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DB Assignment 3

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SQL Section

Query #1: List names and sellers of products that are no longer available (quantity=0)

```SQL
SELECT merchants.name AS Company, products.name AS Product,
sell.quantity_available
FROM merchants JOIN sell ON merchants.mid = sell.mid
JOIN products ON sell.pid = products.pid
WHERE quantity_available = 0;
```

Result	Explanation
<table><tr><th>Company</th><th>Product</th><th>quantity_available</th></tr><tr><td>Acer</td><td>Router</td><td>0</td></tr><tr><td>Acer</td><td>Network Card</td><td>0</td></tr><tr><td>Apple</td><td>Printer</td><td>0</td></tr><tr><td>Apple</td><td>Router</td><td>0</td></tr><tr><td>HP</td><td>Router</td><td>0</td></tr><tr><td>HP</td><td>Super Drive</td><td>0</td></tr><tr><td>HP</td><td>Laptop</td><td>0</td></tr><tr><td>Dell</td><td>Router</td><td>0</td></tr><tr><td>Lenovo</td><td>Ethernet Adapter</td><td>0</td></tr></table>	Here I filter for merchant names, product names, and quantity_available, joining merchants to sell and sell to products, and filtering for rows where quantity_available = 0.

Query #2: List names and descriptions of products that are not sold.

```SQL
SELECT p.name AS Product, p.description
FROM products p
WHERE p.pid NOT IN (
    SELECT DISTINCT c.pid
    FROM contain c
);
```

Result	Explanation
Product description ▶ Super Drive External CD/DVD/RW Super Drive UInternal CD/DVD/RW	This query utilizes a subquery that joins products and contain to filter against products that are not part of orders.

Query #3: How many customers bought SATA drives but not any routers?

```sql
SELECT count(customers.cid) AS Num_Of_Customers
FROM customers
JOIN place ON customers.cid = place.cid
JOIN orders ON place.oid = orders.oid
JOIN contain ON orders.oid = contain.oid
JOIN products ON contain.pid = products.pid
WHERE products.description LIKE '%SATA%'
      AND customers.cid NOT IN (
    SELECT DISTINCT customers.cid
    FROM customers
    JOIN place ON customers.cid = place.cid
    JOIN orders ON place.oid = orders.oid
    JOIN contain ON orders.oid = contain.oid
    JOIN products ON contain.pid = products.pid
    WHERE products.name LIKE '%Router%'
    );
```

Result	Explanation
Num_Of_Customers ▶ 0	This query is a long one because it requires joining across almost every table, first filtering for products with a description that mention SATA. Then, using a subquery, any rows where the product is a router are filtered against.

Query #4: HP has a 20% sale on all its Networking products.

```sql
SELECT ROUND(s.price * 0.8) AS "Price (20% Off)", s.price AS "Full Price",
m.name AS Company, p.category AS Category
FROM merchants m
JOIN sell s ON m.mid = s.mid
JOIN products p ON s.pid = p.pid
WHERE m.name = "HP" AND Category = "Networking";
```

Result	Explanation
<table><tr><td>Price (20% Off)</td><td>Full Price</td><td>Company</td><td>Category</td></tr><tr><td>828</td><td>1034.46</td><td>HP</td><td>Networking</td></tr><tr><td>924</td><td>1154.68</td><td>HP</td><td>Networking</td></tr><tr><td>276</td><td>345.01</td><td>HP</td><td>Networking</td></tr><tr><td>210</td><td>262.2</td><td>HP</td><td>Networking</td></tr><tr><td>1008</td><td>1260.45</td><td>HP</td><td>Networking</td></tr><tr><td>164</td><td>205.56</td><td>HP</td><td>Networking</td></tr><tr><td>1180</td><td>1474.87</td><td>HP</td><td>Networking</td></tr><tr><td>442</td><td>552.02</td><td>HP</td><td>Networking</td></tr><tr><td>81</td><td>100.95</td><td>HP</td><td>Networking</td></tr><tr><td>943</td><td>1179.01</td><td>HP</td><td>Networking</td></tr></table>	I interpreted this query to be asking for a comparison of HP's networking product prices, showing the difference between full prices and eighty percent off. I did this by selecting price twice but manipulating the one column, and joining the necessary tables while filtering for HP and Networking.

