Pizza Basket Analysis

-- 1. Identify Most Frequently Ordered Pizzas.

SELECT pt.name AS pizza_name, COUNT(od.order_id) AS total_orders

FROM pizza_types pt

JOIN pizzas p ON pt.pizza_type_id = p.pizza_type_id

join order_details od on od.pizza_id = p.pizza_id

GROUP BY pt.name

ORDER BY total_orders DESC

LIMIT 10;

pizza_name	total_orders
The Classic Deluxe Pizza	2416
The Barbecue Chicken Pizza	2372
The Hawaiian Pizza	2370
The Pepperoni Pizza	2369
The Thai Chicken Pizza	2315
The California Chicken Pizza	2302
The Spicy Italian Pizza	1887
The Sicilian Pizza	1887
The Southwest Chicken Pizza	1885
The Four Cheese Pizza	1850

-- 2. Find Pizza Combinations Ordered Together

```sql
SELECT pt1.name AS pizza_A, pt2.name AS pizza_B, COUNT(*) AS frequency
FROM order_details od1
JOIN order_details od2
  ON od1.order_id = od2.order_id AND od1.pizza_id <> od2.pizza_id
JOIN pizzas p1 ON od1.pizza_id = p1.pizza_id
JOIN pizzas p2 ON od2.pizza_id = p2.pizza_id
JOIN pizza_types pt1 ON p1.pizza_type_id = pt1.pizza_type_id
JOIN pizza_types pt2 ON p2.pizza_type_id = pt2.pizza_type_id
WHERE pt1.name < pt2.name
GROUP BY pizza_A, pizza_B
ORDER BY frequency DESC
LIMIT 10;
```

pizza_A	pizza_B	frequency
The Hawaiian Pizza	The Thai Chicken Pizza	319
The Barbecue Chicken Pizza	The Pepperoni Pizza	308
The Hawaiian Pizza	The Pepperoni Pizza	299
The Pepperoni Pizza	The Thai Chicken Pizza	299
The Classic Deluxe Pizza	The Hawaiian Pizza	296
The Classic Deluxe Pizza	The Pepperoni Pizza	295
The California Chicken Pizza	The Hawaiian Pizza	294
The Barbecue Chicken Pizza	The Hawaiian Pizza	292
The California Chicken Pizza	The Pepperoni Pizza	292
The Barbecue Chicken Pizza	The California Chicken Pizza	287

Calculate Support, Confidence, and Lift

-- 3. Support (How frequently an item appears in transactions).

SELECT pt.name AS pizza_name,

    COUNT(od.pizza_id) / (SELECT COUNT(DISTINCT order_id) FROM order_details) AS support

FROM order_details od

JOIN pizzas p ON od.pizza_id = p.pizza_id

join pizza_types pt on p.pizza_type_id = pt.pizza_type_id

GROUP BY pt.name

ORDER BY support DESC;

pizza_name	support
The Classic Deluxe Pizza	0.1132
The Barbecue Chicken Pizza	0.1111
The Hawaiian Pizza	0.1110
The Pepperoni Pizza	0.1110
The Thai Chicken Pizza	0.1084
The California Chicken Pizza	0.1078
The Spicy Italian Pizza	0.0884
The Sicilian Pizza	0.0884
The Southwest Chicken Pizza	0.0883
The Four Cheese Pizza	0.0867
The Italian Supreme Pizza	0.0866
The Big Meat Pizza	0.0848
The Vegetables + Vegetables Pizza	0.0707
The Mexicana Pizza	0.0682
The Napolitana Pizza	0.0680
The Spinach and Feta Pizza	0.0671
The Prosciutto and Arugula Pizza	0.0669
The Pepper Salami Pizza	0.0666
The Italian Capocollo Pizza	0.0662

