AutoZone
(A National retail and service store)

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Project – Part 4: (PL/SQL Code)

Group Number: 8
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Introduction:

AutoZone, a national retailer of automotive parts and accessories Company has requirement to store the information of the inventory, employees, insurance, servicing, payment plans, supplier details and customer details. AutoZone also want to store the information about locations, jobs done by the employees and automotive retailer branch details.

Description:

- Each retailer in the AutoZone chain needs to be identified based on the retailer id. It can have the basic information like contact, business hour and each AutoZone retailer can have a manager and the website details related to the that location. Multiple employees can work in the one automotive retailer. Each retailer can have in house inventory and external inventory. Automotive retailer address/location needs to be stored. Each automotive retailer can afford multiple jobs or services.
- Inventory product entity serves as a major component and uniquely identified in this system. It manages the various automotive products. It includes the attributes like name, quantity, price, automotive_retailer_id, automobile_id, address_id. It holds the details of the automotive retailer, automobile data. It establishes the relation with suppliers, automotive retailers, part service, automobile, address and bill.It serves as a central component for efficient inventory management, procurement, and tracking within the system.
- Employee entity holds the data of the employees working in AutoZone. Each employee is uniquely identified with their ID. Along with the ID this entity will also have the attributes first name, last name, date of birth, phone number, email address, annual salary, ssn, address, hire date and the automotive retailer ID. An employee can create many bills for the customers and so the employee entity will form a one-to-many

relation with the bill entity. More than one employee can have the same address as there is a chance of 2 employees living in the same location. So, employee will form a many to one relationship with the address entity. Many employees can be part of a job and one employee can be part of many jobs. So, employee entity will form many to many relationships with the job entity. As Many employees work in one location, employee entity will form a many to one relationship with the automotive retailer entity. Employees may receive multiple paychecks over a period. So, Employee entity will form a one-to-many relationship with employee payroll entity.

- Employee payroll entity has the record of paychecks given to employees. Each pay given to an employee is identified by a unique id. This entity has the attributes hours worked (number of hours worked by employee during the pay cycle), start date (start date of the pay cycle), end date (end date of the pay cycle), pay (amount paid to the employee) and employee id (id of the employee that is used to uniquely identify an employee). The employee payroll entity will form a many to one relationship with the employee as one employee may receive many pays over a period.
- AutoZone can have suppliers to inventory who supply the products that stored or used during the services. An inventory can have multiple suppliers and vice versa. Suppliers' information like contact and address needs to be stored. Suppliers can uniquely identified by their id.
- Address entity serves as a global component within the system, defines location information. It is uniquely identified and includes the attributes like apartment number, street, city, state, country, and ZIP code, all of them are mandatory. This entity forms relationships with other entities in various ways: many employees may have a single address, inventory products are associated with specific addresses, automotive retailers and suppliers have distinct addresses, and multiple customers can be linked to one address.
- Bill entity is crucial for recording financial transactions. It is uniquely defined and includes attributes like date, payment mode, insurance, customer, job, employee, sale type (can be an online or offline), and payment plan. It forms relationships with various entities: multiple bills can be linked to one employee, have many-to-many connections with inventory products, and maintain multiple bills of each association with insurance, customers, and payment plans. Additionally, every job has a specific bill.
- Job entity is essential for managing automotive service tasks. It is uniquely defining and includes attributes like date, description, customers, automotive retailers, VIN numbers, and automobiles. All of which are mandatory. "Job" forms key relationships: It establishes a direct link with billing records, multiple jobs are associated with automobiles and automotive retailers, Customers. Various jobs can be done by different employees. Whereas Single job can be performed using multiple part services. This entity serves as a central hub for tracking and managing automotive service jobs.
- Part service like during the service which are automotive parts we are using to get the job done for a vehicle. It may have the information like job details, name/description of the service and it can have quantity of the parts which are using for that service. Part service can be identified by their id. Part service can have type like is it only service or

any parts used to get that service done. In this many parts service can be related to one job and it have information related to the inventory products to know the parts related to the which inventory.

- Customer entity represents individuals in the system and is identified uniquely. It includes essential attributes like first name, last name, birthdate, driver's license, phone, and address. Multiple customers may opt for multiple insurance policies. A Customer can be associated with multiple jobs which has multiple bills. Many customers may have the single address. This entity enables efficient management of customer data, service history, and financial transactions.
- Insurance is like if customer wants to utilize his insurance plan for the payment, we need to store the information of that insurance. It can have policy type, provider and claim percentage. The particular insurance plan can be identified by plan id. A customer can have multiple insurance and vice versa. we would also like to include insurance id in the bill, it will be like one insurance plan can be included in many bills.
- Payment plan like if customer interested in the paying in instalments, he can use this option. This payment plan will have the information like plan name, number of instalments and the interest rate related to the payment plan. Each payment can be identified by plan id and multiple bills can have single payment plan.
- Would like to store the information about automobile. So that when the job is performed we can use the parts related to the specific automobile model. It can have the information like manufacture, name, variant, year of the build and color of the vehicle. Each automobile model can be identified by automobile id. An automobile can have multiple products in the inventory and would like to keep the automobile information in the jobs performed. It will be like multiple jobs can be performed to an automobile.

- Inventory-product-supplier is a relation table. Which has a primary and foreign key as inventory_product_id, supplier_id. It has a single attribute quantity. Multiple suppliers will provide multiple products. In this we maintain the product_id, supplier_id and the product quantity provided by the supplier.

- Bill_inventory_product is a relation table. Which has a primary and foreign key as bill_id, inventory_product_id. It has a single attribute quantity. Multiple products will have the multiple bills. In this we maintain the bill_id, product_id and the product quantity in each generated bill.

- Job_employee is a relation table. Which has the primary and foreign key as job_id and employee_id. There are multiple employees, working for the on the different jobs to maintains the those details this table helps to track the respective details. It’s a join of employee and job and the job table.

- Cunstomer_insurance is a relation table. Which has the primary and foreign key as cutomer_id and insurance_id. It has a single attribute status. Many customers can opt

for multiple insurances. This table helps to track the insurance opted by the customers and their status.

- In the automotive_retailer a name attribute is newly added. The name identifier helps to track the name of specific automotive_retailer.

Along with the above description we have added one more attribute in the Job table called job_status which describes about the status of the job such as 'completed', 'inprogress', 'unassigned'.

Assumptions:

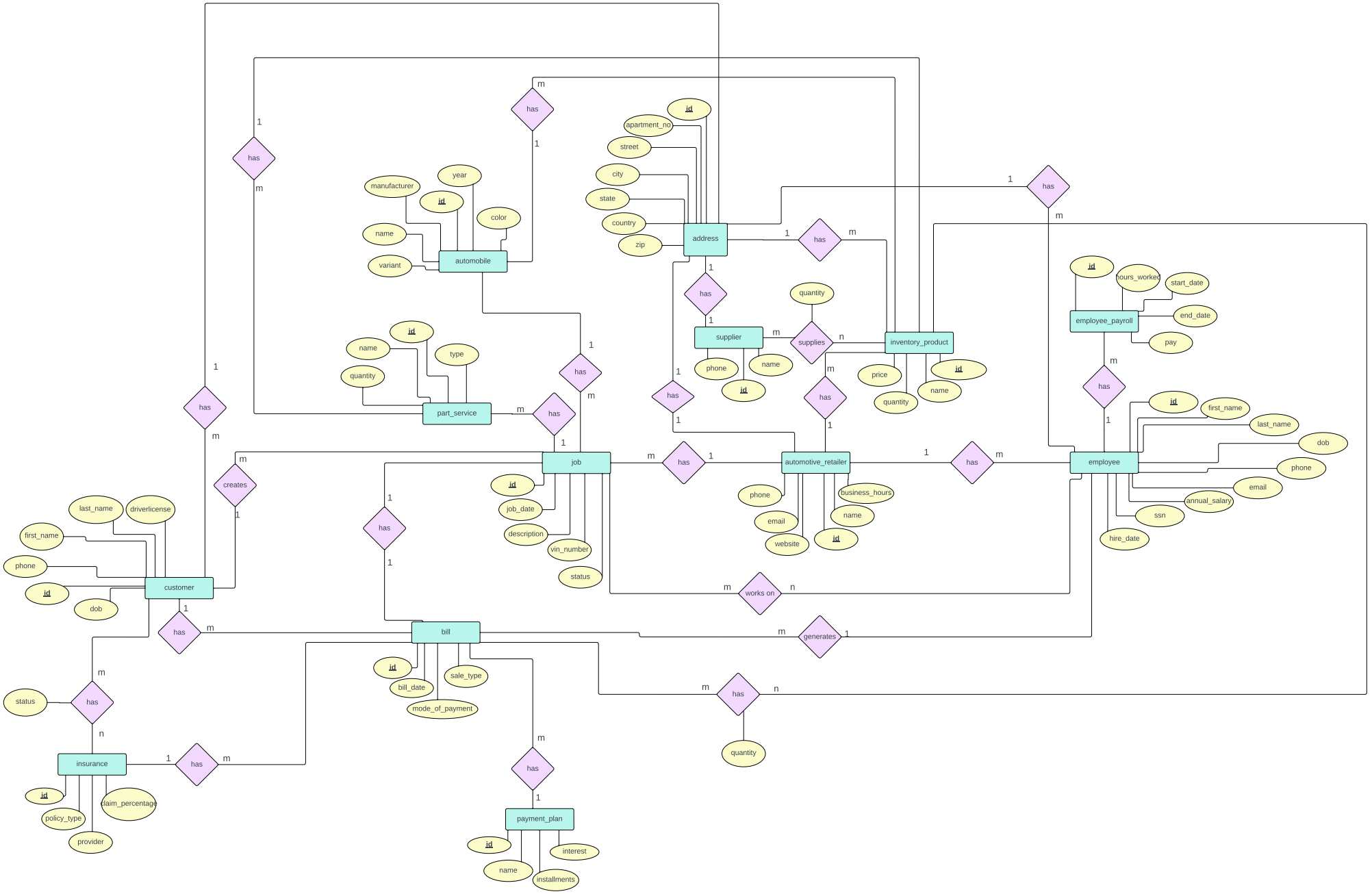
- A product can be available both in store and in warehouse. If the product has automative_retailer_id same as address id, that means the product is in store. And if automative_retailer_id is null, then the inventory is not in store.
- Automobile entity will have the generic information about the model, manufacturer and make of the automobile available in the market.
- A job will be created if a customer wants to get his automobile serviced in the store and the bill will be generated for the job.
- A bill can be generated without a job when a customer purchases products from the store without getting the service done in store where this data is stored in bill_inventory table.
- Employee can receive multiple payments over a period. This is maintained in employee_payroll table.
- Employee can be part of the job and he can generate bill for the job. And employee can sell the products to the customer who is not seeking service (not part of the job) from the retailer.
- Address is global table where the addresses of suppliers, customers, employees, inventory and retailer are stored.
- customer can pay the bill directly or he can opt for payment plan. Customer can select the payment plan form the payment_plan table.
- Job will be created if a customer opts services from the retailer. services are work done by the employees on the automobile to fix issues or install accessories.
- Part_services have the information about the products used in the job. One Job can have multiple products.
- Insurance table has different insurance policies that are available in the market.
- more than one person (customer or employee) can have same address. but no 2 suppliers and retailers can have the same address.
- product id in part service can be null as labor chargers of a job can also be clocked in part service where no inventory will be tagged to that service.

- The total amount of the bill of a customer who opted for a payment plan will be recorded as a transaction in bill table. And the installments are also saved as transactions in the same table.
- A phone number must consist of 10 digits and should only contain numerical characters, with no special symbols or spaces.
- Each email address must be unique, meaning no two users can share the same email ID.
- In the bill table, the sale type can be categorized as either online or offline.
- The vin_number in the job table must have a fixed length of 17 characters.
- The quantity of one item in a bill cannot exceed 10, as customers are limited to purchasing a maximum of 10 identical items.
- The status of insurance in the customer_insurance table can be either active or inactive.
- Zip codes are required to have a fixed length of 5 characters.
- Employees cannot work for more than 100 hours within a two-week period.
- The mode of payment in the bill table can be either cash or card.
- Sales cannot occur across different AutoZone locations. It is limited to few locations.
- When an automotive retailer is deleted from a location, the suppliers associated with that location are also removed.

Along with the above assumption we have added one more assumption as part of project part 4.

- In our autozone, in-progress jobs play the vital role until the job_satus changed to completed. so, any changes on the customer table are closely monitored.

Entity Relationship Diagram



List of PL/SQL Queries for Project-Part 4

The below screenshot displays the list of cloud users using as part of project part 4.

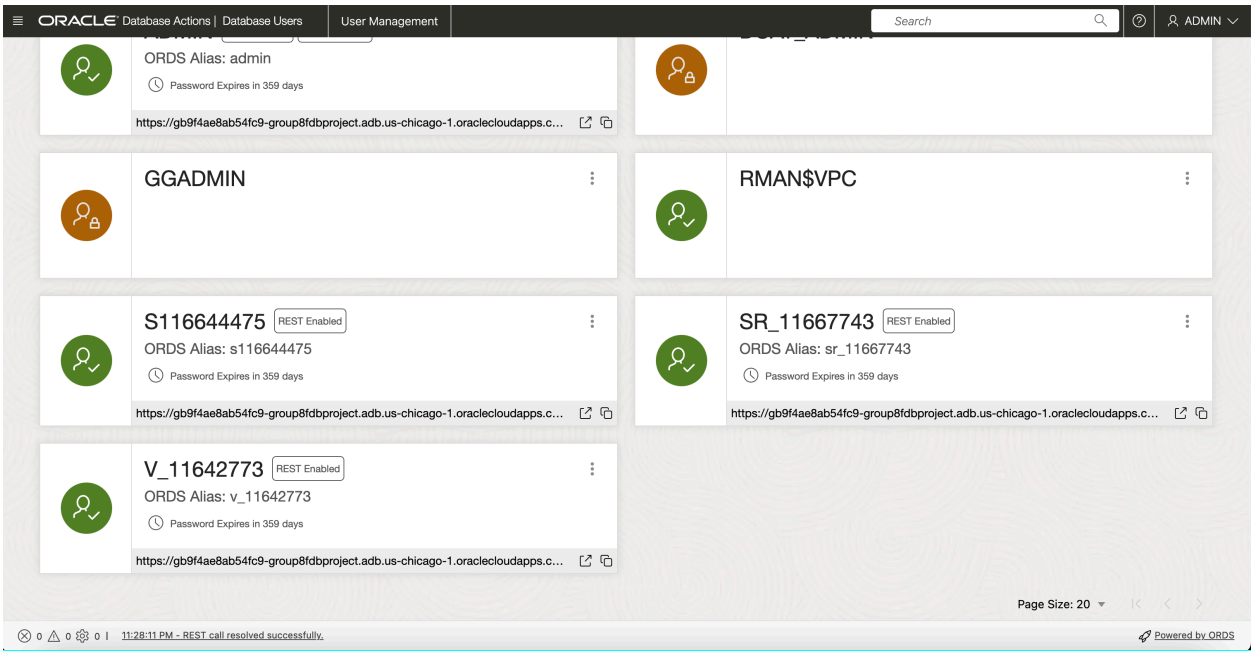


Figure-1: Displayed all the users.

Database Users Details:

V_11642773: https://gb9f4ae8ab54fc9-group8fdbproject.adb.us-chicago-1.oraclecloudapps.com/ords/v_11642773/_sdw/

SR_11667743: https://gb9f4ae8ab54fc9-group8fdbproject.adb.us-chicago-1.oraclecloudapps.com/ords/sr_11667743/_sdw/

S116644475: https://gb9f4ae8ab54fc9-group8fdbproject.adb.us-chicago-1.oraclecloudapps.com/ords/s116644475/_sdw/

Stored Procedures:

1. **write a stored procedure when bill is generated for a new customer, the customer address should be recorded in the address table.**

PL/SQL Code:

```
CREATE OR REPLACE PROCEDURE InsertNewCustomerAddress(
   v_first_name IN VARCHAR2,
   v_last_name VARCHAR2,
   v_dob VARCHAR2,
   v_driverlicense varchar2,
   v_phone varchar2,
   p_apartment_no IN NUMBER,
   p_street IN VARCHAR2,
   p_city IN VARCHAR2,
   p_state IN VARCHAR2,
   p_country IN VARCHAR2,
   p_zip IN CHAR,
   p_address_id OUT RAW,
   v_customer_id OUT RAW
)
IS
BEGIN
   -- Check if an address with the same details already exists
   SELECT id INTO p_address_id
   FROM SR_11667743.address
   WHERE apartment_no = p_apartment_no
   AND street = p_street
   AND city = p_city
   AND state = p_state
   AND country = p_country
   AND zip = p_zip;

   -- If an existing address is found, return its ID
   IF p_address_id IS NOT NULL THEN

      -- If no matching address is found, generate a new address ID
       dbms_output.put_line('Found address_id = ' || p_address_id);

      SELECT SYS_GUID() INTO v_customer_id FROM DUAL;

      INSERT INTO S116644475.customer(id, first_name, last_name, dob, driverlicense,
phone, address_id)
```

```
      VALUES (v_customer_id, v_first_name, v_last_name, TO_TIMESTAMP(v_dob, 'DD-
MM-YYYY'), v_driverlicense, v_phone, p_address_id);
   END IF;

   EXCEPTION
   WHEN NO_DATA_FOUND THEN
      SELECT SYS_GUID() INTO p_address_id FROM DUAL;
      dbms_output.put_line('New address_id = ' || p_address_id);

      -- Insert the new address record
      INSERT INTO SR_11667743.address(id, apartment_no, street, city, state, country,
zip) VALUES (p_address_id, p_apartment_no, p_street, p_city, p_state, p_country,
p_zip);

      SELECT SYS_GUID() INTO v_customer_id FROM DUAL;

      INSERT INTO S116644475.customer (id, first_name, last_name, dob, driverlicense,
phone, address_id) VALUES (v_customer_id, v_first_name, v_last_name,
TO_TIMESTAMP(v_dob, 'DD-MM-YYYY'), v_driverlicense, v_phone, p_address_id);
END;
/
```

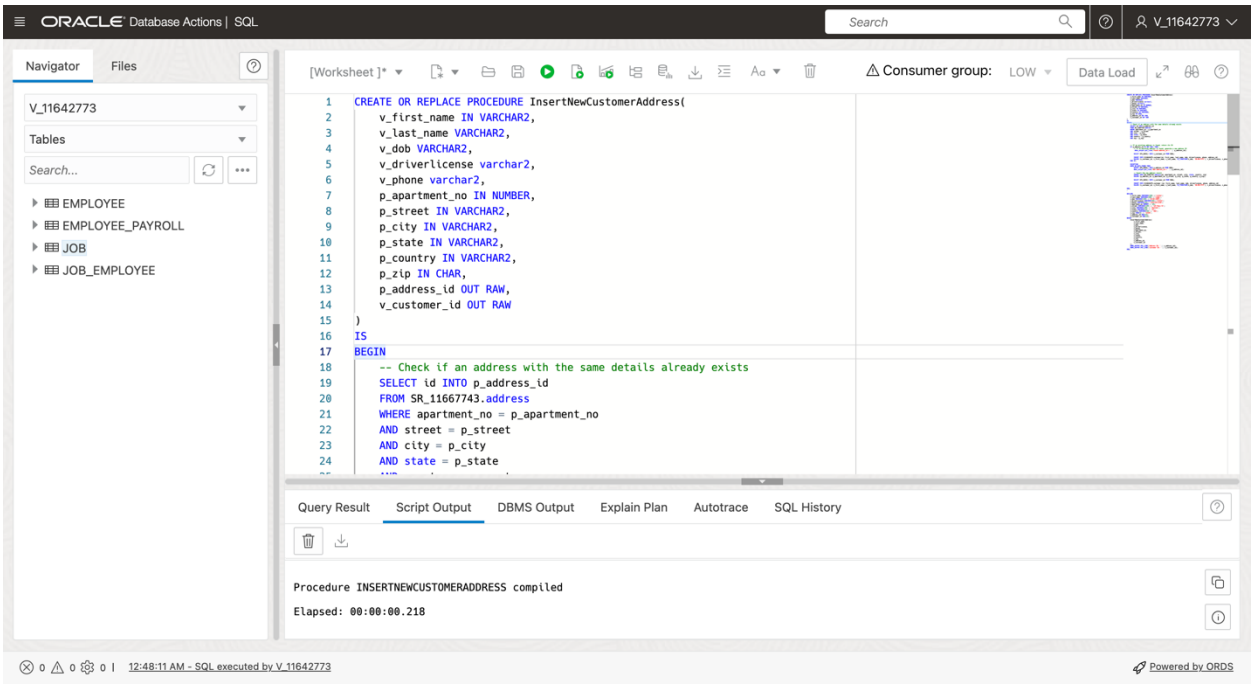
Execution Code:

```
DECLARE
   v_first_name VARCHAR2(100) :='vishnu';
   v_last_name VARCHAR2(100) :='reddy';
   v_dob VARCHAR2(100) :='23-02-1999';
   v_driverlicense VARCHAR2(50):='111111';
   v_phone VARCHAR2(50):='(123)123-1238';
   v_apartment_no NUMBER := 101;
   v_street VARCHAR2(100) := '123 Main St';
   v_city VARCHAR2(100) := 'Anytown';
   v_state VARCHAR2(50) := 'CA';
   v_country VARCHAR2(50) := 'USA';
   v_zip CHAR(5) := '12345';
   v_address_id RAW(16);
   v_customer_id RAW(16);
```

