

# Time Series Plots

November 24, 2024

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[1]: import pandas as pd
import matplotlib.pyplot as plt
import datetime as dt
import numpy as np

[2]: df = pd.read_csv('US Superstore.csv', encoding = 'latin-1')

[3]: df['Order Date'] = pd.to_datetime(df['Order Date'], errors = 'coerce', dayfirst=
    ↳ True)

[4]: df['Order Year'] = df['Order Date'].dt.year
df['Order Month'] = df['Order Date'].dt.month

[5]: df.columns

[5]: Index(['Row ID', 'Order ID', 'Order Date', 'Ship Date', 'Ship Mode',
        'Customer ID', 'Customer Name', 'Segment', 'Country', 'City', 'State',
        'Postal Code', 'Region', 'Product ID', 'Category', 'Sub-Category',
        'Product Name', 'Sales', 'Quantity', 'Discount', 'Profit', 'Order Year',
        'Order Month'],
        dtype='object')

[6]: grouped_data = (
    df.groupby([pd.Grouper(key='Order Date', freq='ME'), 'Category',
    ↳ 'Region'])['Sales']
        .sum()
        .reset_index()
    )

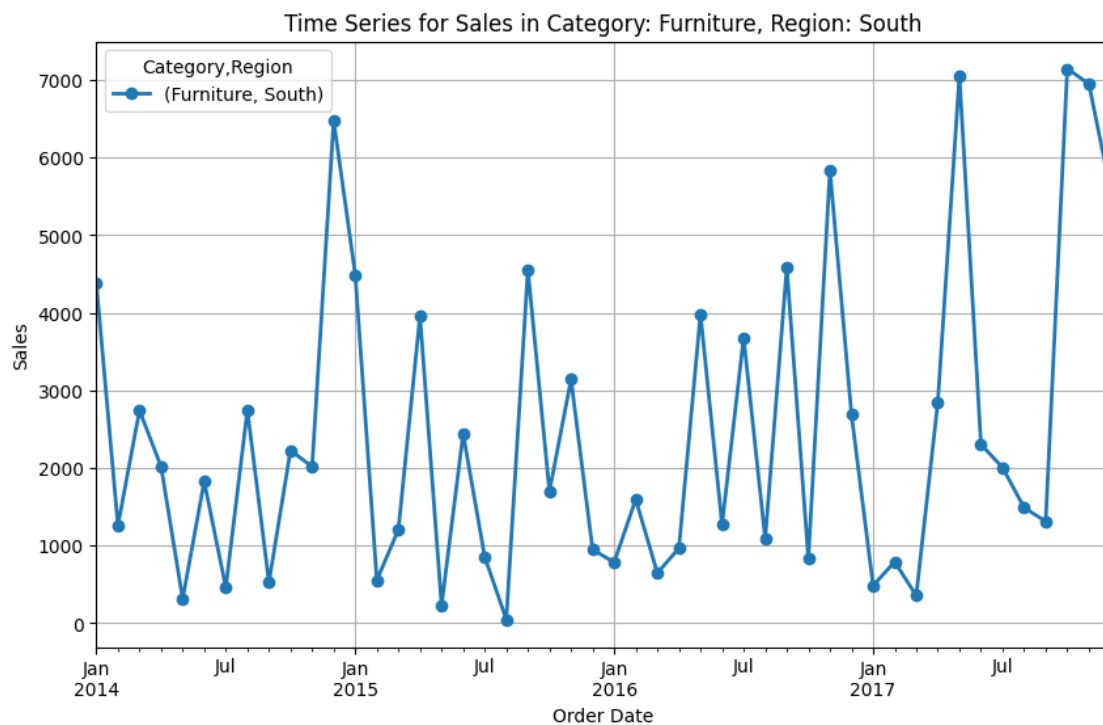
pivot_data = grouped_data.pivot_table(
    index='Order Date',
    columns=['Category', 'Region'],
    values='Sales',
    fill_value=0
)

