# Information System Design
# Final Project for Advanced Database Management Systems
# Group 7 (Teal) | ISM6218.003F22

**Team Members:**

1. **Chandni Kumari**
2. **Simran Agichani**
3. **Abhijeet Sharma**
4. **Shuvrangshu Mukhopadhyay**

## Summary of Contents

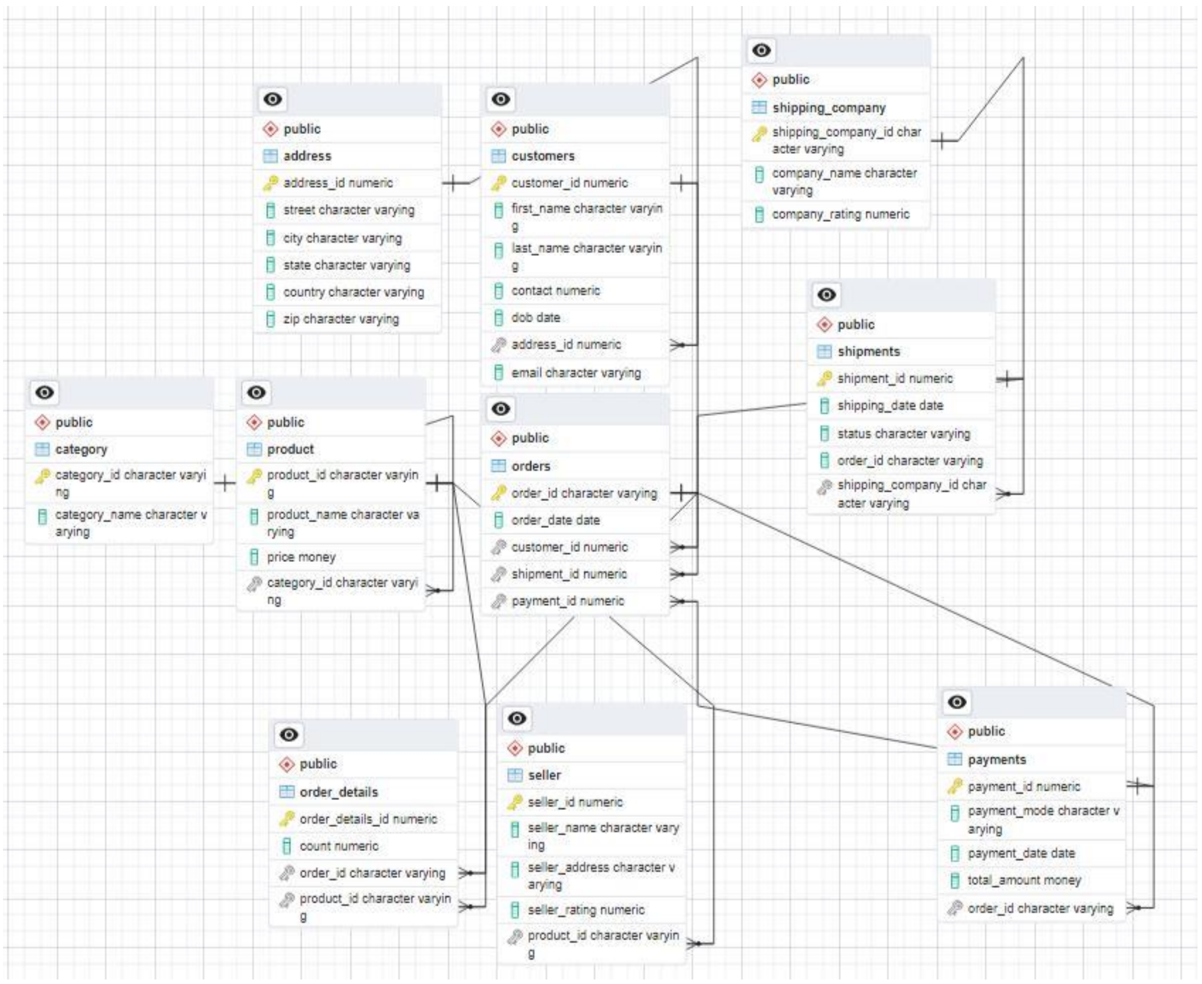
# Project Contribution

| Topic Area | Description | Group Member | Weight |
|---|---|---|---|
| Database Design | This part should include a logical database design (for the relational model), using normalization to control redundancy and integrity constraints for data quality. | Simran Agichani, Chandni Kumari | 25% |
| Query Writing | This part is another chance to write SQL queries, explore transactions, and even do some database programming for stored procedures. | Abhijeet Sharma, Chandni Kumari | 25% |
| Performance Tuning | In this section, you can capitalize and extend your prior experiments with indexing, optimizer modes, partitioning, parallel execution, and any other techniques you want to further explore | Shuvrangshu, Simran Agichani | 25% |
| Data Visualization | Here you are free to explore any other topics of interest. Suggestions include DBA scripts, database security, interface design, data visualization, data mining, and NoSQL databases | Abhijeet Sharma, Shuvrangshu | 25% |

**Overview:**

E-Commerce is the activity of electronically buying or selling of products on online services or over the internet. eCommerce websites should maintain personal data of customers. These websites acts as an aggregator which connects sellers to customers through their website. The website should also maintain seller details and should be able to hold and place multiple order at the same time. In this project we are trying to build a database system which will encompass some of the features of an eCommerce database instances.

## Entity Relationship Diagram:



**Objectives**:

1. The eCommerce Website's database is used to maintain data of the customers, orders, shipping, order details, and payment details provided by the customer
2. Details regarding customer, seller, shipping company and orders placed
3. Monitor and improve the value of eCommerce services
4. Contains information about sellers, shipment provided
5. Unique order ID, customer ID, category ID, seller ID, product ID, order details ID, shipment ID, payment ID, shipment company ID & address ID

## Motivation:

The motive behind this database is to make interactions of customers with sellers via website owner simpler. It will store all the customer details such as their address, contact, address, billing information, there order details, it also stores the status of the orders.

## Business Rules:

1. A customer can place one or more orders, but an order must be placed by one and only one customer.
2. There can be more than one customer living at a particular address, and a customer must have an address for delivery of the order.
3. An order can have multiple products and multiple orders can have a specific product.
4. If there is a product, there must be only one category associated with it, and there can be multiple products in that category.
5. A seller may must sell at least one or more products, but that product can't be sold by any other seller.
6. An order must have one payment and that payment can't belong to any other order.
7. A shipment company may or may not process one or many orders.
8. Once an order is placed, it will be assigned a particular shipment company to deliver. It must be shipped in one shipment process.

## User Requirements:

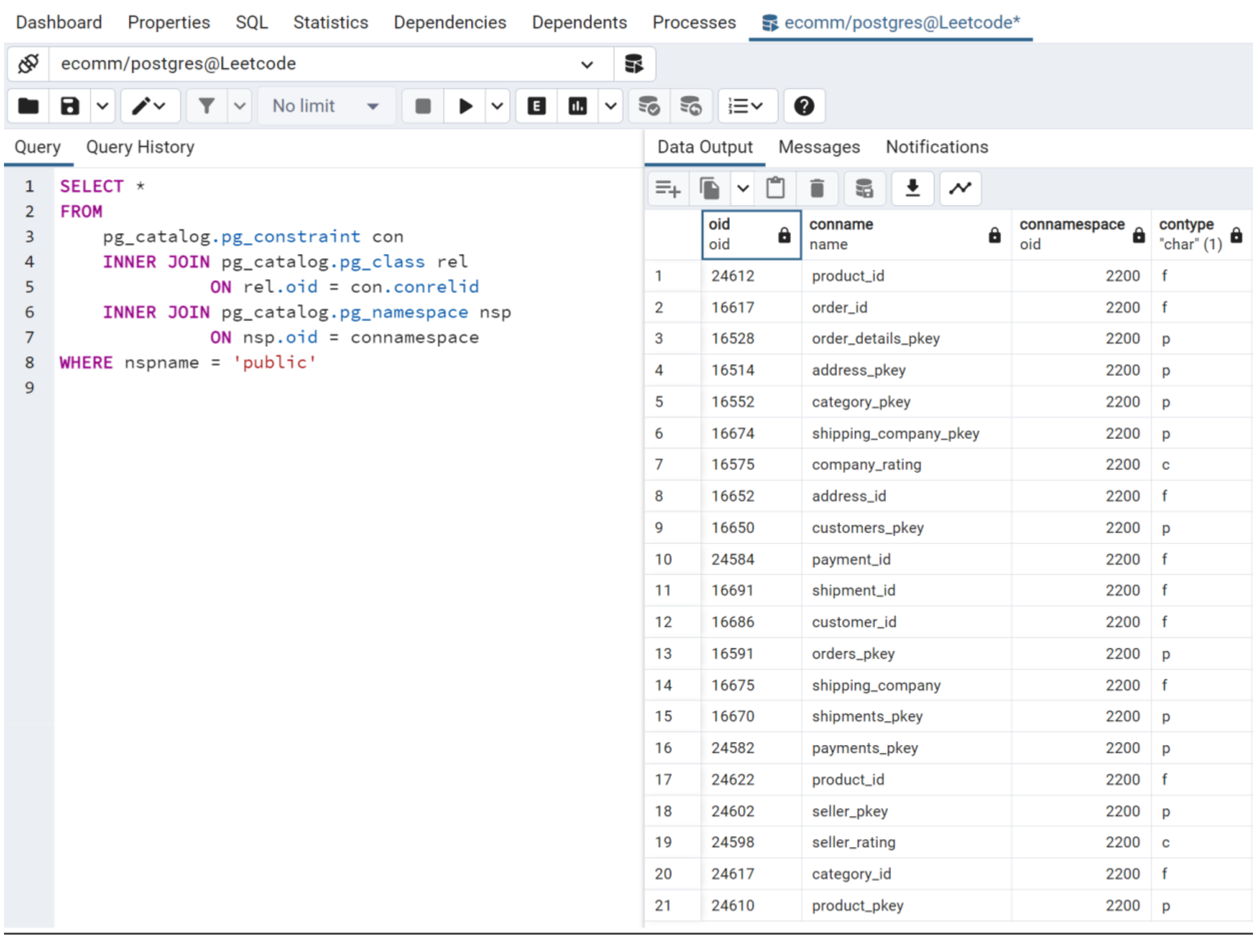
The user requirements are needed for effective use of the system, the users should completely get involved and given opportunity to participate. This can reduce the number of errors associated with the management and users. So, the user requirements that will apply to our system are given below.

1. **Customers**: Details about the customer, e.g., first_name, last_name
2. **Order Details**: Details about the ordered items and its count
3. **Orders**: Details about the order, e.g., order_id, fulfillment_status, product_id, payment_id
4. **Shipments**: Details about shipping, e.g., tracking_number, customer_id, shipping_date
5. **Shipping Company**: Details about the company responsible for shipping
6. **Category**: Details about category, e.g., category_id, category_name
7. **Address**: Details about customer's address, e.g., address_id, street_address, country
8. **Payments**: Details about payment, e.g., payment_id, payment_mode, transaction_number
9. **Product**: Details about the product ordered, e.g., product_id, product_name, price, stock
10. **Seller**: Details about sellers of products, e.g., seller_id, seller_name, product_id

**Data Dictionary**

| **Table Name** | **Attribute Name** | **Description** | **Key Type** |
|---|---|---|---|
| Customers | customer_id | Customer’s unique id | PK |
| | first_name | Customer’s name | |
| | last_name | Customer’s mail address | |
| | email | Customer’s mobile number | |
| | contact | Customer’s address_id | FK (Address(address_id)) |
| | address_id | | |
| Address | address_id | Customer’s unique address id | PK |
| | street | Street of the address | |
| | city | City of the address | |
| | state | State of the address | |
| | country | Country of the address | |
| | zipcode | Zipcode of the address | |
| Orders | order_id | Order’s unique id | PK |
| | order_date | Date of order placement | |
| | customer_id | Customer id number | FK (Customers(customer_id) |
| | ship_id | Shipment id number | FK (Shipments(ship_id)) |
| | payment_id | Payment id number | FK (Payments(payment_id)) |
| Order_details | order_details_id | Quantity of products in order | PK |
| | count | Product id number | FK (Product(product_id)) |
| | product_id | Order id number | FK (Orders(order_id)) |
| | order_id | | |
| Product | product_id | Product’s unique id | PK |
| | product_name | Name of the product | |
| | price | Price in dollars of the product | |
| | category_id | Category of the product | FK (Category(category_id) |
| Category | category_id | Category’s unique id number | PK |
| | category_name | Name of the category | |
| Seller | seller_id | Seller’s unique id | PK |
| | seller_name | Seller’s name | |
| | seller_zipcode | Zipcode of the seller | |
| | seller_rating | Seller’s rating | |
| | product_id | Product’s id, sold by seller | FK (Product(product_id)) |
| Payments | payment_id | Payment’s transaction id | PK |
| | mode | Mode of the payment | |
| | payment_date | Date of the payment | |
| | total_amount | Total amount paid | |
| | order_id | Paid order’s id number | FK (Orders(order_id)) |
| Shipments | ship_id | Shipment’s unique id | PK |
| | ship_date | Date of the shipment | |
| | status | Status of the shipment | |
| | order_id | Shipment’s order id | FK (Orders(order_id)) |
| | company_id | Shipping id of company | FK (Ship_company(company_id)) |
| Shipping_company | company_id | Shipping company’s unique id | PK |
| | company_name | Shipping company’s name | |
| | company_rating | Shipping company’s rating | |

