Task

Test task #2 - Data Quality focus

Use the E-Commerce Data dataset:

https://www.kaggle.com/datasets/carrie1/ecommerce-data

This dataset contains online retail transactions, including invoices, quantities, prices, customers, and countries.

Your goal is to design five data quality checks that would help ensure this dataset can be reliably used for analytics and reporting.

For each check, specify:

What it verifies
The data quality dimension (e.g., completeness, validity, uniqueness, , accuracy)
The SQL logic or condition
The severity level (warning or critical)

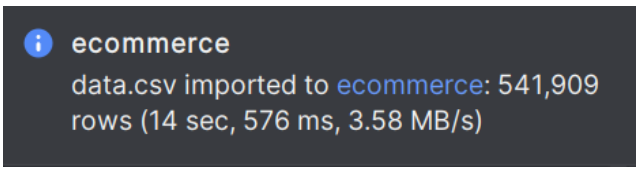
Task Solving

For this task I used PostgreSQL database on Intellij Idea.

Firstly, we create the table with 8 columns that the E-Commerce Data dataset has :

```
[2025-10-28 20:50:23] Connected
postgres.public> CREATE TABLE ecommerce (
                                          InvoiceNo    TEXT,
                                          StockCode    TEXT,
                                          Description  TEXT,
                                          Quantity     INT,
                                          InvoiceDate  TIMESTAMP,
                                          UnitPrice    NUMERIC(12,2),
                                          CustomerID   TEXT,
                                          Country      TEXT
                 )
[2025-10-28 20:50:23] completed in 51 ms
```

Then, import data from .csv file to our ecommerce table :



Let's change the format from timestamp to MM/DD/YYYY

```
postgres.public> ALTER TABLE ecommerce
                     ALTER COLUMN InvoiceDate TYPE TIMESTAMP
                         USING to_timestamp(InvoiceDate, 'MM/DD/YYYY HH24:MI')
[2025-10-28 21:13:03] completed in 2 s 409 ms
```

This is what we got for now :

description	quantity	invoicedate	unitprice	customerid	country
WHITE HANGING HEART T-LIGHT HOLDER	6	2010-12-01 08:26:00.000000	2.55	17850	United Kin
WHITE METAL LANTERN	6	2010-12-01 08:26:00.000000	3.39	17850	United Kin
CREAM CUPID HEARTS COAT HANGER	8	2010-12-01 08:26:00.000000	2.75	17850	United Kin
KNITTED UNION FLAG HOT WATER BOTTLE	6	2010-12-01 08:26:00.000000	3.39	17850	United Kin
RED WOOLLY HOTTIE WHITE HEART.	6	2010-12-01 08:26:00.000000	3.39	17850	United Kin
SET 7 BABUSHKA NESTING BOXES	2	2010-12-01 08:26:00.000000	7.65	17850	United Kin
GLASS STAR FROSTED T-LIGHT HOLDER	6	2010-12-01 08:26:00.000000	4.25	17850	United Kin
HAND WARMER UNION JACK	6	2010-12-01 08:28:00.000000	1.85	17850	United Kin
HAND WARMER RED POLKA DOT	6	2010-12-01 08:28:00.000000	1.85	17850	United Kin

Now, let's dive into making data quality checks that would help ensure this dataset can be reliably used for analytics and reporting.