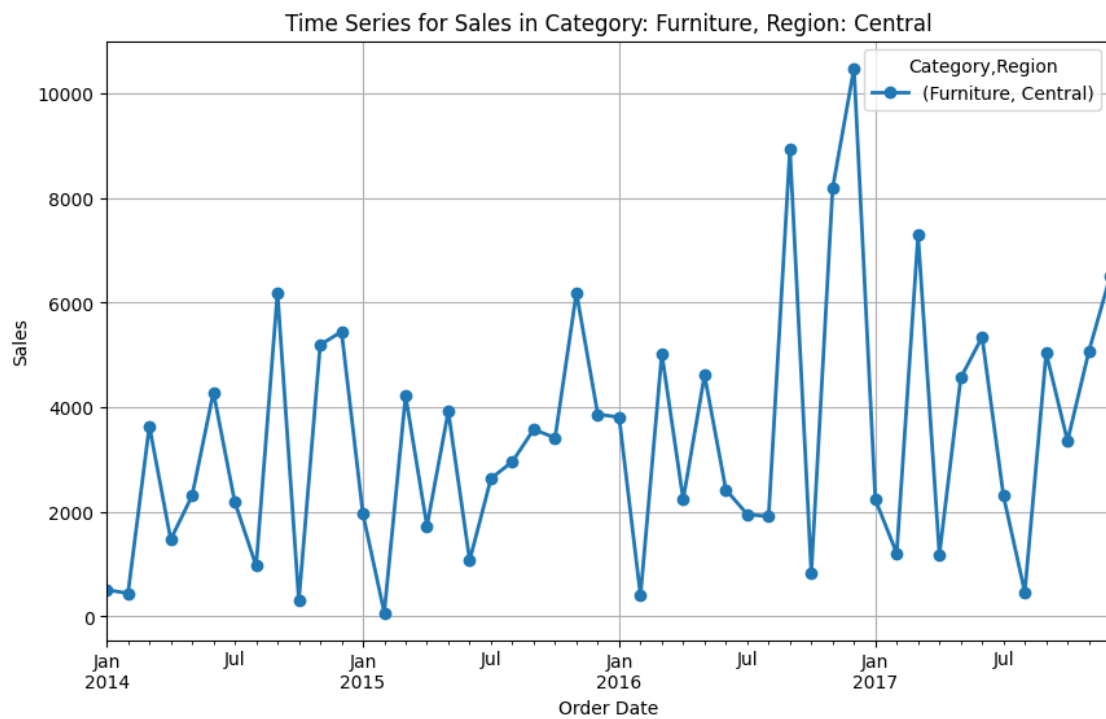
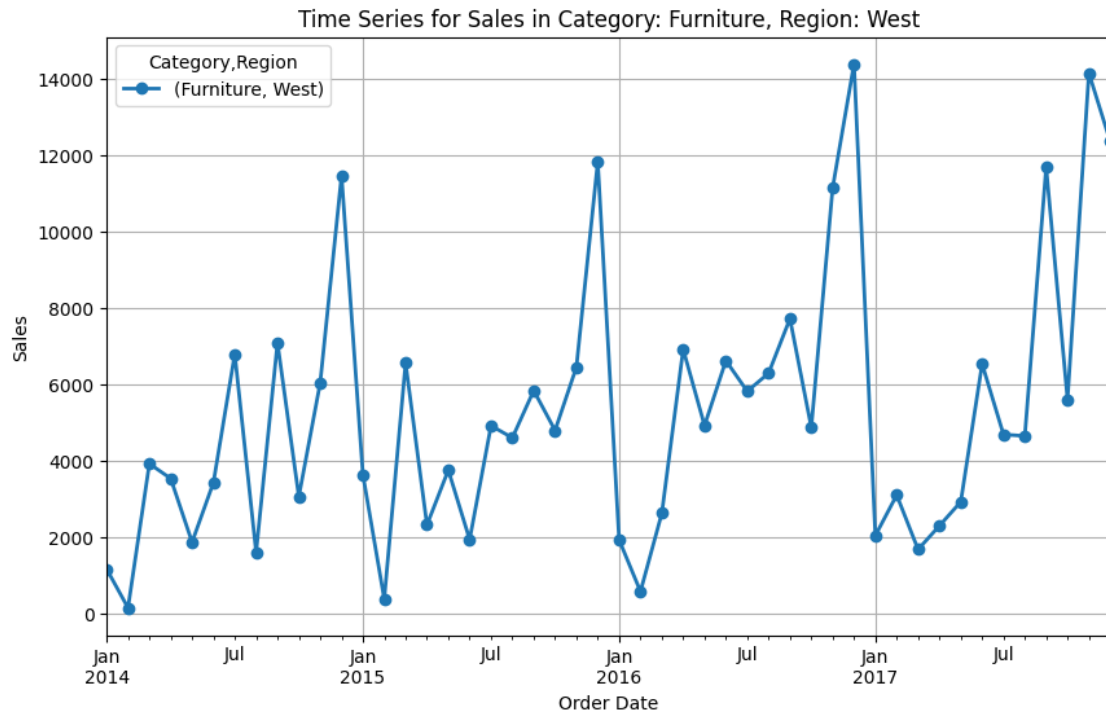
[7]: categories = df['Category'].unique()
regions = df['Region'].unique()
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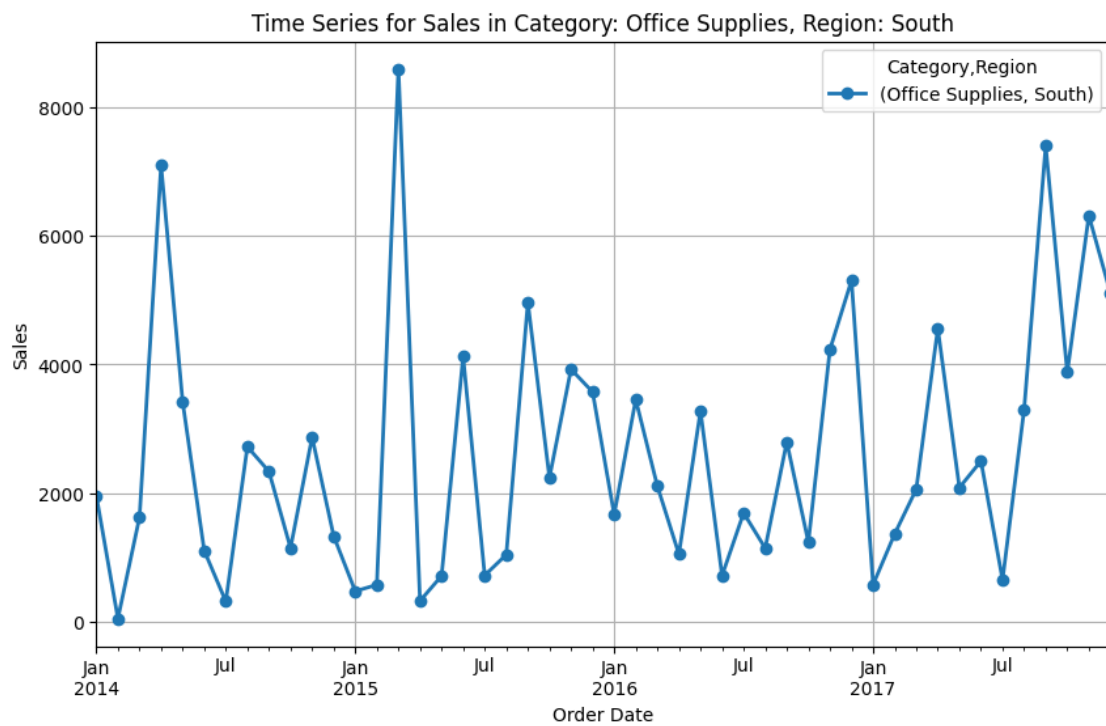
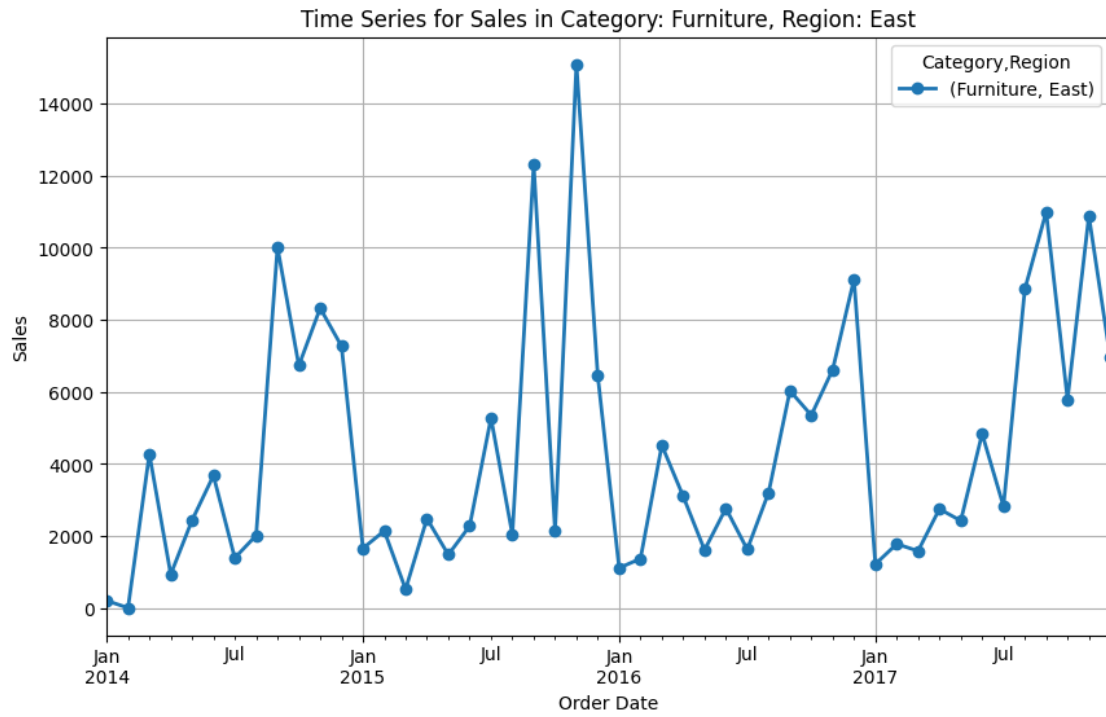