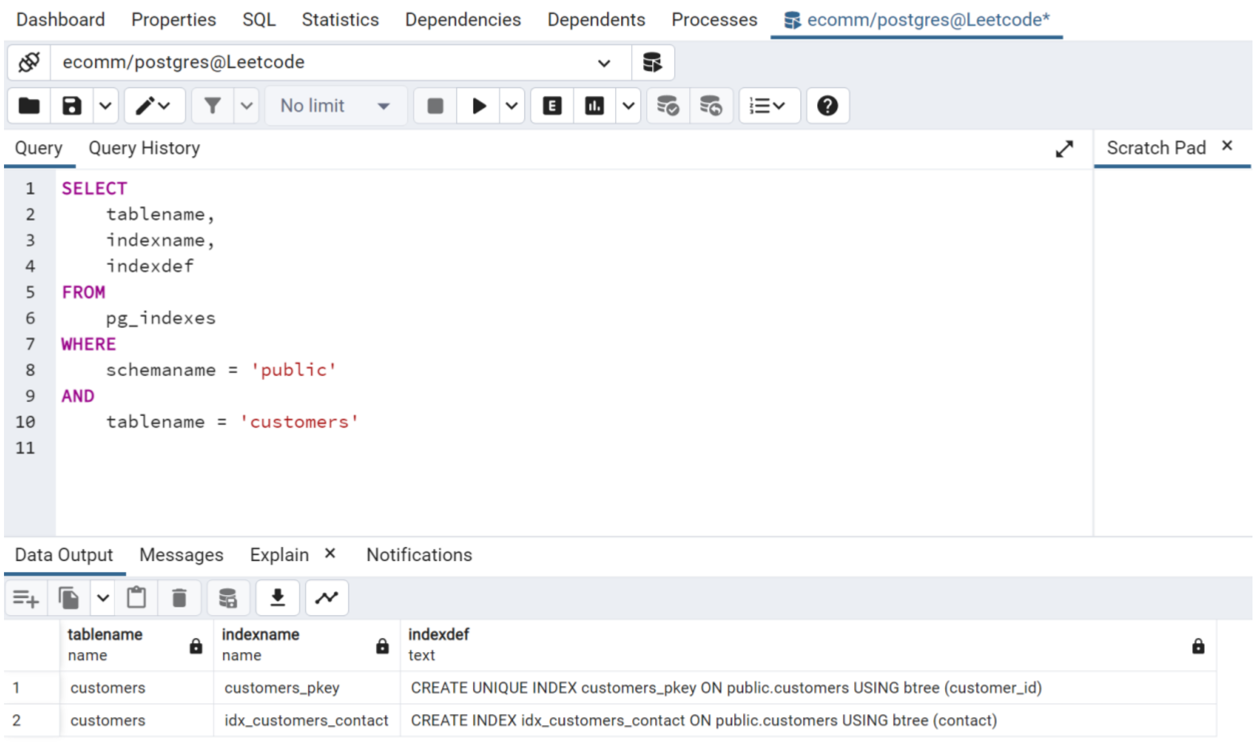
**Table Views:**



```
SELECT *
FROM
    pg_catalog.pg_constraint con
    INNER JOIN pg_catalog.pg_class rel
               ON rel.oid = con.conrelid
    INNER JOIN pg_catalog.pg_namespace nsp
               ON nsp.oid = connamespace
WHERE nspname = 'public'
```

| | oid<br>oid | conname<br>name | connamespace<br>oid | contype<br>"char" (1) |
|---|---|---|---|---|
| 1 | 24612 | product_id | 2200 | f |
| 2 | 16617 | order_id | 2200 | f |
| 3 | 16528 | order_details_pkey | 2200 | p |
| 4 | 16514 | address_pkey | 2200 | p |
| 5 | 16552 | category_pkey | 2200 | p |
| 6 | 16674 | shipping_company_pkey | 2200 | p |
| 7 | 16575 | company_rating | 2200 | c |
| 8 | 16652 | address_id | 2200 | f |
| 9 | 16650 | customers_pkey | 2200 | p |
| 10 | 24584 | payment_id | 2200 | f |
| 11 | 16691 | shipment_id | 2200 | f |
| 12 | 16686 | customer_id | 2200 | f |
| 13 | 16591 | orders_pkey | 2200 | p |
| 14 | 16675 | shipping_company | 2200 | f |
| 15 | 16670 | shipments_pkey | 2200 | p |
| 16 | 24582 | payments_pkey | 2200 | p |
| 17 | 24622 | product_id | 2200 | f |
| 18 | 24602 | seller_pkey | 2200 | p |
| 19 | 24598 | seller_rating | 2200 | c |
| 20 | 24617 | category_id | 2200 | f |
| 21 | 24610 | product_pkey | 2200 | p |

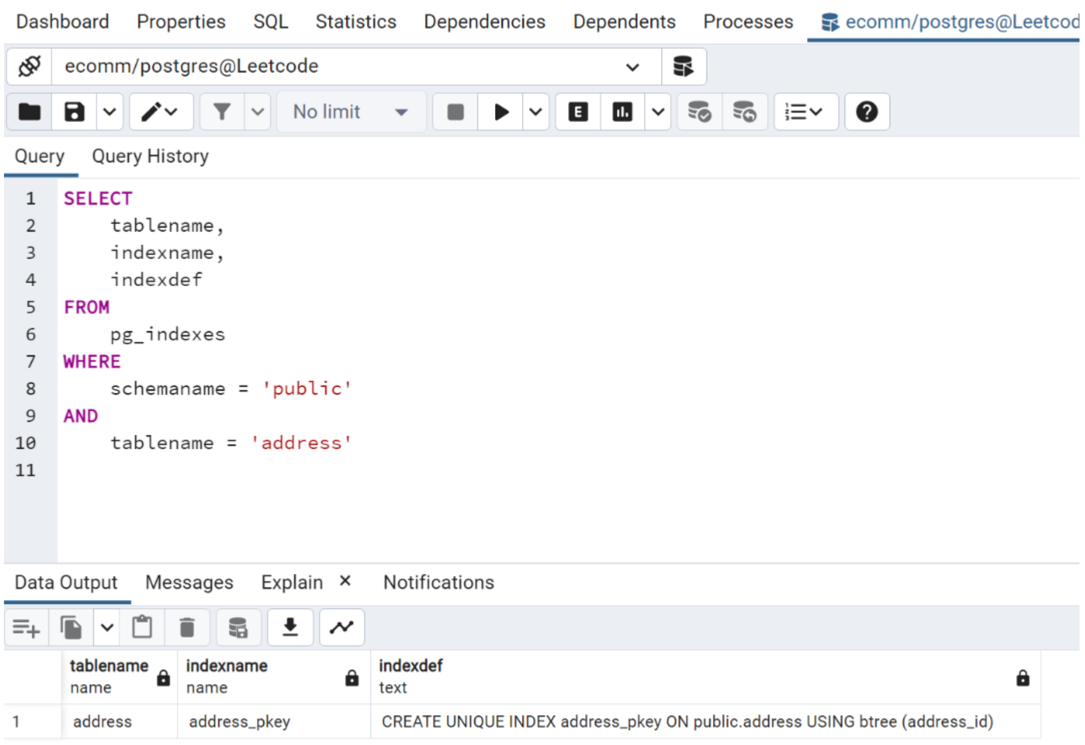
**Customers:**



```sql
SELECT
    tablename,
    indexname,
    indexdef
FROM
    pg_indexes
WHERE
    schemaname = 'public'
AND
    tablename = 'customers'
```

| | tablename name | indexname name | indexdef text |
|---|---|---|---|
| 1 | customers | customers_pkey | CREATE UNIQUE INDEX customers_pkey ON public.customers USING btree (customer_id) |
| 2 | customers | idx_customers_contact | CREATE INDEX idx_customers_contact ON public.customers USING btree (contact) |

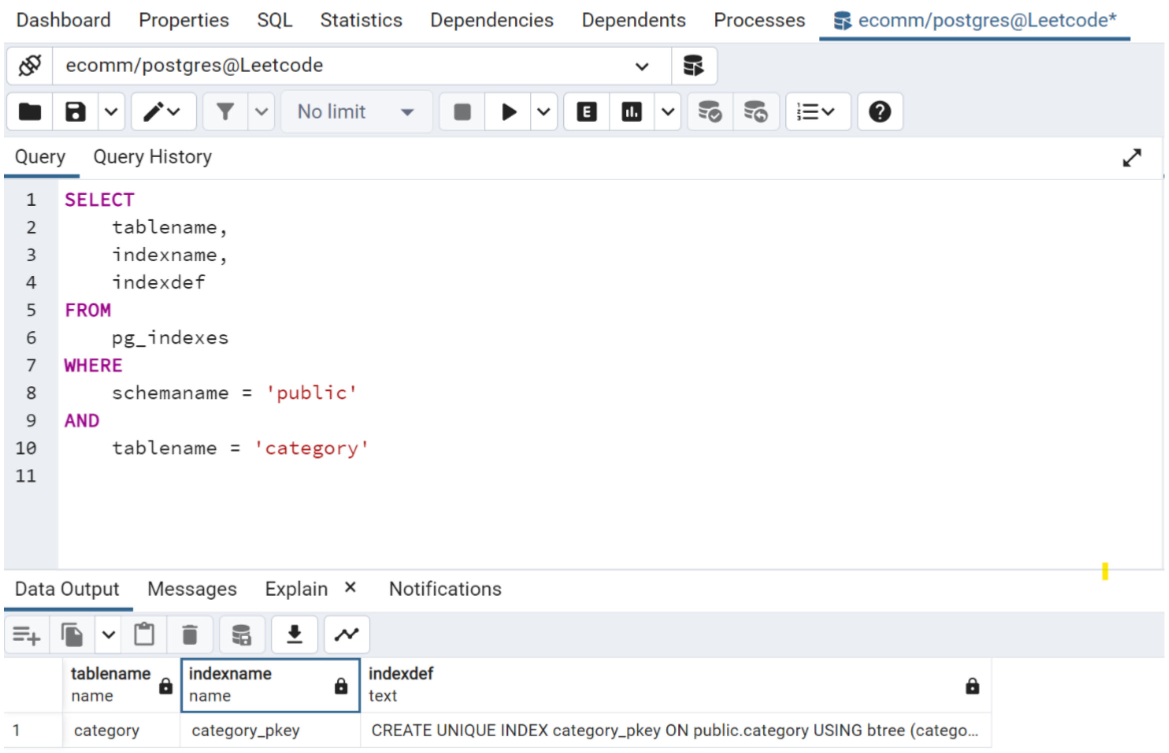
## Address:



```
SELECT
    tablename,
    indexname,
    indexdef
FROM
    pg_indexes
WHERE
    schemaname = 'public'
AND
    tablename = 'address'
```

| | tablename name | indexname name | indexdef text |
|---|---|---|---|
| 1 | address | address_pkey | CREATE UNIQUE INDEX address_pkey ON public.address USING btree (address_id) |

