is the code necessary to retrieve the value of c_Pi and print it to the screen as output? Include both the code and the results in your submission.

1d Try retrieving the value of c_Pi as you would call a function (using a SELECT statement). Can you do so?

Include both the code and the results in your submission.

1e Create a PL/SQL function named CALCULATE_AREA that accepts a single numeric parameter: p_radius. This module should:

- calculate the area of a circle of the specified radius (if you don’t remember the formula, please look it up)
- use the value of c_Pi stored in the MATH_CONSTANTS package when calculating the area of the circle
- return a numeric value representing the area of the circle rounded to 3 digits

1f Test CALCULATE_AREA with the following values:

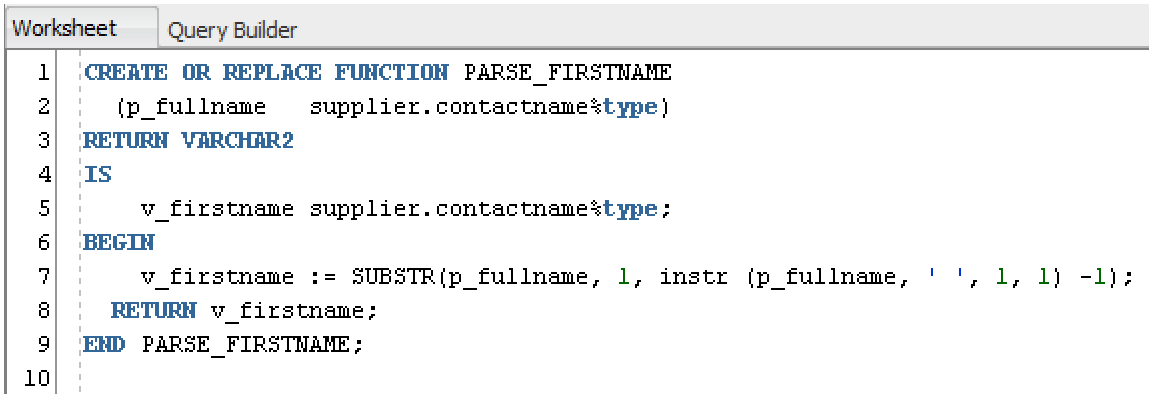
- radius = 5
- radius = 10
- radius = 15

Include both the code and the results in your submission.

General PL/SQL Packages

Most PL/SQL packages contain both a specification section and a body section. However, you may wish to test your functions and procedures prior to inserting them into the package.

2a Create the function PARSE_FIRSTNAME shown below.



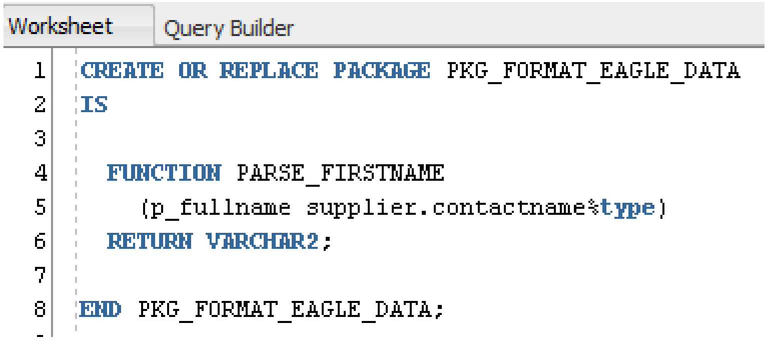
```
CREATE OR REPLACE FUNCTION PARSE_FIRSTNAME
  (p_fullname   supplier.contactname%type)
RETURN VARCHAR2
IS
    v_firstname supplier.contactname%type;
BEGIN
    v_firstname := SUBSTR(p_fullname, 1, instr (p_fullname, ' ', 1, 1) -1);
  RETURN v_firstname;
END PARSE_FIRSTNAME;

```

2b What is the code necessary to use the PARSE_FIRSTNAME function to retrieve the first name of each contact in the Eagle Electronics SUPPLIER table?
Include both the code and the results in your submission.

2c Once we are confident that the function is working correctly, we can remove (drop) the “naked” function and subsequently incorporate it into a package.
Drop the PARSE_FIRSTNAME function.

2d As shown below, create the package specification for a package named PKG_FORMAT_EAGLE_DATA. This package (at least initially) contains a single function named PARSE_FIRSTNAME.