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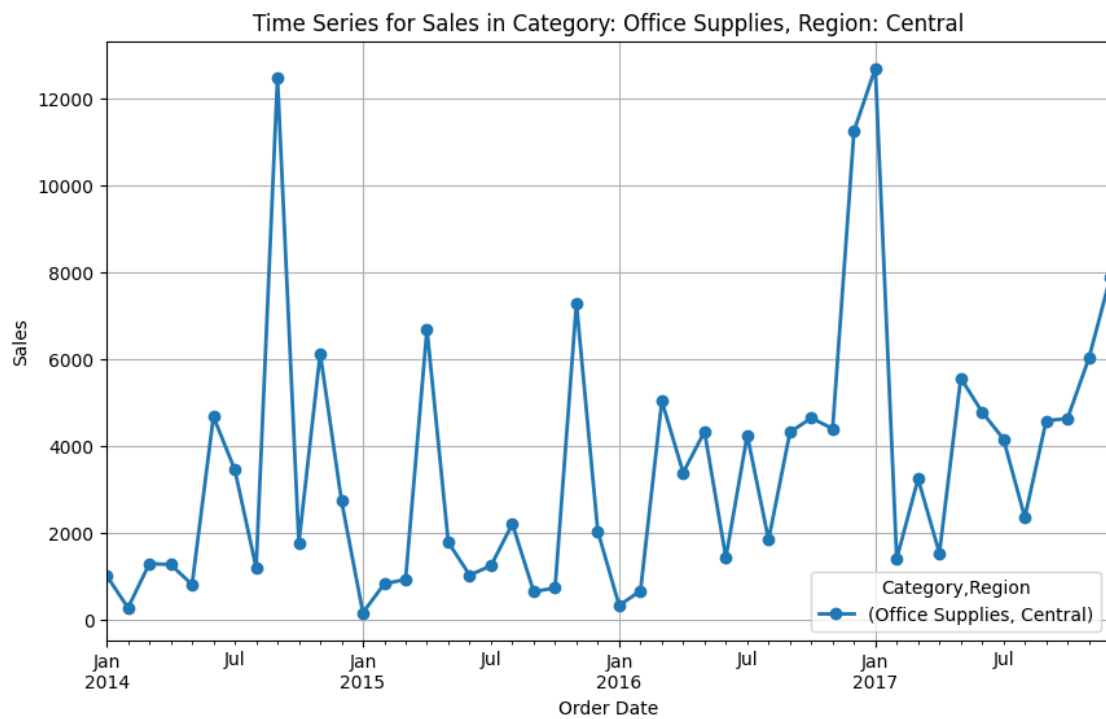
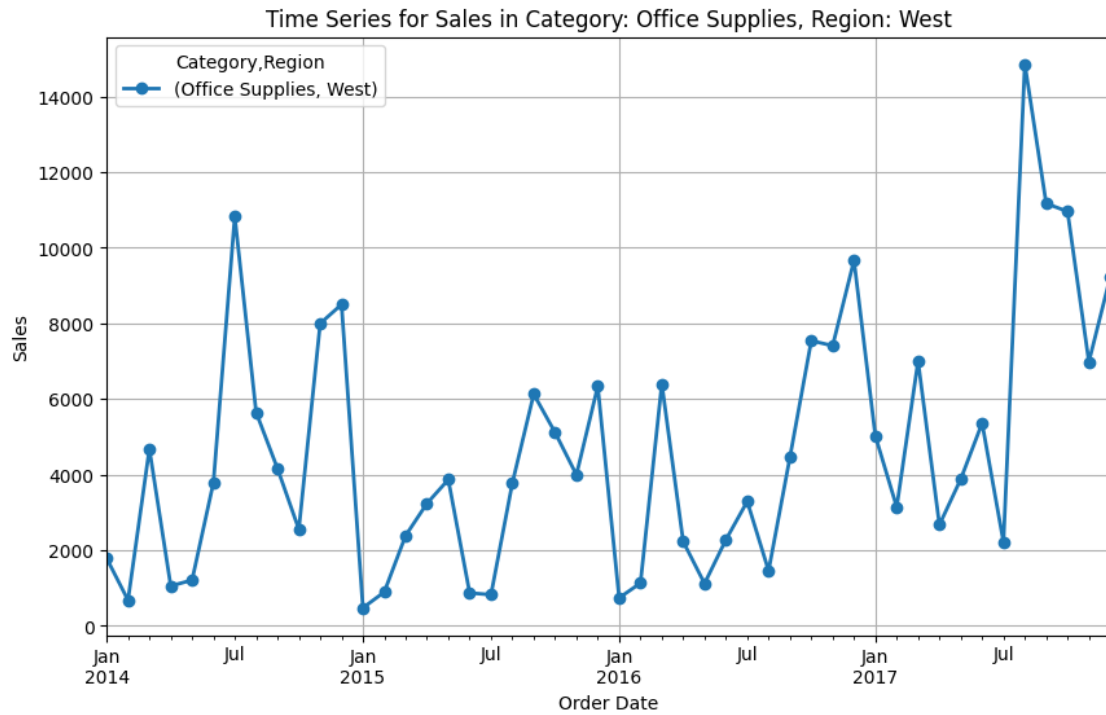
for category in categories:
    for region in regions:
        filtered_data = pivot_data.xs((category, region), axis=1,
drop_level=False)
        plt.figure(figsize=(10, 6))
        filtered_data.plot(ax=plt.gca(), linewidth=2, marker = 'o')
        plt.title(f"Time Series for Sales in Category: {category}, Region:
{region}")
        plt.xlabel("Order Date")
        plt.ylabel("Sales")
        plt.grid(True)
        plt.show()