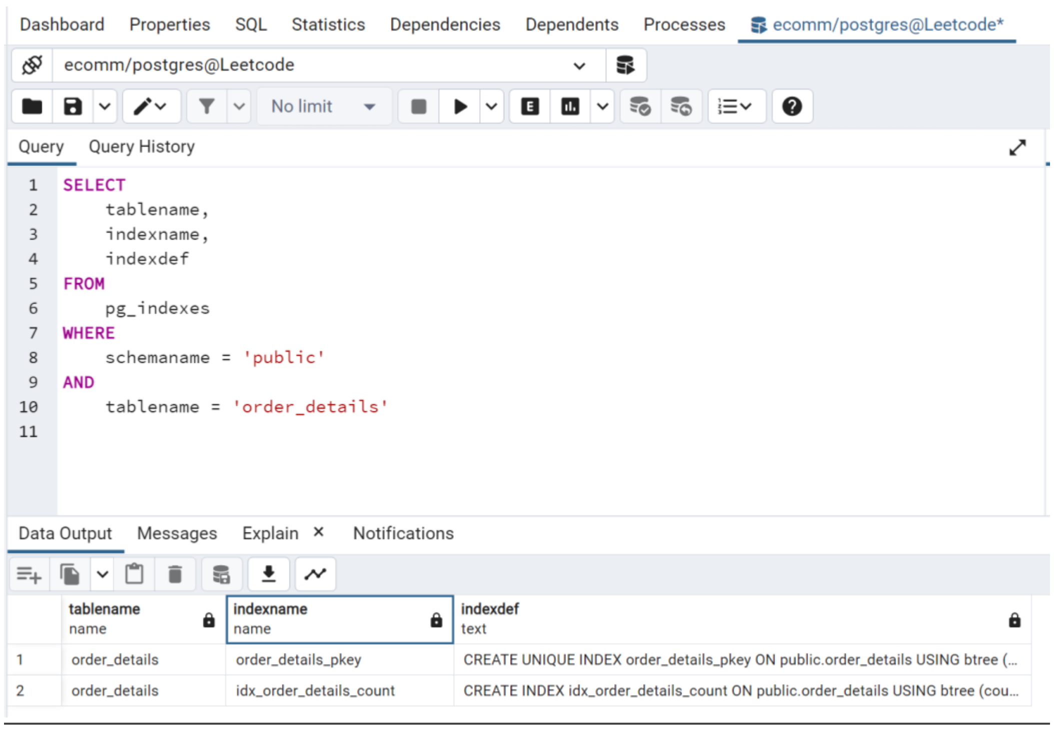
## Category:



```
SELECT
    tablename,
    indexname,
    indexdef
FROM
    pg_indexes
WHERE
    schemaname = 'public'
AND
    tablename = 'category'
```

| | tablename name | indexname name | indexdef text |
|---|---|---|---|
| 1 | category | category_pkey | CREATE UNIQUE INDEX category_pkey ON public.category USING btree (catego... |

**Order Details:**


Dashboard Properties SQL Statistics Dependencies Dependents Processes ecomm/postgres@Leetcode*

ecomm/postgres@Leetcode

No limit

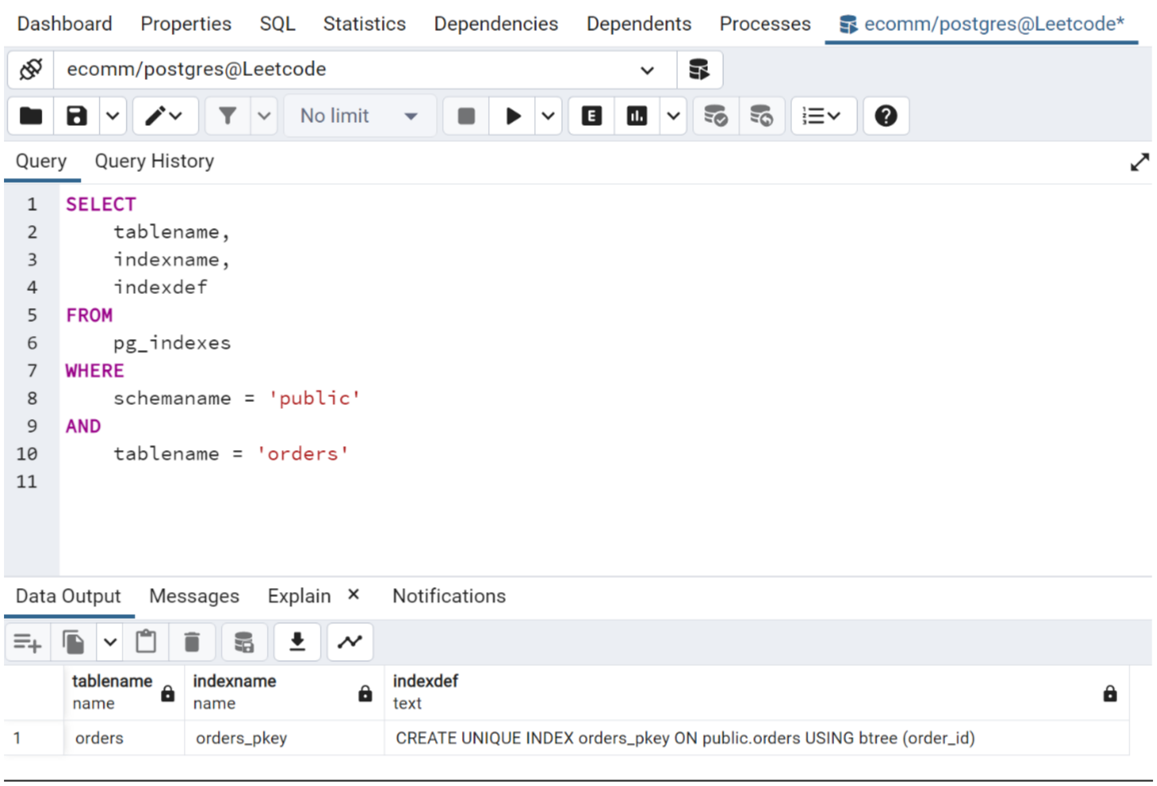
Query Query History

```sql
SELECT
    tablename,
    indexname,
    indexdef
FROM
    pg_indexes
WHERE
    schemaname = 'public'
AND
    tablename = 'order_details'
```

Data Output Messages Explain Notifications

| | tablename name | indexname name | indexdef text |
|---|---|---|---|
| 1 | order_details | order_details_pkey | CREATE UNIQUE INDEX order_details_pkey ON public.order_details USING btree (... |
| 2 | order_details | idx_order_details_count | CREATE INDEX idx_order_details_count ON public.order_details USING btree (cou... |

**Orders:**


Dashboard Properties SQL Statistics Dependencies Dependents Processes ecomm/postgres@Leetcode*

ecomm/postgres@Leetcode

No limit

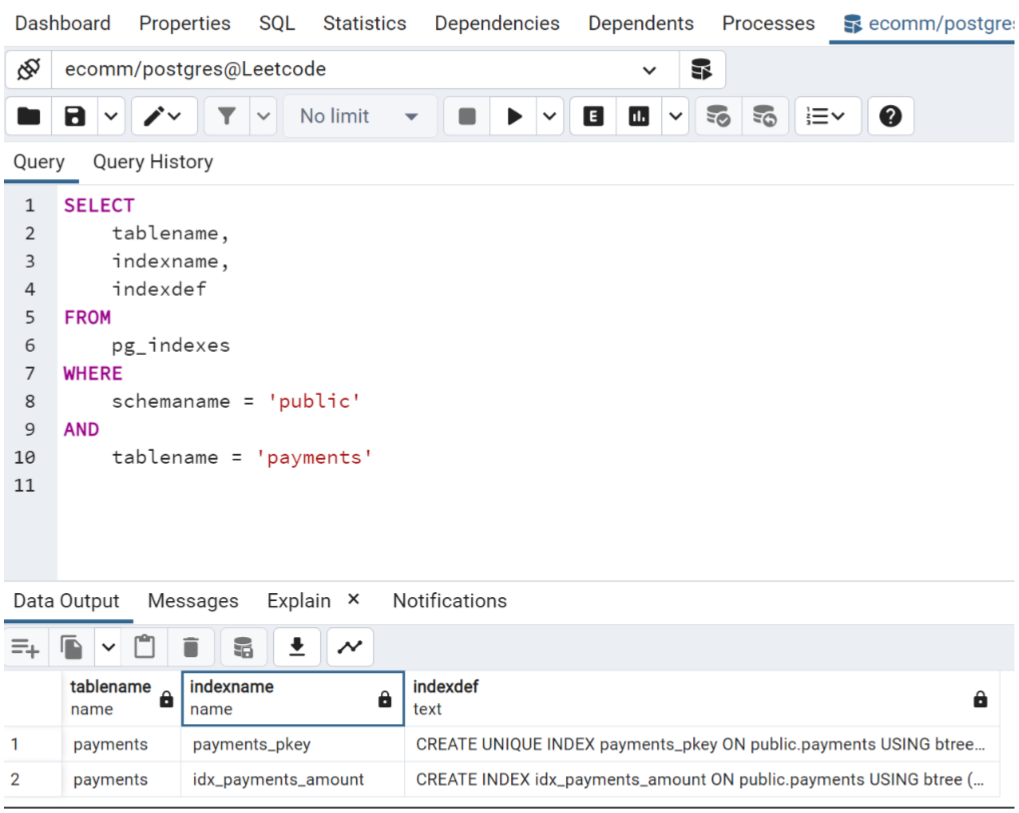
Query Query History

```sql
SELECT
    tablename,
    indexname,
    indexdef
FROM
    pg_indexes
WHERE
    schemaname = 'public'
AND
    tablename = 'orders'
```

Data Output Messages Explain Notifications

| | tablename name | indexname name | indexdef text |
|---|---|---|---|
| 1 | orders | orders_pkey | CREATE UNIQUE INDEX orders_pkey ON public.orders USING btree (order_id) |

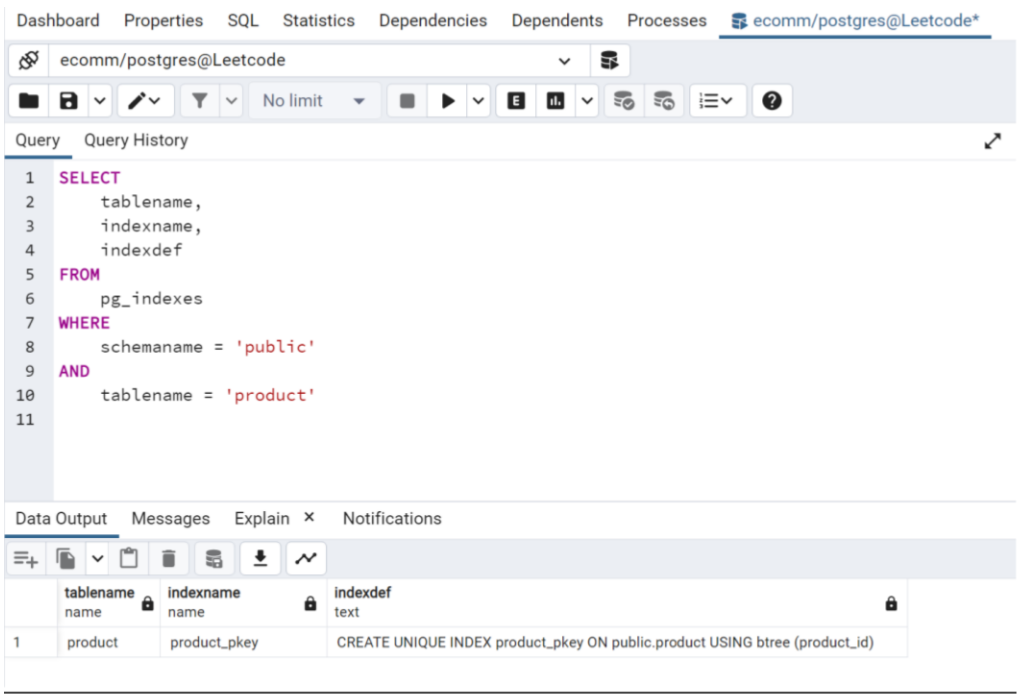
**Payments:**



```sql
SELECT
    tablename,
    indexname,
    indexdef
FROM
    pg_indexes
WHERE
    schemaname = 'public'
AND
    tablename = 'payments'
```

| | tablename name | indexname name | indexdef text |
|---|---|---|---|
| 1 | payments | payments_pkey | CREATE UNIQUE INDEX payments_pkey ON public.payments USING btree... |
| 2 | payments | idx_payments_amount | CREATE INDEX idx_payments_amount ON public.payments USING btree (... |

