```
-- === 1. Create Star Schema Tables (Dimensions) ===

-- Dimension Table for Auto (Vehicle)
CREATE TABLE dim_auto (
   auto_id NUMBER PRIMARY KEY,
   vehicle_type VARCHAR2(50),
   driver_category VARCHAR2(50)
);

-- Dimension Table for Location (Street)
CREATE TABLE dim_location (
   location_id NUMBER PRIMARY KEY,
   street_name VARCHAR2(50),
   city VARCHAR2(50)
);

-- Dimension Table for Time (Year, Month, Day)
CREATE TABLE dim_time (
   time_id NUMBER PRIMARY KEY,
   year NUMBER,
   month NUMBER,
   day NUMBER
);

-- === 2. Create Fact Table ===

CREATE TABLE fact_auto_movement (
   fact_id NUMBER PRIMARY KEY,
   auto_id NUMBER,
   location_id NUMBER,
   time_id NUMBER,
   speed NUMBER,
   FOREIGN KEY (auto_id) REFERENCES dim_auto(auto_id),
   FOREIGN KEY (location_id) REFERENCES dim_location(location_id),
   FOREIGN KEY (time_id) REFERENCES dim_time(time_id)
);

-- === 3. Insert Data into Star Schema ===

-- Insert data into dim_auto
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INSERT INTO dim_auto (auto_id, vehicle_type, driver_category) VALUES (1, 'Car', 'Experienced');
INSERT INTO dim_auto (auto_id, vehicle_type, driver_category) VALUES (2, 'Truck', 'Novice');
INSERT INTO dim_auto (auto_id, vehicle_type, driver_category) VALUES (3, 'Motorcycle', 'Experienced');
INSERT INTO dim_auto (auto_id, vehicle_type, driver_category) VALUES (4, 'Bus', 'Experienced');
INSERT INTO dim_auto (auto_id, vehicle_type, driver_category) VALUES (5, 'Car', 'Novice');

-- Insert data into dim_location
INSERT INTO dim_location (location_id, street_name, city) VALUES (1, 'Main Street', 'City A');
INSERT INTO dim_location (location_id, street_name, city) VALUES (2, 'Broadway', 'City B');
INSERT INTO dim_location (location_id, street_name, city) VALUES (3, '5th Avenue', 'City C');
INSERT INTO dim_location (location_id, street_name, city) VALUES (4, 'Sunset Boulevard', 'City A');
INSERT INTO dim_location (location_id, street_name, city) VALUES (5, 'Ocean Drive', 'City B');

-- Insert data into dim_time
INSERT INTO dim_time (time_id, year, month, day) VALUES (1, 2025, 5, 1);
INSERT INTO dim_time (time_id, year, month, day) VALUES (2, 2025, 5, 2);
INSERT INTO dim_time (time_id, year, month, day) VALUES (3, 2025, 5, 3);
INSERT INTO dim_time (time_id, year, month, day) VALUES (4, 2025, 5, 4);
INSERT INTO dim_time (time_id, year, month, day) VALUES (5, 2025, 5, 5);

-- Insert data into fact_auto_movement
INSERT INTO fact_auto_movement (fact_id, auto_id, location_id, time_id, speed) VALUES (1, 1, 1, 1, 60);
INSERT INTO fact_auto_movement (fact_id, auto_id, location_id, time_id, speed) VALUES (2, 2, 2, 2, 50);
INSERT INTO fact_auto_movement (fact_id, auto_id, location_id, time_id, speed) VALUES (3, 3, 3, 3, 70);
INSERT INTO fact_auto_movement (fact_id, auto_id, location_id, time_id, speed) VALUES (4, 4, 4, 4, 40);
```

```
INSERT INTO fact_auto_movement (fact_id, auto_id, location_id, time_id,
speed) VALUES (5, 5, 5, 5, 80);

-- === 4. Create Snowflake Schema Tables ===

-- Snowflake Dimension Table for Location (Street -> City)
CREATE TABLE dim_location_snowflake (
   location_id NUMBER PRIMARY KEY,
   street_name VARCHAR2(50),
   city_id NUMBER
);

-- Snowflake Dimension Table for City
CREATE TABLE dim_city_snowflake (
   city_id NUMBER PRIMARY KEY,
   city_name VARCHAR2(50)
);

-- === 5. Alter Fact Table to Add References to Snowflake Schema ===

ALTER TABLE fact_auto_movement
ADD (city_id NUMBER, FOREIGN KEY (city_id) REFERENCES
dim_city_snowflake(city_id));

-- === 6. Insert Data into Snowflake Schema ===