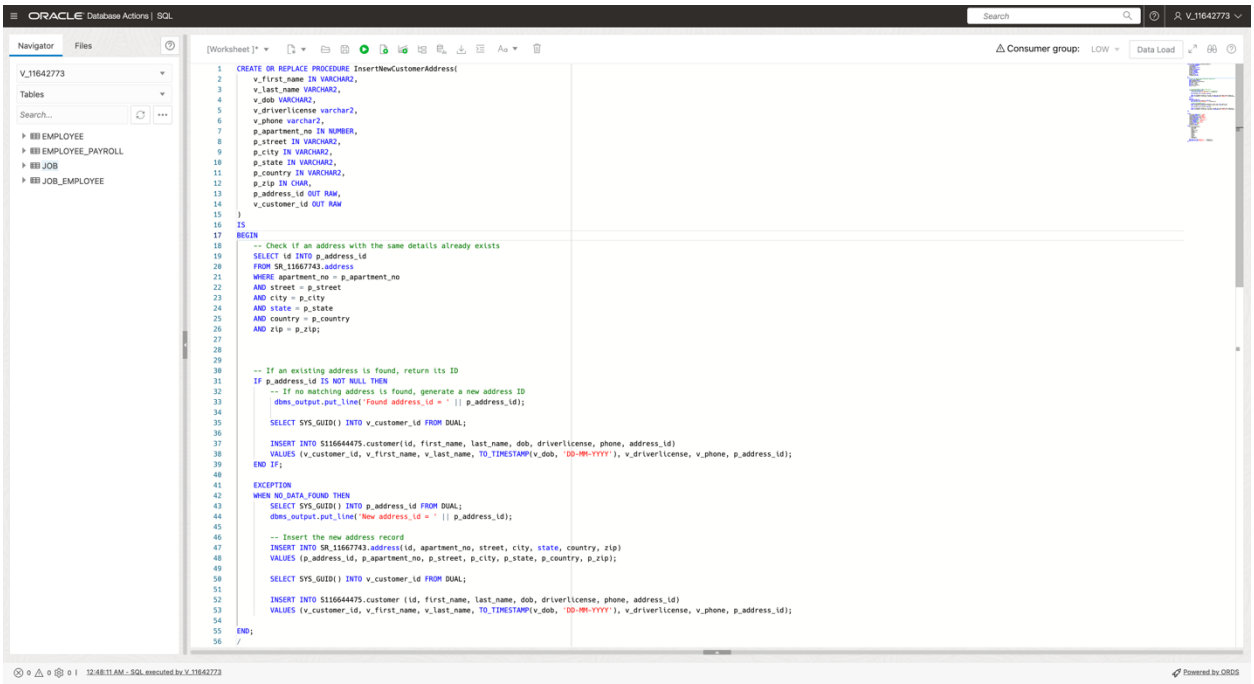
```
BEGIN
   InsertNewCustomerAddress(
      v_first_name,
      v_last_name,
      v_dob,
      v_driverlicense,
      v_phone,
      v_apartment_no,
      v_street,
      v_city,
      v_state,
      v_country,
      v_zip,
      v_address_id,
      v_customer_id
   );
   DBMS_OUTPUT.PUT_LINE('Address ID: ' || v_address_id);
   DBMS_OUTPUT.PUT_LINE('customer ID: ' || v_customer_id);
END;
/
```

Code Execution in Cloud:

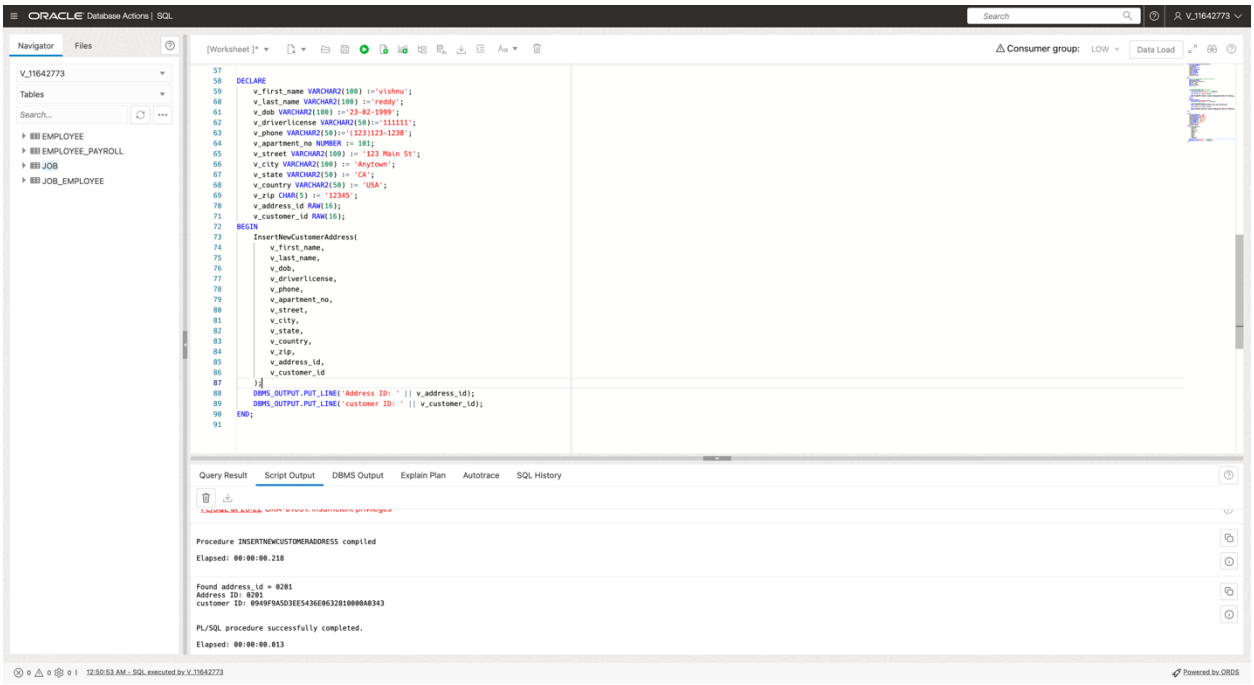
Screenshot-1:



Screenshot-2:



Screenshot-3:



Explanation: The procedure, `InsertNewCustomerAddress`, is designed to insert a new customer's address into the database and associate it with a customer record. This procedure inserts a new customer's address into the database, either by reusing an existing address or creating a new one and associates it with a new customer record. It ensures that the address is uniquely identified and linked to the customer.

2. **create a stored procedure that prints the list of inventory items belonging to a automotive retailer having more than 1 employees working in it**

PL/SQL Code:

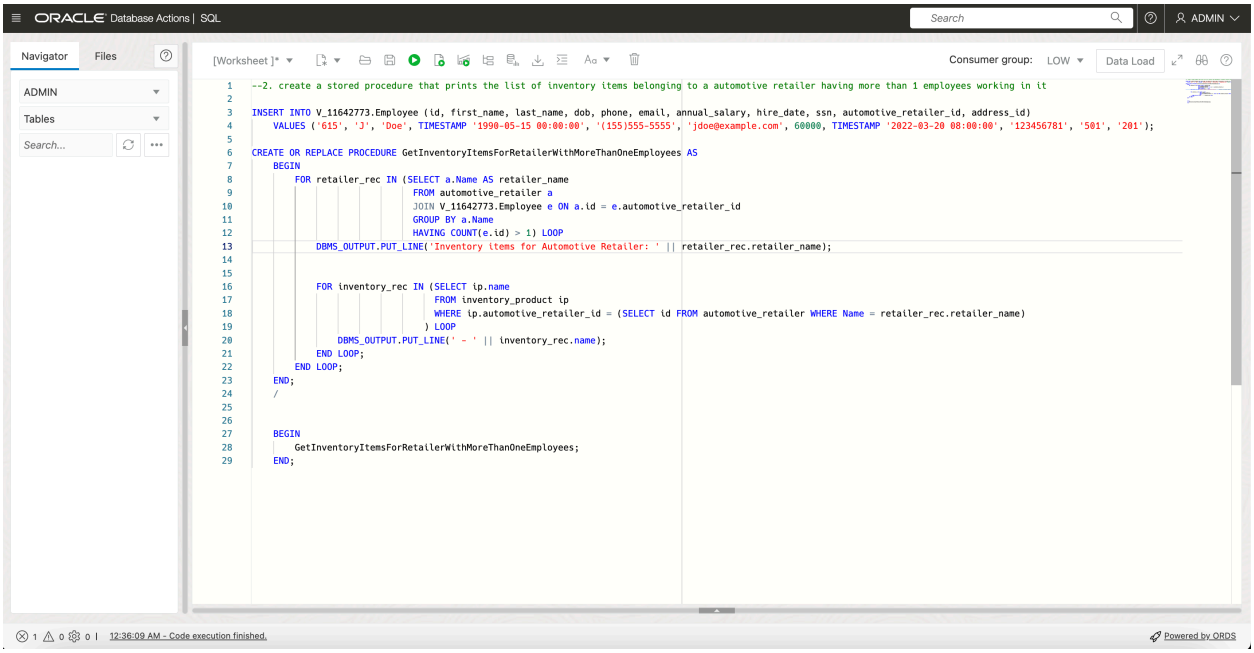
```
CREATE OR REPLACE PROCEDURE GetInventoryItemsForRetailerWithMoreThanOneEmployees
AS
  BEGIN
    FOR retailer_rec IN (SELECT a.Name AS retailer_name
                FROM automotive_retailer a
                JOIN V_11642773.Employee e ON a.id = e.automotive_retailer_id
                GROUP BY a.Name
                HAVING COUNT(e.id) > 1) LOOP
      DBMS_OUTPUT.PUT_LINE('Inventory items for Automotive Retailer: ' ||
retailer_rec.retailer_name);

      FOR inventory_rec IN (SELECT ip.name
                  FROM inventory_product ip
                  WHERE ip.automotive_retailer_id = (SELECT id FROM automotive_retailer
WHERE Name = retailer_rec.retailer_name)) LOOP
        DBMS_OUTPUT.PUT_LINE(' - ' || inventory_rec.name);
      END LOOP;
    END LOOP;
  END;
  /
```

Execution Code:

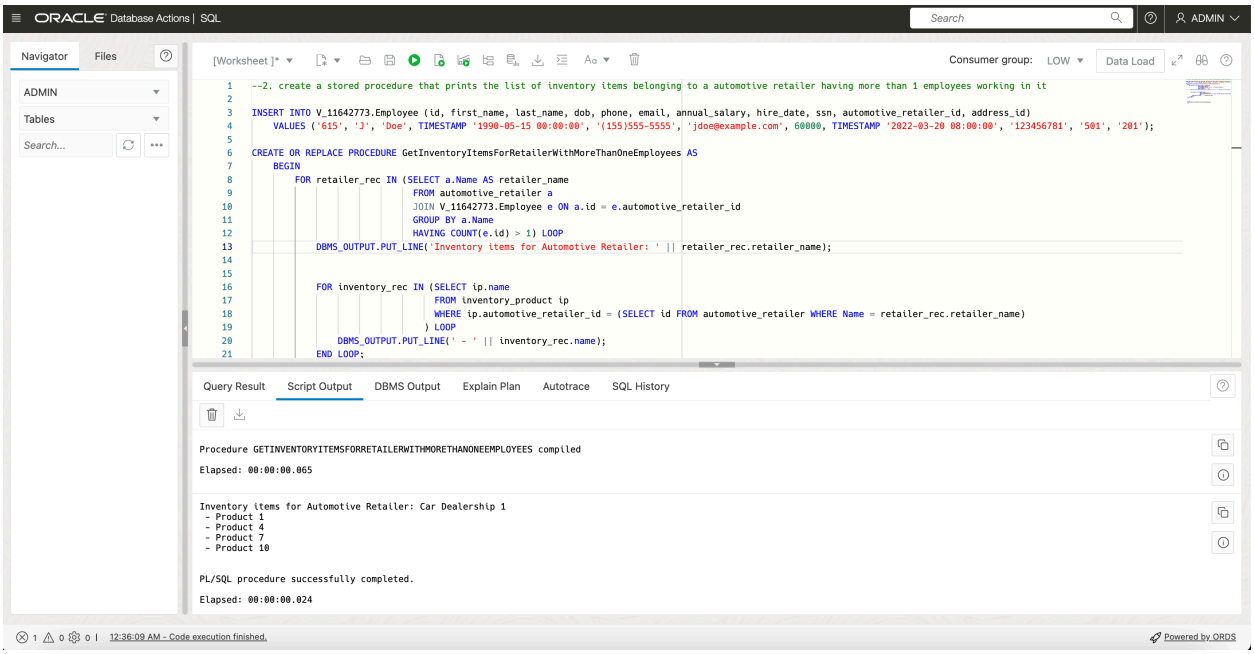
```
  BEGIN
    GetInventoryItemsForRetailerWithMoreThanOneEmployees;
  END;
```

Code Execution in Cloud:

Screenshot-1:



Screenshot-2



Explanation: This procedure, named GetInventoryItemsForRetailerWithMoreThan5Employees, is designed to retrieve and display the inventory items for automotive retailers that have more

than 5 employees. The procedure identifies automotive retailers with more than 5 employees, and for each of these retailers, it lists the names of the inventory items they have for sale.

3. **Write a stored procedure to retrieve the top suppliers' information including their names and the total quantity supplied using Pl/SQL.**

PL/SQL Code:

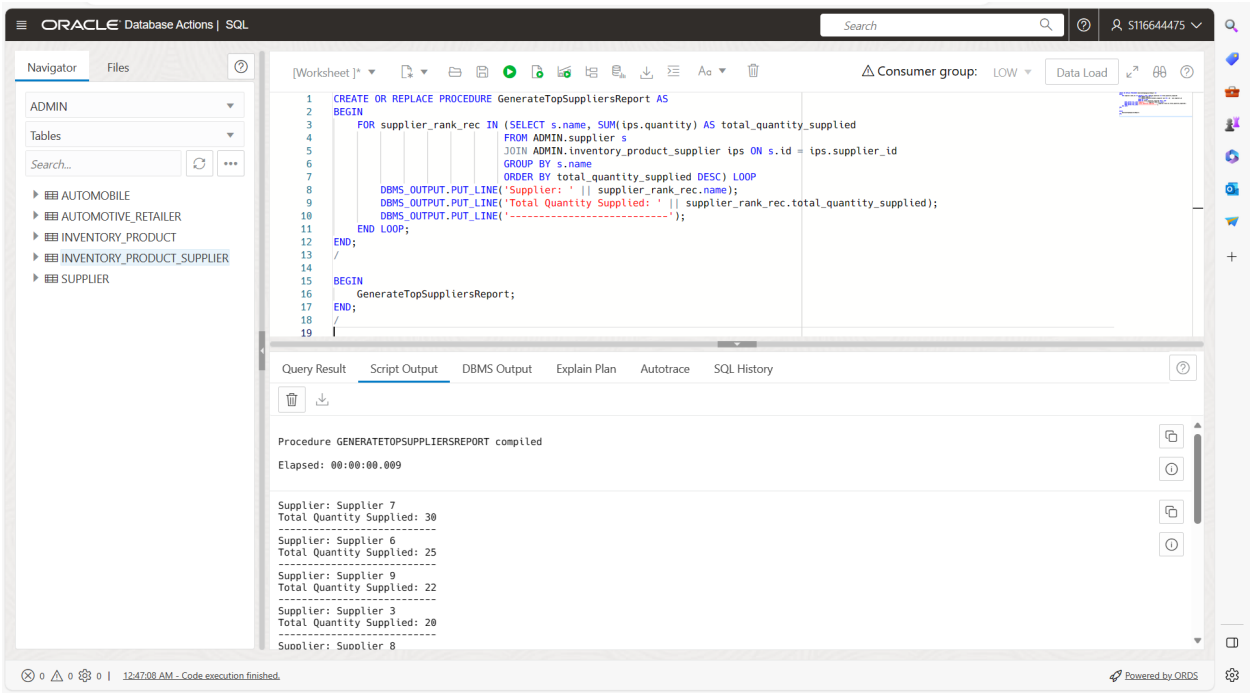
```
CREATE OR REPLACE PROCEDURE GenerateTopSuppliersReport AS
BEGIN
   FOR supplier_rank_rec IN (SELECT s.name, SUM(ips.quantity) AS total_quantity_supplied
                     FROM ADMIN.supplier s
                     JOIN ADMIN.inventory_product_supplier ips ON s.id = ips.supplier_id
                     GROUP BY s.name
                     ORDER BY total_quantity_supplied DESC) LOOP
      DBMS_OUTPUT.PUT_LINE('Supplier: ' || supplier_rank_rec.name);
      DBMS_OUTPUT.PUT_LINE('Total Quantity Supplied: ' ||
supplier_rank_rec.total_quantity_supplied);
      DBMS_OUTPUT.PUT_LINE('---------------------------');
   END LOOP;
END;
/
```

Execution Code:

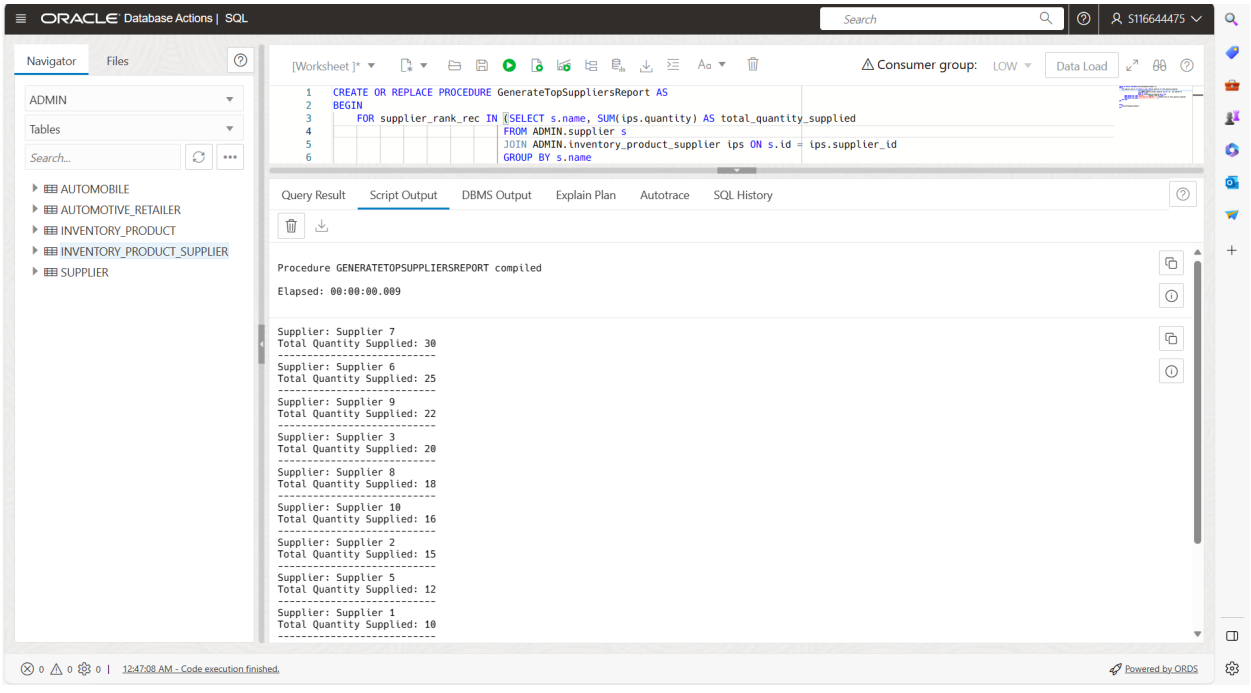
```
BEGIN
   GenerateTopSuppliersReport;
END;
/
```

Code Execution in Cloud:

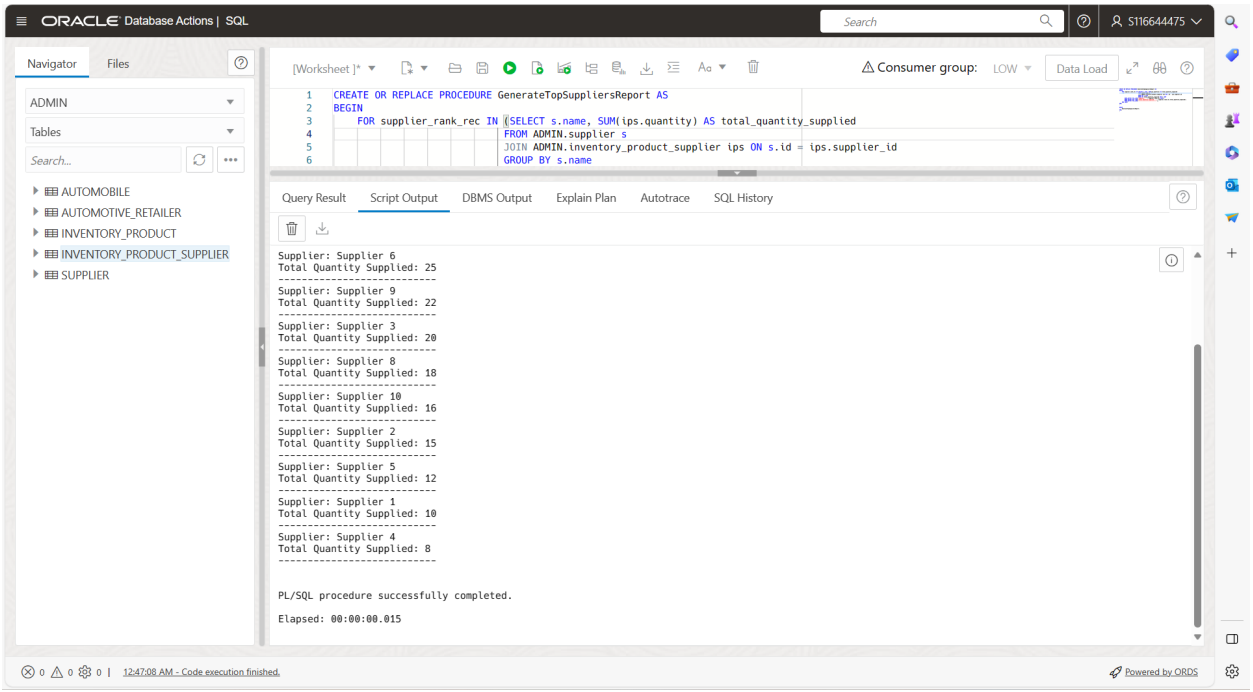
Screenshot-1:



Screenshot-2:



Screenshot-3:



Explanation: This procedure, "GenerateTopSuppliersReport," is designed to calculates and displays a report that lists the top suppliers in the database based on the total quantity of products they have supplied, with the highest-supplying suppliers appearing at the top of the report. It retrieves data by joining the supplier and inventory_product_supplier tables, grouping by supplier and calculating the total quantity supplied, and then ranks the suppliers in descending order.