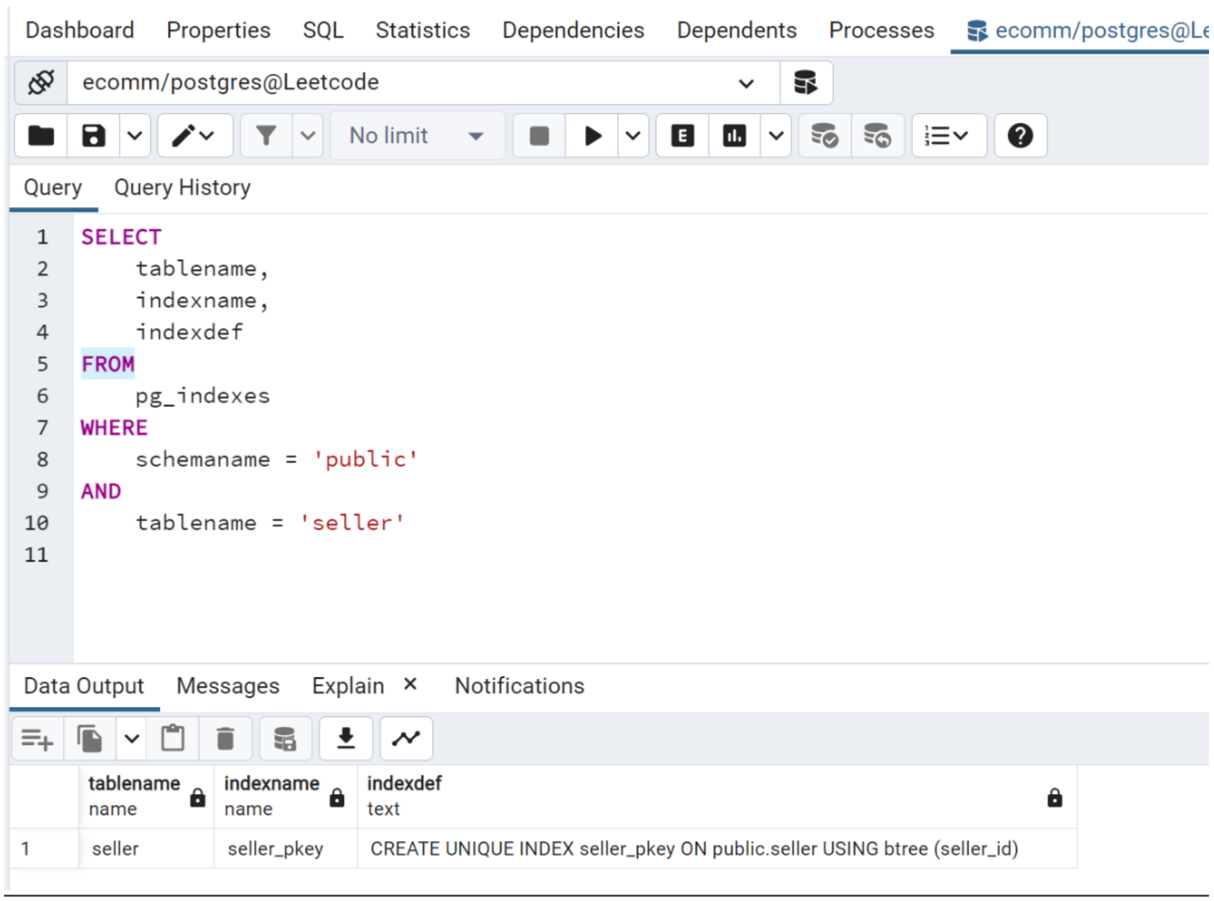
**Product:**



```sql
SELECT
    tablename,
    indexname,
    indexdef
FROM
    pg_indexes
WHERE
    schemaname = 'public'
AND
    tablename = 'product'
```

| | tablename name | indexname name | indexdef text |
|---|---|---|---|
| 1 | product | product_pkey | CREATE UNIQUE INDEX product_pkey ON public.product USING btree (product_id) |

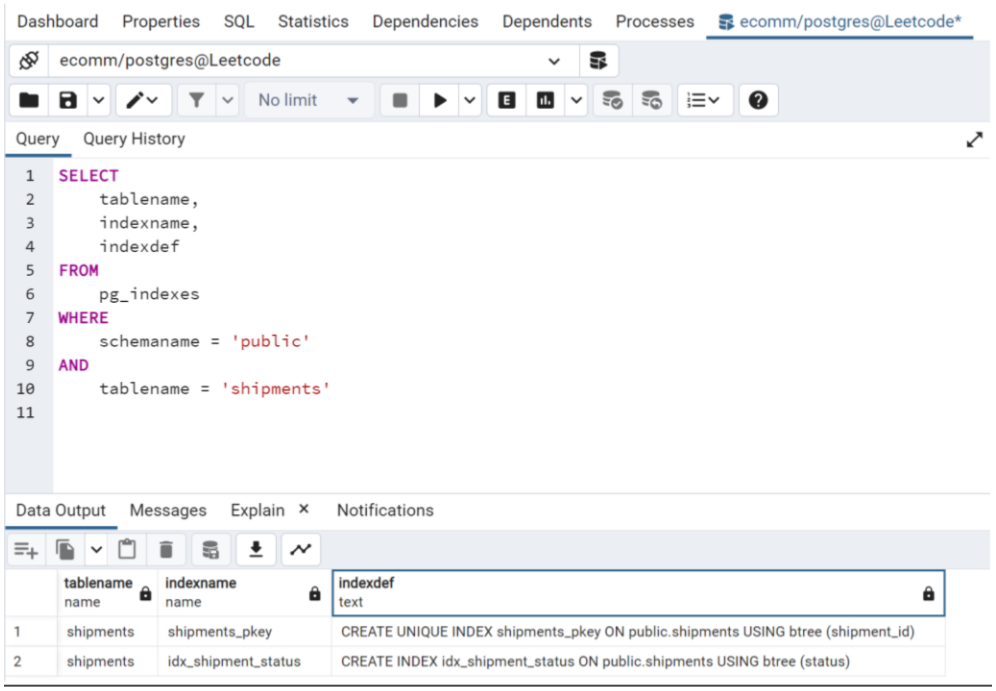
**Seller:**



```sql
SELECT
    tablename,
    indexname,
    indexdef
FROM
    pg_indexes
WHERE
    schemaname = 'public'
AND
    tablename = 'seller'
```

| | tablename name | indexname name | indexdef text |
|---|---|---|---|
| 1 | seller | seller_pkey | CREATE UNIQUE INDEX seller_pkey ON public.seller USING btree (seller_id) |

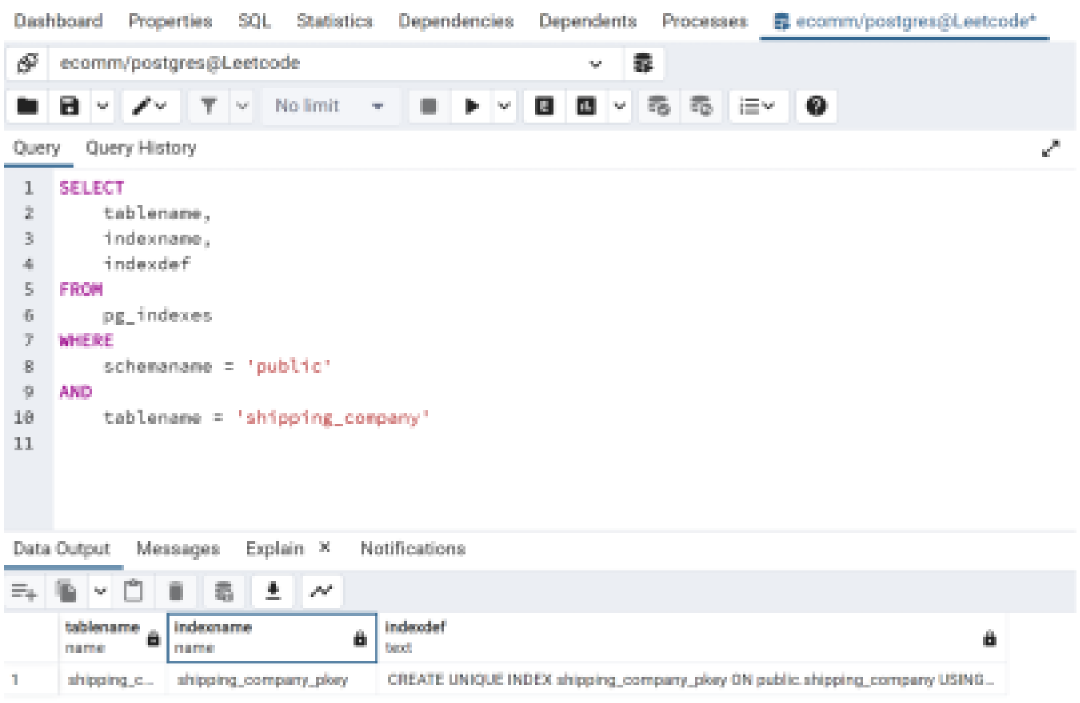
**Shipments:**



```sql
SELECT
    tablename,
    indexname,
    indexdef
FROM
    pg_indexes
WHERE
    schemaname = 'public'
AND
    tablename = 'shipments'
```

| | tablename name | indexname name | indexdef text |
|---|---|---|---|
| 1 | shipments | shipments_pkey | CREATE UNIQUE INDEX shipments_pkey ON public.shipments USING btree (shipment_id) |
| 2 | shipments | idx_shipment_status | CREATE INDEX idx_shipment_status ON public.shipments USING btree (status) |

**Shipping Company:**



```
SELECT
    tablename,
    indexname,
    indexdef
FROM
    pg_indexes
WHERE
    schemaname = 'public'
AND
    tablename = 'shipping_company'
```

| | tablename name | indexname name | indexdef text |
|---|---|---|---|
| 1 | shipping_c... | shipping_company_pkey | CREATE UNIQUE INDEX shipping_company_pkey ON public.shipping_company USING... |

## Data Synthesis

The data for the project has been synthesized using a combination of an online tool named **Mockaroo** and **Microsoft Excel.** Some of the prominent functions that were used in Excel includes:

- VLOOKUP
- INDEX MATCH
- ROWS
- RAND()
- RANDBETWEEN

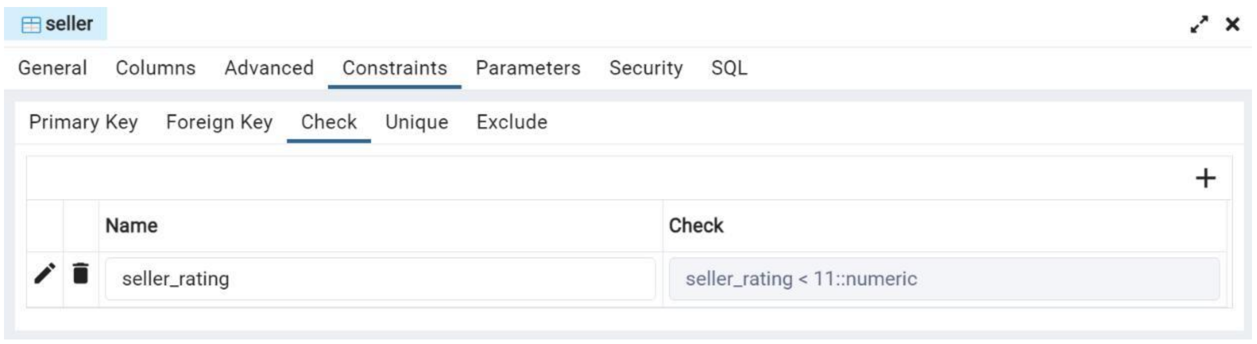
## Data Integrity

Data Integrity refers to the consistency and maintenance of the data through the life cycle of the database. In a database, data integrity can be ensured through the implementation of Integrity Constraints in a table. Integrity constraints help apply business rules to the database tables. The constraints can either be at a column level or a table level. Some of the most common constraints are,

- NOT NULL – Prevents a column from having a NULL value.
- PRIMARY KEY – Uniquely identifies each row or record in table.
- FOREIGN KEY – Uniquely identifies a column that references a PRIMARY KEY in another table.
- UNIQUE – Prevents a column from having duplicate values.
- CHECK – Checks for values that satisfy a specific condition as defined by the user

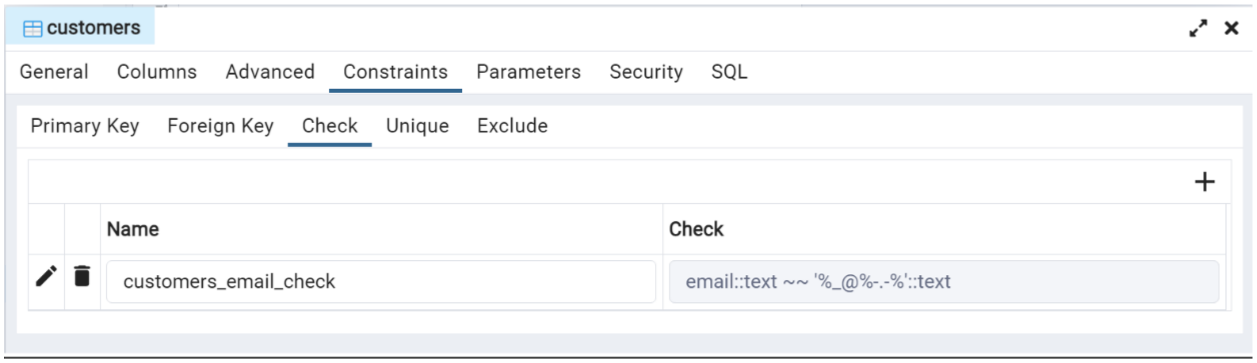
***Check constraints set on seller_ratings (<=10) and regex for email id check.***

