Step 3 – PL/SQL Code

Create OrderDetailsType which will be used in the first function.

```
CREATE OR REPLACE TYPE OrderDetailsType AS OBJECT (
  total_value NUMBER,
  total_orders NUMBER
);
/
```

Function 1:

Calculate total orders and total orders values for a customer

```
CREATE OR REPLACE FUNCTION calculate_order_details(p_customer_id IN NUMBER)
RETURN OrderDetailsType
IS
  -- Variable to store the total value of orders
  v_total_value NUMBER := 0;
  -- Variable to store the total number of orders
  v_total_orders NUMBER := 0;

  -- Cursor to iterate over orders of the specified customer
  CURSOR orders_cursor IS
    SELECT o.order_id
    FROM Orders o
    WHERE o.customer_id = p_customer_id;

  -- Variable to hold the order ID fetched from the cursor
  v_order_id Orders.order_id%TYPE;

  -- Cursor to fetch the total value of tickets for a specific order
  CURSOR tickets_cursor IS
    SELECT SUM(t.price) AS total_order_value
    FROM Order_Items oi
    JOIN Tickets t ON oi.ticket_id = t.ticket_id
    WHERE oi.order_id = v_order_id;

  -- Variable to hold the total value of tickets for the current order
  v_order_value NUMBER;
BEGIN
  -- Open the orders cursor
  OPEN orders_cursor;
  LOOP
    -- Fetch each order ID from the cursor
    FETCH orders_cursor INTO v_order_id;
    EXIT WHEN orders_cursor%NOTFOUND; -- Exit loop when no more rows are found

    -- Initialize the order value for the current order
    v_order_value := 0;

    -- Open the tickets cursor for the current order
    OPEN tickets_cursor;
    FETCH tickets_cursor INTO v_order_value;
    CLOSE tickets_cursor;

    -- Add the current order value to the total value
    v_total_value := v_total_value + v_order_value;
    -- Increment the total number of orders
    v_total_orders := v_total_orders + 1;
  END LOOP;
  -- Close the orders cursor
  CLOSE orders_cursor;

  -- Return the total value and total number of orders as an object
  RETURN OrderDetailsType(v_total_value, v_total_orders);
EXCEPTION
  WHEN NO_DATA_FOUND THEN
    RETURN OrderDetailsType(0, 0);
  WHEN OTHERS THEN
    RAISE;
END calculate_order_details;
/
```

Add discount field to orders table.

```
ALTER TABLE Orders ADD discount NUMBER(5, 2);
```

Procedure 1:

Receive a customer id and a total orders value and apply 10% discount to all orders if total orders value is higher than 1000.

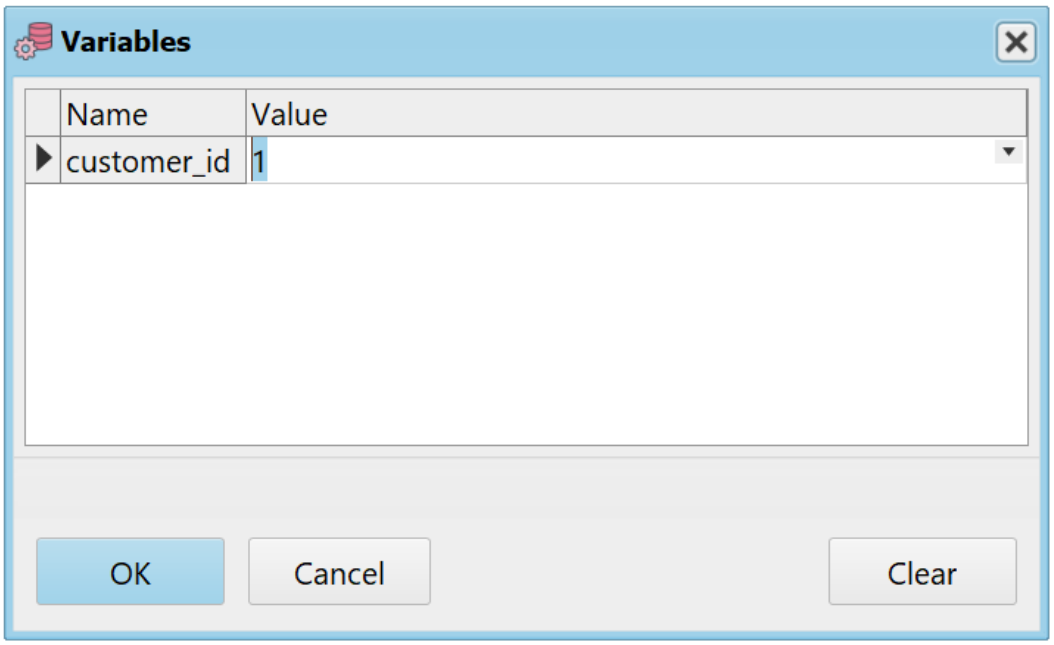
```
CREATE OR REPLACE PROCEDURE apply_discount_to_high_value_customer (
  p_customer_id IN Customers.customer_id%TYPE,
  p_total_value IN NUMBER
)
IS
BEGIN
  -- Check if the total value exceeds 1000
  IF p_total_value > 1000 THEN
    -- Apply 10% discount to all orders of the customer
    UPDATE Orders
    SET discount = 10
    WHERE customer_id = p_customer_id
      AND discount IS NULL; -- Update only if discount is not already set

    DBMS_OUTPUT.PUT_LINE('Discount applied to orders for customer ID: ' || p_customer_id);
  ELSE
    DBMS_OUTPUT.PUT_LINE('Total value is less than 1000. No discount applied.');
  END IF;
EXCEPTION
  WHEN OTHERS THEN
    DBMS_OUTPUT.PUT_LINE('An error occurred: ' || SQLERRM);
END apply_discount_to_high_value_customer;
/
```