4. **Write a stored procedure to retrieve a list of customers who have purchased specific inventory products and provides details of their purchases.**

PL/SQL Code:

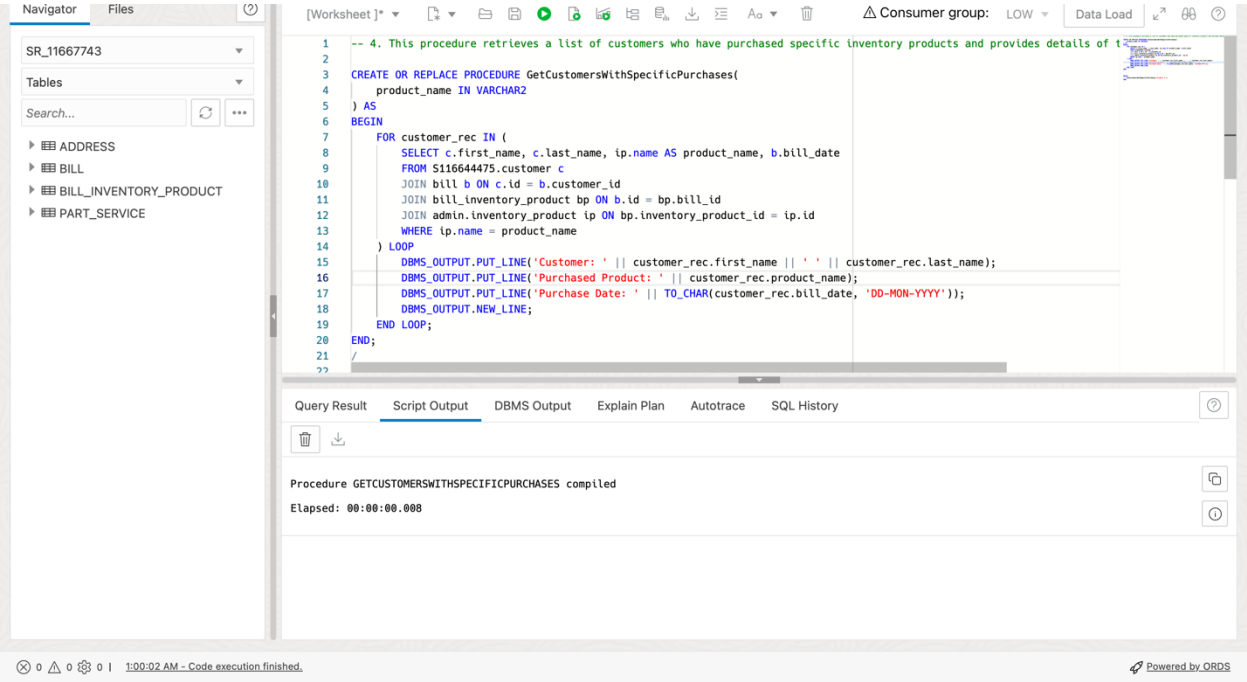
```
CREATE OR REPLACE PROCEDURE GetCustomersWithSpecificPurchases(
   product_name IN VARCHAR2
) AS
BEGIN
   FOR customer_rec IN (
      SELECT c.first_name, c.last_name, ip.name AS product_name, b.bill_date
      FROM S116644475.customer c
      JOIN bill b ON c.id = b.customer_id
      JOIN bill_inventory_product bp ON b.id = bp.bill_id
      JOIN admin.inventory_product ip ON bp.inventory_product_id = ip.id
      WHERE ip.name = product_name
   ) LOOP
      DBMS_OUTPUT.PUT_LINE('Customer: ' || customer_rec.first_name || ' ' ||
customer_rec.last_name);
      DBMS_OUTPUT.PUT_LINE('Purchased Product: ' || customer_rec.product_name);
      DBMS_OUTPUT.PUT_LINE('Purchase Date: ' || TO_CHAR(customer_rec.bill_date, 'DD-
MON-YYYY'));
      DBMS_OUTPUT.NEW_LINE;
   END LOOP;
END;
/
```

Execution Code:

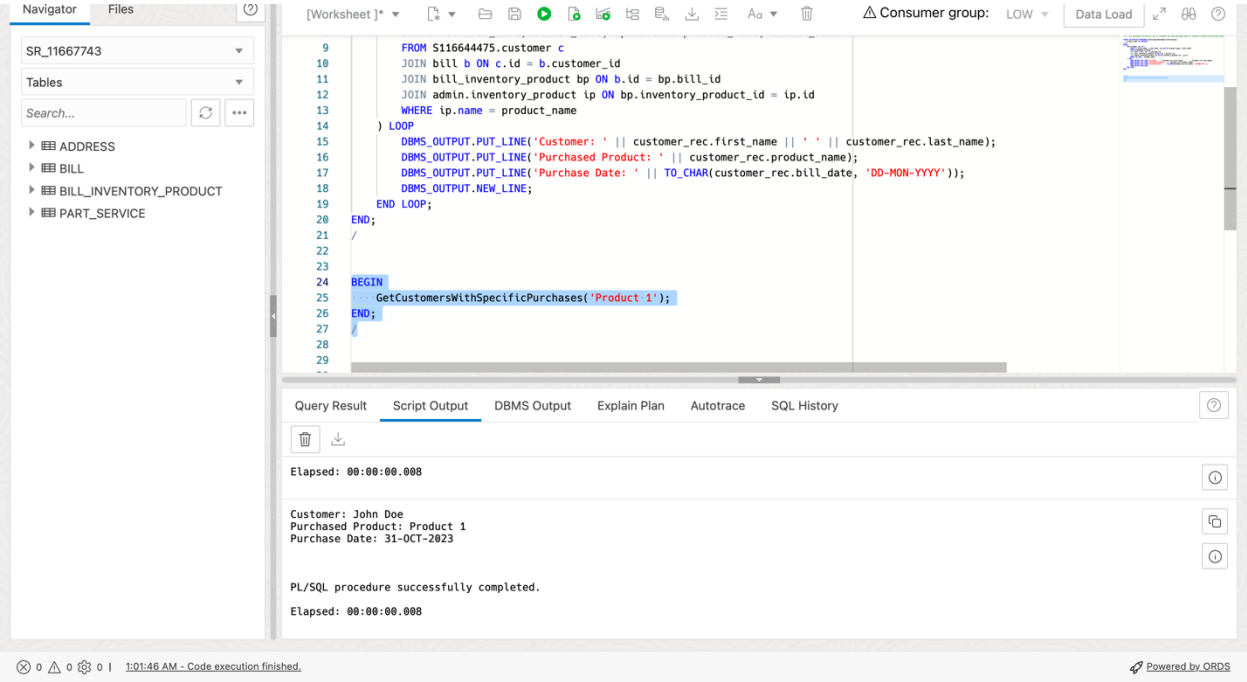
```
BEGIN
   GetCustomersWithSpecificPurchases('Product 1');
END;
/
```

Code Execution in Cloud:

Screenshot-1:



Screenshot-2:



Explanation: This procedure named "GetCustomersWithSpecificPurchases" is designed to retrieve and display information about customers who have made specific purchases of a product. It is to find and list customers who have purchased a specific product, providing their names, the product's name, and the date of purchase as output. The procedure can be called by passing the desired product name as an argument, and it will output information about customers who purchased that specific product.

5. **Write a stored procedure to get the list of employee who can train the employees on specific automobile(Input param - automobile)**

PL/SQL Code:

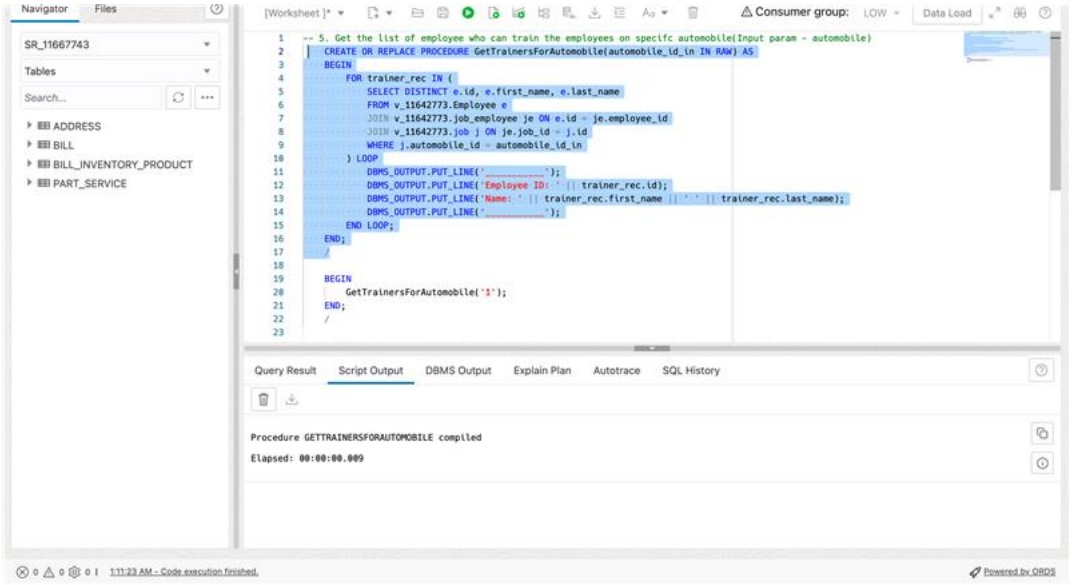
```
CREATE OR REPLACE PROCEDURE GetTrainersForAutomobile(automobile_id_in IN RAW) AS
  BEGIN
    FOR trainer_rec IN (
      SELECT DISTINCT e.id, e.first_name, e.last_name
      FROM v_11642773.Employee e
      JOIN v_11642773.job_employee je ON e.id = je.employee_id
      JOIN v_11642773.job j ON je.job_id = j.id
      WHERE j.automobile_id = automobile_id_in
    ) LOOP
      DBMS_OUTPUT.PUT_LINE('_____________');
      DBMS_OUTPUT.PUT_LINE('Employee ID: ' || trainer_rec.id);
      DBMS_OUTPUT.PUT_LINE('Name: ' || trainer_rec.first_name || ' ' ||
trainer_rec.last_name);
      DBMS_OUTPUT.PUT_LINE('_____________');
    END LOOP;
  END;
  /
```

Execution Code:

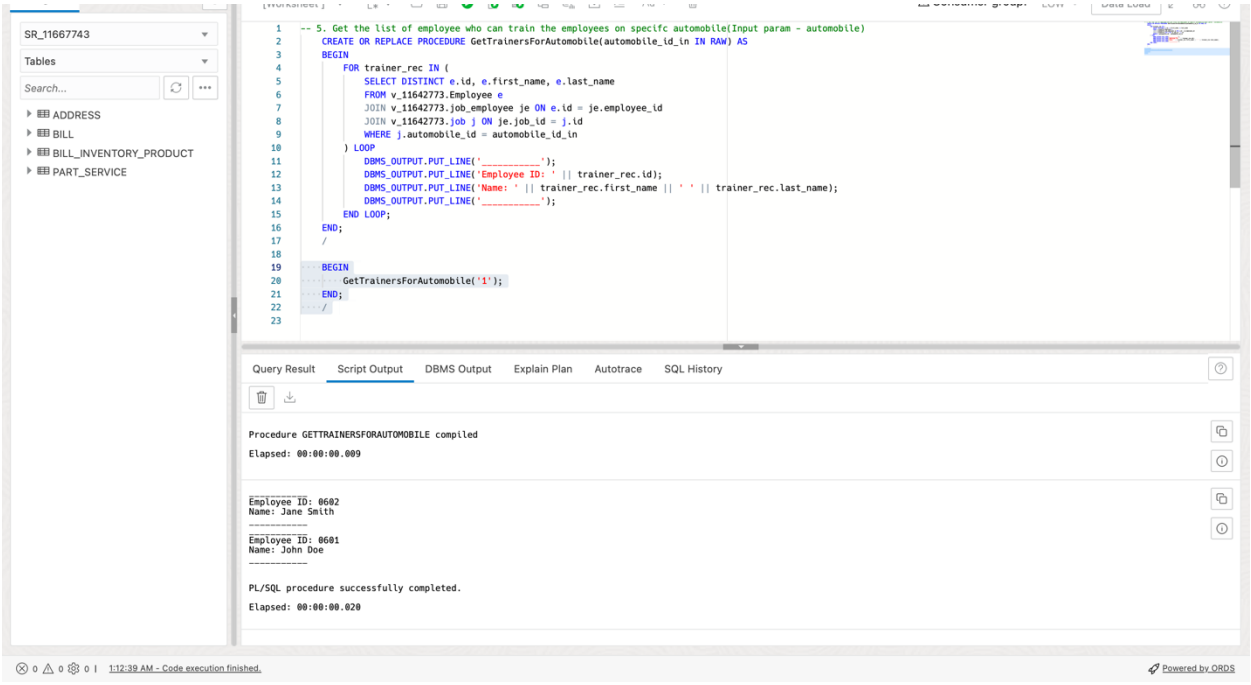
```
BEGIN
    GetTrainersForAutomobile('1');
END;
/
```

Code Execution in Cloud:

Screenshot-1:



Screenshot-2:



Explanation: This procedure "GetTrainersForAutomobile," retrieves and displays the names of trainers who have been involved in jobs associated with a given automobile, helping to identify the individuals responsible for servicing or working on that vehicle. It takes an automobile ID as

input and retrieves data by joining the Employee, job_employee, and job tables to find employees who have worked on the specific automobile and can be considered trainers.

Stored Functions:

1. **when a function to update the address of the employee with new address.**

PL/SQL Code:

```
CREATE OR REPLACE FUNCTION update_employee_address(
   p_employee_id IN RAW,
   p_apartment_no IN NUMBER,
   p_street IN VARCHAR2,
   p_city IN VARCHAR2,
   p_state IN VARCHAR2,
   p_country IN VARCHAR2,
   p_zip IN CHAR
) RETURN RAW IS
   v_address_id RAW(16);

   -- Declare a cursor to fetch the address data
   CURSOR address_cursor IS
      SELECT id
      FROM SR_11667743.address
      WHERE
         apartment_no = p_apartment_no
         AND street = p_street
         AND city = p_city
         AND state = p_state
         AND country = p_country
         AND zip = p_zip;
BEGIN
   -- Initialize the address_id to NULL
   v_address_id := NULL;

   -- Fetch data using the cursor
   OPEN address_cursor;
   FETCH address_cursor INTO v_address_id;
   CLOSE address_cursor;

   -- If no data found, insert a new address
   IF v_address_id IS NULL THEN
      INSERT INTO SR_11667743.address (id, apartment_no, street, city, state, country, zip)
      VALUES (SYS_GUID(), p_apartment_no, p_street, p_city, p_state, p_country, p_zip)
```

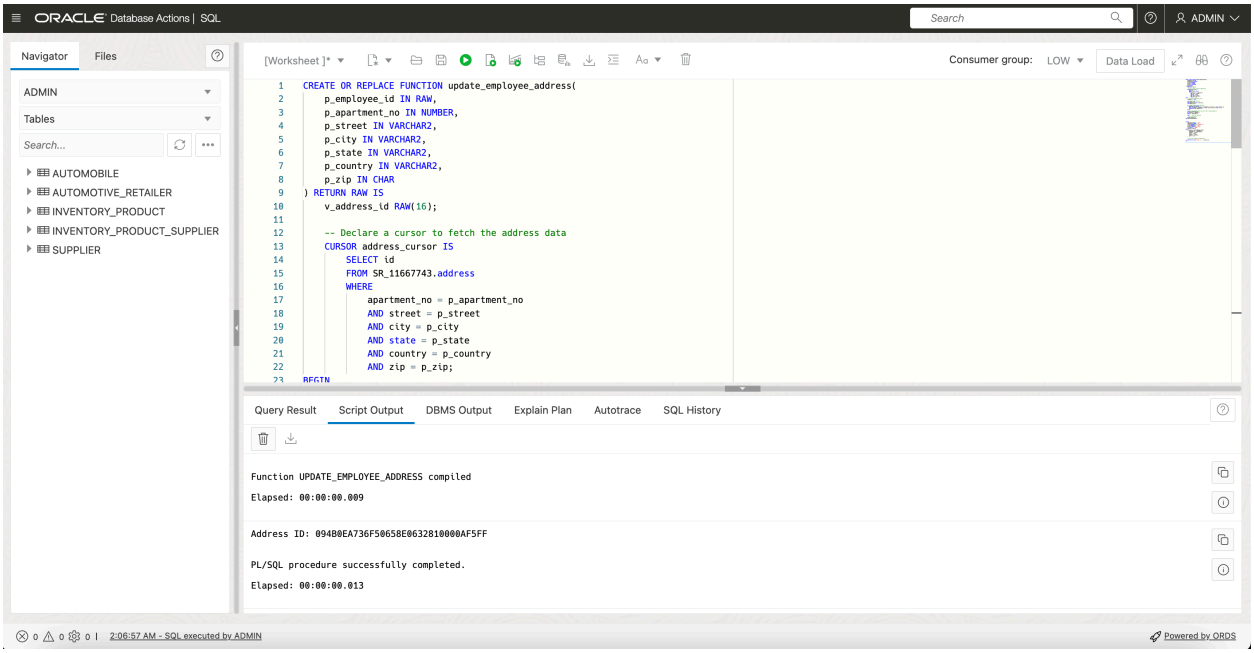
```
      RETURNING id INTO v_address_id;
   END IF;

   -- Update the employee's address_id with the new or existing address_id
   UPDATE V_11642773.Employee
   SET address_id = v_address_id
   WHERE id = p_employee_id;

   COMMIT; -- Commit the transaction

   -- Return the address ID
   RETURN v_address_id;
END update_employee_address;
/
```

Execution Code:

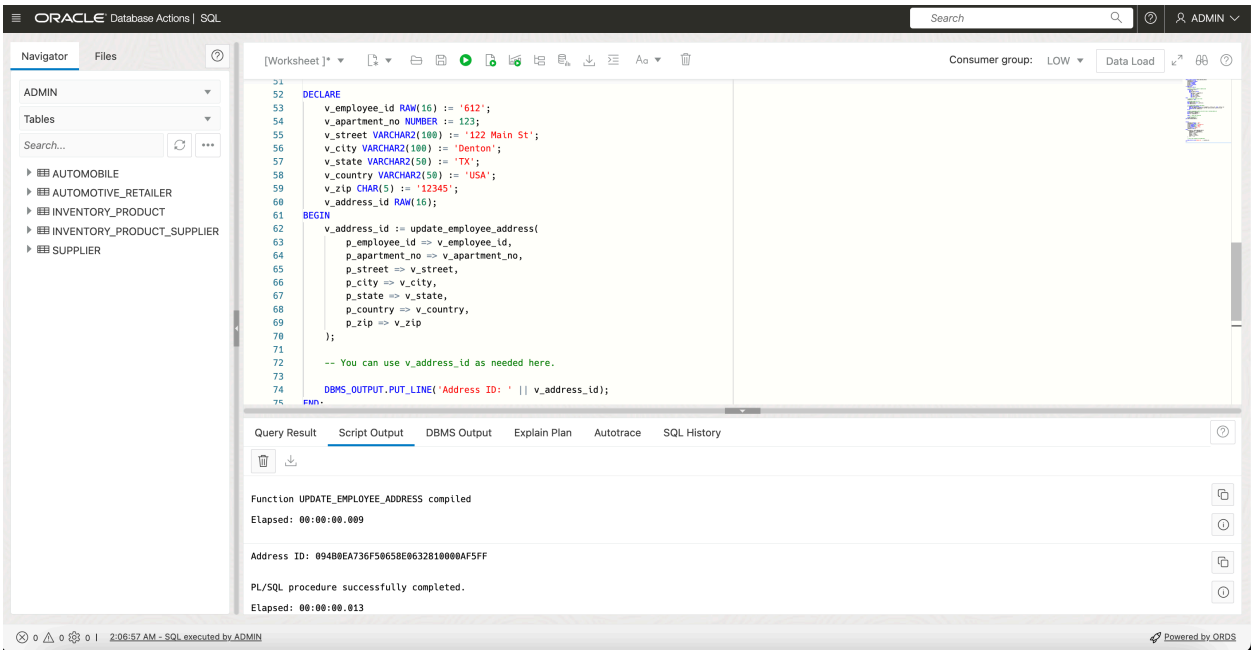
```
DECLARE
   v_employee_id RAW(16) := '612';
   v_apartment_no NUMBER := 123;
   v_street VARCHAR2(100) := '122 Main St';
   v_city VARCHAR2(100) := 'Denton';
   v_state VARCHAR2(50) := 'TX';
   v_country VARCHAR2(50) := 'USA';
   v_zip CHAR(5) := '12345';
   v_address_id RAW(16);
BEGIN
   v_address_id := update_employee_address(
      p_employee_id => v_employee_id,
      p_apartment_no => v_apartment_no,
      p_street => v_street,
      p_city => v_city,
      p_state => v_state,
      p_country => v_country,
      p_zip => v_zip
   );

   DBMS_OUTPUT.PUT_LINE('Address ID: ' || v_address_id);
END;
/
```

Code Execution in Cloud:

Screenshot-1:



Screenshot-2:



Explanation: This function updates an employee(s)address. It checks if the new address already exists in the database.