### Seller Table Check Constraint



| Name | Check |
|---|---|
| seller_rating | seller_rating < 11::numeric |

### Customer Table Check Constraint



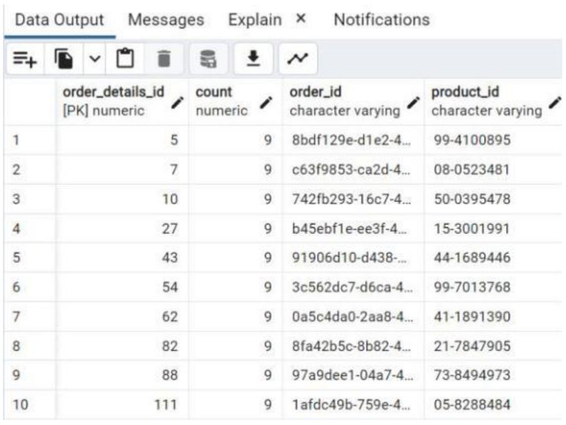
| Name | Check |
|---|---|
| customers_email_check | email::text ~~ '%_@%-.-%'::text |

## Performance Tuning

### INDEX

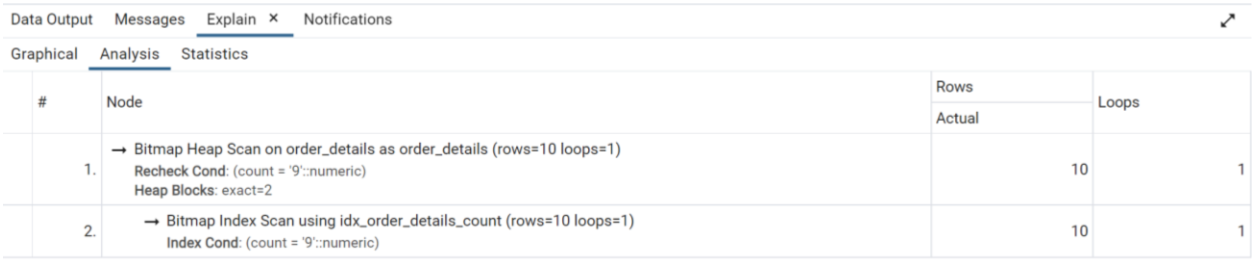
An index is used to increase the overall performance of queries. Indexing does this by reducing the data pages that has to be visited or scanned every time a query is run. When we create index, by default the primary key creates a clustered index. A clustered index determines the physical order of data in a table. There can be only one clustered index per table.

```
SELECT * FROM order_details

WHERE count = 9;
```



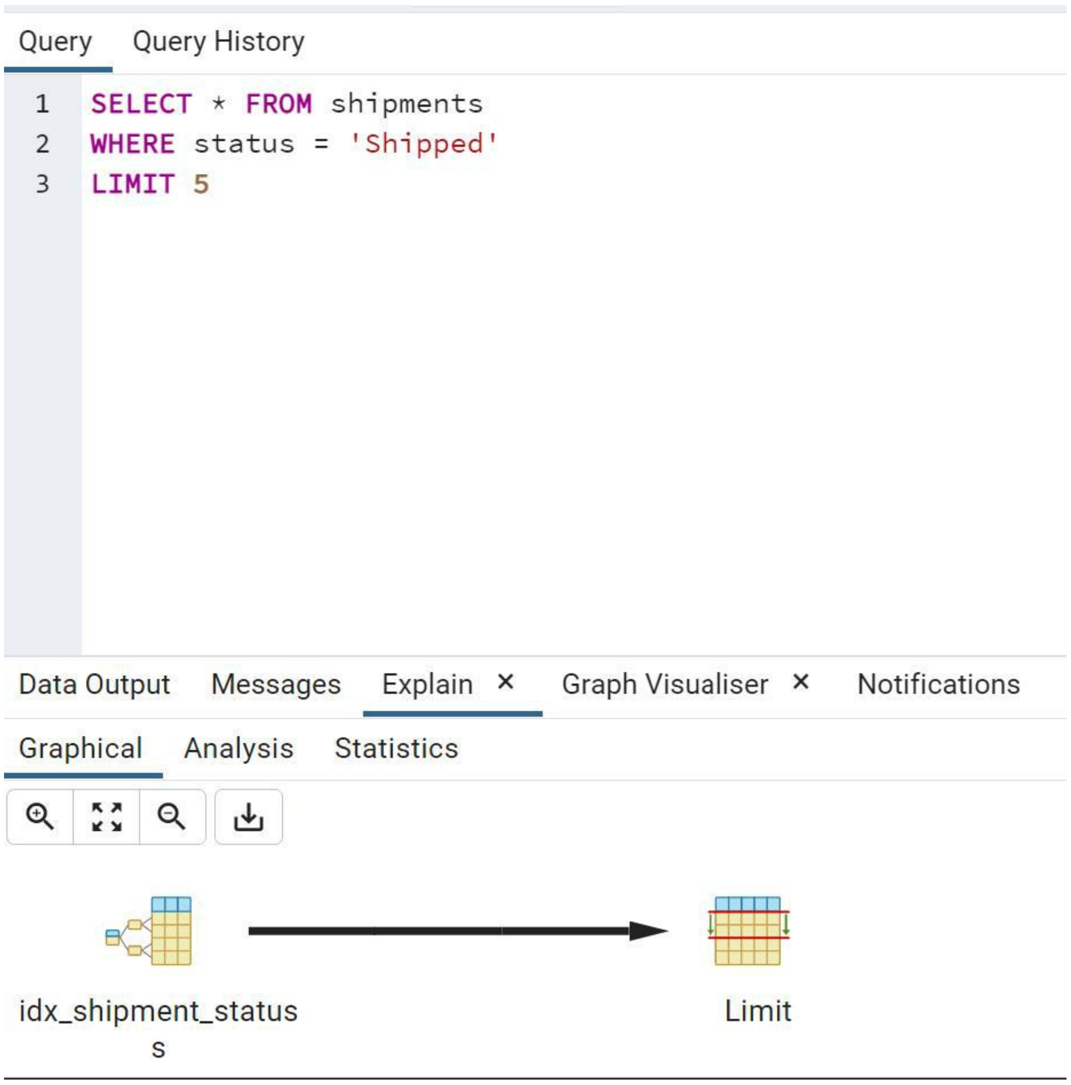
|  | order_details_id [PK] numeric | count numeric | order_id character varying | product_id character varying |
|---|---|---|---|---|
| 1 | 5 | 9 | 8bdf129e-d1e2-4... | 99-4100895 |
| 2 | 7 | 9 | c63f9853-ca2d-4... | 08-0523481 |
| 3 | 10 | 9 | 742fb293-16c7-4... | 50-0395478 |
| 4 | 27 | 9 | b45ebf1e-ee3f-4... | 15-3001991 |
| 5 | 43 | 9 | 91906d10-d438-... | 44-1689446 |
| 6 | 54 | 9 | 3c562dc7-d6ca-4... | 99-7013768 |
| 7 | 62 | 9 | 0a5c4da0-2aa8-4... | 41-1891390 |
| 8 | 82 | 9 | 8fa42b5c-8b82-4... | 21-7847905 |
| 9 | 88 | 9 | 97a9dee1-04a7-4... | 73-8494973 |
| 10 | 111 | 9 | 1afdc49b-759e-4... | 05-8288484 |

### Execution Plan



| # | Node | Rows Actual | Loops |
|---|---|---|---|
| 1. | → Bitmap Heap Scan on order_details as order_details (rows=10 loops=1) Recheck Cond: (count = '9'::numeric) Heap Blocks: exact=2 | 10 | 1 |
| 2. | → Bitmap Index Scan using idx_order_details_count (rows=10 loops=1) Index Cond: (count = '9'::numeric) | 10 | 1 |

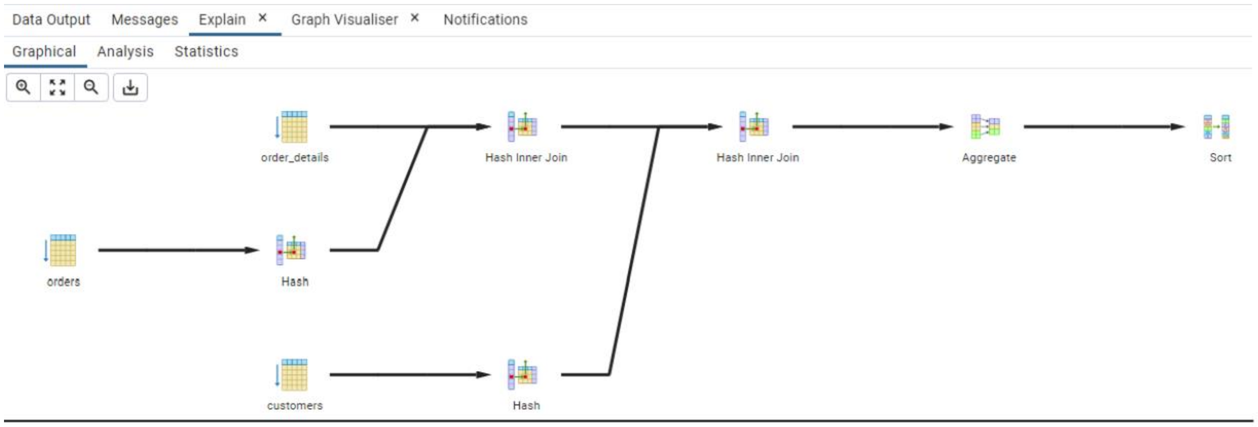
**Optimizer mode:** Optimizer mode is used to choose better execution plans for poorly written queries. This is good for applications that routinely display partial results to users such as paging data to a customer in a web application

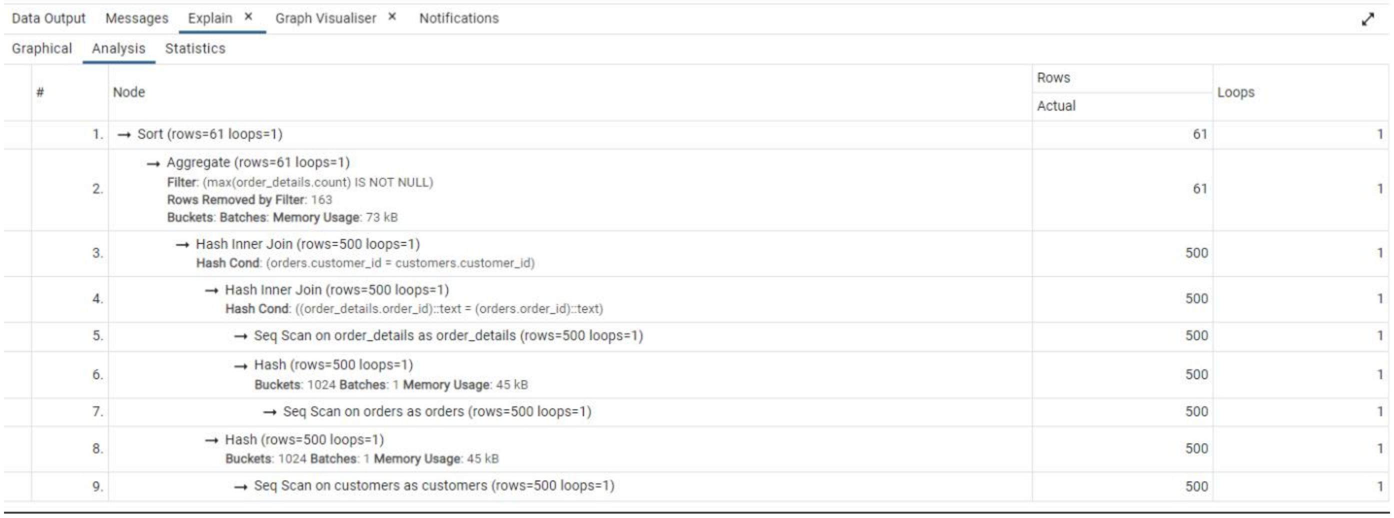


```
SELECT * FROM shipments
WHERE status = 'Shipped'
LIMIT 5
```