Main program:

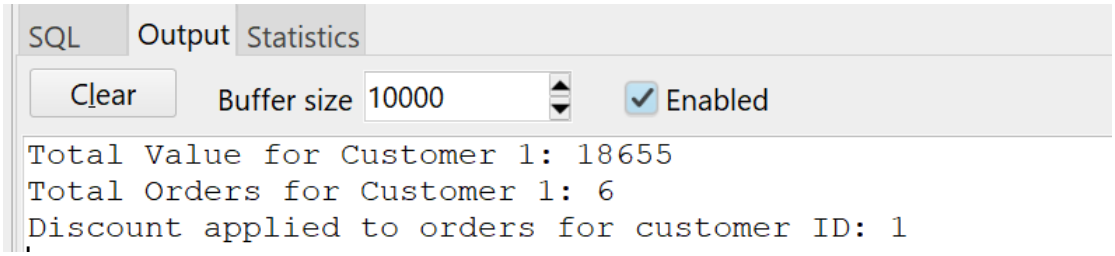
A program which receive a customer id as an input, calculates it's total orders value and update each order to get 10% discount.

```
DECLARE
  v_customer_id NUMBER := &customer_id; -- Input parameter for customer_id
  v_order_details OrderDetailsType;
BEGIN

  -- Call function to calculate total orders
  v_order_details := calculate_order_details(v_customer_id);
  DBMS_OUTPUT.PUT_LINE('Total Value for Customer ' || v_customer_id || ': ' || v_order_details.total_value);
  DBMS_OUTPUT.PUT_LINE('Total Orders for Customer ' || v_customer_id || ': ' || v_order_details.total_orders);

  -- Apply discount to high-value customers
  apply_discount_to_high_value_customer(v_customer_id, v_order_details.total_value);

EXCEPTION
  WHEN OTHERS THEN
    DBMS_OUTPUT.PUT_LINE('Error: ' || SQLERRM);
END;
/
```

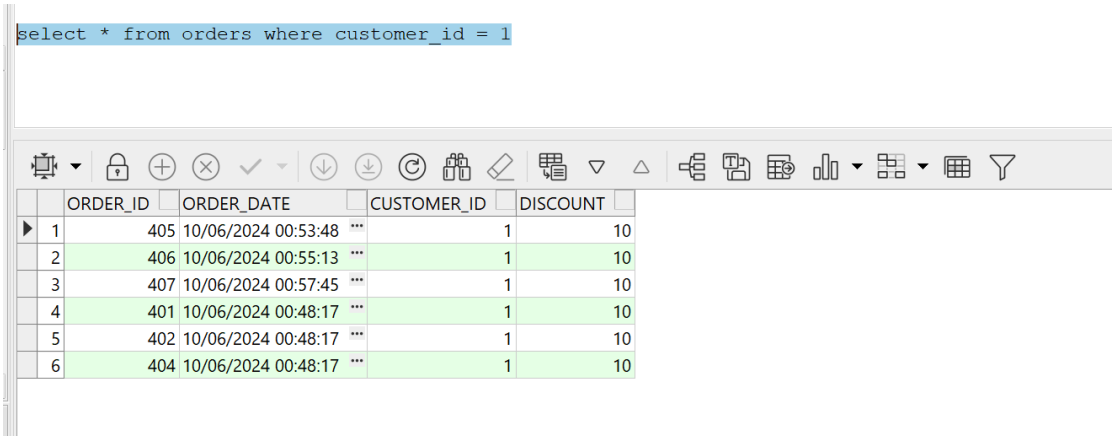
Main program execution.