-- 4. Confidence (How often B is bought when A is bought).

```sql
WITH pizza_order_count AS (
    SELECT pizza_id, COUNT(*) AS total_orders
    FROM order_details
    GROUP BY pizza_id
)
SELECT pt1.name AS pizza_A, pt2.name AS pizza_B,
       COUNT(*) / poc.total_orders AS confidence
FROM order_details od1
JOIN order_details od2
  ON od1.order_id = od2.order_id AND od1.pizza_id <> od2.pizza_id
JOIN pizzas p1 ON od1.pizza_id = p1.pizza_id
JOIN pizzas p2 ON od2.pizza_id = p2.pizza_id
JOIN pizza_types pt1 ON p1.pizza_type_id = pt1.pizza_type_id
JOIN pizza_types pt2 ON p2.pizza_type_id = pt2.pizza_type_id
JOIN pizza_order_count poc ON p1.pizza_id = poc.pizza_id
WHERE pt1.name > pt2.name
GROUP BY pt1.name, pt2.name, poc.total_orders
ORDER BY confidence DESC
LIMIT 10;
```

pizza_A	pizza_B	confidence
The Spinach and Feta Pizza	The Pepperoni Pizza	0.3043
The Spinach and Feta Pizza	The Barbecue Chicken Pizza	0.2700
The Spinach and Feta Pizza	The Hawaiian Pizza	0.2334
The Spinach and Feta Pizza	The California Chicken Pizza	0.2311
The Spinach and Feta Pizza	The Classic Deluxe Pizza	0.2197
The Spinach and Feta Pizza	The Sicilian Pizza	0.2105
The Spinach and Feta Pizza	The Spicy Italian Pizza	0.2059
The Spinach and Feta Pizza	The Four Cheese Pizza	0.1991
The Italian Supreme Pizza	The Classic Deluxe Pizza	0.1959
The Italian Vegetables Pizza	The Hawaiian Pizza	0.1947

-- 5. Lift (Strength of the relationship).

```sql
WITH total_orders_cte AS (
    SELECT COUNT(DISTINCT order_id) AS total_orders
    FROM order_details
),
pizza_counts AS (
    SELECT pizza_id, COUNT(DISTINCT order_id) AS orders_count
    FROM order_details
    GROUP BY pizza_id
),
pair_counts AS (
    SELECT
        od1.pizza_id AS pizza_A_id,
        od2.pizza_id AS pizza_B_id,
        COUNT(DISTINCT od1.order_id) AS pair_count
    FROM order_details od1
    JOIN order_details od2
      ON od1.order_id = od2.order_id
     AND od1.pizza_id < od2.pizza_id
    GROUP BY od1.pizza_id, od2.pizza_id
)
SELECT
    pt1.name AS pizza_A,
    pt2.name AS pizza_B,
    (pc_pair.pair_count * tot.total_orders) / (pc1.orders_count * pc2.orders_count) AS lift
FROM pair_counts pc_pair
JOIN pizza_counts pc1 ON pc_pair.pizza_A_id = pc1.pizza_id
JOIN pizza_counts pc2 ON pc_pair.pizza_B_id = pc2.pizza_id
CROSS JOIN total_orders_cte tot
JOIN pizzas p1 ON pc_pair.pizza_A_id = p1.pizza_id
JOIN pizzas p2 ON pc_pair.pizza_B_id = p2.pizza_id
JOIN pizza_types pt1 ON p1.pizza_type_id = pt1.pizza_type_id
JOIN pizza_types pt2 ON p2.pizza_type_id = pt2.pizza_type_id
ORDER BY lift DESC
LIMIT 10;
```

pizza_A	pizza_B	lift
The Calabrese Pizza	The Greek Pizza	7.7020
The Calabrese Pizza	The Green Garden Pizza	6.8827
The Greek Pizza	The Greek Pizza	5.9804
The Chicken Pesto Pizza	The Greek Pizza	5.8355
The Chicken Alfredo Pizza	The Italian Vegetables Pizza	4.6820
The Chicken Alfredo Pizza	The Spinach Supreme Pizza	3.9512
The Italian Supreme Pizza	The Greek Pizza	3.9304
The Spinach Pesto Pizza	The Greek Pizza	3.8413
The Spinach and Feta Pizza	The Greek Pizza	3.4897
The Italian Vegetables Pizza	The Spinach Pesto Pizza	3.3965