**Parallelism:** First, we execute the below query with the default cores. Since the minimum table size should be greater than 8 MB, we cannot add more workers per gather.

```
SELECT first_name, last_name, email, MAX(order_details.count) FROM
customers
INNER JOIN orders USING(customer_id)
INNER JOIN order_details USING(order_id)
GROUP BY customer_id
HAVING MAX(order_details.count) IS NOT NULL
ORDER BY 4 DESC
```





| # | Node | Rows<br>Actual | Loops |
|---|---|---|---|
| 1. | → Sort (rows=61 loops=1) | 61 | 1 |
| 2. | → Aggregate (rows=61 loops=1)<br>**Filter**: (max(order_details.count) IS NOT NULL)<br>**Rows Removed by Filter**: 163<br>**Buckets**: **Batches**: **Memory Usage**: 73 kB | 61 | 1 |
| 3. | → Hash Inner Join (rows=500 loops=1)<br>**Hash Cond**: (orders.customer_id = customers.customer_id) | 500 | 1 |
| 4. | → Hash Inner Join (rows=500 loops=1)<br>**Hash Cond**: ((order_details.order_id)::text = (orders.order_id)::text) | 500 | 1 |
| 5. | → Seq Scan on order_details as order_details (rows=500 loops=1) | 500 | 1 |
| 6. | → Hash (rows=500 loops=1)<br>**Buckets**: 1024 **Batches**: 1 **Memory Usage**: 45 kB | 500 | 1 |
| 7. | → Seq Scan on orders as orders (rows=500 loops=1) | 500 | 1 |
| 8. | → Hash (rows=500 loops=1)<br>**Buckets**: 1024 **Batches**: 1 **Memory Usage**: 45 kB | 500 | 1 |
| 9. | → Seq Scan on customers as customers (rows=500 loops=1) | 500 | 1 |

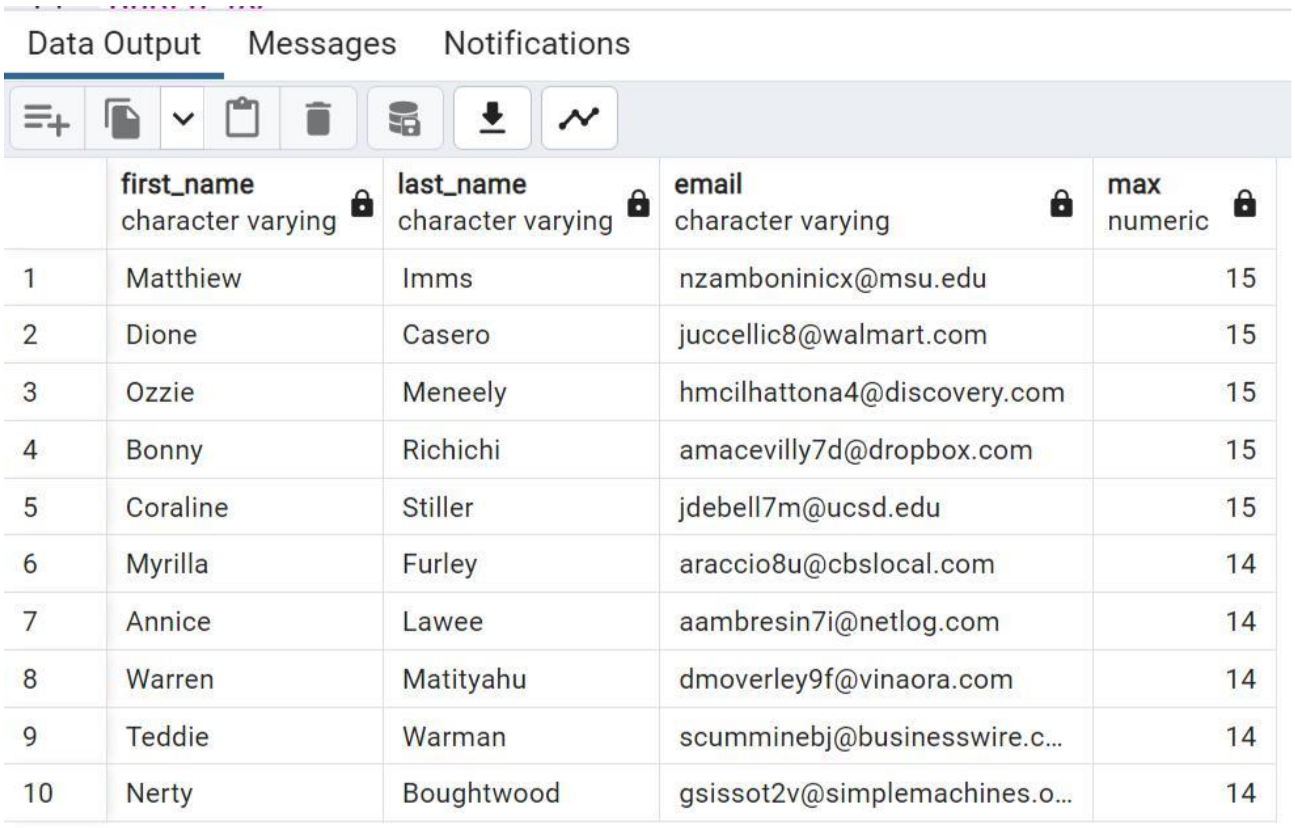
**Explanation**: As the first table customers gets scanned (E1), the order_details table gets scanned (E2) in the parallel. After E1 ends running, it sends the data to E2 to process. After processing of E2, it switches to perform GROUP BY operation in the parallel. This is how 2 servers run concurrently to achieve inter-operation parallelism across various operators in the query tree.

## <u>SQL Queries</u>

1. List the top 10 customer's first_name, last_name, email and their respective count of orders. Results should be in descending order of the count.

```
SELECT
     first_name, last_name, email, MAX(order_details.count)
FROM
     customers
     INNER JOIN
     orders USING(customer_id)
```

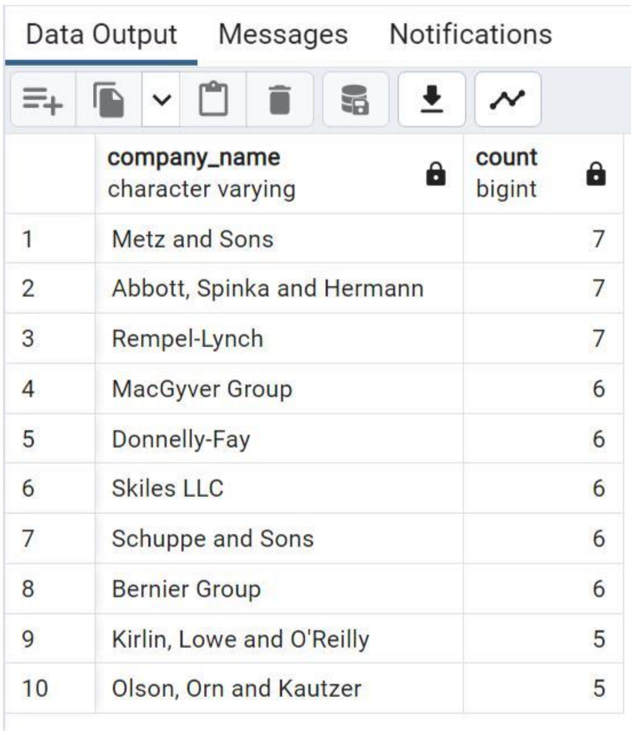
```
      INNER JOIN order_details USING(order_id)
GROUP BY
      customer_id
HAVING
      MAX(order_details.count) IS NOT NULL
ORDER BY
      MAX(order_details.count) DESC
LIMIT 10;
```



| | first_name character varying | last_name character varying | email character varying | max numeric |
|---|---|---|---|---|
| 1 | Matthiew | Imms | nzamboninicx@msu.edu | 15 |
| 2 | Dione | Casero | juccellic8@walmart.com | 15 |
| 3 | Ozzie | Meneely | hmcilhattona4@discovery.com | 15 |
| 4 | Bonny | Richichi | amacevilly7d@dropbox.com | 15 |
| 5 | Coraline | Stiller | jdebell7m@ucsd.edu | 15 |
| 6 | Myrilla | Furley | araccio8u@cbslocal.com | 14 |
| 7 | Annice | Lawee | aambresin7i@netlog.com | 14 |
| 8 | Warren | Matityahu | dmoverley9f@vinaora.com | 14 |
| 9 | Teddie | Warman | scumminebj@businesswire.c... | 14 |
| 10 | Nerty | Boughtwood | gsissot2v@simplemachines.o... | 14 |

2. Print Top 10 order count split per shipping companies. Sort the results based on count, highest to lowest.

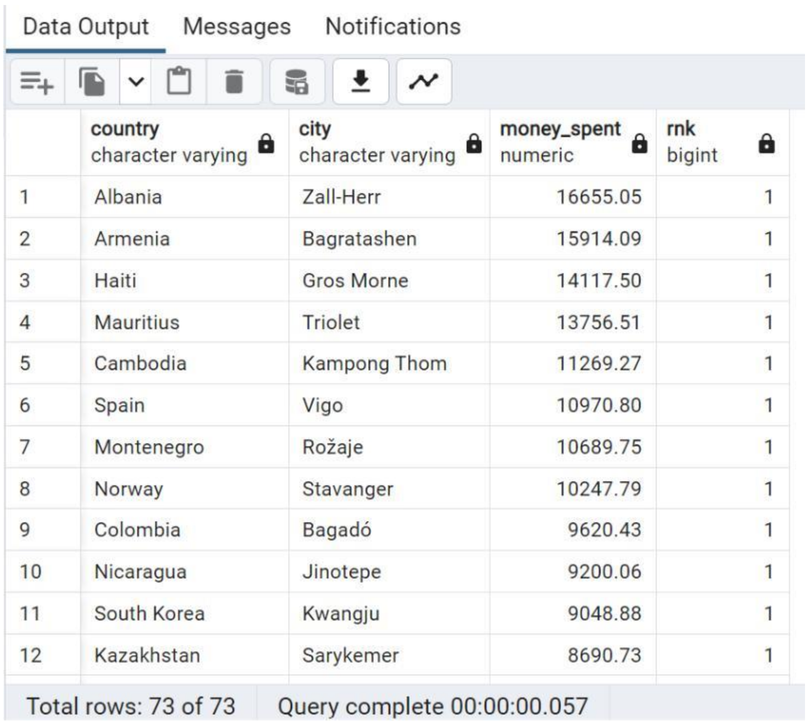
```
WITH cte AS
(SELECT
    orders.order_id, company_name
 FROM
              orders
    FULL OUTER JOIN
    shipments USING(shipment_id)
              FULL OUTER JOIN
    SHIPPING_COMPANY USING(shipping_company_id))

SELECT
              company_name, COUNT(cte.order_id)
FROM
              cte
WHERE
              order_id IS NOT NULL
GROUP BY
              company_name
ORDER BY 2 DESC
LIMIT 10;
```



| | company_name character varying | count bigint |
|---|---|---|
| 1 | Metz and Sons | 7 |
| 2 | Abbott, Spinka and Hermann | 7 |
| 3 | Rempel-Lynch | 7 |
| 4 | MacGyver Group | 6 |
| 5 | Donnelly-Fay | 6 |
| 6 | Skiles LLC | 6 |
| 7 | Schuppe and Sons | 6 |
| 8 | Bernier Group | 6 |
| 9 | Kirlin, Lowe and O'Reilly | 5 |
| 10 | Olson, Orn and Kautzer | 5 |

3. List the richest city of every country based on their spending on the website.

```
WITH cte1 AS
(SELECT
                    COUNTRY, CITY, SUM(TOTAL_AMOUNT) AS Money_spent
FROM
                    PAYMENTS
                    JOIN
                    orders USING(payment_id)
                    JOIN
                    customers USING(customer_id)
                    JOIN
                    address USING(address_id)
GROUP BY
                    CITY,COUNTRY),
cte2 AS
(SELECT
                    country, city, Money_spent,
DENSE_RANK() OVER(PARTITION BY COUNTRY ORDER BY Money_spent) AS rnk
FROM
                    cte1)
SELECT *
FROM cte2
WHERE rnk = 1
ORDER BY money_spent DESC;
```

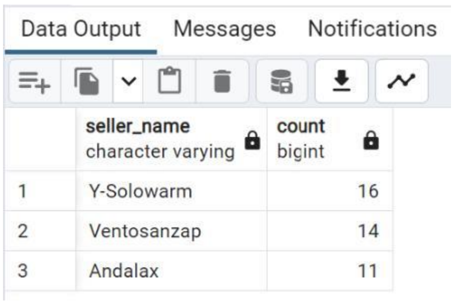


| | country character varying | city character varying | money_spent numeric | rnk bigint |
|---|---|---|---|---|
| 1 | Albania | Zall-Herr | 16655.05 | 1 |
| 2 | Armenia | Bagratashen | 15914.09 | 1 |
| 3 | Haiti | Gros Morne | 14117.50 | 1 |
| 4 | Mauritius | Triolet | 13756.51 | 1 |
| 5 | Cambodia | Kampong Thom | 11269.27 | 1 |
| 6 | Spain | Vigo | 10970.80 | 1 |
| 7 | Montenegro | Rožaje | 10689.75 | 1 |
| 8 | Norway | Stavanger | 10247.79 | 1 |
| 9 | Colombia | Bagadó | 9620.43 | 1 |
| 10 | Nicaragua | Jinotepe | 9200.06 | 1 |
| 11 | South Korea | Kwangju | 9048.88 | 1 |
| 12 | Kazakhstan | Sarykemer | 8690.73 | 1 |