Main program output.



Customer id 1 orders have been updated and 10 discount applied.



	ORDER_ID	ORDER_DATE	CUSTOMER_ID	DISCOUNT
1	405	10/06/2024 00:53:48	1	10
2	406	10/06/2024 00:55:13	1	10
3	407	10/06/2024 00:57:45	1	10
4	401	10/06/2024 00:48:17	1	10
5	402	10/06/2024 00:48:17	1	10
6	404	10/06/2024 00:48:17	1	10

Function 2:

Analyze attractions revenue by area.

Present a report displaying four categories:

Revenue > 1000

Revenue between 500 to 1000

Revenue between 100 to 500

Low revenue

The function receives an area id and returns the revenue analysis according to this area.

By default, the function returns analysis for all revenues.

```
-- Create a pipelined function to analyze revenue by area
CREATE OR REPLACE FUNCTION analyze_revenue_by_area (
    p_area_id IN NUMBER DEFAULT NULL
)
RETURN RevenueTableType PIPELINED
IS
    -- Declare local variables
    v_revenue_record RevenueRecordType;
BEGIN
    -- Query to fetch revenue data based on area id and categorize it
    FOR rec IN (

        SELECT
            A.ATTRACTION_NAME,
            SUM(T.PRICE),
            (CASE WHEN SUM(T.PRICE) > 1000 THEN SUM(T.PRICE) ELSE 0 END) AS REVENUE_OVER_1000,
            (CASE WHEN SUM(T.PRICE) > 500 AND SUM(T.PRICE) <= 1000 THEN SUM(T.PRICE) ELSE 0 END) AS REVENUE_OVER_500,
            (CASE WHEN SUM(T.PRICE) > 100 AND SUM(T.PRICE) <= 500 THEN SUM(T.PRICE) ELSE 0 END) AS REVENUE_OVER_100,
            (CASE WHEN SUM(T.PRICE) <= 100 THEN SUM(T.PRICE) ELSE 0 END) AS LOW_REVENUE
        FROM ATTRACTIONS A
        INNER JOIN TICKETS T ON A.ATTRACTION_ID = T.ATTRACTION_ID
        INNER JOIN Order_Items oi ON oi.ticket_id = t.ticket_id
        INNER JOIN LOCATIONS L ON A.LOCATION_ID = L.LOCATION_ID
        WHERE (P_AREA_ID IS NULL OR L.AREA_ID = P_AREA_ID)
        GROUP BY A.ATTRACTION_NAME

    ) LOOP
        -- Populate the record type with fetched data
        v_revenue_record := RevenueRecordType(
            rec.ATTRACTION_NAME,
            rec.REVENUE_OVER_1000,
            rec.REVENUE_OVER_500,
            rec.REVENUE_OVER_100,
            rec.LOW_REVENUE
        );

        -- Pipe the record type to the result set
        PIPE ROW(v_revenue_record);
    END LOOP;

    -- Return the pipelined result set
    RETURN;
EXCEPTION
    WHEN NO_DATA_FOUND THEN
        NULL; -- Return NULL when no data found
    WHEN OTHERS THEN
        RAISE; -- Raise exception for other errors
END analyze_revenue_by_area;
/
```

Procedure 2:

Calculate total revenue for attraction.

The procedure receives an attraction name and calculates it's revenue.

```
CREATE OR REPLACE PROCEDURE calculate_total_revenue (
    v_attraction_name IN VARCHAR2,
    p_total_revenue OUT NUMBER
)
IS
  v_total_revenue NUMBER := 0;

  CURSOR revenue_cursor IS
    SELECT price
    FROM Tickets t
    INNER JOIN Order_Items oi ON oi.ticket_id = t.ticket_id
    INNER JOIN Attractions A ON A.Attraction_Id = t.attraction_id
    WHERE attraction_name = v_attraction_name;
  v_price NUMBER;
BEGIN
  OPEN revenue_cursor;
  LOOP
    FETCH revenue_cursor INTO v_price;
    EXIT WHEN revenue_cursor%NOTFOUND;
    v_total_revenue := v_total_revenue + v_price;
  END LOOP;
  CLOSE revenue_cursor;

  -- Store the calculated total revenue in the output parameter
  p_total_revenue := v_total_revenue;
EXCEPTION
  WHEN NO_DATA_FOUND THEN
    p_total_revenue := 0;
  WHEN OTHERS THEN
    RAISE;
END calculate_total_revenue;
/
```