If it does, it links the employee to that address. If not, it creates a new address entry and links the employee to it. Finally, it returns the address ID.

2. **write a stored function to retrieve eligible bonus employees. Eligible bonus employees are who have held more than 3 jobs within a defined date range.**

PL/SQL Code:

```
CREATE OR REPLACE FUNCTION get_bonus_eligible_employees(
    p_start_date TIMESTAMP,
    p_end_date TIMESTAMP
) RETURN SYS_REFCURSOR IS
    bonus_employees_cursor SYS_REFCURSOR;
BEGIN
    OPEN bonus_employees_cursor FOR
      SELECT je.employee_id
      FROM V_11642773.job_employee je
      JOIN V_11642773.job j ON je.job_id = j.id
      WHERE j.job_date >= p_start_date
      AND j.job_date <= p_end_date
      GROUP BY je.employee_id
      HAVING COUNT(*) >= 3;

    RETURN bonus_employees_cursor;
END;
/
```

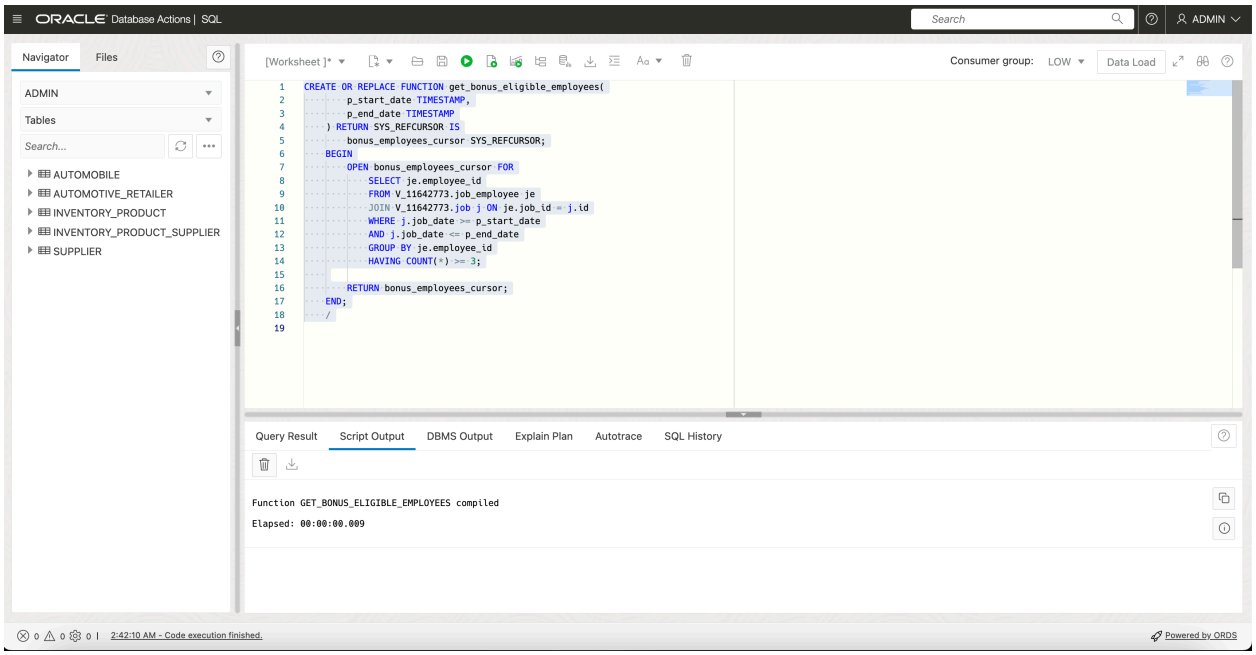
Execution Code:

```
DECLARE
bonus_employee_cursor SYS_REFCURSOR;
start_date TIMESTAMP;
end_date TIMESTAMP;
v_employee_id RAW(16);
BEGIN
start_date := TO_TIMESTAMP('2023-10-22 00:00:00','YYYY-MM-DD HH24:MI:SS');
end_date := TO_TIMESTAMP('2023-10-30 23:59:59','YYYY-MM-DD HH24:MI:SS');

bonus_employee_cursor := get_bonus_eligible_employees(start_date, end_date);

LOOP
    FETCH bonus_employee_cursor INTO v_employee_id;
    EXIT WHEN bonus_employee_cursor%NOTFOUND;
```

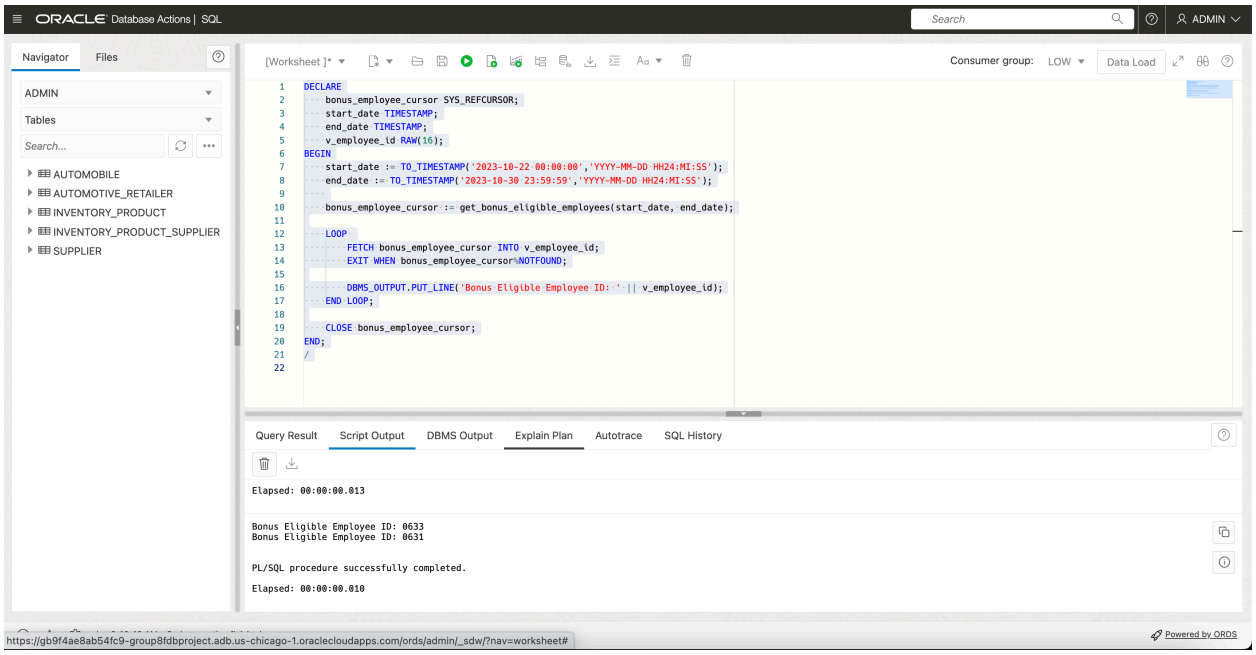
```
    DBMS_OUTPUT.PUT_LINE('Bonus Eligible Employee ID: ' || v_employee_id);
  END LOOP;

  CLOSE bonus_employee_cursor;
END;
/
```

Code Execution in Cloud:

Screenshot-1:



Screenshot-2:



Explanation: Explanation: "update_employee_salary" that figures out which employees have done more than 3 jobs during a specific time frame and gives their Employee IDs in a list. In the execution part, we set a date range (start_date and end_date), and then we use the function to find the Employee IDs who meet the job criteria during that time.

3 write a stored function to return the list of customer ID's whose insurance status is 'active'.

PL/SQL Code:

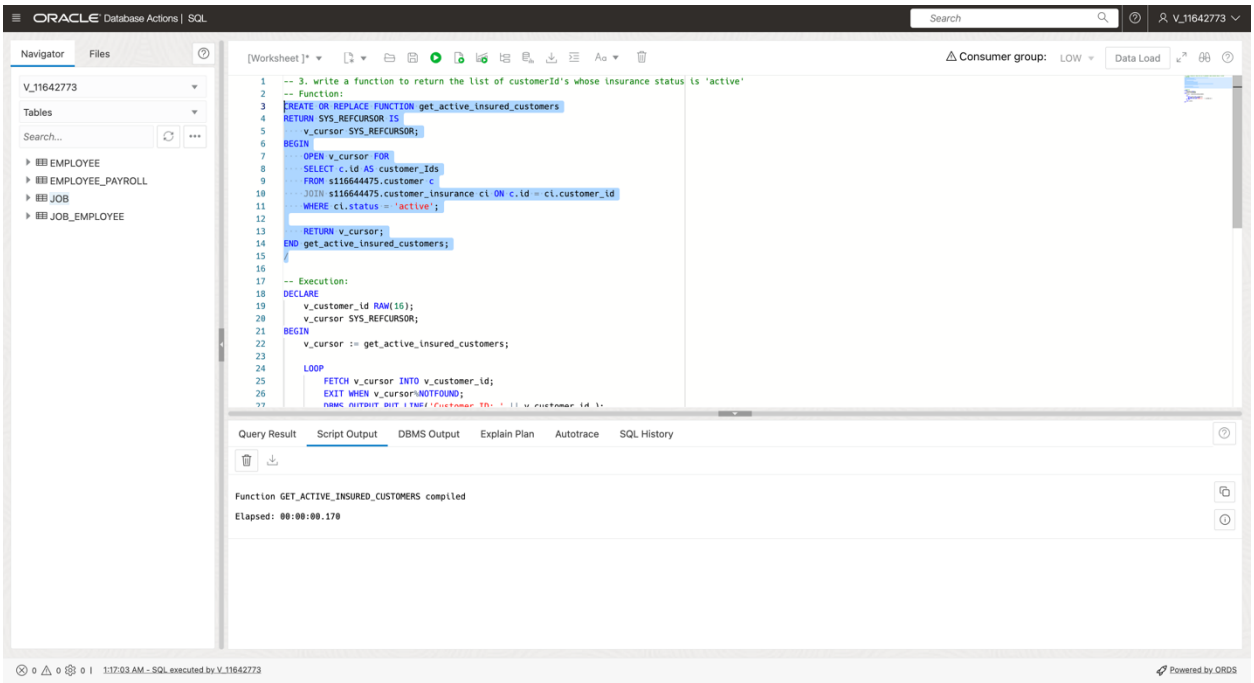
```
CREATE OR REPLACE FUNCTION get_active_insured_customers
RETURN SYS_REFCURSOR IS
   v_cursor SYS_REFCURSOR;
BEGIN
   OPEN v_cursor FOR
   SELECT c.id AS customer_Ids
   FROM s116644475.customer c
   JOIN s116644475.customer_insurance ci ON c.id = ci.customer_id
   WHERE ci.status = 'active';

   RETURN v_cursor;
END get_active_insured_customers;
/
```

Execution Code:

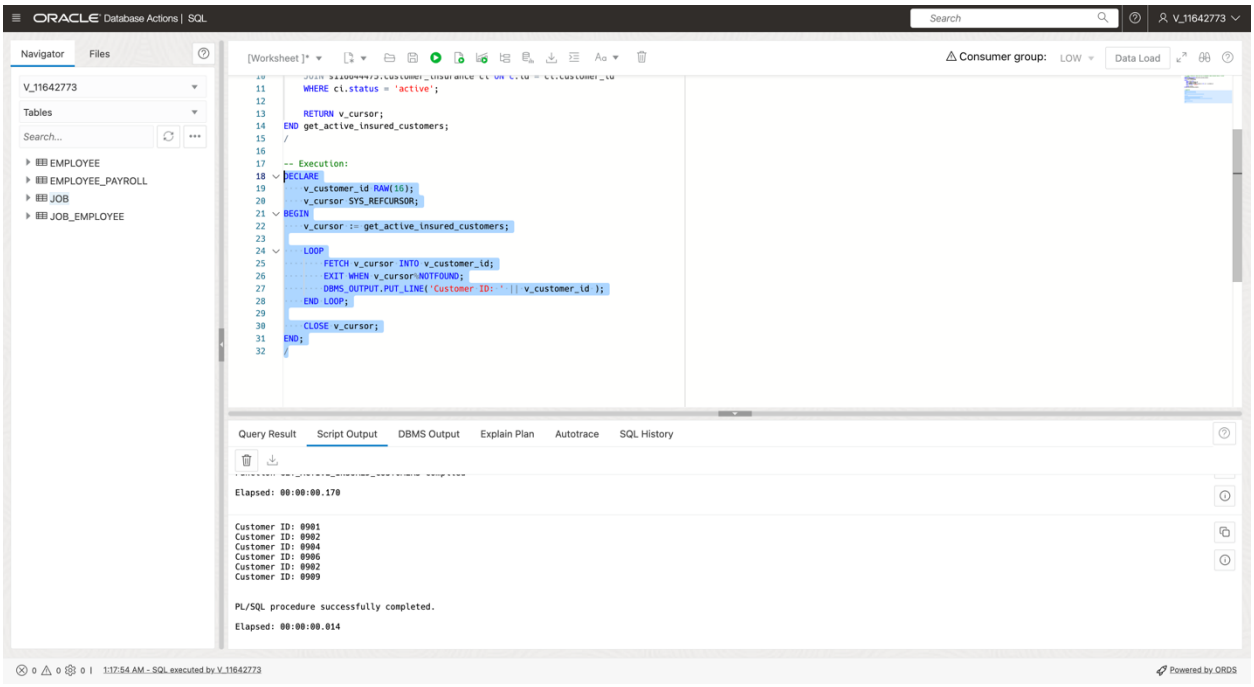
```
DECLARE
   v_customer_id RAW(16);
   v_cursor SYS_REFCURSOR;
BEGIN
   v_cursor := get_active_insured_customers;

   LOOP
      FETCH v_cursor INTO v_customer_id;
      EXIT WHEN v_cursor%NOTFOUND;
      DBMS_OUTPUT.PUT_LINE('Customer ID: ' || v_customer_id );
   END LOOP;

   CLOSE v_cursor;
END;
/
```

Code Execution in Cloud:

Screenshot-1:



Screenshot-2:



Explanation: This function, named 'get_active_insured_customers,' does the job of finding and listing customer IDs with active insurance status. It uses a database cursor to hold these customer IDs and a SQL query to fetch the relevant information from the 'customer' and 'customer_insurance' tables. When executed, it prints out these customer IDs one by one. Essentially, it helps to identify and display the customers who currently have active insurance policies.

4. write a stored function to return the list of customerId's, who did payment using CASH in autozone on particular date.

PL/SQL Code:

```
CREATE OR REPLACE FUNCTION get_offline_payment_customers(p_target_date
TIMESTAMP)
    RETURN SYS_REFCURSOR IS
      v_cursor SYS_REFCURSOR;
    BEGIN
      OPEN v_cursor FOR
      SELECT DISTINCT b.customer_id
      FROM SR_11667743.bill b
      WHERE b.bill_date = p_target_date
      AND b.sale_type = 'OFFLINE'
```

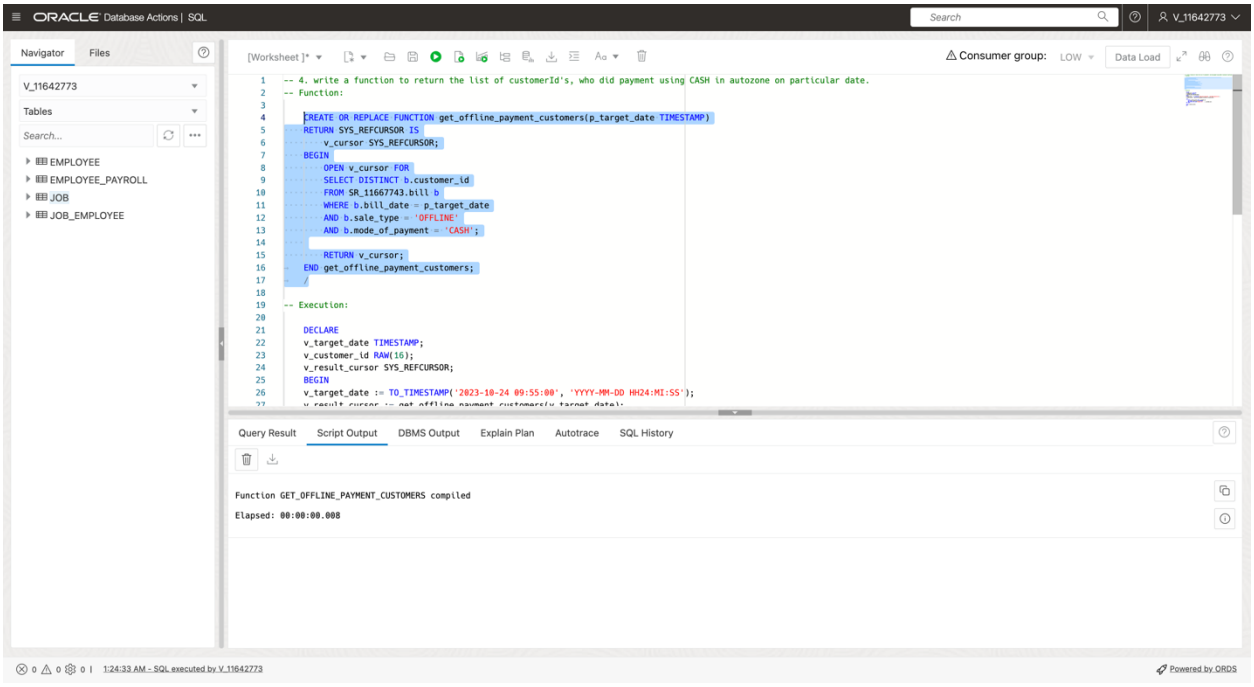
```
    AND b.mode_of_payment = 'CASH';

    RETURN v_cursor;
END get_offline_payment_customers;
/
```

Execution Code:

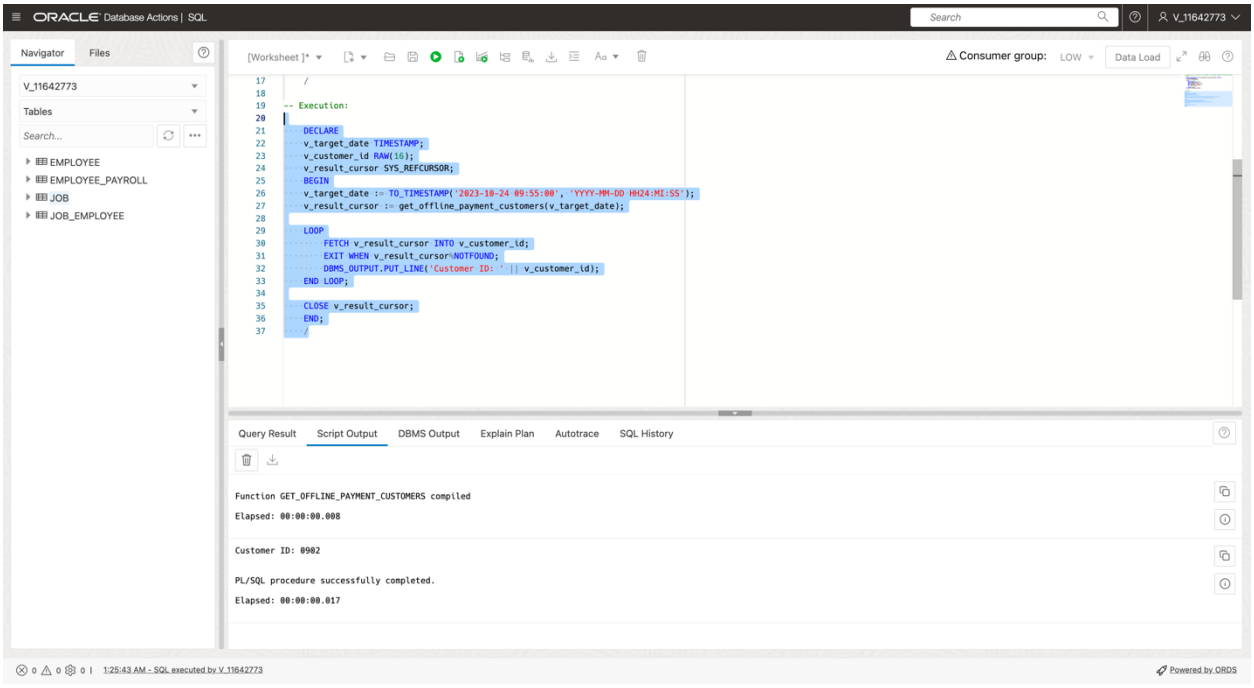
```
DECLARE
v_target_date TIMESTAMP;
v_customer_id RAW(16);
v_result_cursor SYS_REFCURSOR;
BEGIN
v_target_date := TO_TIMESTAMP('2023-10-24 09:55:00', 'YYYY-MM-DD HH24:MI:SS');
v_result_cursor := get_offline_payment_customers(v_target_date);

LOOP
   FETCH v_result_cursor INTO v_customer_id;
   EXIT WHEN v_result_cursor%NOTFOUND;
   DBMS_OUTPUT.PUT_LINE('Customer ID: ' || v_customer_id);
END LOOP;

CLOSE v_result_cursor;
END;
/
```

Code Execution in Cloud:

Screenshot-1:



Screenshot-2:



Explanation: this function, 'get_offline_payment_customers,' does the job of identifying and listing customer IDs who paid with cash for their purchases at AutoZone on a specific date, which you can specify. It employs a cursor to store the results and a SQL query that picks out unique customer IDs from the 'bill' table where the purchase date matches your chosen date, the purchase was made 'OFFLINE,' and the payment method used was 'CASH.' When executed, it iterates through the results and prints out these customer IDs one by one. In essence, it helps to find and display the customers who paid in cash for their purchases at AutoZone on a particular date.