-- Insert data into dim_city_snowflake
INSERT INTO dim_city_snowflake (city_id, city_name) VALUES (1, 'City A');
INSERT INTO dim_city_snowflake (city_id, city_name) VALUES (2, 'City B');
INSERT INTO dim_city_snowflake (city_id, city_name) VALUES (3, 'City C');

-- Insert data into dim_location_snowflake
INSERT INTO dim_location_snowflake (location_id, street_name, city_id)
VALUES (1, 'Main Street', 1);
INSERT INTO dim_location_snowflake (location_id, street_name, city_id)
VALUES (2, 'Broadway', 2);
INSERT INTO dim_location_snowflake (location_id, street_name, city_id)
VALUES (3, '5th Avenue', 3);
INSERT INTO dim_location_snowflake (location_id, street_name, city_id)
VALUES (4, 'Sunset Boulevard', 1);
```

```
INSERT INTO dim_location_snowflake (location_id, street_name, city_id)
VALUES (5, 'Ocean Drive', 2);

-- === 7. Perform OLAP Operations ===
-- === 7. Perform OLAP Operations with Print Statements ===

-- === SLICE OPERATION ===
-- Slice by Auto ID (Car) - Extract data for Auto ID = 1 (Car)
BEGIN
   DBMS_OUTPUT.PUT_LINE('=== SLICE OPERATION ===');
   DBMS_OUTPUT.PUT_LINE('Description: Slice by Auto ID (Car)');
   DBMS_OUTPUT.PUT_LINE('Extracting data for Auto ID = 1 (Car)');
END;
/
SELECT f.fact_id, a.vehicle_type, l.street_name, t.year, t.month, t.day, f.speed
FROM fact_auto_movement f
JOIN dim_auto a ON f.auto_id = a.auto_id
JOIN dim_location_snowflake l ON f.location_id = l.location_id
JOIN dim_time t ON f.time_id = t.time_id
WHERE a.auto_id = 1;

-- === DICE OPERATION ===
-- Filter data for Speed > 50 and Location = Main Street
BEGIN
   DBMS_OUTPUT.PUT_LINE('=== DICE OPERATION ===');
   DBMS_OUTPUT.PUT_LINE('Description: Filter data for Speed > 50 and
Location = Main Street');
END;
/
SELECT f.fact_id, a.vehicle_type, l.street_name, t.year, t.month, t.day, f.speed
FROM fact_auto_movement f
JOIN dim_auto a ON f.auto_id = a.auto_id
JOIN dim_location_snowflake l ON f.location_id = l.location_id
JOIN dim_time t ON f.time_id = t.time_id
WHERE f.speed > 50 AND l.street_name = 'Main Street';

-- === DRILL-DOWN OPERATION ===
-- Drill down from Year → Month for Vehicle Movements in 2025
BEGIN
   DBMS_OUTPUT.PUT_LINE('=== DRILL-DOWN OPERATION ===');
```

```
   DBMS_OUTPUT.PUT_LINE('Description: Drill down from Year → Month for
Vehicle Movements in 2025');
   DBMS_OUTPUT.PUT_LINE('Drilling down from Year to Month for Movements
in 2025');
END;
/
SELECT t.year, t.month, COUNT(f.fact_id) AS movements
FROM fact_auto_movement f
JOIN dim_time t ON f.time_id = t.time_id
WHERE t.year = 2025
GROUP BY t.year, t.month
ORDER BY t.year, t.month;

-- === ROLL-UP OPERATION ===
-- Roll-up from Day → Month for Vehicle Movements
BEGIN
   DBMS_OUTPUT.PUT_LINE('=== ROLL-UP OPERATION ===');
   DBMS_OUTPUT.PUT_LINE('Description: Roll-up from Day → Month for
Vehicle Movements');
   DBMS_OUTPUT.PUT_LINE('Rolling up from Day to Month');
END;
/
SELECT t.year, t.month, SUM(f.speed) AS total_speed
FROM fact_auto_movement f
JOIN dim_time t ON f.time_id = t.time_id
GROUP BY t.year, t.month
ORDER BY t.year, t.month;

-- === PIVOT OPERATION ===
-- Pivot by Month to Show Total Speed for Each Vehicle
BEGIN
   DBMS_OUTPUT.PUT_LINE('=== PIVOT OPERATION ===');
   DBMS_OUTPUT.PUT_LINE('Description: Pivot by Month to Show Total Speed
for Each Vehicle');
END;
/
SELECT *
FROM (
   SELECT a.vehicle_type, t.month, f.speed
   FROM fact_auto_movement f
```

```
    JOIN dim_auto a ON f.auto_id = a.auto_id
    JOIN dim_time t ON f.time_id = t.time_id
)
PIVOT (
    SUM(speed)
    FOR month IN (1 AS "January", 2 AS "February", 3 AS "March", 4 AS "April", 5
AS "May")
);
```