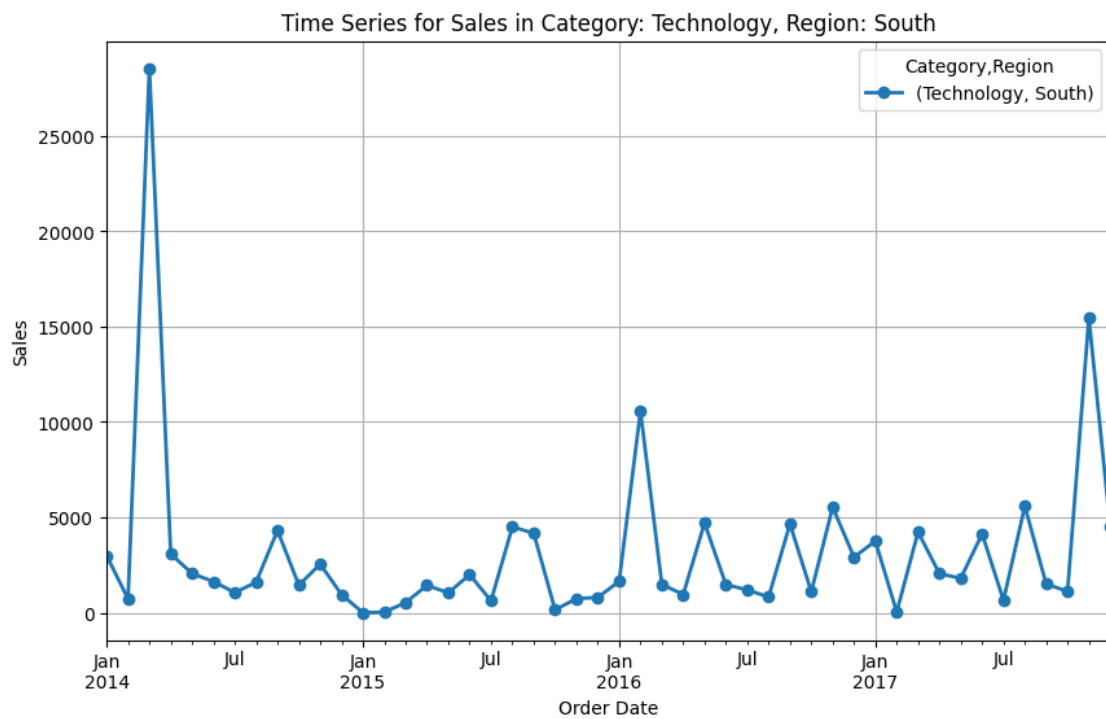
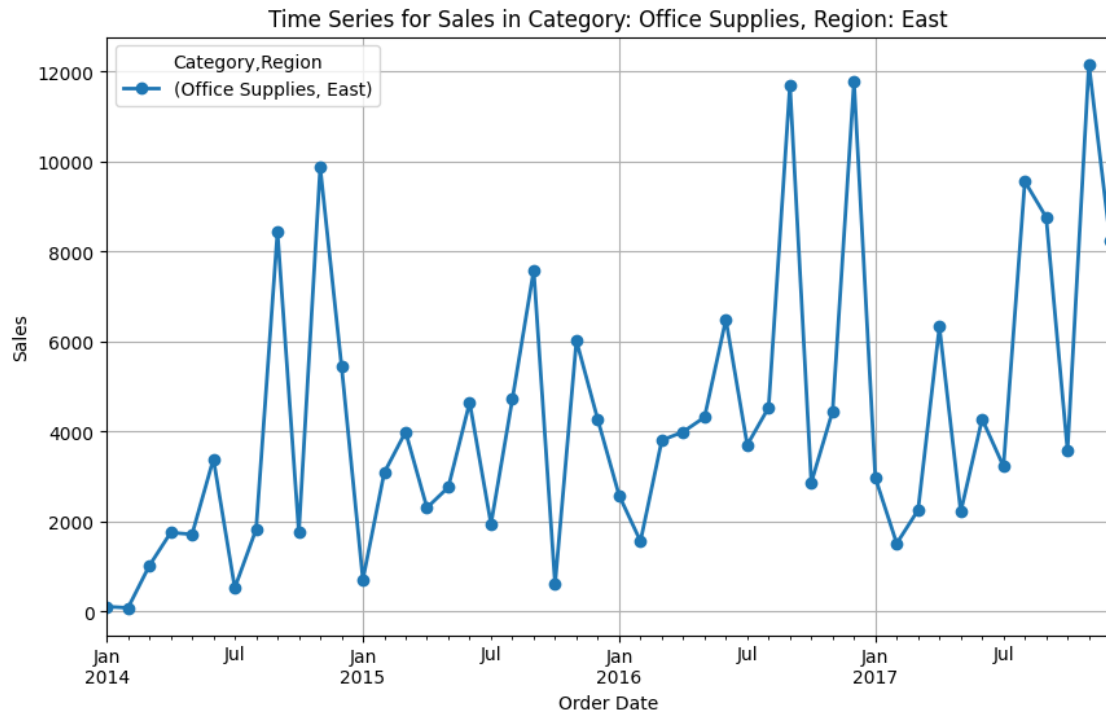
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