5. Write the function, which returns the inventory_product Id's whose automobile year before 2000.

PL/SQL Code:

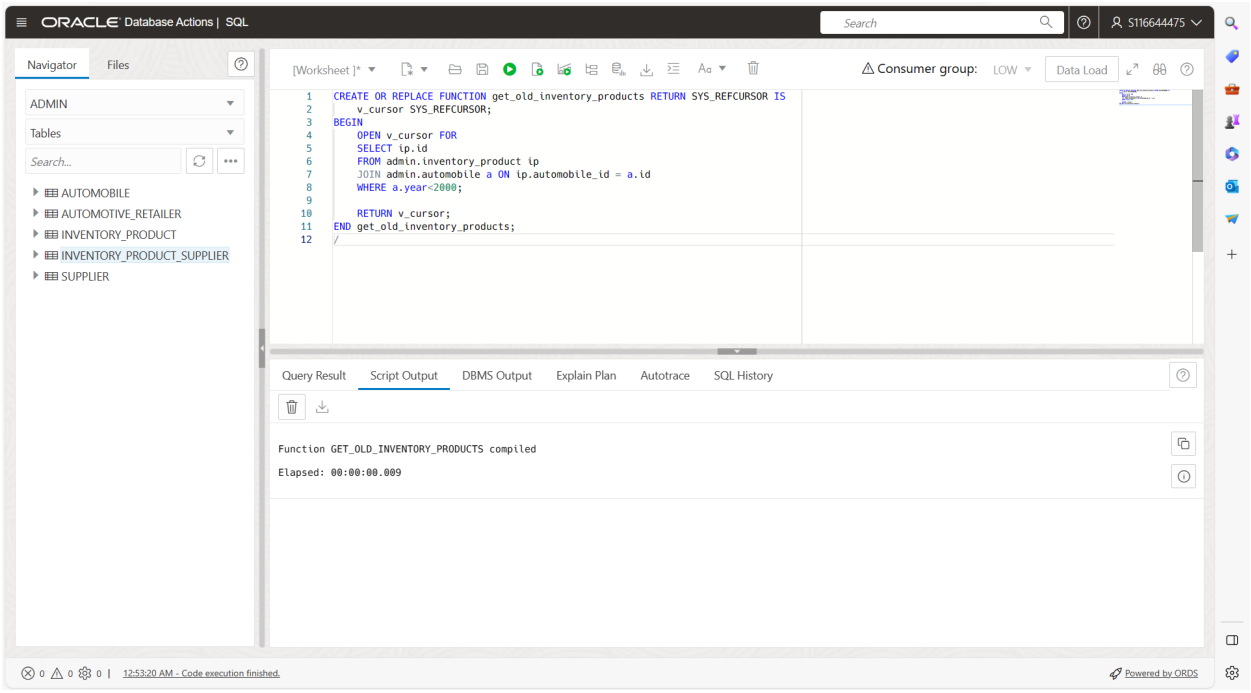
```
CREATE OR REPLACE FUNCTION get_old_inventory_products RETURN SYS_REFCURSOR IS
  v_cursor SYS_REFCURSOR;
BEGIN
  OPEN v_cursor FOR
  SELECT ip.id
  FROM inventory_product ip
  JOIN automobile a ON ip.automobile_id = a.id
  WHERE a.year<2000;
  RETURN v_cursor;
END get_old_inventory_products;
/
```

Code Execution:

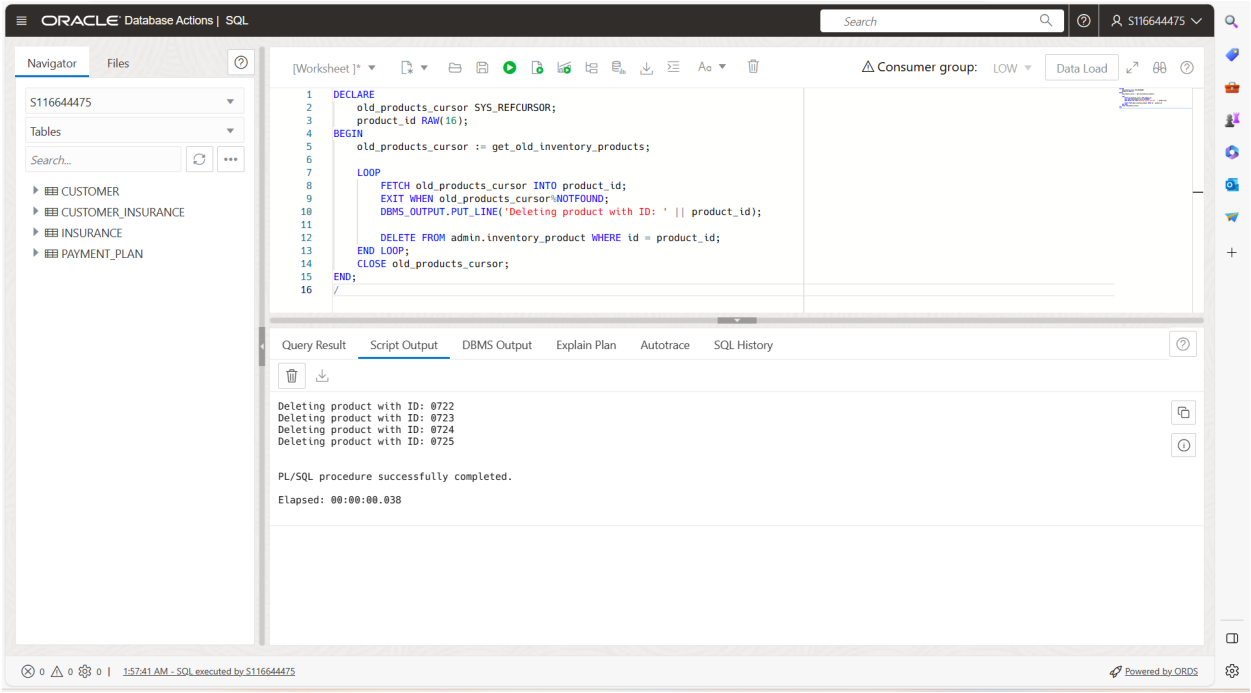
```
DECLARE
  old_products_cursor SYS_REFCURSOR;
  product_id RAW(16);
BEGIN
  old_products_cursor := get_old_inventory_products;

  LOOP
    FETCH old_products_cursor INTO product_id;
    EXIT WHEN old_products_cursor%NOTFOUND;
    DBMS_OUTPUT.PUT_LINE('Deleting product with ID: ' || product_id);

    DELETE FROM admin.inventory_product WHERE id = product_id;
  END LOOP;
  CLOSE old_products_cursor;
END;
/
```

Code Execution in Cloud:

Screenshot-1:



Screenshot-2:



Explanation: This function, 'get_old_inventory_products,' is designed to identify and list the IDs of inventory products associated with automobiles manufactured before the year 2000. It utilizes a cursor to hold these product IDs and a SQL query that fetches IDs from the 'inventory_product' table, where the related automobiles have a manufacturing year earlier than 2000. When executed, the code loops through these IDs, prints a message for each, and subsequently deletes the corresponding products from the inventory. It helps us find and remove products linked to older automobiles from the inventory.

6. write a stored function calculates the total sales made to a specific customer based on their customer ID.

PL/SQL Code:

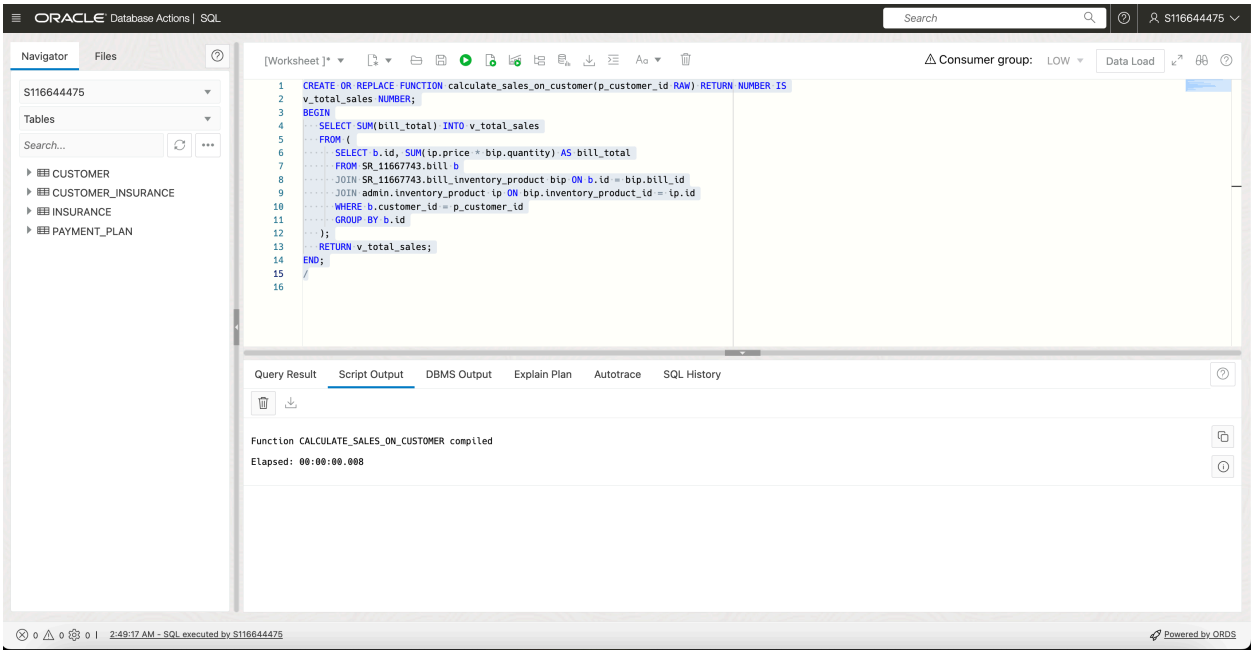
```
CREATE OR REPLACE FUNCTION calculate_sales_on_customer(p_customer_id RAW) RETURN
NUMBER IS
v_total_sales NUMBER;
BEGIN
  SELECT SUM(bill_total) INTO v_total_sales
  FROM (
    SELECT b.id, SUM(ip.price * bip.quantity) AS bill_total
    FROM SR_11667743.bill b
    JOIN SR_11667743.bill_inventory_product bip ON b.id = bip.bill_id
    JOIN admin.inventory_product ip ON bip.inventory_product_id = ip.id
    WHERE b.customer_id = p_customer_id
    GROUP BY b.id
  );
  RETURN v_total_sales;
END;
/
```

Execution Code:

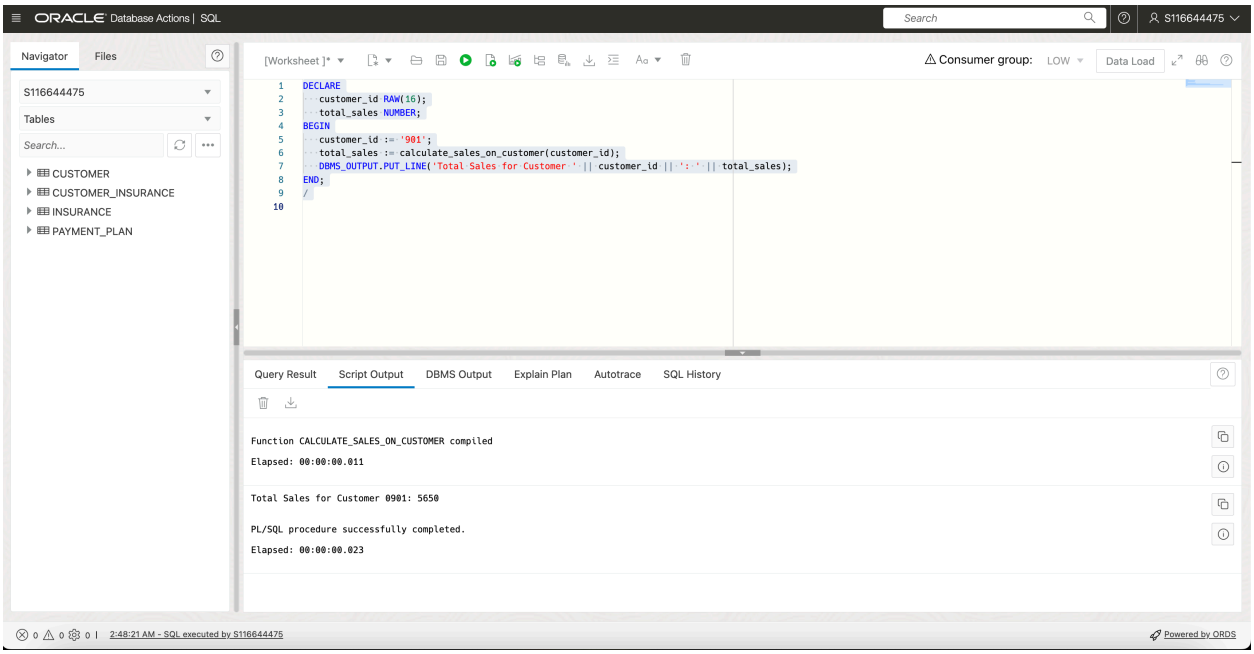
```
DECLARE
  customer_id RAW(16);
  total_sales NUMBER;
BEGIN
  customer_id := '901';
  total_sales := calculate_sales_on_customer(customer_id);
  DBMS_OUTPUT.PUT_LINE('Total Sales for Customer ' || customer_id || ': ' || total_sales);
END;
/
```

Code Execution in Cloud:

Screenshot-1:



Screenshot-2:



Explanation: This function, 'calculate_sales_on_customer,' serves the purpose of determining the total sales amount for a specific customer, whose ID is provided as 'p_customer_id.' It does so by summing up the bill totals, which are calculated from the prices and quantities of inventory products listed on each bill associated with the customer. When executed, it takes a customer's ID (in this case, '901'), calculates their total sales, and prints out the result, helping you find the total sales amount for a particular customer.

7 write a stored function, identifies employees who have not been assigned to any job.

PL/SQL Code:

```
CREATE OR REPLACE FUNCTION get_employees_without_jobs RETURN SYS_REFCURSOR AS
  result_cursor SYS_REFCURSOR;
BEGIN
  OPEN result_cursor FOR
  SELECT e.id, e.first_name, e.last_name
  FROM v_11642773.employee e
  WHERE NOT EXISTS (
    SELECT *
    FROM v_11642773.job_employee je
    WHERE je.employee_id = e.id
  );

  RETURN result_cursor;
END;
/
```

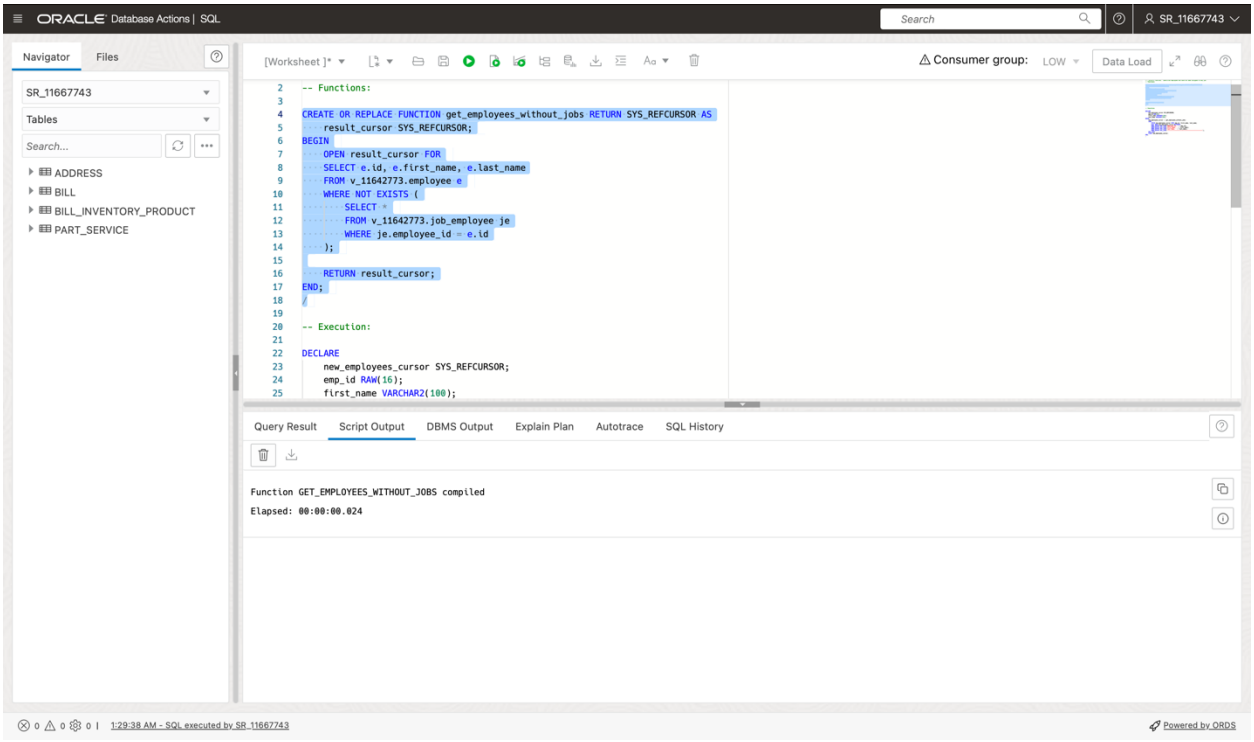
Execution Code:

```
DECLARE
  new_employees_cursor SYS_REFCURSOR;
  emp_id RAW(16);
  first_name VARCHAR2(100);
  last_name VARCHAR2(100);
BEGIN
  new_employees_cursor := get_employees_without_jobs;
  LOOP
    FETCH new_employees_cursor INTO emp_id, first_name, last_name;
    EXIT WHEN new_employees_cursor%NOTFOUND;
    DBMS_OUTPUT.PUT_LINE('Employee ID: ' || emp_id);
    DBMS_OUTPUT.PUT_LINE('First Name: ' || first_name);
    DBMS_OUTPUT.PUT_LINE('Last Name: ' || last_name);
    DBMS_OUTPUT.PUT_LINE('-----------------------------------------------');
  END LOOP;
```

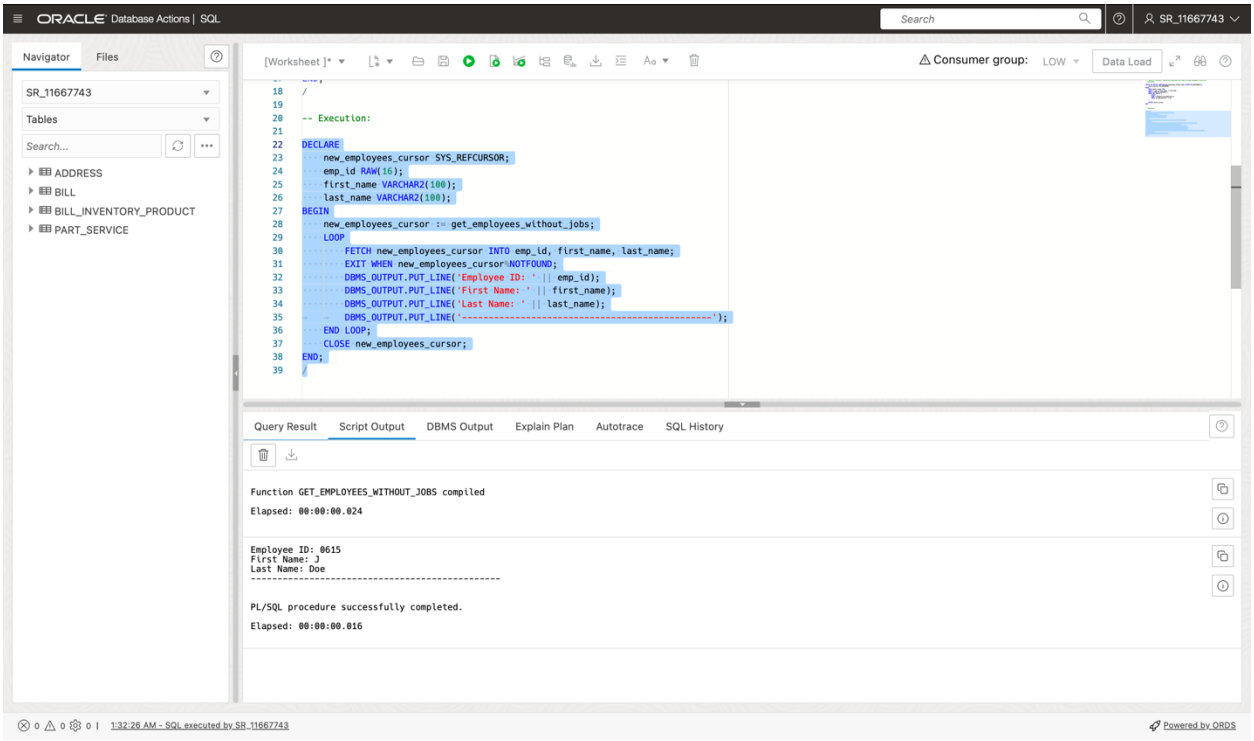
```
    CLOSE new_employees_cursor;
END;
/
```

Code Execution in Cloud:

Screenshot-1:



Screenshot-2:



Explanation: This function, 'get_employees_without_jobs,' is designed to identify and list employees who currently don't have any job assignments. It uses a cursor to store the results and a SQL query that selects employee IDs, first names, and last names from the 'employee' table for those employees where no job assignments exist in the 'job_employee' table. When executed, the code loops through the results, prints out the employee details, and helps you easily find and display employees who are currently without job assignments within your organization.