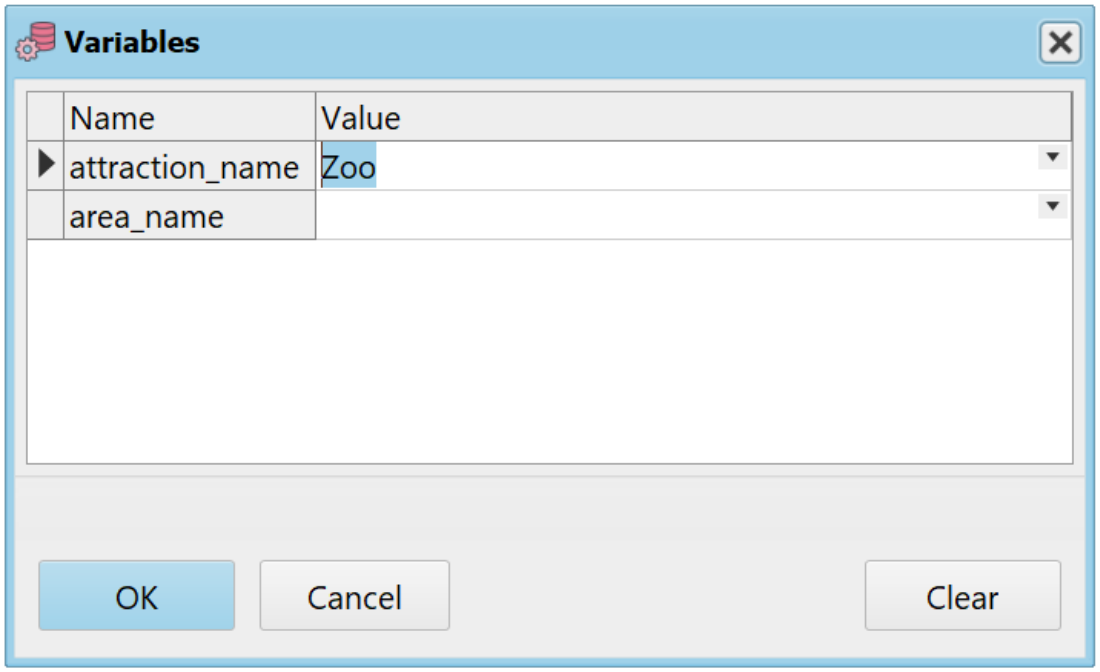
Main program:

The program receives an attraction name and area and then print the attraction revenue and a table with all revenues according to this area.

Eventually, the program presents the total count of attractions with high revenue.

```
DECLARE
  TYPE RevenueRecordType IS RECORD (
    attraction_name VARCHAR2(100),
    revenue_over_1000 NUMBER,
    revenue_over_500 NUMBER,
    revenue_over_100 NUMBER,
    low_revenue NUMBER
  );
  v_attraction_name VARCHAR2(100) := '&attraction_name'; -- Example attraction_name
  v_total_revenue NUMBER;
  v_area_name VARCHAR2(100) := '&area_name';
  rev_over_1000_count NUMBER;

  -- Define a cursor to fetch data from the pipelined function
  CURSOR c_revenue_records IS
    SELECT * FROM TABLE(analyze_revenue_by_area(v_area_name));

  v_revenue_table RevenueRecordType;
BEGIN

  -- Call function to calculate total revenue
  calculate_total_revenue(v_attraction_name, '&area_name', v_total_revenue);
  DBMS_OUTPUT.PUT_LINE('Total Revenue for ' || v_attraction_name || ': ' || v_total_revenue);
  DBMS_OUTPUT.PUT_LINE('');

  -- Open the cursor
  OPEN c_revenue_records;

  -- Fetch and process each record
  LOOP
    FETCH c_revenue_records INTO v_revenue_table;
    EXIT WHEN c_revenue_records%NOTFOUND;

    -- Output each row as a table format (you can format as needed)
    DBMS_OUTPUT.PUT_LINE(
      RPAD(v_revenue_table.attraction_name, 20) || ' | ' ||
      RPAD(v_revenue_table.revenue_over_1000, 15) || ' | ' ||
      RPAD(v_revenue_table.revenue_over_500, 15) || ' | ' ||
      RPAD(v_revenue_table.revenue_over_100, 15) || ' | ' ||
      RPAD(v_revenue_table.low_revenue, 15)
    );
  END LOOP;

   FETCH c_revenue_records INTO v_revenue_table;

  SELECT COUNT(*) INTO rev_over_1000_count FROM TABLE(analyze_revenue_by_area(v_area_name)) WHERE REVENUE_OVER_300 > 0;

     -- Output each row as a table format (you can format as needed)
    DBMS_OUTPUT.PUT_LINE('');
    DBMS_OUTPUT.PUT_LINE('Count attractions with high revenue: ' || RPAD(rev_over_1000_count, 15));

  -- Close the cursor
  CLOSE c_revenue_records;
EXCEPTION
  WHEN OTHERS THEN
    DBMS_OUTPUT.PUT_LINE('Error: ' || SQLERRM);
END;
/
```