Total rows: 73 of 73    Query complete 00:00:00.057

4. Who are the TOP 3 vendors across the vendors based on their order size.

```
SELECT
               seller_name, COUNT(order_id)
FROM seller
               JOIN order_details USING(product_id)
               JOIN orders USING(order_id)
GROUP BY
               seller_name
ORDER BY 2 DESC
LIMIT 3;
```

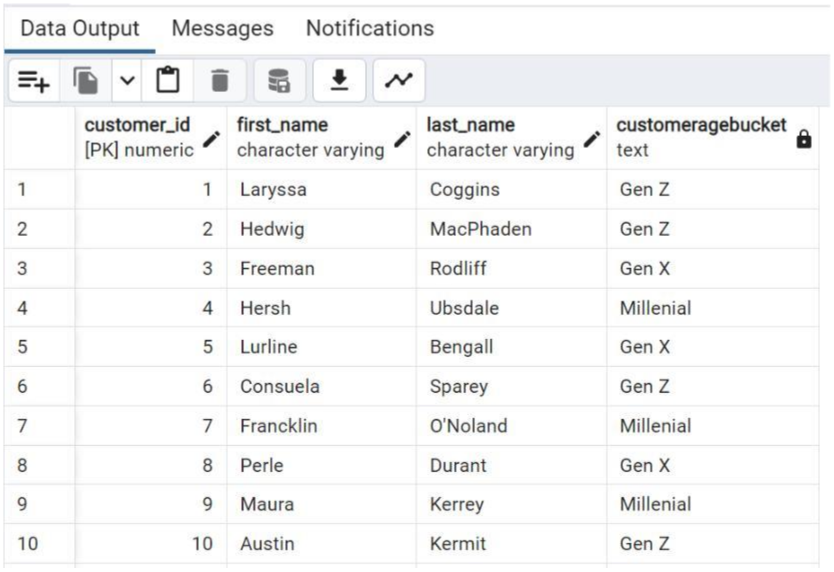


Data Output | Messages | Notifications

| | seller_name character varying | count bigint |
|---|---|---|
| 1 | Y-Solowarm | 16 |
| 2 | Ventosanzap | 14 |
| 3 | Andalax | 11 |

5. Classify each customer based on their age into 3 buckets, 90s Kids, Millenial and Oldi

```
SELECT
               customer_id, first_name, last_name,
               CASE
                 WHEN EXTRACT(YEAR FROM DOB) < 1981 THEN 'Gen X'
                 WHEN EXTRACT(YEAR FROM DOB) BETWEEN 1981 AND 1996
THEN 'Millenial'
                 ELSE 'Gen Z'
               END AS CustomerAgeBucket
FROM customers;
```

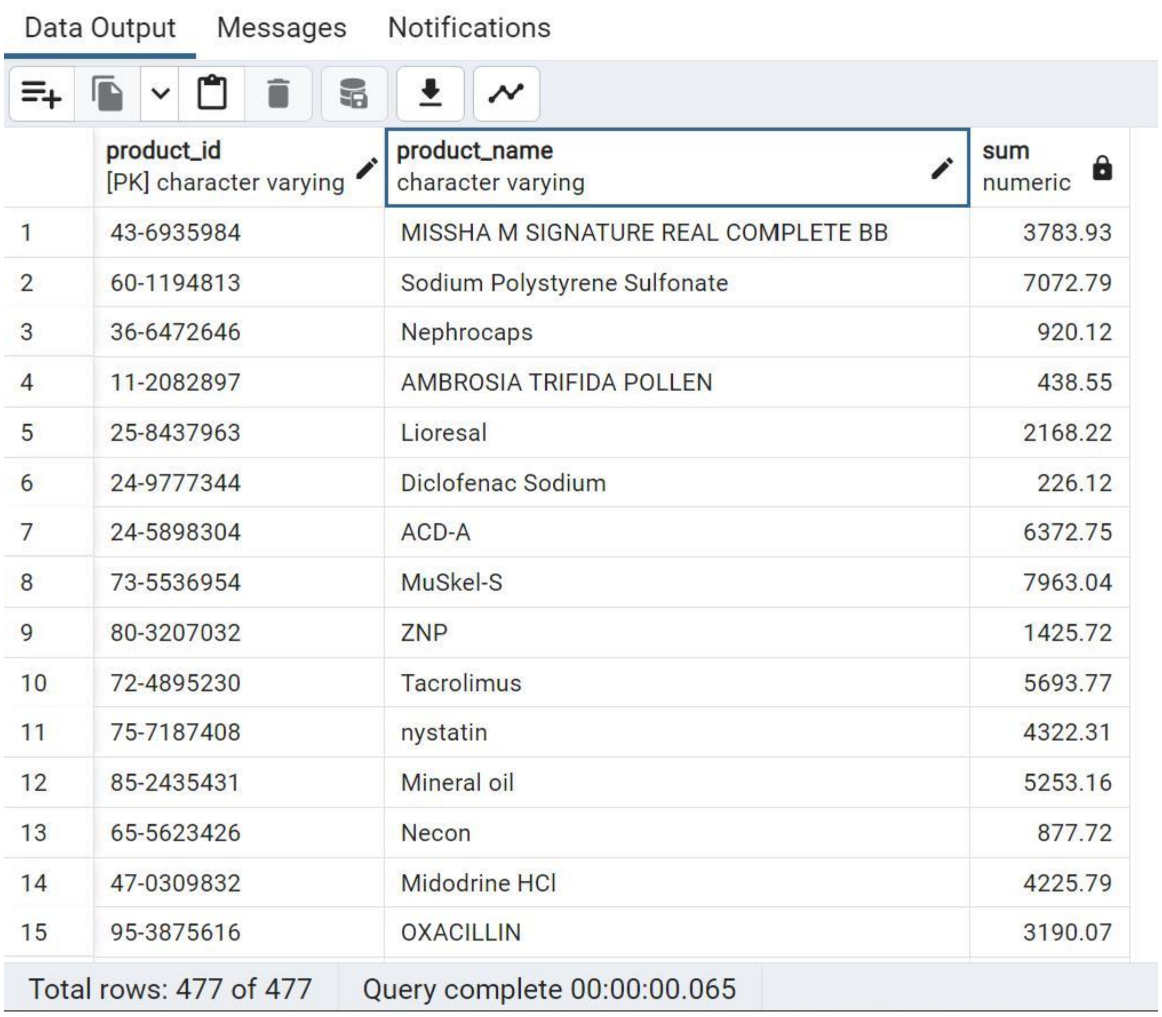


Data Output | Messages | Notifications

| | customer_id [PK] numeric | first_name character varying | last_name character varying | customeragebucket text |
|---|---|---|---|---|
| 1 | 1 | Laryssa | Coggins | Gen Z |
| 2 | 2 | Hedwig | MacPhaden | Gen Z |
| 3 | 3 | Freeman | Rodliff | Gen X |
| 4 | 4 | Hersh | Ubsdale | Millenial |
| 5 | 5 | Lurline | Bengall | Gen X |
| 6 | 6 | Consuela | Sparey | Gen Z |
| 7 | 7 | Francklin | O'Noland | Millenial |
| 8 | 8 | Perle | Durant | Gen X |
| 9 | 9 | Maura | Kerrey | Millenial |
| 10 | 10 | Austin | Kermit | Gen Z |

6. List down the top 10 products based on their selling amount, order by total amount.

```
SELECT
                product.product_id, product.product_name,
SUM(total_amount)
FROM
                product JOIN order_details USING(product_id)
                        JOIN payments USING(order_id)
GROUP BY
                product_id, product_name;
```

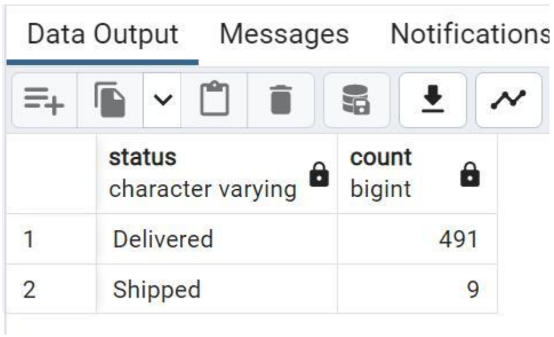


| | product_id [PK] character varying | product_name character varying | sum numeric |
|---|---|---|---|
| 1 | 43-6935984 | MISSHA M SIGNATURE REAL COMPLETE BB | 3783.93 |
| 2 | 60-1194813 | Sodium Polystyrene Sulfonate | 7072.79 |
| 3 | 36-6472646 | Nephrocaps | 920.12 |
| 4 | 11-2082897 | AMBROSIA TRIFIDA POLLEN | 438.55 |
| 5 | 25-8437963 | Lioresal | 2168.22 |
| 6 | 24-9777344 | Diclofenac Sodium | 226.12 |
| 7 | 24-5898304 | ACD-A | 6372.75 |
| 8 | 73-5536954 | MuSkel-S | 7963.04 |
| 9 | 80-3207032 | ZNP | 1425.72 |
| 10 | 72-4895230 | Tacrolimus | 5693.77 |
| 11 | 75-7187408 | nystatin | 4322.31 |
| 12 | 85-2435431 | Mineral oil | 5253.16 |
| 13 | 65-5623426 | Necon | 877.72 |
| 14 | 47-0309832 | Midodrine HCl | 4225.79 |
| 15 | 95-3875616 | OXACILLIN | 3190.07 |

Total rows: 477 of 477    Query complete 00:00:00.065

7. How many orders are delivered or shipped as of today?

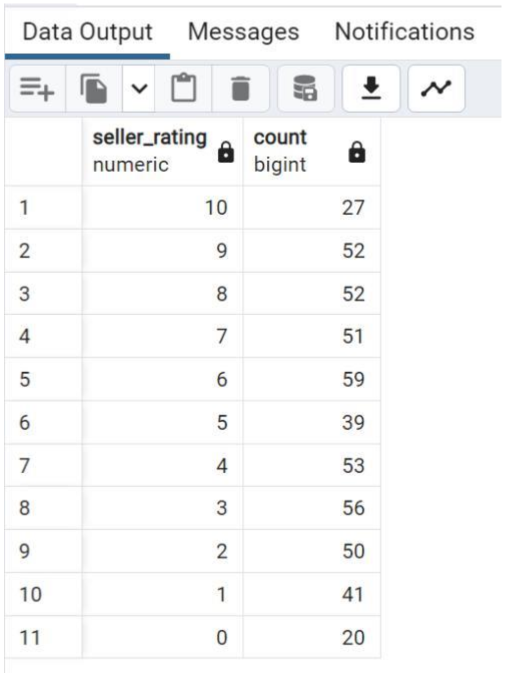
```
SELECT
                    status, COUNT(shipment_id)
FROM shipments
group by status;
```



| | status character varying | count bigint |
|---|---|---|
| 1 | Delivered | 491 |
| 2 | Shipped | 9 |

8. Bucket all the sellers based on their seller rating.

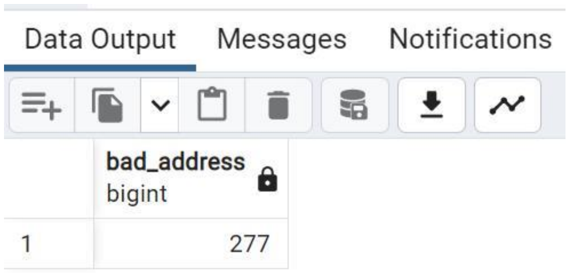
```
SELECT
                    seller_rating,
                    COUNT(seller_id)
FROM
                    seller
GROUP BY
                    seller_rating
ORDER BY
seller_rating DESC, 2 DESC;
```



| | seller_rating numeric | count bigint |
|---|---|---|
| 1 | 10 | 27 |
| 2 | 9 | 52 |
| 3 | 8 | 52 |
| 4 | 7 | 51 |
| 5 | 6 | 59 |
| 6 | 5 | 39 |
| 7 | 4 | 53 |
| 8 | 3 | 56 |
| 9 | 2 | 50 |
| 10 | 1 | 41 |
| 11 | 0 | 20 |

9. How many customers did not provide State and Zip while ordering from the website?

```
SELECT
                COUNT(*) AS bad_address
FROM
                address INNER JOIN customers USING(address_id)
WHERE
                address.state IS NULL
                AND ZIP IS NULL
```