Triggers:

1. **Write a trigger to calculate the job cost, using total number of parts used and respective cost for them when a new job is created.**

PL/SQL Code:

```
CREATE OR REPLACE TRIGGER calculate_job_cost
BEFORE INSERT ON SR_11667743.part_service
FOR EACH ROW
DECLARE
   job_cost NUMBER;
BEGIN
```

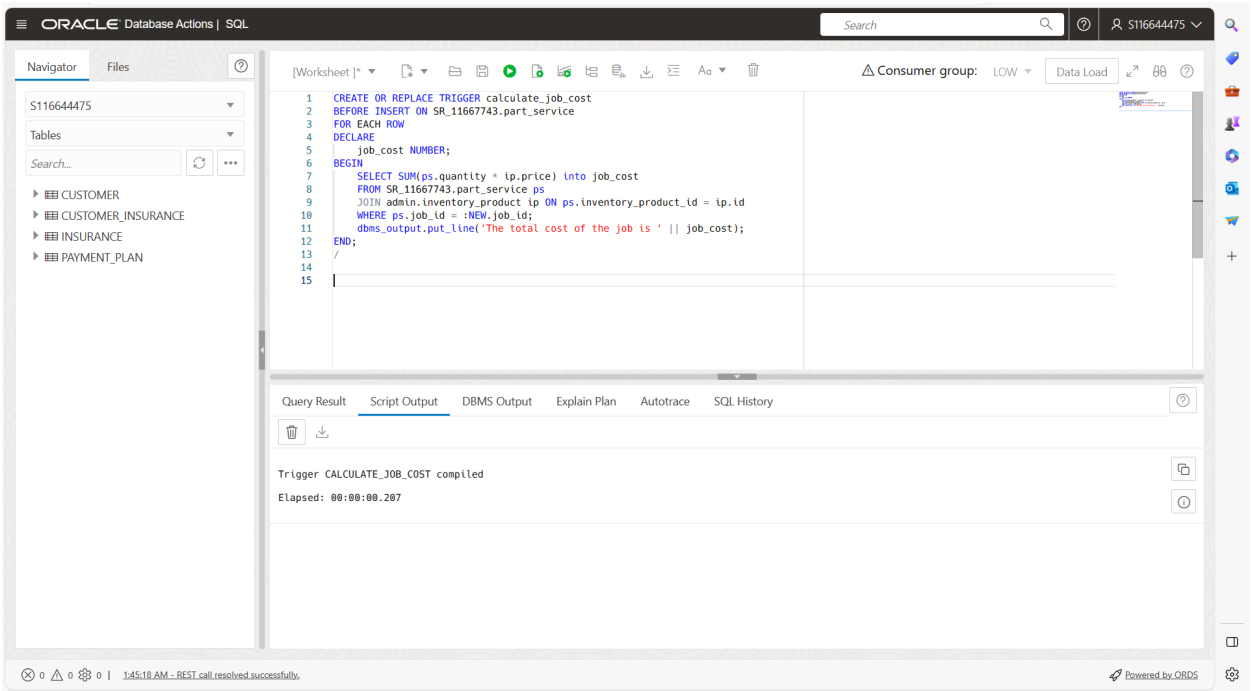
```
    SELECT SUM(ps.quantity * ip.price) into job_cost
    FROM SR_11667743.part_service ps
    JOIN admin.inventory_product ip ON ps.inventory_product_id = ip.id
    WHERE ps.job_id = :NEW.job_id;
    dbms_output.put_line('The total cost of the job is ' || job_cost);
END;
/
```

Execution Code:

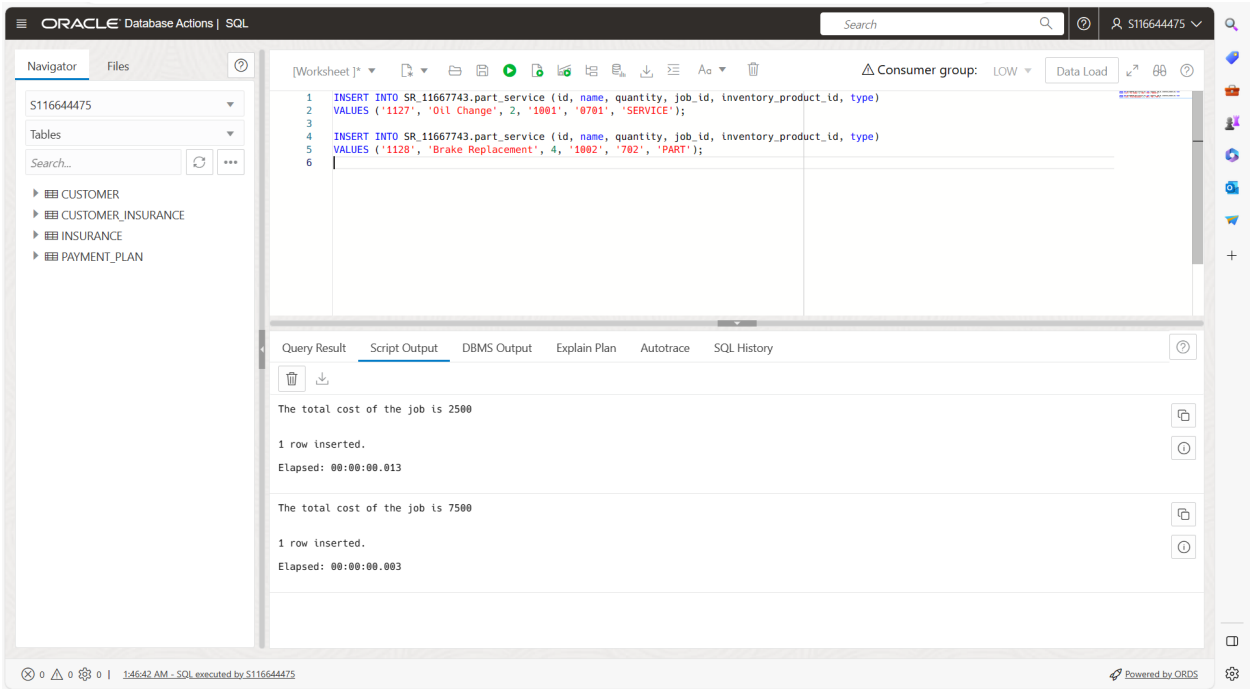
```
INSERT INTO SR_11667743.part_service (id, name, quantity, job_id, inventory_product_id,
type)
VALUES ('1127', 'Oil Change', 2, '1001', '0701', 'SERVICE');

INSERT INTO SR_11667743.part_service (id, name, quantity, job_id, inventory_product_id,
type)
VALUES ('1128', 'Brake Replacement', 4, '1002', '702', 'PART');
```

Code Execution in Cloud:

Screenshot-1:



Screenshot-2:



Explanation: The trigger calculate_job_cost is designed to automatically calculate and output the total cost of a job. This trigger enhances the system by providing a real-time cost calculation for each job, making it easier to manage and track job expenses. It simplifies cost tracking for services and parts utilized in each job.

2. **Write a trigger, to update the product quantity in the inventory_product table upon completion of job.**

PL/SQL Code:

```
CREATE OR REPLACE TRIGGER update_inventory_product_quantity_on_job_completion
AFTER UPDATE ON V_11642773.job
FOR EACH ROW
   declare quantity number;
BEGIN
   -- Update the inventory product quantity on job completion
   UPDATE admin.inventory_product ip
   SET ip.quantity = ip.quantity - (
      SELECT SUM(ps.quantity)
      FROM part_service ps
      WHERE ps.job_id = :NEW.id
```

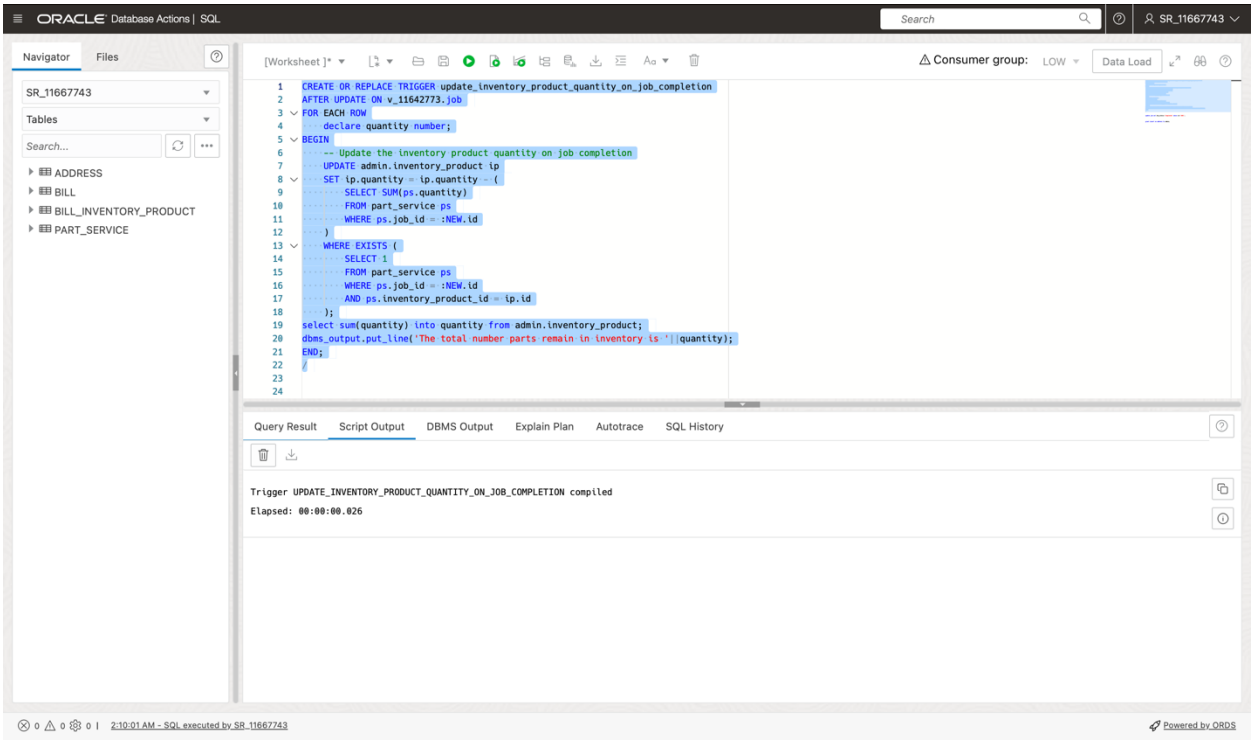
```
    )
    WHERE EXISTS (
        SELECT 1
        FROM part_service ps
        WHERE ps.job_id = :NEW.id
        AND ps.inventory_product_id = ip.id
    );
select sum(quantity) into quantity from admin.inventory_product;
dbms_output.put_line('The total number parts remain in inventory is '||quantity);
END;
/
```

Execution Code:

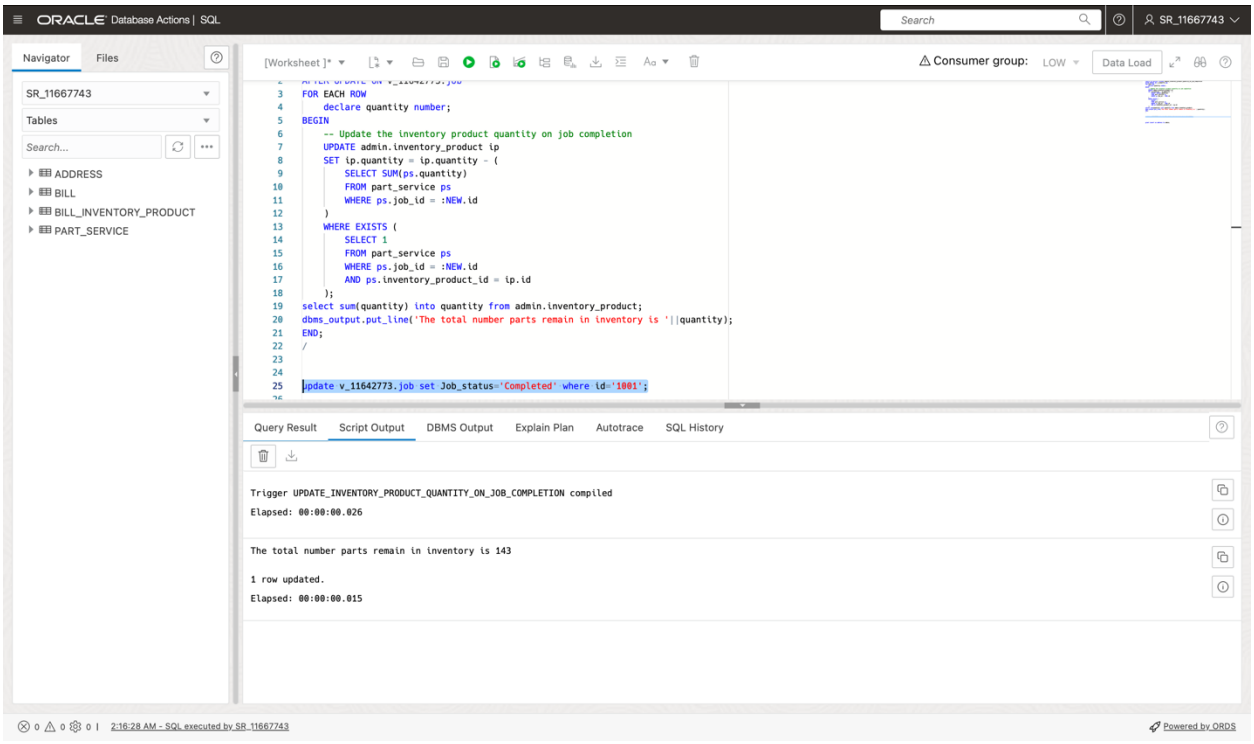
```
update V_11642773.job set Job_status='Completed' where id='1001';
```

Code Execution in Cloud:

Screenshot-1:



Screenshot-2:



Explanation: The 'update_inventory_product_quantity_on_job_completion' trigger is designed to automatically update inventory product quantities when a job is marked as 'Completed' in the 'V_11642773.job' table. It calculates the total quantity of parts used in the completed job by summing the quantities from the 'part_service' table. It then subtracts this calculated quantity from the corresponding inventory product in the 'admin.inventory_product' table, ensuring accurate inventory management. After the update, the trigger displays the total quantity of parts remaining in the inventory using 'DBMS_OUTPUT.PUT_LINE.' This trigger helps maintain inventory accuracy and streamline parts management in the automotive context.

3. **Write a trigger message with employee name reminding his next target after completing 10 bills and creating 11th bill.**

PL/SQL Code:

```
CREATE OR REPLACE TRIGGER check_successful_bills_trigger
BEFORE INSERT ON sr_11667743.bill
FOR EACH ROW
DECLARE
   first_name varchar(100);
   last_name varchar(100);
   bill_counts number;
```

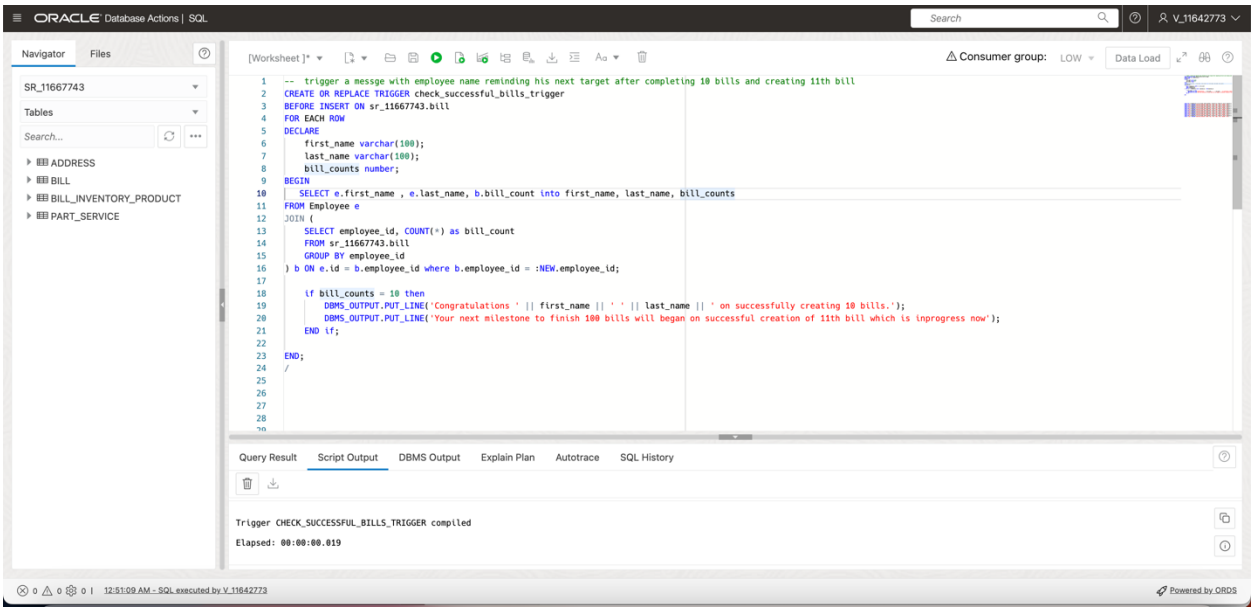
```
BEGIN
  SELECT e.first_name , e.last_name, b.bill_count into first_name, last_name, bill_counts
FROM Employee e
JOIN (
   SELECT employee_id, COUNT(*) as bill_count
   FROM sr_11667743.bill
   GROUP BY employee_id
) b ON e.id = b.employee_id where b.employee_id = :NEW.employee_id;

   if bill_counts = 10 then
      DBMS_OUTPUT.PUT_LINE('Congratulations ' || first_name || ' ' || last_name || ' on
successfully creating 10 bills.');
      DBMS_OUTPUT.PUT_LINE('Your next milestone to finish 100 bills will began on successful
creation of 11th bill which is inprogress now');
   END if;
END;
/
```

Execution Code:

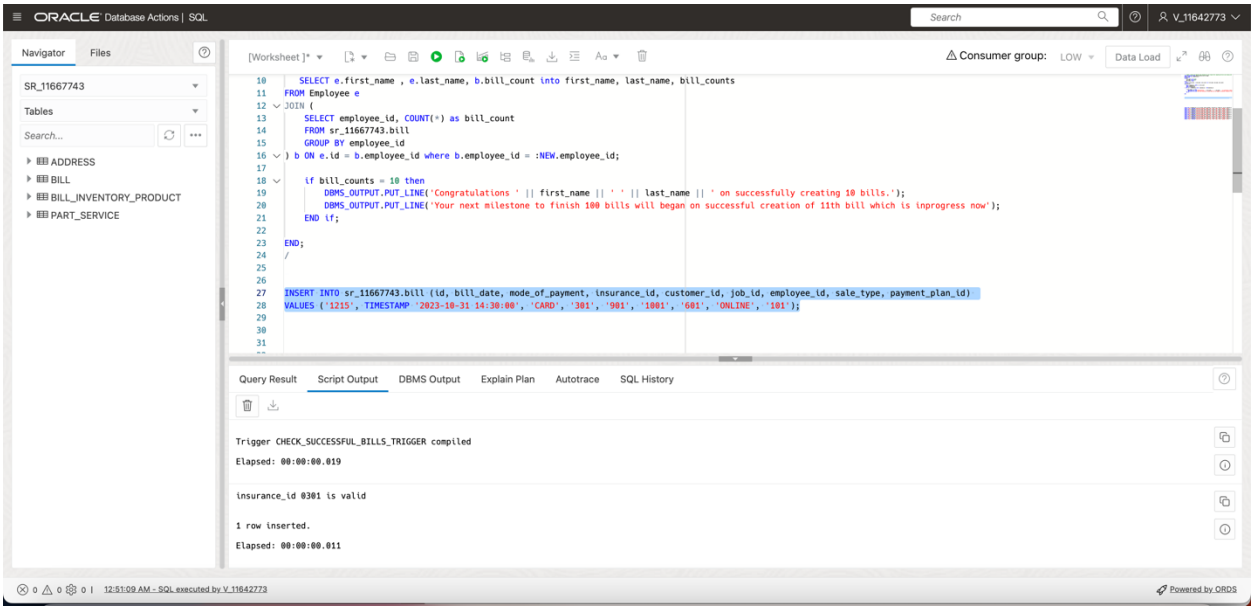
```
INSERT INTO sr_11667743.bill (id, bill_date, mode_of_payment, insurance_id, customer_id,
job_id, employee_id, sale_type, payment_plan_id)
VALUES ('1224', TIMESTAMP '2023-10-31 14:30:00', 'CARD', '301', '901', '1001', '601', 'ONLINE',
'101');
```