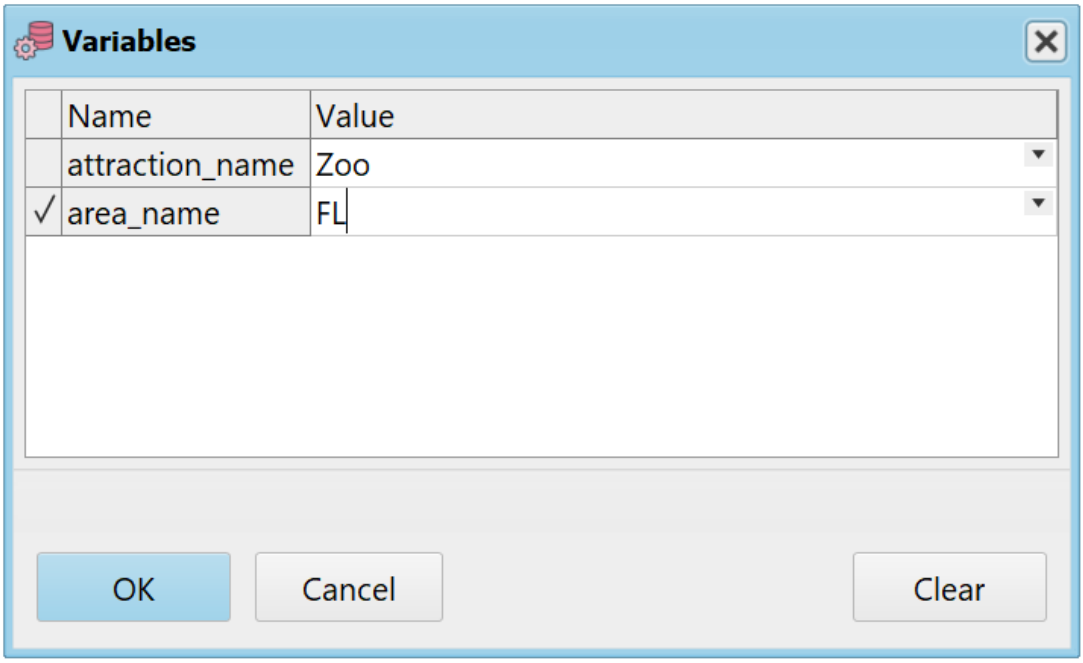
Main program execution:



Default – no area selected.

Output:

```
Total Revenue for Zoo: 1419

Observation Deck     | 0              | 792            | 0              | 0
Water Park           | 0              | 0              | 492            | 0
Wildlife Sanctuary   | 0              | 0              | 331            | 0
Public Garden        | 1503           | 0              | 0              | 0
Zoo                  | 1419           | 0              | 0              | 0
Science Center       | 0              | 889            | 0              | 0
Beach                | 0              | 931            | 0              | 0
Aquarium             | 0              | 0              | 210            | 0
Botanical Garden     | 0              | 583            | 0              | 0
Luna Park            | 1022           | 0              | 0              | 0
Adventure Park       | 0              | 754            | 0              | 0
Disneyland           | 0              | 952            | 0              | 0
Famous Bridge        | 1208           | 0              | 0              | 0
Historic Landmark    | 0              | 653            | 0              | 0
Cultural Festival    | 1354           | 0              | 0              | 0
Museum               | 0              | 904            | 0              | 0
Amusement Park       | 2535           | 0              | 0              | 0
Universal Studio     | 0              | 820            | 0              | 0
Art Gallery          | 0              | 0              | 425            | 0
National Park        | 0              | 878            | 0              | 0

Count attractions with high revenue: 6
```



Select FL area.

Output:

```
Total Revenue for Zoo: 416

Zoo                  | 0              | 0              | 416            | 0
Cultural Festival    | 0              | 0              | 290            | 0

Count attractions with high revenue: 0
```