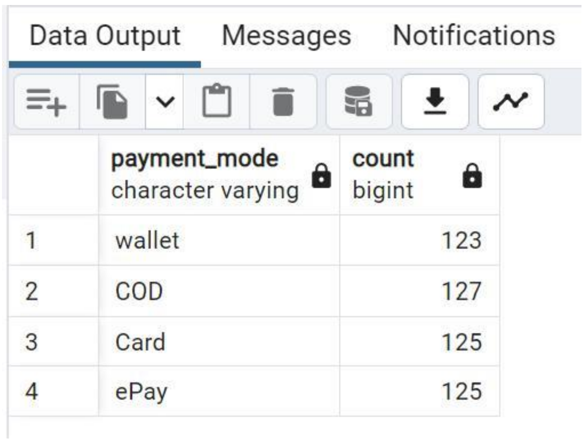


Data Output | Messages | Notifications

| | bad_address bigint |
|---|---|
| 1 | 277 |

10. Provide the distribution of payment_modes across all the orders created on the website.

```
Select
                payment_mode, COUNT(payment_mode)
FROM
                payments
GROUP BY
                payment_mode
```

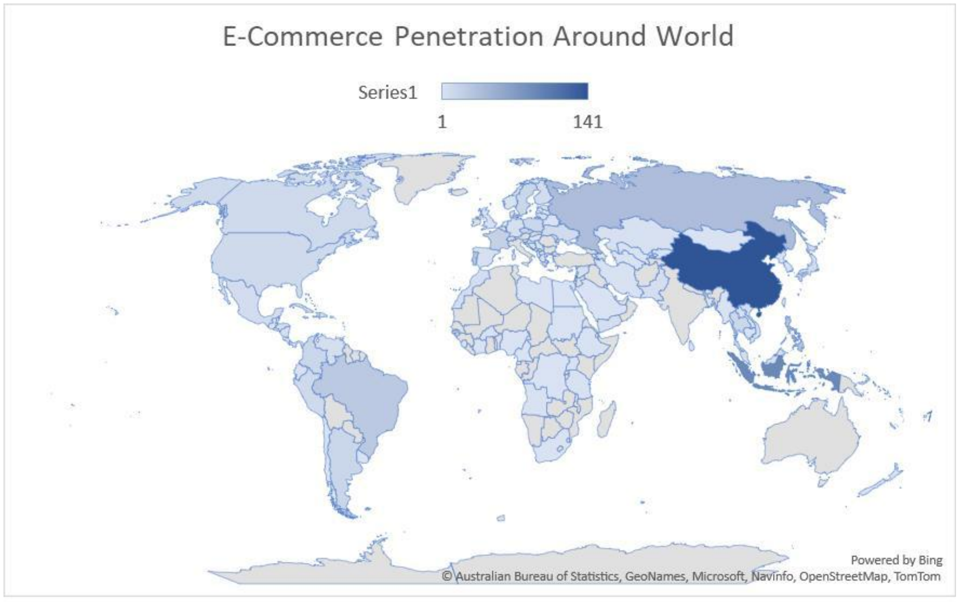


Data Output | Messages | Notifications

| | payment_mode character varying | count bigint |
|---|---|---|
| 1 | wallet | 123 |
| 2 | COD | 127 |
| 3 | Card | 125 |
| 4 | ePay | 125 |

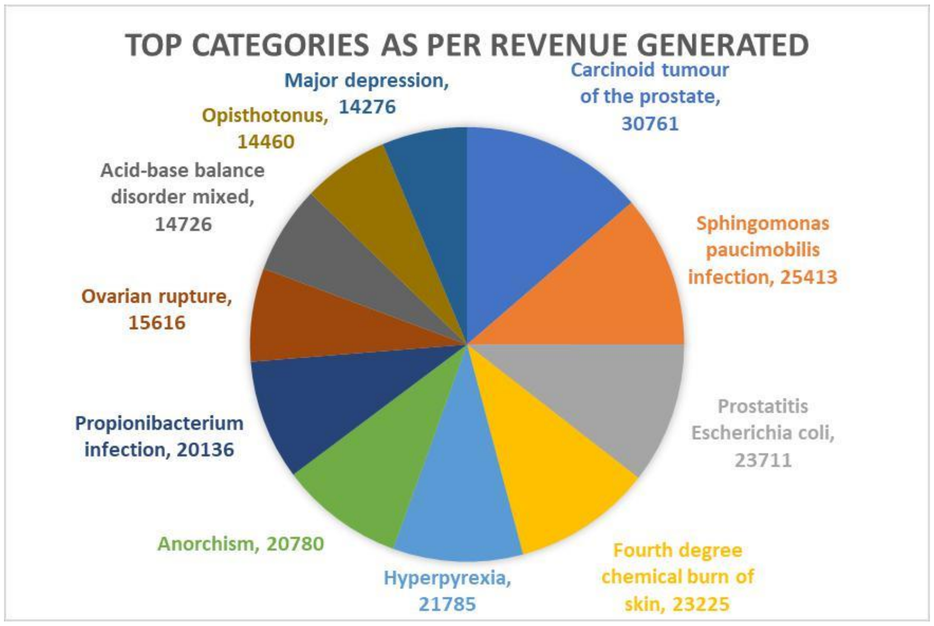
## Data Visualization

**Visualize number of members who have taken the policies across different countries in the world.**

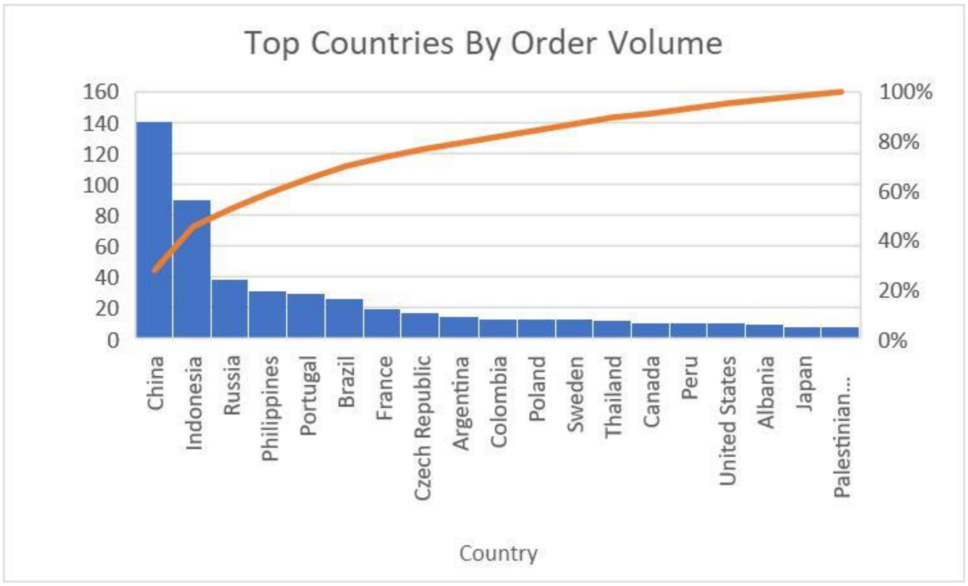

E-Commerce Penetration Around World
Series1
1
141
Powered by Bing
© Australian Bureau of Statistics, GeoNames, Microsoft, Navinfo, OpenStreetMap, TomTom

As per the above plot, we observe that highest orders come in from China, i.e., 105, followed by Indonesia

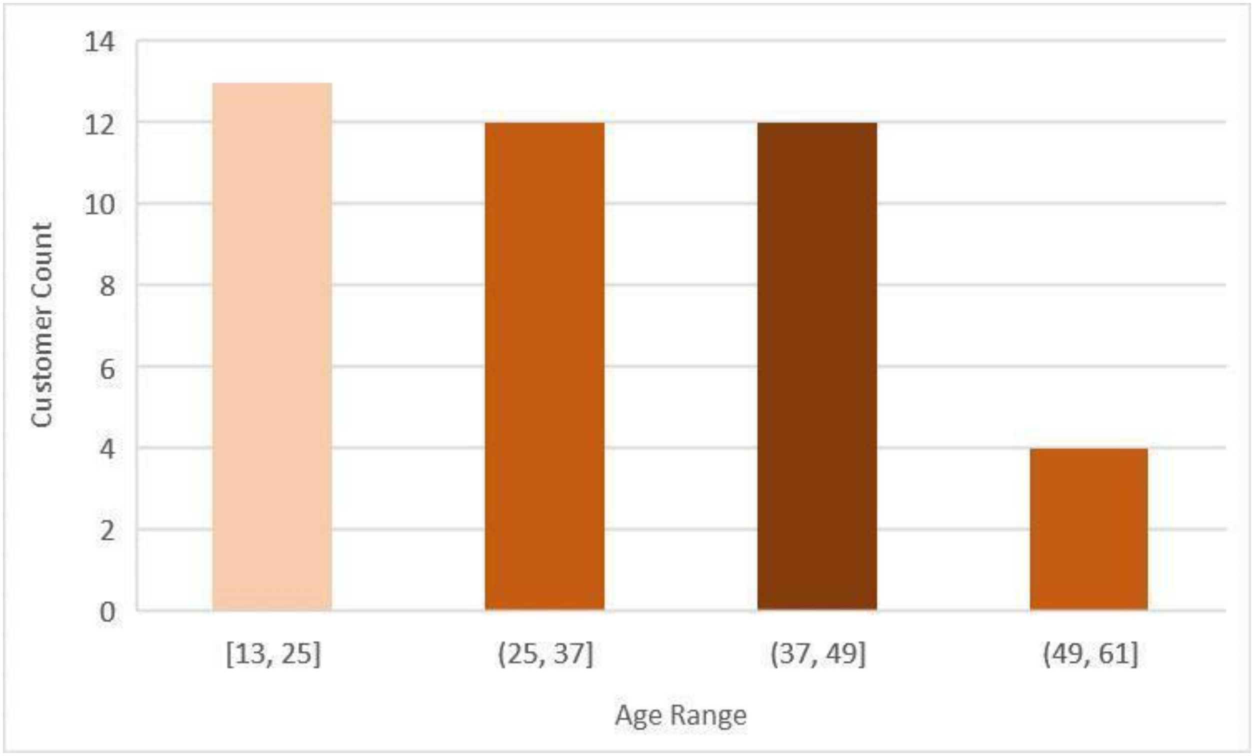
**Visualize Top categories based on revenue generated.**



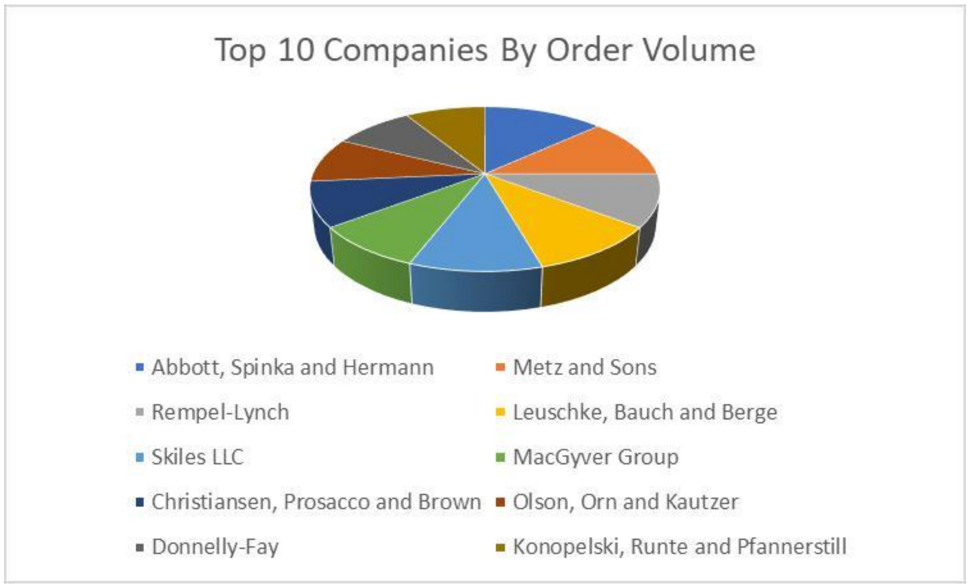
**Visualize Top Countries by ordered volume**



**Visualize customer's age customers based on their orders**



**Visualize Top 10 companies based on their volume of order processed**


Top 10 Companies By Order Volume
Abbott, Spinka and Hermann
Metz and Sons
Rempel-Lynch
Leuschke, Bauch and Berge
Skiles LLC
MacGyver Group
Christiansen, Prosacco and Brown
Olson, Orn and Kautzer
Donnelly-Fay
Konopelski, Runte and Pfannerstill