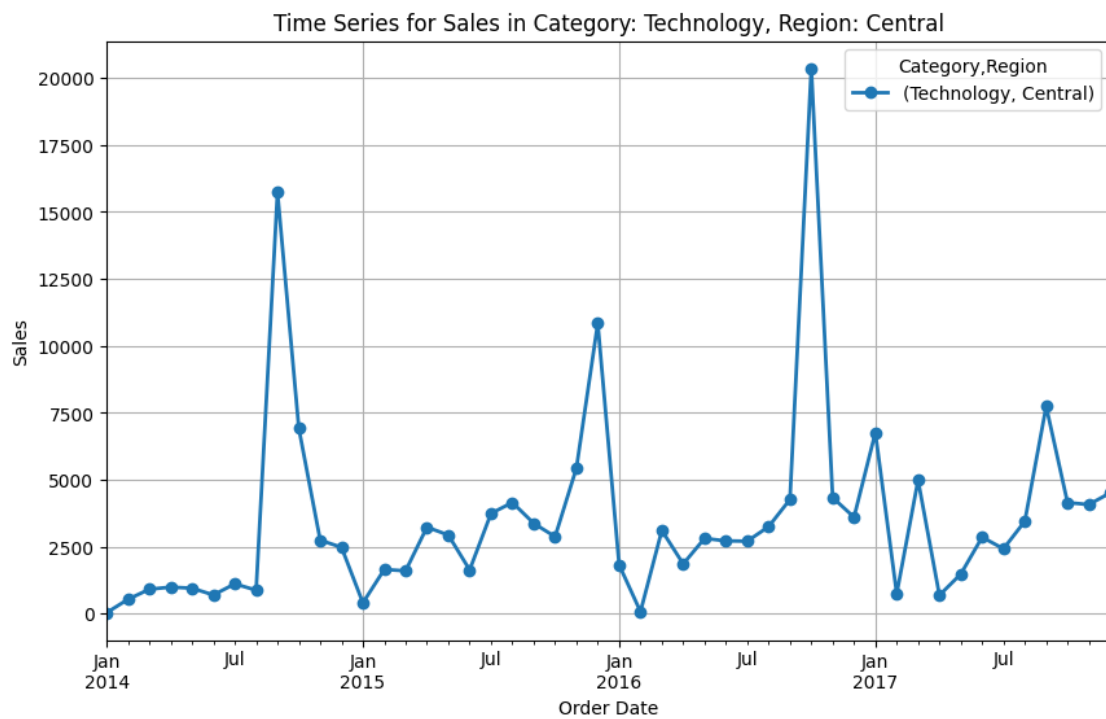
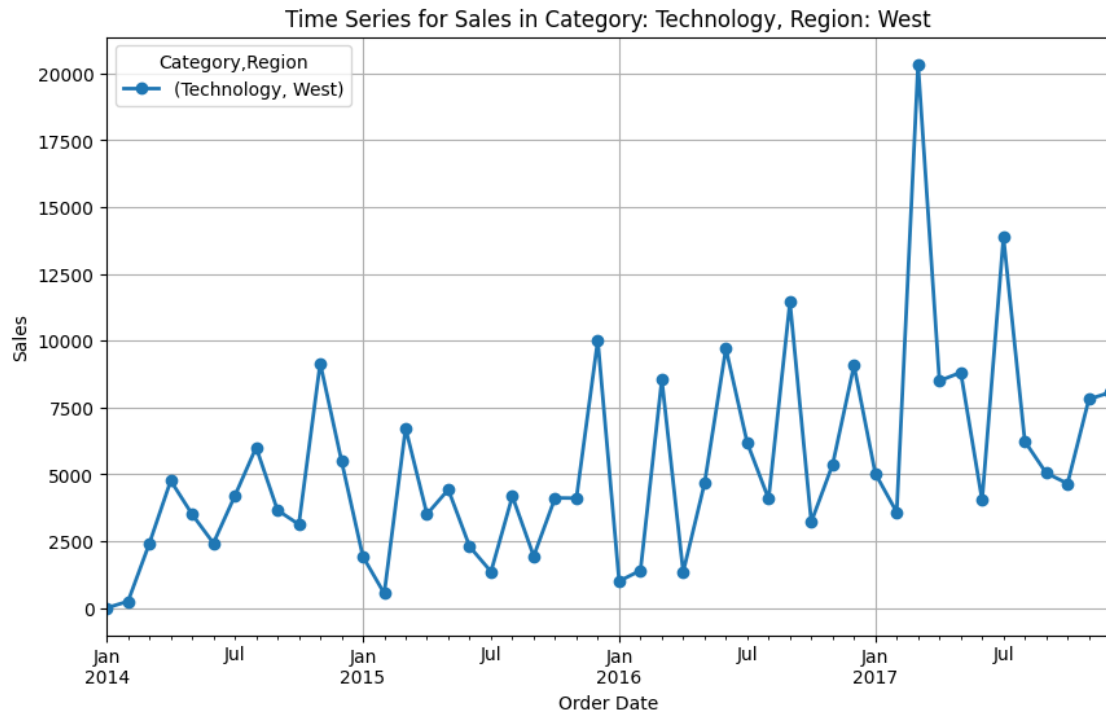