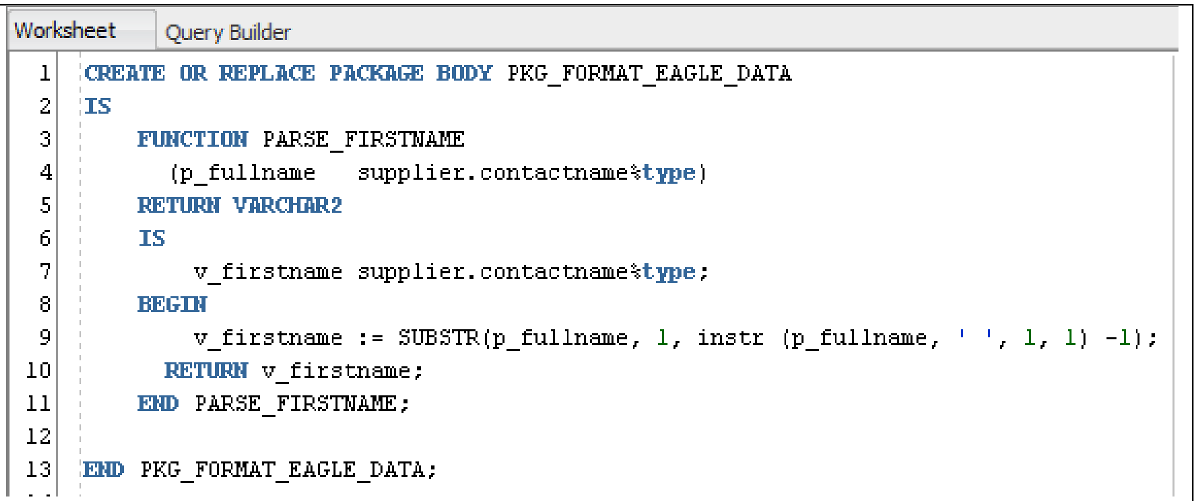
```
CREATE OR REPLACE PACKAGE PKG_FORMAT_EAGLE_DATA
IS

  FUNCTION PARSE_FIRSTNAME
    (p_fullname supplier.contactname%type)
  RETURN VARCHAR2;

END PKG_FORMAT_EAGLE_DATA;
```

Notice the interface for the PARSE_FIRSTNAME function is the module type (function), module name (PARSE_FIRSTNAME), parameter list, and return type.

2e Subsequently create the package body for the PKG_FORMAT_EAGLE_DATA package as shown below.



```
CREATE OR REPLACE PACKAGE BODY PKG_FORMAT_EAGLE_DATA
IS
    FUNCTION PARSE_FIRSTNAME
      (p_fullname    supplier.contactname%type)
    RETURN VARCHAR2
    IS
        v_firstname supplier.contactname%type;
    BEGIN
        v_firstname := SUBSTR(p_fullname, 1, instr (p_fullname, ' ', 1, 1) -1);
      RETURN v_firstname;
    END PARSE_FIRSTNAME;

END PKG_FORMAT_EAGLE_DATA;
```

Notice that the package body contains the full implementation details for the PARSE_FIRSTNAME function (unlike the package spec which contains no implementation details).

2f Test the PARSE_FIRSTNAME functionality of the PKG_FORMAT_EAGLE_DATA package using the contact name of the suppliers to Eagle Electronics.
Include both the code and the results in your submission.

2g Extend the package specification of the PKG_FORMAT_EAGLE_DATA package. Specifically, incorporate a 2nd public function named PARSE_LASTNAME into the package.

- The function should accept a character input in 'FirstName LastName' format
- The input should have the same data type with contact name from supplier table
- The function should return ONLY the last name of each contact

2h Extend the package body of the PKG_FORMAT_EAGLE_DATA package with the implementation details for the PARSE_LASTNAME function.

2i Using the contact name for each supplier to Eagle Electronics, test your PKG_FORMAT_EAGLE_DATA package.
Make certain to test **both** the PARSE_LASTNAME functionality (to confirm it works) as well as your PARSE_FIRSTNAME functionality (to confirm you have not broken anything).
Include both the code and the results in your submission.

Implement Your Own PL/SQL Package

3 Create a package named PKG_SHAPE_CALCULATION. Include the following modules in this package, each of which is described in the sub-questions.

- A public function named RECTANGLE_AREA (see part a)
- A public function named RECTANGLE_AREA (see part b)
- A private constant named c_Pi (see part c)
- A public function named CIRCLE_AREA (see part d)
- A private function CHECK_VALUE that takes a numeric value and returns a boolean value that indicates whether the input is acceptable (see part e)

3a A public function named RECTANGLE_AREA that:

	• accepts 2 numeric parameters: length and width • verifies that the length and width are physically possible – use private function CHECK_VALUE • calculates the area of a rectangle of the specified dimensions (if you don’t remember the formula, please look it up) • returns a numeric value representing this area • incorporates a general exception handler to gracefully deal with exceptions
3b	A public function named RECTANGLE_AREA that: • accepts 1 numeric parameter: length • verifies that the length is physically possible – use private function CHECK_VALUE • calculates the area of a square (e.g., a rectangle having sides of equal length) of the specified dimension (*NOTE: the function is named the same as in 5a, keep it this way*) • returns a numeric value representing this area • incorporates a general exception handler to gracefully deal with exceptions
3c	A private constant named c_Pi that uses the arccosine to determine the value of π. What is the benefit of making it private?
3d	A public function named CIRCLE_AREA that: • accepts 1 numeric parameter: radius • verifies that the radius is physically possible -– use private function CHECK_VALUE • calculates the area of a circle having the specified radius • returns a numeric value representing this area • incorporates a general exception handler to gracefully deal with exceptions
3e	A private function named CHECK_VALUE that: • accepts 1 numeric parameter which can used as a length, a width, or a radius • returns a boolean value (True or False) ○ True should be returned if the value is above 0 ○ False should be returned if the value is less than or equal to 0 • incorporates a general exception handler to gracefully deal with exceptions
3f	Test each of the modules in the PKG_SHAPE_CALCULATION package at least 3 times. Make certain to include the following cases in the test for each module • Positive number(s) • Negative number(s) • Zero(s) Include both the code and the results in your submission.