Query #5: What did Uriel Whitney order from Acer? (make sure to at least retrieve product names and prices).

```sql
SELECT DISTINCT p.name AS product_name,
       s.price AS price
FROM customers c
JOIN place pl ON c.cid = pl.cid
JOIN contain co ON pl.oid = co.oid
JOIN products p ON co.pid = p.pid
JOIN sell s ON p.pid = s.pid
JOIN merchants m ON s.mid = m.mid
WHERE c.fullname = 'Uriel Whitney'
  AND m.name = 'Acer';
```

Result	Explanation
product_name price ▶ Monitor 1435.38 Router 521.07 Router 1256.57 Monitor 1103.47 Super Drive 356.13 Printer 1345.37 Super Drive 671.75 Super Drive 1135.3 Super Drive 1015.95 Network Card 405.4 Hard Drive 836.99 Super Drive 1124.26 Network Card 609.2 Router 945.51 Hard Drive 333.71 Laptop 247.96 Router 394.04 Laptop 33.5	This query joins the necessary tables to find what Uriel Whitney ordered from Acer by filtering for those specific values after the join.

Query #6: List the annual total sales for each company (sort the results along the company and the year attributes).

```SQL
SELECT m.name AS company,
       YEAR(pl.order_date) AS year,
       FORMAT(SUM(s.price) * s.quantity_available, 2) AS total_sales
FROM merchants m
JOIN sell s ON m.mid = s.mid
JOIN products p ON s.pid = p.pid
JOIN contain c ON p.pid = c.pid
JOIN orders o ON c.oid = o.oid
JOIN place pl ON o.oid = pl.oid
GROUP BY m.name, YEAR(pl.order_date)
ORDER BY m.name, YEAR(pl.order_date);
```

Result	Explanation
	In this query, I used the YEAR() function to select for specific years and the FORMAT() function to clean up my total sales values, which I assumed were found by multiplying product price sums by the number of available products. Then, I performed the necessary joins and made sure to group by merchant name and the order year.

company	year	total_sales
Acer	2011	0.00
Acer	2016	361,746.84
Acer	2017	1,060,336.62
Acer	2018	524,118.58
Acer	2019	417,631.60
Acer	2020	2,187,733.80
Apple	2011	667,291.64
Apple	2016	453,239.22
Apple	2017	897,803.90
Apple	2018	3,304,545.53
Apple	2019	1,621,012.19
Apple	2020	2,164,610.60
Dell	2011	1,999,033.85
Dell	2016	1,000,480.18
Dell	2017	546,865.83
Dell	2018	1,575,024.10
Dell	2019	1,328,350.98

Query #7: Which company had the highest annual revenue and in what year?

```SQL
SELECT m.name AS company,
            YEAR (pl.order_date) AS year,
         ROUND(SUM(s.price), 2) * s.quantity_available AS total_sales
FROM merchants m
JOIN sell s ON m.mid = s.mid
JOIN products p ON s.pid = p.pid
JOIN contain c ON p.pid = c.pid
JOIN orders o ON c.oid = o.oid
JOIN place pl ON o.oid = pl.oid
GROUP BY m.name, YEAR(pl.order_date)
ORDER BY total_sales desc
LIMIT 1;
```

Result	Explanation
	In this query I used similar functions to the last query, except I used ROUND() instead of FORMAT() since I still needed to use the

company	year	total_sales
Apple	2018	3304545.53

	integer value of total_sales. This query I interpreted as being the same as the previous, but I needed to find only the highest revenue. I used ORDER and LIMIT instead of a subquery since I assumed the value would be too specific for any companies to tie.

Query #8: On average, what was the cheapest shipping method used ever?

```sql
SELECT o.shipping_method, ROUND(AVG(o.shipping_cost), 2) AS avg_shipping_cost
FROM orders o
GROUP BY o.shipping_method
HAVING AVG(o.shipping_cost) = (
    SELECT MIN(avg_cost)
    FROM (
        SELECT AVG(o2.shipping_cost) AS avg_cost
        FROM orders o2
        GROUP BY o2.shipping_method
    ) AS sub
);
```

Result	Explanation
shipping_method avg_shipping_cost USPS 7.46	The subquery finds the average cost for each shipping method. The outer query does the same, but uses HAVING and SELECT MIN to keep only the shipping method whose average shipping cost is equal to the minimum from the subquery.