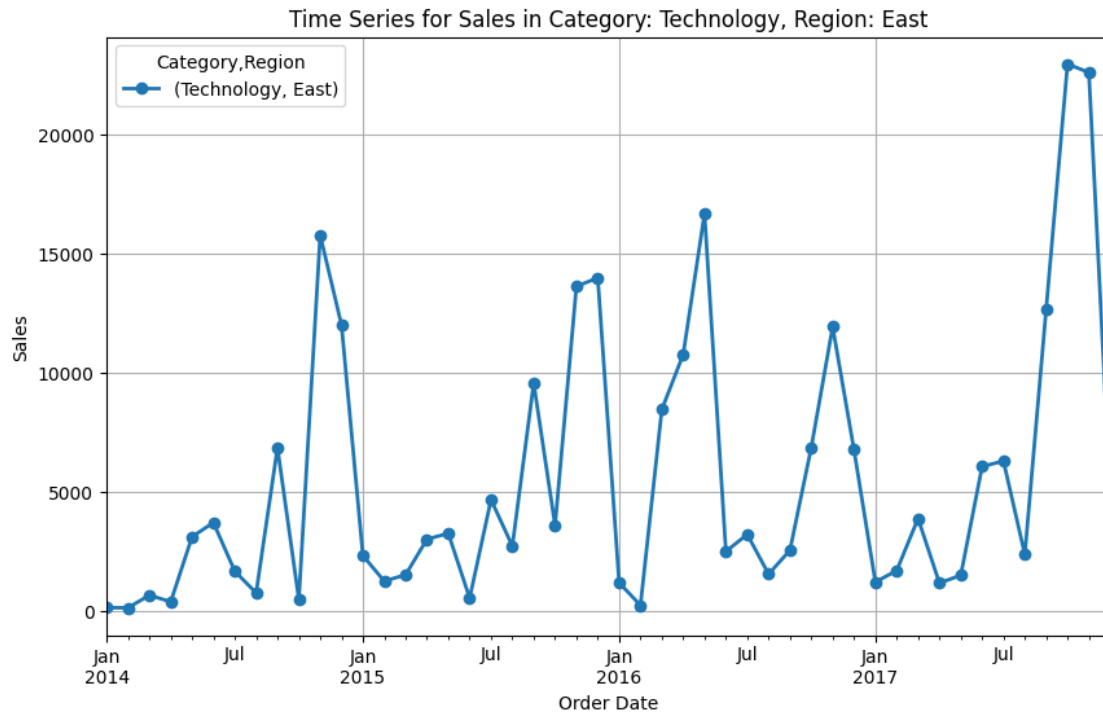






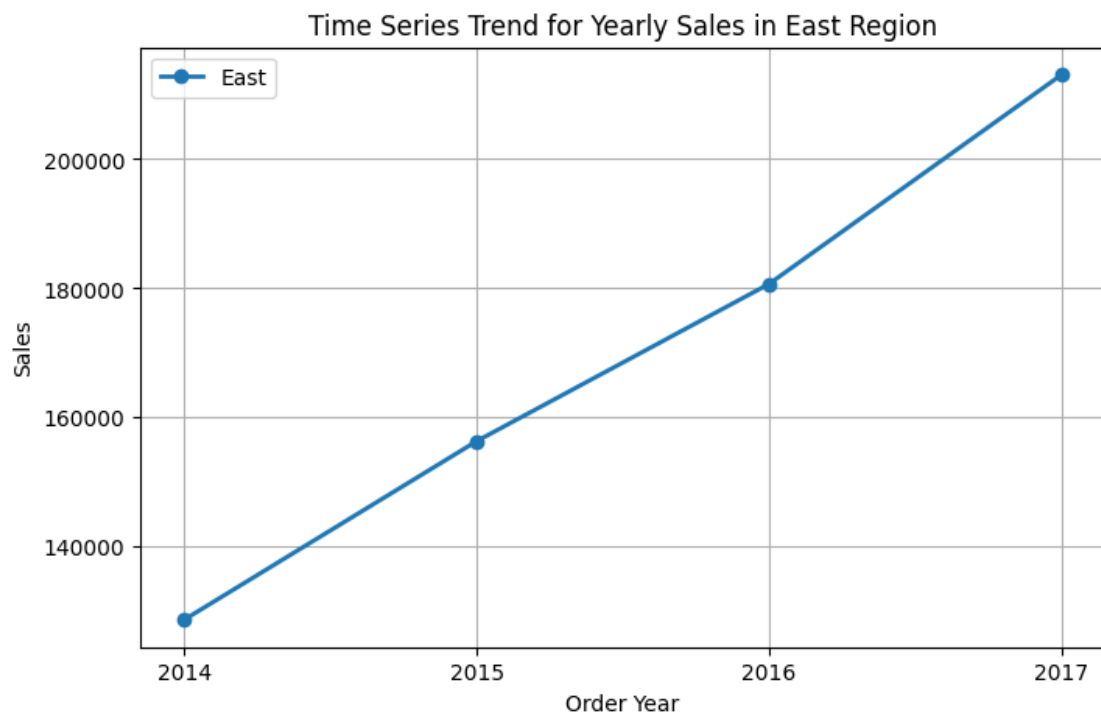
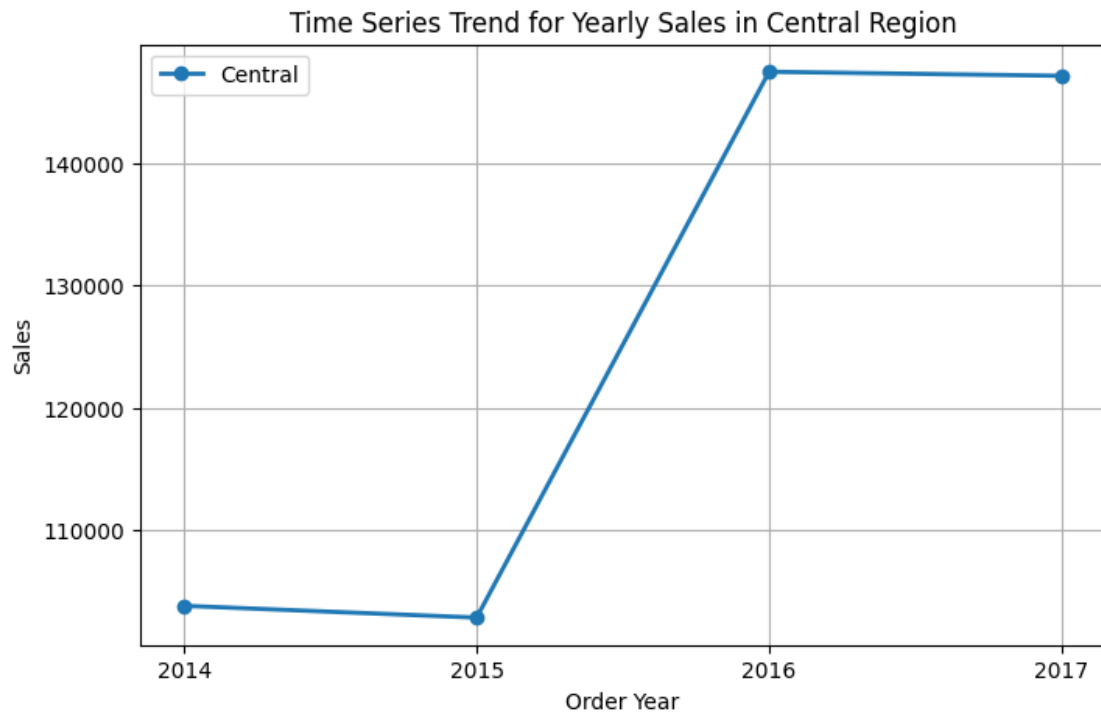