Code Execution in Cloud:

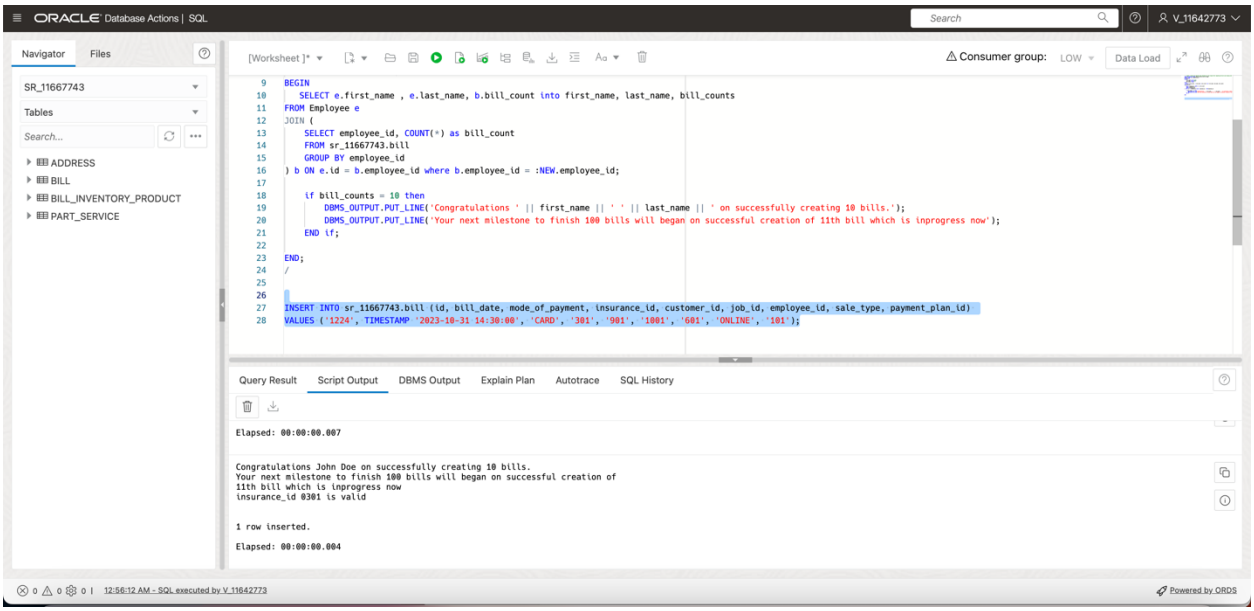
Screenshot-1:



Screenshot-2:



Screenshot-3:



Explanation: The 'check_successful_bills_trigger' trigger in the 'sr_11667743' schema monitors the creation of bills by employees. When an employee inserts a new bill, the trigger checks if they have successfully created 10 bills. If they have, it congratulates them and mentions that the next milestone is to complete 100 bills, which will start upon the successful creation of the 11th bill (currently in progress). This trigger provides recognition and motivation for employees based on their bill creation milestones.

4. **Write a trigger to log customer details because it ensures that changes to customer data are carefully monitored and logged when in-progress jobs are associated with the customer to communicate this vital information.**

PL/SQL Code:

```
CREATE OR REPLACE TRIGGER LogCustomerChanges
BEFORE UPDATE ON S116644475.customer
FOR EACH ROW
DECLARE
   v_job_id VARCHAR2(4000);
   employee_id RAW(15);
   first_name VARCHAR2(100);
   last_name VARCHAR2(100);
BEGIN
```

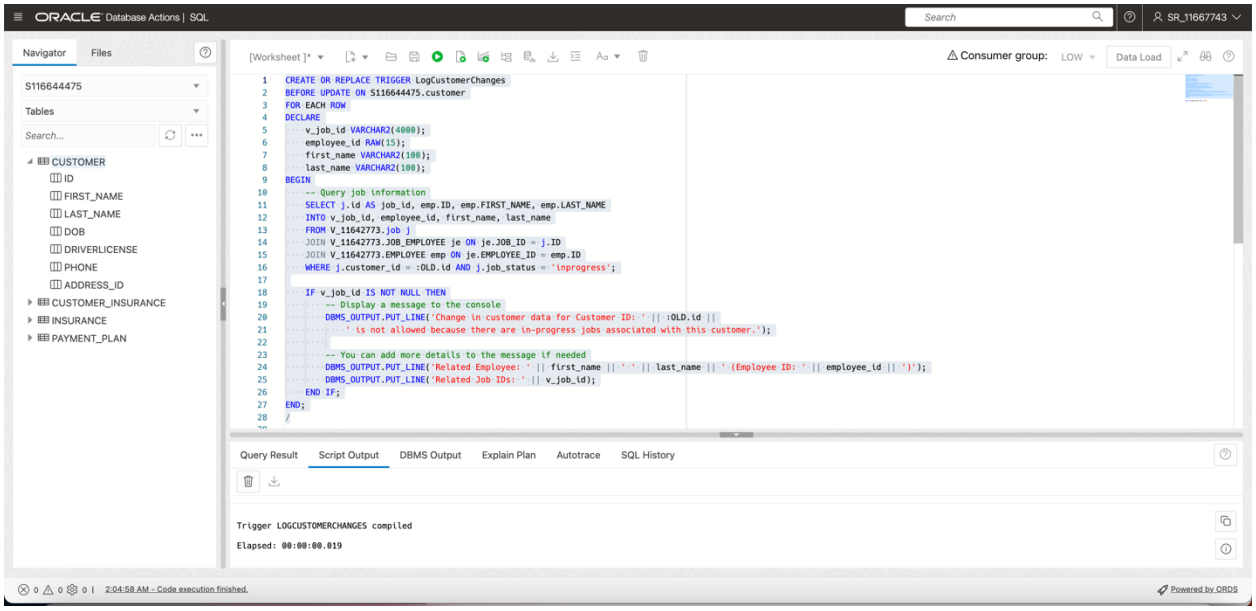
```
  -- Query job information
  SELECT j.id AS job_id, emp.ID, emp.FIRST_NAME, emp.LAST_NAME
  INTO v_job_id, employee_id, first_name, last_name
  FROM V_11642773.job j
  JOIN V_11642773.JOB_EMPLOYEE je ON je.JOB_ID = j.ID
  JOIN V_11642773.EMPLOYEE emp ON je.EMPLOYEE_ID = emp.ID
  WHERE j.customer_id = :OLD.id AND j.job_status = 'inprogress';

  IF v_job_id IS NOT NULL THEN
    -- Display a message to the console
    DBMS_OUTPUT.PUT_LINE('Change in customer data for Customer ID: ' || :OLD.id ||
      ' is not allowed because there are in-progress jobs associated with this customer.');

    -- You can add more details to the message if needed
    DBMS_OUTPUT.PUT_LINE('Related Employee: ' || first_name || ' ' || last_name || '
(Employee ID: ' || employee_id || ')');
    DBMS_OUTPUT.PUT_LINE('Related Job IDs: ' || v_job_id);
  END IF;
END;
/
```

Execution Code:

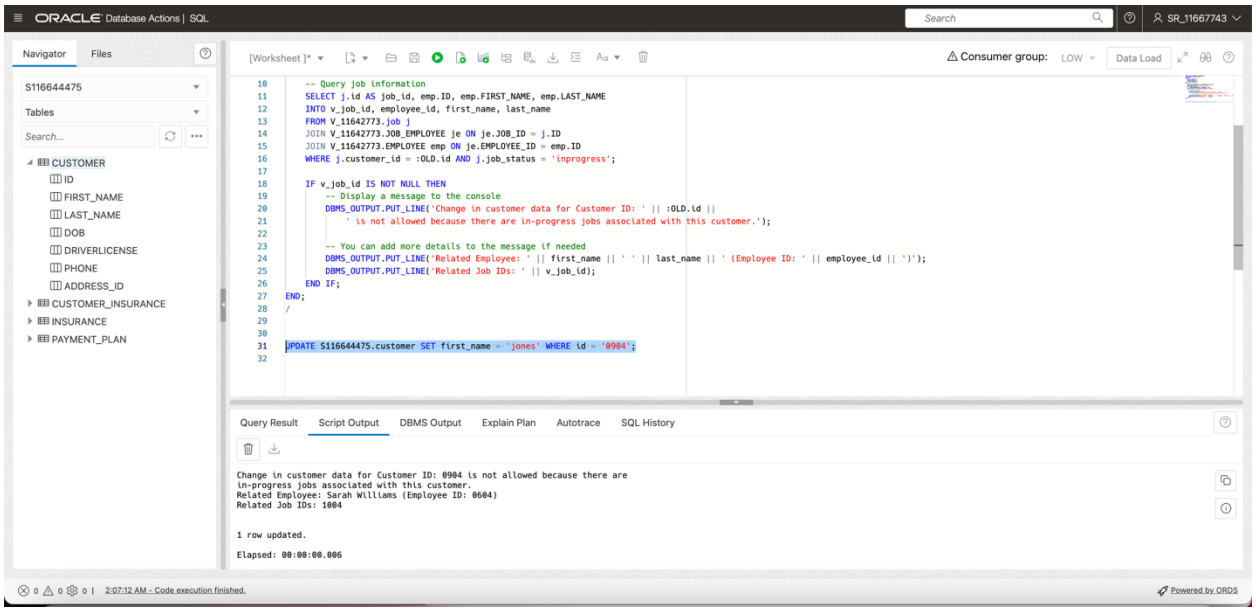
```
UPDATE S116644475.customer SET first_name = 'jones' WHERE id = '0904';
```

Code Execution in Cloud:

Screenshot -1:



Screenshot-2:



Explanation: The LogCustomerChanges trigger is designed to monitor and log changes to customer data in the S116644475.customer table. This trigger executes before an UPDATE operation on the customer table and checks for the presence of in-progress jobs associated with the customer. If such jobs are found, the trigger displays a console message via

DBMS_OUTPUT.PUT_LINE, providing a notification that the change in customer data is not allowed due to the active job associations. The message includes pertinent details such as the customer's ID, the related employee associated with in-progress jobs, and the job IDs currently in progress.

By implementing this trigger, you can maintain data integrity and provide real-time notifications when updates to customer data are restricted due to ongoing job commitments, ensuring that data modifications are appropriately tracked and communicated to relevant stakeholders.

Package:

1. **Write a package and its corresponding package body to retrieve information about customers and their automobiles, as well as to print the list of automobiles serviced by employees in an automotive retailer?**

PL/SQL Code:

Package:

```
CREATE OR REPLACE PACKAGE automotive_package AS
  -- Stored Function 1: Get the list of customers and their purchased automobiles
  FUNCTION get_customers_with_purchased_automobiles RETURN SYS_REFCURSOR;

  -- Stored Procedure 1: Print the list of automobiles serviced in an automotive retailer
  PROCEDURE get_employee_jobs;

END automotive_package;
```

Package Body:

```
CREATE OR REPLACE PACKAGE BODY automotive_package AS
  -- Stored Function 1: Get the list of customers and their purchased automobiles
  FUNCTION get_customers_with_purchased_automobiles RETURN SYS_REFCURSOR IS
    customers_cursor SYS_REFCURSOR;
  BEGIN
    OPEN customers_cursor FOR
      SELECT c.id, c.first_name, c.last_name, a.manufacturer, a.name, a.variant
      FROM S116644475.customer c
      JOIN V_11642773.job j ON c.id = j.customer_id
      JOIN automobile a ON j.automobile_id = a.id;

    RETURN customers_cursor;
  END get_customers_with_purchased_automobiles;

  -- Stored Procedure 1: procedure fetches data related to employees and their associated jobs
```

```
PROCEDURE get_employee_jobs IS
BEGIN
  DBMS_OUTPUT.PUT_LINE('Employee Jobs');
  DBMS_OUTPUT.PUT_LINE('--------------------------------');

  FOR emp_rec IN (
    SELECT e.first_name, e.last_name, j.description, a.name AS automobile_name
    FROM V_11642773.Employee e
      JOIN V_11642773.job_employee je  on je.employee_id = e.id
      JOIN V_11642773.job j ON j.id = je.job_id
    JOIN Automobile a ON j.automobile_id = a.id
  ) LOOP
    DBMS_OUTPUT.PUT_LINE('Employee: ' || emp_rec.first_name || ' ' || emp_rec.last_name
||', ' || 'Job: ' || emp_rec.description || ', ' || 'Automobile: ' || emp_rec.automobile_name);
  END LOOP;
END get_employee_jobs;

END automotive_package;
```

Execution code for function:

```
DECLARE
  customers_cursor SYS_REFCURSOR;
          customer_id varchar(100);
  first_name VARCHAR2(100);
  last_name VARCHAR2(100);
  manufacturer VARCHAR(100);
  name VARCHAR(100);
  variant VARCHAR(100);
-- Adjust data type as needed
BEGIN
  customers_cursor := automotive_package.get_customers_with_purchased_automobiles;
          DBMS_OUTPUT.PUT_LINE('----------------------------------------------------------------');
  LOOP
    FETCH customers_cursor INTO customer_id, first_name, last_name, manufacturer, name,
variant;
    EXIT WHEN customers_cursor%NOTFOUND;

    -- Process and print the data
    DBMS_OUTPUT.PUT_LINE('Customer ID: ' || customer_id ||  ', Customer: ' || first_name || '
' || last_name || ', Automobile: ' || manufacturer || ' ' || name || ' ' ||  variant);
  END LOOP;
          DBMS_OUTPUT.PUT_LINE('----------------------------------------------------------------');
  CLOSE customers_cursor;
```

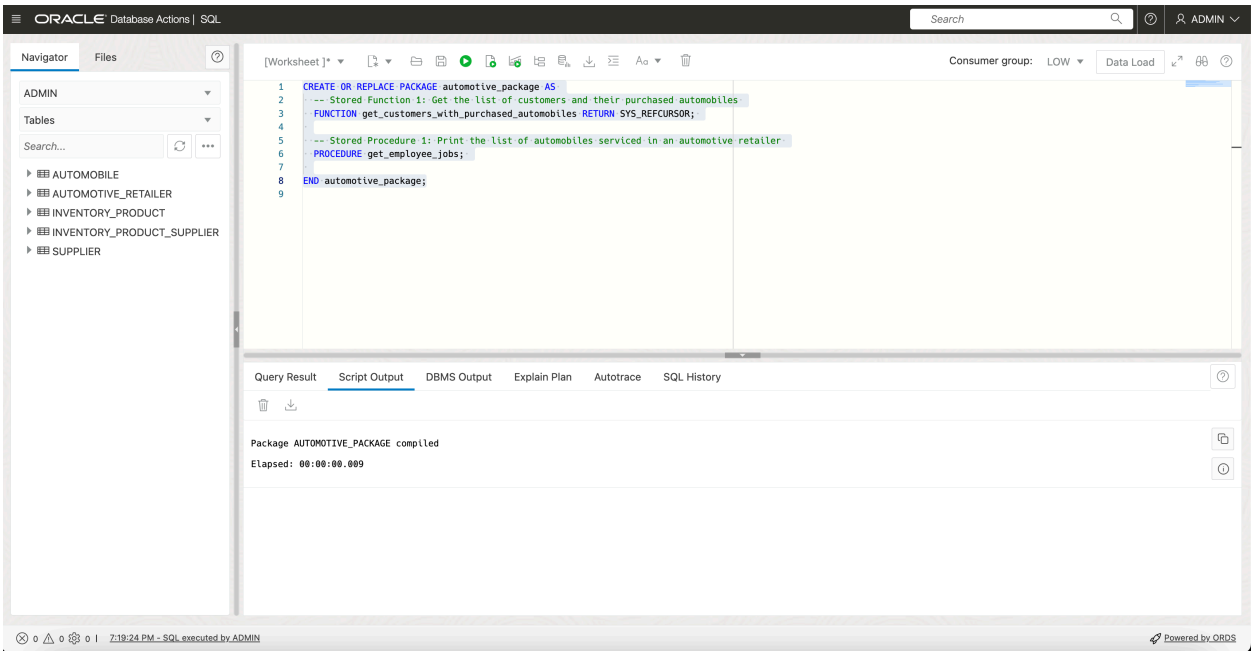
END;

Execution Code for Procedure:

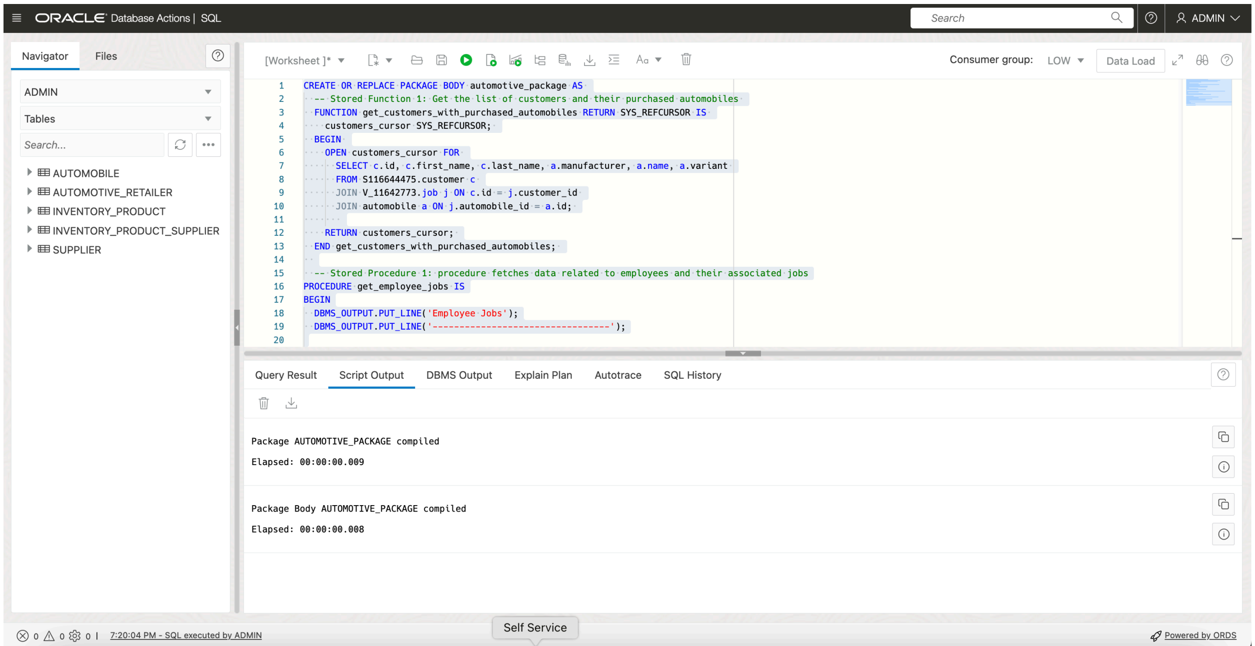
```
BEGIN
  automotive_package.get_employee_jobs;
END;
```

Code Execution in Cloud:

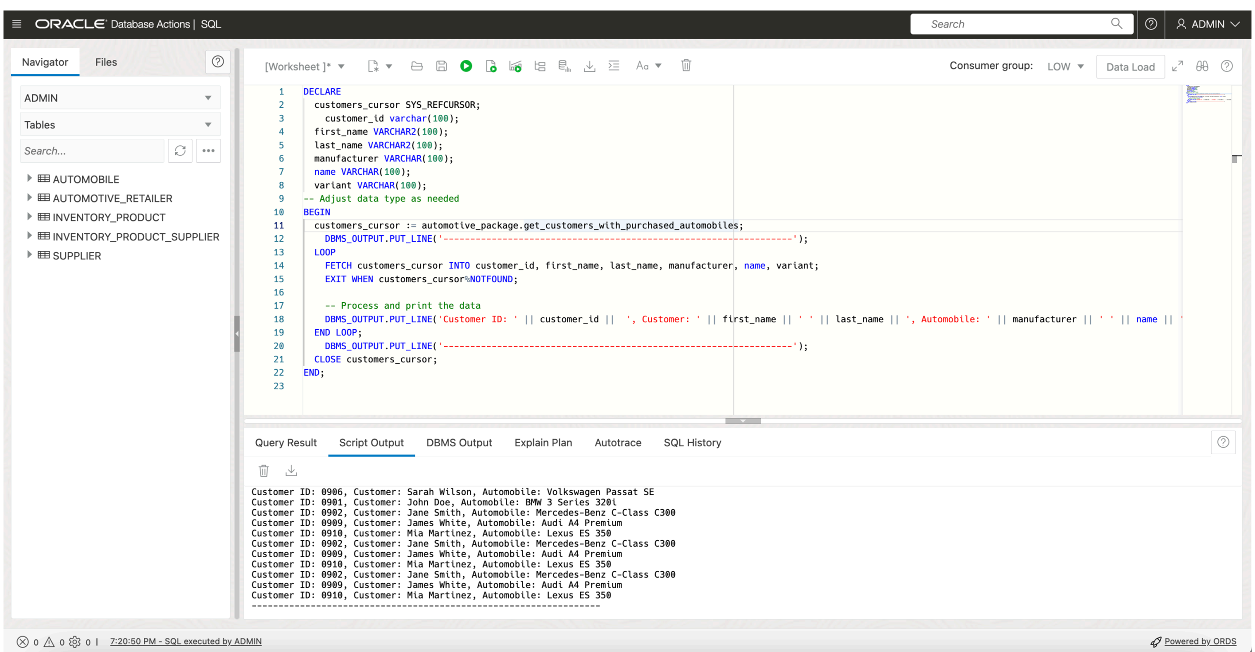
Screenshot-1:



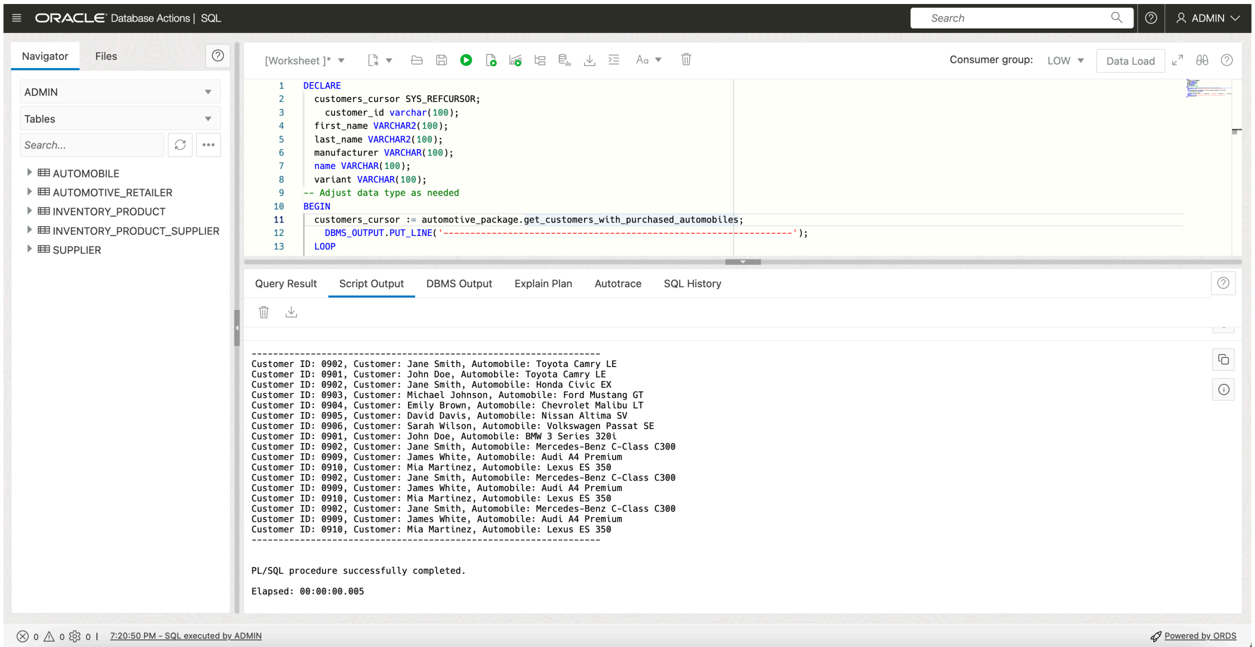
Screenshot-2:



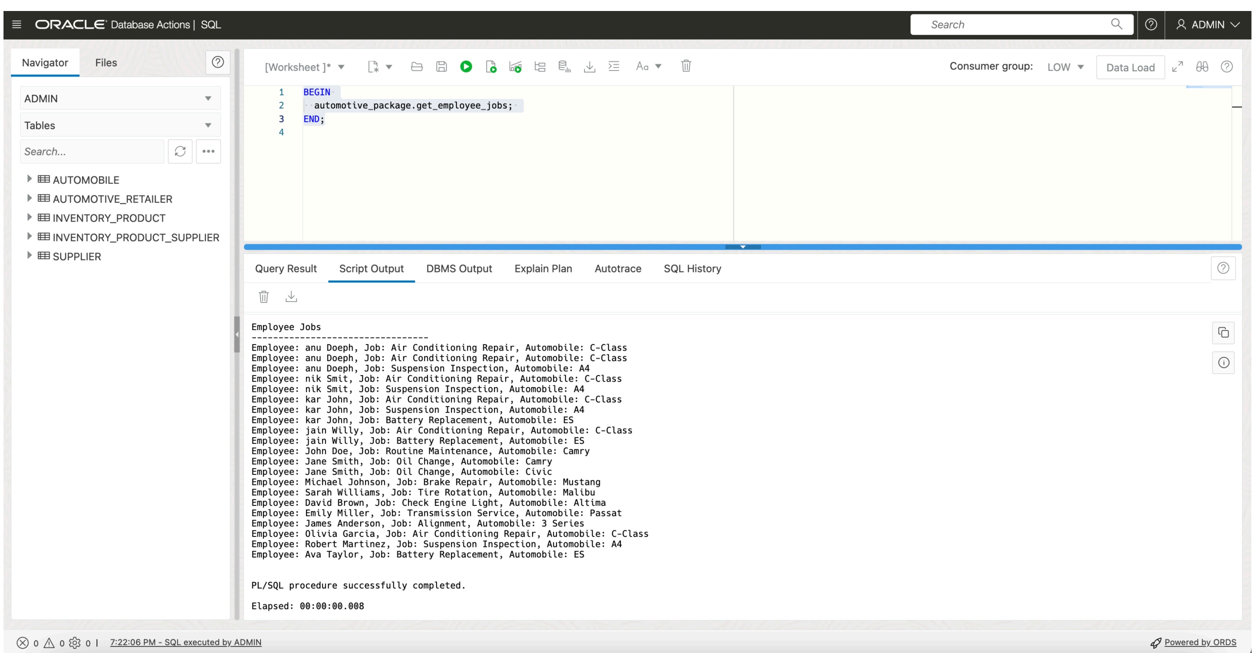
Screenshot-3:



Screenshot-4:



Screenshot-5:



Output for Function:

```
-----------------------------------------------------------------
Customer ID: 0902, Customer: Jane Smith, Automobile: Toyota Camry LE
Customer ID: 0901, Customer: John Doe, Automobile: Toyota Camry LE
Customer ID: 0902, Customer: Jane Smith, Automobile: Honda Civic EX
Customer ID: 0903, Customer: Michael Johnson, Automobile: Ford Mustang GT
Customer ID: 0904, Customer: Emily Brown, Automobile: Chevrolet Malibu LT
Customer ID: 0905, Customer: David Davis, Automobile: Nissan Altima SV
Customer ID: 0906, Customer: Sarah Wilson, Automobile: Volkswagen Passat SE
Customer ID: 0901, Customer: John Doe, Automobile: BMW 3 Series 320i
Customer ID: 0902, Customer: Jane Smith, Automobile: Mercedes-Benz C-Class C300
Customer ID: 0909, Customer: James White, Automobile: Audi A4 Premium
Customer ID: 0910, Customer: Mia Martinez, Automobile: Lexus ES 350
Customer ID: 0902, Customer: Jane Smith, Automobile: Mercedes-Benz C-Class C300
Customer ID: 0909, Customer: James White, Automobile: Audi A4 Premium
Customer ID: 0910, Customer: Mia Martinez, Automobile: Lexus ES 350
Customer ID: 0902, Customer: Jane Smith, Automobile: Mercedes-Benz C-Class C300
Customer ID: 0909, Customer: James White, Automobile: Audi A4 Premium
Customer ID: 0910, Customer: Mia Martinez, Automobile: Lexus ES 350
-----------------------------------------------------------------
```

Output for Procedure:

```
Employee Jobs
---------------------------------
Employee: anu Doeph, Job: Air Conditioning Repair, Automobile: C-Class
Employee: anu Doeph, Job: Air Conditioning Repair, Automobile: C-Class
Employee: anu Doeph, Job: Suspension Inspection, Automobile: A4
Employee: nik Smit, Job: Air Conditioning Repair, Automobile: C-Class
Employee: nik Smit, Job: Suspension Inspection, Automobile: A4
Employee: kar John, Job: Air Conditioning Repair, Automobile: C-Class
Employee: kar John, Job: Suspension Inspection, Automobile: A4
Employee: kar John, Job: Battery Replacement, Automobile: ES
Employee: jain Willy, Job: Air Conditioning Repair, Automobile: C-Class
Employee: jain Willy, Job: Battery Replacement, Automobile: ES
Employee: John Doe, Job: Routine Maintenance, Automobile: Camry
Employee: Jane Smith, Job: Oil Change, Automobile: Camry
Employee: Jane Smith, Job: Oil Change, Automobile: Civic
Employee: Michael Johnson, Job: Brake Repair, Automobile: Mustang
Employee: Sarah Williams, Job: Tire Rotation, Automobile: Malibu
Employee: David Brown, Job: Check Engine Light, Automobile: Altima
Employee: Emily Miller, Job: Transmission Service, Automobile: Passat
Employee: James Anderson, Job: Alignment, Automobile: 3 Series
Employee: Olivia Garcia, Job: Air Conditioning Repair, Automobile: C-Class
Employee: Robert Martinez, Job: Suspension Inspection, Automobile: A4
Employee: Ava Taylor, Job: Battery Replacement, Automobile: ES


PL/SQL procedure successfully completed.
```

Explanation: The provided PL/SQL package, 'automotive_package,' and its body serve two main purposes:

The 'get_customers_with_purchased_automobiles' function retrieves information about customers and the automobiles they have purchased. It returns a list of customer IDs, first and last names, as well as details about the automobiles they own.

The 'get_employee_jobs' procedure prints a list of automobiles serviced by employees in an automotive retailer. It retrieves data about employees, their associated jobs, and the automobiles they've serviced, and then prints this information.

To use these functionalities, you can execute the function to retrieve customer and automobile data and execute the procedure to display employee job details. This package provides a convenient way to access and display essential information in an automotive context.

Analysis

Table	Attributes	Domain Contraints	Contraints	Constraint Name	Relations
automotive_retailer	id	RAW(16)	PRIMARY KEY	NA	automotive_retailer has one to many relationship with employee, automotive_retailer has one to many relationship with inventory_product, automotive_retailer has one to one relationship with address, automotive_retailer has one to many relationship with job
	phone	VARCHAR2(20)	NOT NULL, UNIQUE, CHECK (REGEXP_LIKE (phone, '^\ (\d{3}\) \d{3}-\d {4}$'))	invalid_automotive_retailer_phone	
	email	VARCHAR2(255)	NOT NULL, UNIQUE, CHECK (REGEXP_LIKE (email, '^[A-Za-z0-9. _%+-]+@[A-Za-z0-9.-] +\.[A-Za-z]{2,}$'))	invalid_automotive_retailer_email	
	website	VARCHAR2(255)	NOT NULL, UNIQUE	NA	
	business_hours	VARCHAR2(20)	NOT NULL	NA	
	manager_id	RAW(16)	NOT NULL, FOREIGN KEY (manager_id) REFERENCES employee(id)	NA	
	address_id	RAW(16)	NOT NULL, FOREIGN KEY (address_id) REFERENCES address(id)	NA	
inventory_product	id	RAW(16)	PRIMARY KEY	NA	inventory_product has many to many relationship with supplier, inventory_product has many to one realationship with automotive_retailer, inventory_product has many to many relationship with bill, inventory_product has one to many relationship with part_service, inventory_product has many to one relationship with automobile, inventory_product has many to one relationship with address
	name	VARCHAR2(100)	NOT NULL	NA	
	quantity	INTEGER	NOT NULL	NA	
	price	INTEGER	NOT NULL	NA	
	automotive_retailer_id	RAW(16)	NOT NULL, FOREIGN KEY (automotive_retailer_id) REFERENCES automotive_retailer (id)	NA	
	automobile_id	RAW(16)	"NOT NULL, FOREIGN KEY (automobile_id) REFERENCES automobile(id)"	NA	
	address_id	RAW(16)	NOT NULL, FOREIGN KEY (address_id) REFERENCES address(id)	NA	
automobile	id	RAW(16)	PRIMARY KEY	NA	automobile has one to many relationship with inventory_product, automobile has one to many relationship with job
	manufacturer	VARCHAR2(100)	NOT NULL	NA	
	name	VARCHAR2(100)	NOT NULL	NA	
	variant	VARCHAR2(100)	NOT NULL	NA	
	year	VARCHAR2(10)	NOT NULL	NA	
	color	VARCHAR2(100)	NOT NULL	NA	
supplier	id	RAW(16)	PRIMARY KEY	NA	supplier has many to many relationship with inventory_product, supplier has one to one relationship with address
	name	VARCHAR2(100)	NOT NULL	NA	
	phone	VARCHAR2(20)	NOT NULL, UNIQUE, CHECK (REGEXP_LIKE (phone, '^\ (\d{3}\) \d{3}-\d {4}$'))	invalid_supplier_phone	
	address_id	RAW(16)	NOT NULL, FOREIGN KEY (address_id) REFERENCES address(id)	NA	

Analysis

Table	Attributes	Domain Contraints	Contraints	Constraint Name	Relations
Employee	id	RAW(16)	PRIMARY KEY	NA	employee has one to many relationship with employee_payroll, employee has many to one relationship with automotive_retailer, employee has one to many relationship with bill, employee has many to one relationship with address, employee has many to many relationship with job
	first_name	VARCHAR2(100)	NOT NULL	NA	
	last_name	VARCHAR2(100)	NOT NULL	NA	
	dob	TIMESTAMP	NOT NULL	NA	
	phone	VARCHAR2(20)	NOT NULL, UNIQUE, CHECK (REGEXP_LIKE (phone, '^\ (\d{3}\) \d{3}-\d {4}$'))	invalid_employee_phone	
	email	VARCHAR2(255)	NOT NULL, UNIQUE, CHECK (REGEXP_LIKE (email, '^[A-Za-z0-9. _%+-]+@[A-Za-z0-9.-] +\.[A-Za-z]{2,}$'))	invalid_employee_email	
	annual_salary	INTEGER	NOT NULL	NA	
	ssn	CHAR(9)	NOT NULL, UNIQUE	NA	
	automotive_retailer_id	RAW(16)	NOT NULL, FOREIGN KEY (automotive_retailer_id) REFERENCES automotive_retailer (id)	NA	
	address_id	RAW(16)	NOT NULL, FOREIGN KEY (address_id) REFERENCES address(id)	NA	
	hire_date	TIMESTAMP	NOT NULL	NA	
employee_payroll	id	RAW(16)	PRIMARY KEY	NA	employee_payroll has many to one relationship with employee
	hours_worked	NUMBER	NOT NULL	NA	
	start_date	TIMESTAMP	NOT NULL	NA	
	end_date	TIMESTAMP	NOT NULL	NA	
	pay	NUMBER	NOT NULL	NA	
	employee_id	RAW(16)	NOT NULL, FOREIGN KEY (employee_id) REFERENCES employee(id)	NA	
address	id	RAW(16)	PRIMARY KEY	NA	address has one to many relationship with employee, address has one to many relationship with inventory_product, address has one to one relationship with automotive_retailer, address has one to one relationship with supplier, address has one to many relationship with customer
	apartment_no	NUMBER	NOT NULL	NA	
	street	VARCHAR2(100)	NOT NULL	NA	
	city	VARCHAR2(100)	NOT NULL	NA	
	state	VARCHAR2(50)	NOT NULL	NA	
	country	VARCHAR2(50)	NOT NULL	NA	
	zip	CHAR(5)	NOT NULL	NA	
	id	RAW(16)	PRIMARY KEY	NA	
	date	TIMESTAMP	NOT NULL	NA	
	mode_of_payment	CHAR(4)	NOT NULL, CHECK (mode_of_payment IN ('CARD', 'CASH'))	invalid_mode_of_payment	

Analysis

Table	Attributes	Domain Contraints	Contraints	Constraint Name	Relations
bill	insurance_id	RAW(16)	NOT NULL, FOREIGN KEY (insurance_id) REFERENCES insurance(id)	NA	bill has many to one relationship with employee, bill has many to many relationship with inventory_product, bill has many to one relationship with insurance, bill has many to one relationship with customer, bill has one to one relationship with job, bill has many to one relationship with payment_plan
	customer_id	RAW(16)	NOT NULL, FOREIGN KEY (customer_id) REFERENCES customer(id)	NA	
	job_id	RAW(16)	NOT NULL, FOREIGN KEY (job_id) REFERENCES job(id)	NA	
	employee_id	RAW(16)	NOT NULL, FOREIGN KEY (employee_id) REFERENCES employee(id)	NA	
	sale_type	CHAR(7)	NOT NULL, CHECK (mode_of_payment IN ('ONLINE', 'OFFLINE'))	invalid_sale_type	
	payment_plan_id	RAW(16)	NOT NULL, FOREIGN KEY (payment_plan_id) REFERENCES payment_plan(id)	NA	
job	id	RAW(16)	PRIMARY KEY	NA	job has one to one realtionship with bill, job has many to one realtionship with automobile, job has many to one realtionship with automotive_retailer, job has many to many relationship with employee, job has one to many realtionship with part_service, job has many to one realtionship with customer
	date	TIMESTAMP	NOT NULL	NA	
	description	VARCHAR2(255)	NOT NULL	NA	
	customer_id	RAW(16)	NOT NULL, FOREIGN KEY (customer_id) REFERENCES customer(id)	NA	
	automotive_retailer_id	RAW(16)	NOT NULL, FOREIGN KEY (automotive_retailer_id) REFERENCES automotive_retailer (id)	NA	
	vin_number	VARCHAR2(100)	NOT NULL, CHECK()	NA	
	automobile_id	RAW(16)	NOT NULL, FOREIGN KEY (automobile_id) REFERENCES automobile(id)	NA	
	job_status	VARCHAR2(20)		NA	
part_service	id	RAW(16)	PRIMARY KEY	NA	part_service has many to one relationship with job, part_service has one to one relationship with inventary_product
	name	VARCHAR2(100)	NOT NULL	NA	
	quantity	INTEGER	NOT NULL	NA	
	job_id	RAW(16)	NOT NULL, FOREIGN KEY (job_id) REFERENCES job(id)	NA	
	inventory_product_id	RAW(16)	NOT NULL, FOREIGN KEY (inventory_product_id) REFERENCES inventory_product (id)	NA	
	type	CHAR(7)	NOT NULL, CHECK (mode_of_payment IN ('SERVICE', 'PART'))	invalid_part_service_type	
	id	RAW(16)	PRIMARY KEY	NA	

Analysis

Table	Attributes	Domain Contraints	Contraints	Constraint Name	Relations
payment_plan	name	VARCHAR2(100)	NOT NULL	NA	payment_plan has one to many relationship with bill
	installments	INTEGER	NOT NULL	NA	
	interest	INTEGER	NOT NULL	NA	
customer	id	RAW(16)	PRIMARY KEY	NA	customer has many to many relationship with insurance, customer has one to many relationship with job, customer has many to one relationship with address, customer has one to many relationship with bills
	first_name	VARCHAR2(100)	NOT NULL	NA	
	last_name	VARCHAR2(100)	NOT NULL	NA	
	dob	TIMESTAMP	NOT NULL	NA	
	driverlicense	VARCHAR2(50)	UNIQUE, NOT NULL	NA	
	phone	VARCHAR2(20)	NOT NULL, UNIQUE, CHECK (REGEXP_LIKE (phone, '^\ (\d{3}\) \d{3}-\d {4}$'))	invalid_customer_phone	
	address_id	RAW(16)	NOT NULL, FOREIGN KEY (address_id) REFERENCES address(id)	NA	
insurance	id	RAW(16)	PRIMARY KEY	NA	insurance has many to many relationship with customer, insurance has one to many relationship with bill
	policy_type	VARCHAR2(100)	NOT NULL	NA	
	provider	VARCHAR2(100)	NOT NULL	NA	
	claim_percentage	INTEGER	NOT NULL	NA	
inventory_product_supplier	inventory_product_id	RAW(16)	PRIMARY KEY, NOT NULL, FOREIGN KEY (inventory_product_id) REFERENCES inventory_product (id)"	NA	NA
	supplier_id	RAW(16)	PRIMARY KEY, NOT NULL, FOREIGN KEY (supplier_id) REFERENCES supplier(id)	NA	
	quantity	INTEGER	NOT NULL	NA	
bill_inventory_product	bill_id	RAW(16)	PRIMARY KEY, NOT NULL, FOREIGN KEY (bill_id) REFERENCES bill(id)"	NA	NA
	inventory_product_id	RAW(16)	PRIMARY KEY, NOT NULL, FOREIGN KEY (inventory_product_id) REFERENCES inventory_product (id)"	NA	
	quantity	INTEGER	NOT NULL	NA	
job_employee	job_id	RAW(16)	PRIMARY KEY, NOT NULL, FOREIGN KEY (job_id) REFERENCES job(id)"	NA	NA

Analysis

Table	Attributes	Domain Contraints	Contraints	Constraint Name	Relations
job_employee	employee_id	RAW(16)	PRIMARY KEY, NOT NULL, FOREIGN KEY (employee_id) REFERENCES employee(id)"	NA	NA
customer_insurance	customer_id	RAW(16)	PRIMARY KEY, NOT NULL, FOREIGN KEY (customer_id) REFERENCES customer(id)"	NA	NA
	insurance_id	RAW(16)	PRIMARY KEY, NOT NULL, FOREIGN KEY (insurance_id) REFERENCES insurance(id)"	NA	
	status	CHAR(8)	NOT NULL	NA	