Query #9: What is the best sold ($) category for each company?

```sql
WITH totals AS (
  SELECT
      m.mid,
```

```
        m.name AS company,
        p.category,
        ROUND(SUM(s.price), 2) * s.quantity_available AS total_sales
    FROM merchants m
    JOIN sell s ON m.mid = s.mid
    JOIN products p ON s.pid = p.pid
    JOIN contain c ON p.pid = c.pid
    JOIN orders o ON c.oid = o.oid
    JOIN place pl ON o.oid = pl.oid
    GROUP BY m.mid, m.name, p.category
)
SELECT t1.company, t1.category, t1.total_sales
FROM totals t1
WHERE t1.total_sales = (
    SELECT MAX(t2.total_sales)
    FROM totals t2
    WHERE t2.mid = t1.mid
)
ORDER BY t1.company;
```

Result	Explanation
<table><tr><th>company</th><th>category</th><th>total_sales</th></tr><tr><td>Acer</td><td>Peripheral</td><td>3892377.42</td></tr><tr><td>Apple</td><td>Peripheral</td><td>1840862.8499999999</td></tr><tr><td>Dell</td><td>Peripheral</td><td>4154530.66</td></tr><tr><td>HP</td><td>Peripheral</td><td>3408617.1999999997</td></tr><tr><td>Lenovo</td><td>Peripheral</td><td>6689509.970000001</td></tr></table>	In this query I used a CTE to create a table representing each category at each company and their total sales. Then, in my query itself, I used a subquery that found the max sales for each category. I ensured that the merchant IDs matched across queries.

Query #10: For each company, find out which customers have spent the most and the least amounts.

```
SQL
WITH totals AS (
    SELECT
        m.mid,
```

```sql
        m.name AS company,
        c.fullname AS customer,
        ROUND(SUM(s.price), 2) AS total_spent
    FROM merchants m
    JOIN sell s ON m.mid = s.mid
    JOIN products p ON s.pid = p.pid
    JOIN contain co ON p.pid = co.pid
    JOIN orders o ON co.oid = o.oid
    JOIN place pl ON o.oid = pl.oid
    JOIN customers c ON pl.cid = c.cid
    GROUP BY m.mid, m.name, c.fullname
)

SELECT
    t1.company,
    t1.customer,
    t1.total_spent,
    'Most Spent' AS spending_type
FROM totals t1
WHERE t1.total_spent = (
    SELECT MAX(t2.total_spent)
    FROM totals t2
    WHERE t2.mid = t1.mid
)

UNION

SELECT
    t1.company,
    t1.customer,
    t1.total_spent,
    'Least Spent' AS spending_type
FROM totals t1
WHERE t1.total_spent = (
    SELECT MIN(t2.total_spent)
    FROM totals t2
    WHERE t2.mid = t1.mid
)

ORDER BY company, spending_type DESC;
```

Result	Explanation
	In this query, I used a similar CTE to find the total amount of money each customer has spent at each company. Then, I used UNION to join two similar queries. The first query finds out who has spent the most at each company by using a subquery, matching one row from the outer query to the max spent from the subquery. In a similar fashion, the second query in the UNION uses a subquery that filters for the minimum value. Using UNION, I get the customer who has spent the most at each company and the one who has spent the least.

	company	customer	total_spent	spending_type
▶	Acer	Dean Heath	75230.29	Most Spent
	Acer	Inez Long	31901.02	Least Spent
	Apple	Clementine Travis	84551.11	Most Spent
	Apple	Inez Long	32251.1	Least Spent
	Dell	Clementine Travis	85611.55	Most Spent
	Dell	Inez Long	31135.74	Least Spent
	HP	Clementine Travis	66628.06	Most Spent
	HP	Inez Long	26062.89	Least Spent
	Lenovo	Haviva Stewart	83030.26	Most Spent
	Lenovo	Inez Long	33948.91	Least Spent