In [33]:
```
!pip install pandas sqlalchemy
```

```
Defaulting to user installation because normal site-packages is not writeable
Requirement already satisfied: pandas in c:\users\dhruv\appdata\roaming\python\python313\site-packages (2.2.3)
Requirement already satisfied: sqlalchemy in c:\users\dhruv\appdata\roaming\python\python313\site-packages (2.0.40)
Requirement already satisfied: numpy>=1.26.0 in c:\users\dhruv\appdata\roaming\python\python313\site-packages (from pandas) (2.2.1)
Requirement already satisfied: python-dateutil>=2.8.2 in c:\users\dhruv\appdata\roaming\python\python313\site-packages (from pandas) (2.9.0.post0)
Requirement already satisfied: pytz>=2020.1 in c:\users\dhruv\appdata\roaming\python\python313\site-packages (from pandas) (2024.2)
Requirement already satisfied: tzdata>=2022.7 in c:\users\dhruv\appdata\roaming\python\python313\site-packages (from pandas) (2025.1)
Requirement already satisfied: greenlet>=1 in c:\users\dhruv\appdata\roaming\python\python313\site-packages (from sqlalchemy) (3.2.1)
Requirement already satisfied: typing-extensions>=4.6.0 in c:\python313\lib\site-packages (from sqlalchemy) (4.12.2)
Requirement already satisfied: six>=1.5 in c:\users\dhruv\appdata\roaming\python\python313\site-packages (from python-dateutil>=2.8.2->pandas) (1.17.0)
[notice] A new release of pip is available: 25.1 -> 25.1.1
[notice] To update, run: python.exe -m pip install --upgrade pip
```

In [34]:
```
import pandas as pd

# Load the CSV file
df = pd.read_csv("Online Sales Data.csv")
df.head()
```

Out[34]:

	Transaction ID	Date	Product Category	Product Name	Units Sold	Unit Price	Total Revenue	Region	Payme Metho
0	10001	2024-01-01	Electronics	iPhone 14 Pro	2	999.99	1999.98	North America	Cred Ca
1	10002	2024-01-02	Home Appliances	Dyson V11 Vacuum	1	499.99	499.99	Europe	PayP
2	10003	2024-01-03	Clothing	Levi's 501 Jeans	3	69.99	209.97	Asia	Deb Ca
3	10004	2024-01-04	Books	The Da Vinci Code	4	15.99	63.96	North America	Cred Ca
4	10005	2024-01-05	Beauty Products	Neutrogena Skincare Set	1	89.99	89.99	Europe	PayP

In [35]:
```
from sqlalchemy import create_engine, Table, Column, Integer, Float, String, Met
from sqlalchemy.orm import Session

engine = create_engine("sqlite:///sales.db")
metadata = MetaData()
```

In [36]:
```
query = """
SELECT
```

```
    STRFTIME('%Y', Date) AS year,
    STRFTIME('%m', Date) AS month,
    SUM("Total Revenue") AS total_revenue,
    COUNT(DISTINCT "Transaction ID") AS order_volume
FROM
    orders
GROUP BY
    year, month
ORDER BY
    year, month;
"""

sales_trend = pd.read_sql_query(query, engine)
sales_trend
```

Out[36]:

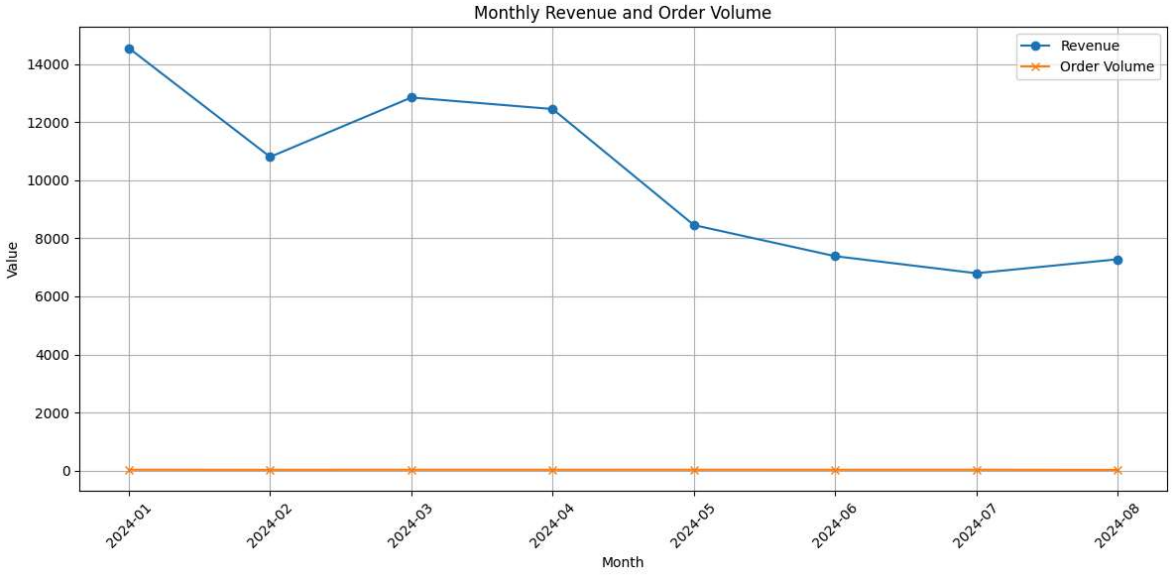
	year	month	total_revenue	order_volume
0	2024	01	14548.32	31
1	2024	02	10803.37	29
2	2024	03	12849.24	31
3	2024	04	12451.69	30
4	2024	05	8455.49	31
5	2024	06	7384.55	30
6	2024	07	6797.08	31
7	2024	08	7278.11	27

In [37]:

```
import matplotlib.pyplot as plt

# Combine year and month into one column
sales_trend["Period"] = sales_trend["year"] + "-" + sales_trend["month"]

plt.figure(figsize=(12,6))
plt.plot(sales_trend["Period"], sales_trend["total_revenue"], label="Revenue", m
plt.plot(sales_trend["Period"], sales_trend["order_volume"], label="Order Volume
plt.xticks(rotation=45)
plt.title("Monthly Revenue and Order Volume")
plt.xlabel("Month")
plt.ylabel("Value")
plt.legend()
plt.grid(True)
plt.tight_layout()
plt.show()
```



In [38]:
```
df_sql = df.rename(columns={
    "Transaction ID": "order_id",
    "Date": "order_date",
    "Total Revenue": "amount",
    "Product Name": "product_id"
})[["order_id", "order_date", "amount", "product_id"]]
```

In [39]:
```
online_sales = Table(
    "online_sales", metadata,
    Column("order_id", Integer),
    Column("order_date", String),
    Column("amount", Float),
    Column("product_id", String)
)

metadata.create_all(engine)
```

In [40]:
```
df_sql.to_sql("online_sales", engine, index=False, if_exists="replace")
```

Out[40]: 240

In [41]:
```
with Session(engine) as session:
    stmt = (
        select(
            extract('year', func.DATE(online_sales.c.order_date)).label("year"),
            extract('month', func.DATE(online_sales.c.order_date)).label("month"
            func.sum(online_sales.c.amount).label("total_revenue"),
            func.count(func.distinct(online_sales.c.order_id)).label("order_volu
        )
        .group_by("year", "month")
        .order_by("year", "month")
    )

    result = session.execute(stmt).fetchall()
```

In [42]:
```
result_df = pd.DataFrame(result, columns=["year", "month", "total_revenue", "ord
print(result_df)
```

	year	month	total_revenue	order_volume
0	2024	1	14548.32	31
1	2024	2	10803.37	29
2	2024	3	12849.24	31
3	2024	4	12451.69	30
4	2024	5	8455.49	31
5	2024	6	7384.55	30
6	2024	7	6797.08	31
7	2024	8	7278.11	27