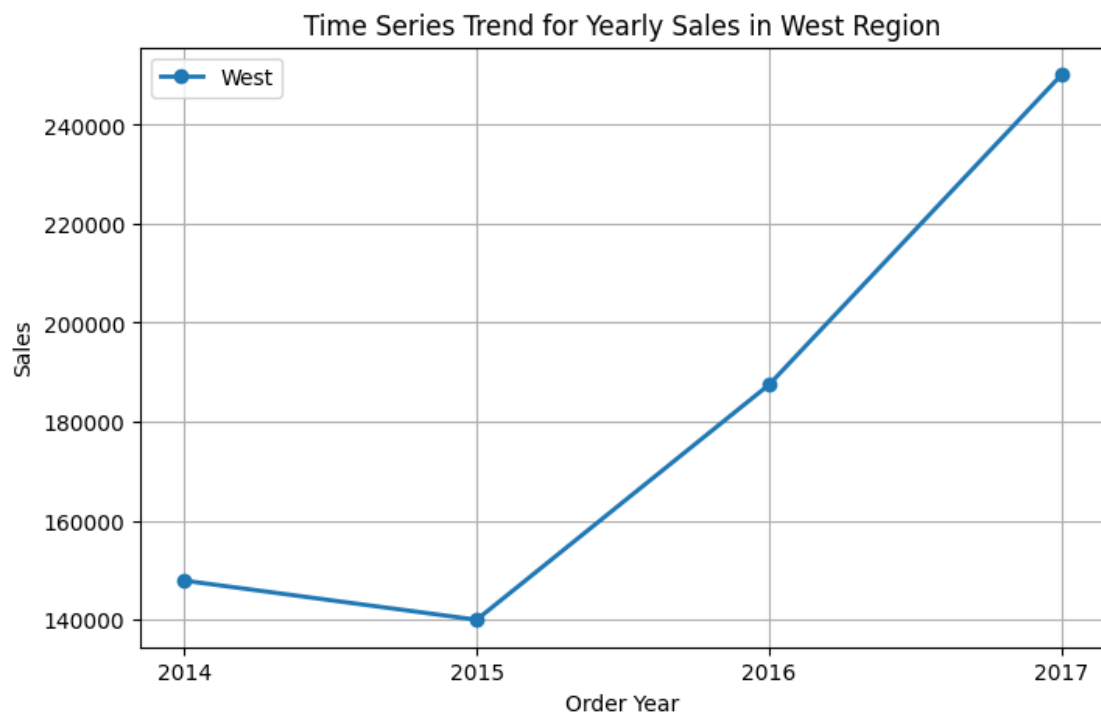
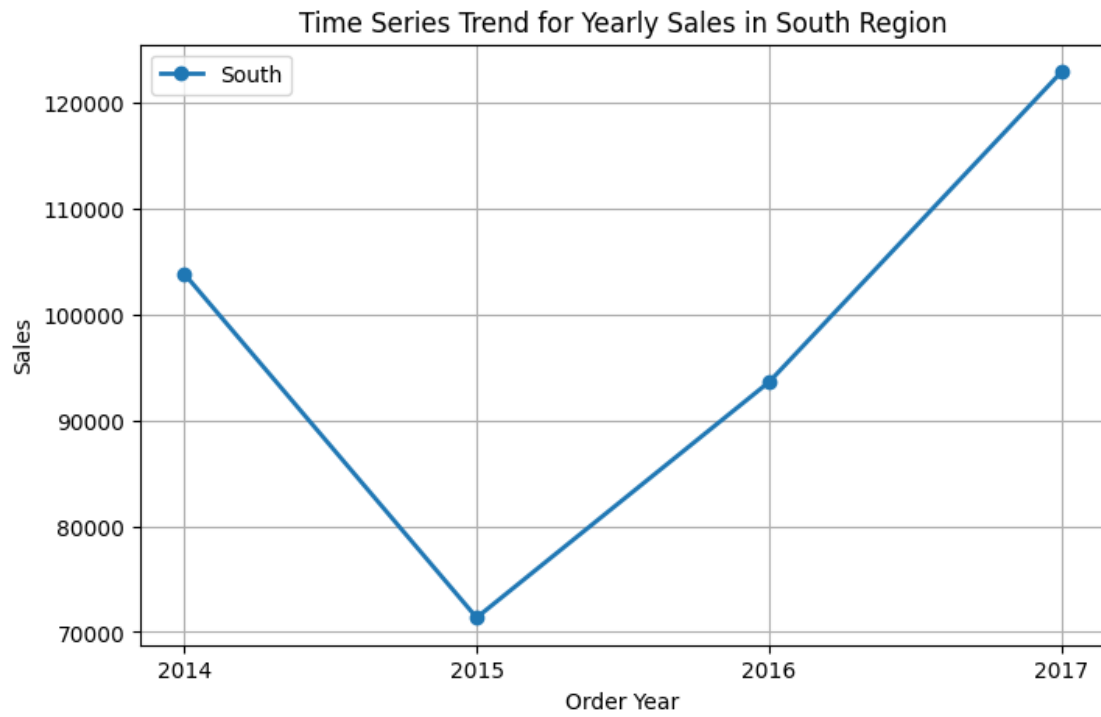




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[8]: regionalSales = df.groupby(['Order Year', 'Region'])['Sales'].sum().
    ↪reset_index()
RegionalSalesTable = regionalSales.pivot(index = 'Order Year', columns = '
    ↪Region', values = 'Sales')
regions = RegionalSalesTable.columns
years = RegionalSalesTable.index
for region in regions:
    plt.figure(figsize = (8, 5))
    plt.plot(years, RegionalSalesTable[region], marker = 'o', label = region,
    ↪linewidth = 2)
    plt.title(f'Time Series Trend for Yearly Sales in {region} Region')
    plt.xlabel("Order Year")
    plt.ylabel("Sales")
    plt.xticks(years)
    plt.grid(True)
    plt.legend()
    plt.show()
```







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[9]: df['Order Year-Month'] = df['Order Date'].dt.to_period('M')
regionalMonthlySales = df.groupby(['Order Year-Month', 'Region'])['Sales'].
    ↪sum().reset_index()
regionalMonthlySales['Order Year-Month'] = regionalMonthlySales['Order_
    ↪Year-Month'].astype(str)
regionalSalesPivot = regionalMonthlySales.pivot(index = 'Order Year-Month',
    ↪columns = 'Region', values = 'Sales')
regions = regionalSalesPivot.columns
months = regionalSalesPivot.index

for region in regions:
    plt.figure(figsize = (12, 6))
    plt.plot(months, regionalSalesPivot[region], marker = 'o', label = region)
    plt.title(f'Time Series Trend for Monthly Sales in {region} Region')
    plt.xlabel('Order Year-Month')
    plt.ylabel('Sales')
    plt.xticks(months, rotation = 45)
    plt.grid(True)
    plt.legend()
    plt.show()
```