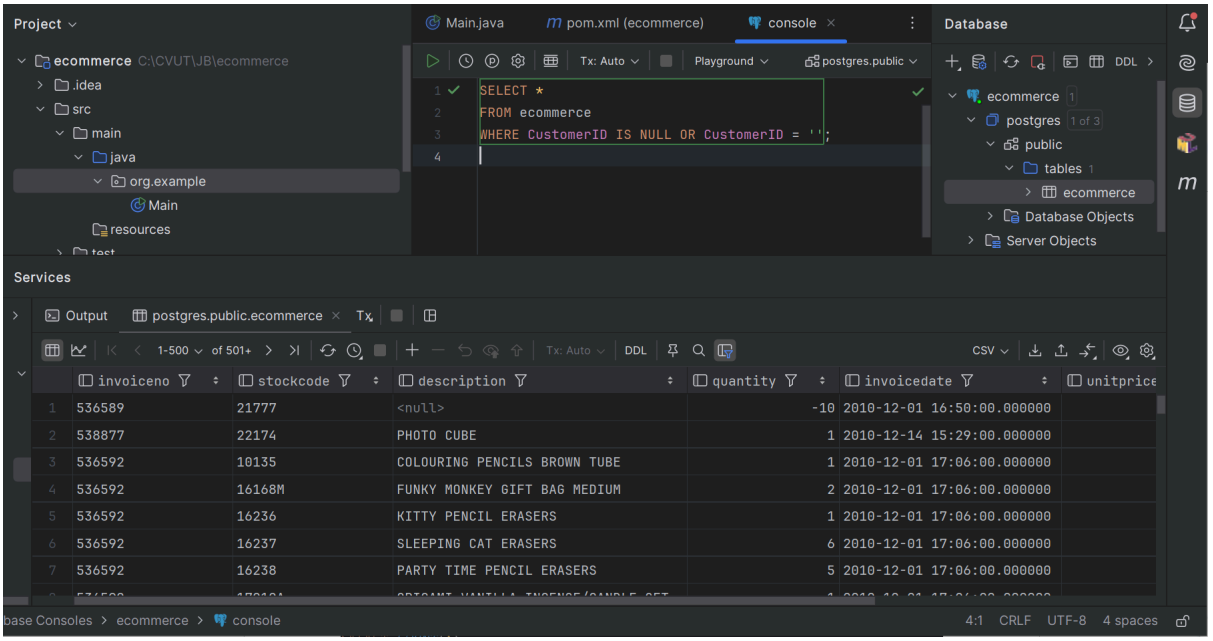
Quality checks

1. **Completeness check**
   Verifies if each transaction has a customer id. Shows the number of lines where it's NULL or empty

   Critical severity level - without it, it is impossible to build customer analytics. If fields like description were NULL then it would be just a warning.

```sql
SELECT COUNT(*)
FROM ecommerce
WHERE CustomerID IS NULL OR CustomerID = '';
```

count
135080



*To see the rows, use SELECT **

2. Validity check

Checks the correctness of the quantity and price :
For regular invoices (invoice number contains only numbers) — quantity > 0 and price per unit > 0;
For cancellations (invoice number starts with C) — quantity < 0, but price per unit > 0.
Shows number of discrepancies in each case

Critical severity level - if here is an error here, it breaks the basic business logic

```
SELECT COUNT(*)
FROM ecommerce
WHERE InvoiceNo NOT LIKE 'C%'
 AND (Quantity <= 0 OR UnitPrice <= 0)

UNION ALL

SELECT COUNT(*)
FROM ecommerce
WHERE InvoiceNo LIKE 'C%'
 AND (Quantity >= 0 OR UnitPrice <= 0);
```

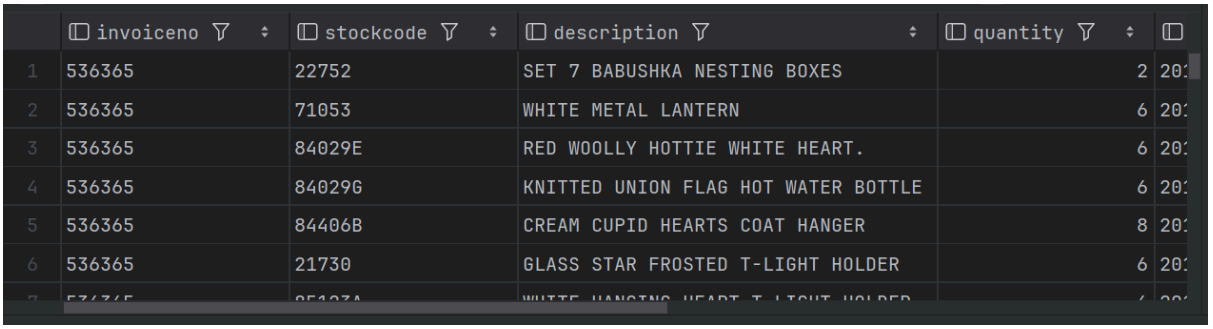
	count
1	2521
2	0

3. Uniqness check

shows full rows with duplicates of invoice numbers

Critical severity level - if we count how many invoices we got and use DISTINCT, it will show smaller number. But if it said “invoice number can be repeated, but the lines inside must be different” then it would be warning, and the business key is something like invoice number + stock code.

```sql
SELECT *
FROM ecommerce
WHERE InvoiceNo IN (
   SELECT InvoiceNo
   FROM ecommerce
   WHERE InvoiceNo IS NOT NULL
   GROUP BY InvoiceNo
   HAVING COUNT(*) > 1
)
ORDER BY InvoiceNo;
```



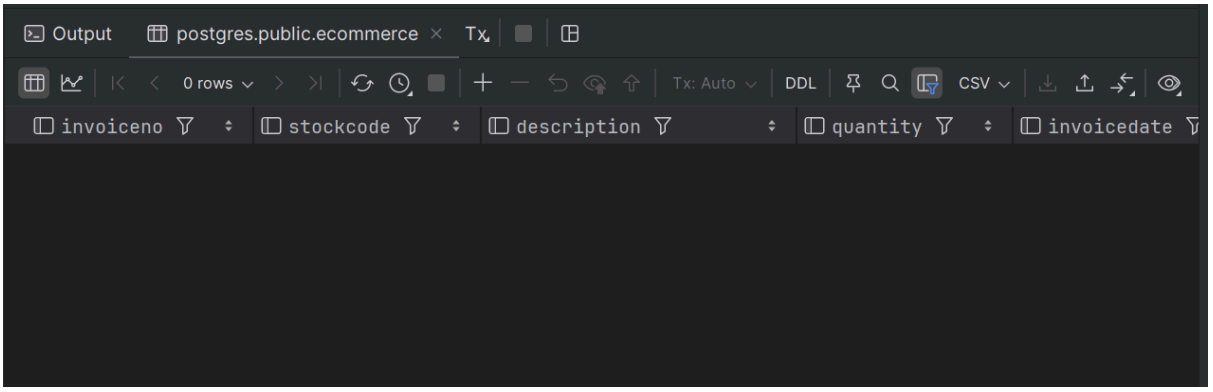
	invoiceno	stockcode	description	quantity	
1	536365	22752	SET 7 BABUSHKA NESTING BOXES	2	201
2	536365	71053	WHITE METAL LANTERN	6	201
3	536365	84029E	RED WOOLLY HOTTIE WHITE HEART.	6	201
4	536365	84029G	KNITTED UNION FLAG HOT WATER BOTTLE	6	201
5	536365	84406B	CREAM CUPID HEARTS COAT HANGER	8	201
6	536365	21730	GLASS STAR FROSTED T-LIGHT HOLDER	6	201

4. Timeliness check

Checks if invoice dates are not in the future. Shows full rows. I could do additional check if they are not too much in the past, but couldn't decide which year should I pick

Critical severity level - dates from the future also disrupt the basic business logic, and old transactions are obsolete for reports

```sql
SELECT *
FROM ecommerce
WHERE InvoiceDate > NOW();
```

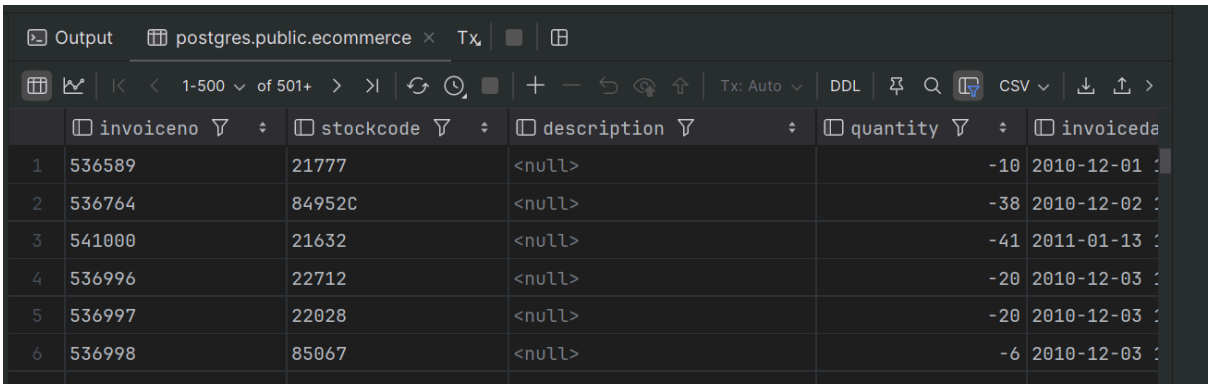


5. Accuracy check

If quantity < 0 (return), then invoice number must begin with 'C'.
If quantity > 0 (sale), then invoice number cannot begin with 'C'.
we display rows that violate the rule.

Critical severity level - directly affects financial performance.

```sql
SELECT *
FROM public.ecommerce
WHERE
   (Quantity < 0 AND InvoiceNo NOT LIKE 'C%')
  OR (Quantity > 0 AND InvoiceNo LIKE 'C%');
```



	invoiceno	stockcode	description	quantity	invoiceda
1	536589	21777	<null>	-10	2010-12-01
2	536764	84952C	<null>	-38	2010-12-02
3	541000	21632	<null>	-41	2011-01-13
4	536996	22712	<null>	-20	2010-12-03
5	536997	22028	<null>	-20	2010-12-03
6	536998	85067	<null>	-6	2010-12-03